

# Intention to Adopt Digitalized E-Invoicing Systems among Small and Medium Enterprises (SMEs) in China: A PRISMA-Guided Systematic Review

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**Abstract:** This study used a PRISMA guided Systematic Literature Review to synthesize 28 peer-reviewed studies published between 2015 and 2025. The aim was to examine Chinese SMEs' intention to adopt digitalized e-invoicing in China and closely related, invoice-proximate digitalization. As the literature on Chinese SME's e-invoicing strategies was found to be scarce, the scope of the study was expanded. The evidence found clustered within a TOW-UTAUT institutional framework. This precluded that technological benefits (relative advantage, compatibility, trialability) and organizational readiness (top-management support, IT capability, training) increase intention, while complexity, integration burden, and security/privacy risks dampen it. Additionally, individual-level trust and perceived risk shape acceptance of public/platform services, and environmental forces, standards, mandates/clearance regimes, buyer/platform pressure. They often catalyze intention into use. Additionally, it was found that most studies that focus on digitalization or e-invoicing use methodologies like survey/PLS-SEM, qualitative/case work, and quasi-experimental designs. However, recent years show growth in policy-analytics. This links e-invoicing to compliance and reporting outcomes. The review thus proposes an integrative China-specific framework and offers policy and managerial guidance. It pairs phased mandate with investments in service-design, standardization and building SME capabilities. It also underscores leveraging invoice data for finance.

**Keywords:** e-invoicing, SMEs, adoption intention, TOE, UTAUT, Institutional, China

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## 1. Introduction

Across OECD and emerging economies, tax digitalization has moved from pilots to platforms, with e-invoicing a core instrument for real-time transaction visibility and compliance. Beyond revenue assurance, e-invoicing is increasingly framed as an enabling infrastructure for SME digitalization: lowering process frictions, accelerating receivables, and improving data quality for finance and analytics. The diffusion of such systems, however, hinges on organizational readiness, perceived risk and trust, and the surrounding institutional regime. Recent large-scale policy evaluations in Europe show that mandatory e-invoicing can materially reduce VAT fraud and generate net fiscal gains, strengthening the case for broader adoption by countries that rely on invoice-based VAT administration (Heinemann & Stiller, 2025). At the firm level, newer adoption studies indicate that technology–organization–environment (TOE)



factors, particularly compatibility, complexity, relative advantage, and external pressures—remain decisive for uptake of invoice-linked and adjacent digital tools in SMEs (Kumar et al., 2023; Faiz et al., 2024).

In China, the rapid expansion of fully digitalized e-fapiao, alongside wider SME digital transformation agendas, creates a timely opportunity to integrate evidence from e-invoicing and proximate technologies (e.g., cloud accounting, digital finance). While formal e-invoice studies on Chinese SMEs remain limited, closely related domains—e-commerce and e-government services—offer transferable insights on trust, risk, and platform governance in Chinese contexts (Li et al., 2023; Mensah et al., 2023). Synthesizing that evidence base can clarify which technological, organizational, individual, and environmental determinants shape adoption intention, which theories and methods dominate the field, and what barriers/enablers and policy/managerial implications follow for accelerating SME e-invoicing.

This review therefore maps recent peer-reviewed findings (2015–2025), with emphasis on 2022–2025 and uses them to motivate an integrative TOE–UTAUT–institutional framing specific to compliance-heavy settings. The goal is to inform both researchers, by consolidating theoretical and methodological trends, and decision-makers designing China’s e-invoicing rollout and SME support mechanisms. Evidence is drawn from cross-country e-invoicing studies and Chinese SME digitalization research to ensure relevance and transferability. (Heinemann & Stiller, 2025; Kumar et al., 2023; Li et al., 2023; Clemente-Almendros & Durán, 2024; Faiz et al., 2024). Overall the study aims to answer the following research questions (RQs):

- *RQ1*: What technological, organizational, individual, and environmental/regulatory factors shape SMEs’ adoption intention?
- *RQ2*: Which theories and methods are most commonly applied, and with what findings?
- *RQ3*: What barriers/enablers and policy/managerial implications emerge for accelerating e-invoicing adoption?

The review has been divided into 5 sections. The second sections cite some related literature to synthesize evidence from varying contexts, for the research questions of this study. The third section lays down the methodology of this study detailing how the systematic literature review (SLR) is conducted with the help of PRISMA. The following section, section 4 summarizes the findings of the study including the PRISMA flowchart, the descriptive trends of the 28 shortlisted articles and the synthesized evidence to answer the research questions. Section 5 entails a discussion on the main findings of the study suggesting an integrative framework for China while also formulating policy implications for SMEs across the nations. Lastly, section 6 concludes the review by reiterating the findings and also underscoring limitations and future research directions for the same.

## 2. Literature Review

### 2.1 Theoretical anchors and their evolution

Recent e-invoicing work extends classic TOE and diffusion perspectives by testing invoice-specific antecedents, compatibility, complexity, relative advantage, and trialability, alongside organizational and environmental forces (Kumar et al., 2023). In an emerging-economy context, the study finds that compatibility and relative advantage raise adoption, complexity dampens it, and regulatory pressure remains a strong external driver, while trading-partner pressure is often weaker than assumed, suggesting policy and platform design can dominate supply-chain nudges.

Parallel streams integrate UTAUT constructs (performance/effort expectancy, facilitating conditions, social influence) with TOE, especially for SME e-commerce, which is technologically adjacent to invoice platforms. In China, Mensah et al. (2023) combine TOE+UTAUT and show that perceived usefulness/effort and supportive conditions, together with organizational readiness, shape SMEs’ behavioral intention to adopt platform-based services.

A third stream draws on institutional theory and public governance. Large quasi-experimental studies demonstrate that mandatory e-invoicing curbs fraud and raises VAT revenues: evidence consistent with coercive pressure translating into actual usage and downstream behavioral change (Heinemann & Stiller, 2025). The institutional lens thus helps explain why intention-to-use models under-predict adoption in compliance-intensive regimes; once standards and penalties are credible and the state provides reliable infrastructure, environmental pressure can be decisive.

Finally, newer SME digitalization studies broaden the explanatory set with risk/trust and capability perspectives. In e-government contexts, citizens’ use of digital services raises trust in government via better

evaluations of service performance: an effect moderated by perceptions of effectiveness and fairness (Li et al., 2023). While not invoice-specific, the mechanism is directly relevant for tax portals and clearance interfaces where trust in public platforms conditions usage and satisfaction.

## *2.2 Determinants of adoption intention*

**Technological factors:** Across recent studies, compatibility with existing systems (ERP/accounting), perceived relative advantage (speed, accuracy, analytics), and trialability consistently foster adoption, whereas complexity and integration burden deter it (Kumar et al., 2023). Broader SME digitalization evidence indicates that technology readiness, cybersecurity posture, and data-sharing standards also matter and can be shaped by policy and vendor ecosystems (Faiz et al., 2024; Clemente-Almendros & Durán, 2024).

**Organizational factors:** Top-management support, IT capability, and resource slack remain robust predictors in surveys and mixed-method designs (Kumar et al., 2023). In accounting/finance settings, SME studies show that progressing toward digital financial accounting is driven by managerial support and perceived performance benefits, signaling readiness for invoice-centric workflows (Gao et al., 2024). Systems-oriented research adds that digital culture and continuous digital drive interact with adoption to improve innovation performance, implying complementary investments beyond the invoice module (Wang et al., 2025).

**Individual factors:** UTAUT variables (performance/effort expectancy) and trust/risk perceptions influence intention and willingness to transact on public or platform systems; in Chinese settings, digital service usage itself can reinforce trust, suggesting feedback loops once onboarding succeeds (Li et al., 2023). For Chinese SMEs on commercial platforms, perceived usefulness/effort, management support, and employee competence jointly raise intention, mirroring e-invoice belief structures (Mensah et al., 2023).

**Environmental/regulatory factors:** Evidence from Italy shows that mandatory e-invoicing reduced cross-border VAT fraud by an estimated €2.2–€2.6 billion in 2019 through real-time monitoring—an externality that strengthens the business case for adoption when compliance benefits are coupled with service reliability (Heinemann & Stiller, 2025). For SMEs more broadly, external pressures—competition, buyer expectations, and policy incentives: feature as significant TOE drivers in multi-country studies (Faiz et al., 2024; Clemente-Almendros & Durán, 2024).

## *2.3 Methods and evidence trends*

Methodologically, survey/PLS-SEM remains prevalent in firm-level studies of adoption intention (Kumar et al., 2023; Faiz et al., 2024). At the system level, quasi-experiments (e.g., difference-in-differences) increasingly evaluate policy shocks and platform introductions (Heinemann & Stiller, 2025). Mixed designs, combining structural models with qualitative cases or econometric identification, are gaining ground to link belief-based intention with observable outcomes (e.g., fraud reduction, process time, financeability), a linkage especially salient for e-invoicing in compliance-heavy settings.

## *2.4 Synthesis*

Pulling these threads together, the most defensible view for Chinese SMEs is an integrated TOE–UTAUT–institutional approach: (i) technological fit and perceived advantage overcome complexity; (ii) organizational leadership and capability make adoption feasible; (iii) individual beliefs are conditioned by trust/risk in public platforms; and (iv) credible standards, mandates, and incentives tilt intention into actual use. The recent literature also suggests that adoption is more likely to be durable when invoice platforms are embedded in broader digital finance and accounting upgrades, which magnify benefits and reduce switching costs (Gao et al., 2024; Wang et al., 2025).

# **3. Methodology**

## *3.1 Review Design and Scope*

This study applies a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to identify, screen, and synthesize peer-reviewed evidence on SMEs' e-invoicing adoption in China, and close cognates (e.g., e-invoice within digitalization, tax digitalization, blockchain e-invoice). Two bibliographic sources were searched: ScienceDirect and Google Scholar. The study operationalized the three research questions (RQ1 determinants, RQ2 theories/methods, RQ3 barriers/enablers & implications) into explicit search strings, then executed a four-stage PRISMA flow: identification → screening (title/abstract) → eligibility (full text) → inclusion.

### **Inclusion/Exclusion Criteria**

- Years: 2015–2025 (inclusive).
- Language: English only.
- Publication type: Peer-reviewed journal articles (Google Scholar hits that were books, book sections, theses/dissertations, conference papers, reports were excluded).
- Topical fit: E-invoicing or directly adjacent digitalization phenomena that speak to SMEs in China and/or to adoption antecedents, theories, methods, barriers/enablers, or policy/managerial implications relevant to e-invoicing.
- Access: For ScienceDirect, “Research Articles” within Open Access and archives were considered; for Google Scholar, the study retained items with “e-invoice” as an exact phrase and the terms China and SME anywhere in the record.

Duplicates were removed within each database and across databases prior to full-text eligibility.

### 3.2 Databases, Filters and Search Strings

#### 3.2.1 Science Direct

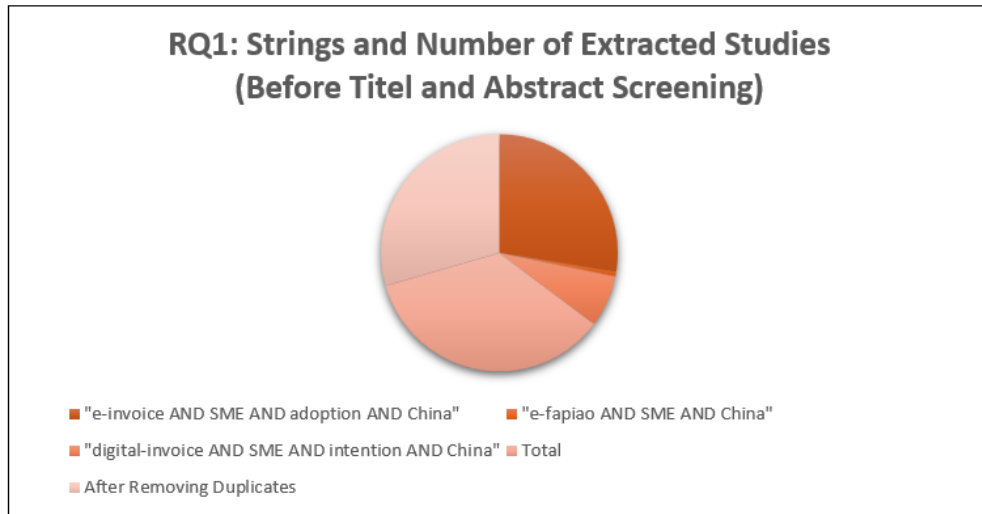
**Filters:** Year 2015–2025; Article type = Research Articles; Access = Open Access and Archives; English only.

Search strings were grouped by RQs as shown in Table 1:

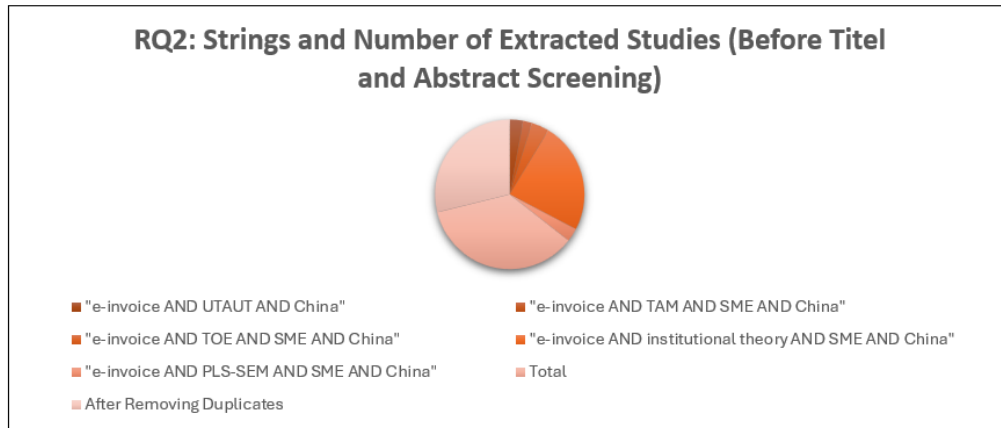
**Table 1: ScienceDirect Search Strings and Number of Articles Extracted**

| <b>ScienceDirect</b>                                   |            |
|--------------------------------------------------------|------------|
| <b>RQ1</b>                                             |            |
| "e-invoice AND SME AND adoption AND China"             | 43         |
| "e-fapiao AND SME AND China"                           | 1          |
| "Digital-invoice AND SME AND intention AND China"      | 11         |
| Total                                                  | 55         |
| <i>After Removing Duplicates</i>                       | 46         |
| <b>RQ2</b>                                             |            |
| "e-invoice AND UTAUT AND China"                        | 3          |
| "e-invoice AND TAM AND SME AND China"                  | 2          |
| "e-invoice AND TOE AND SME AND China"                  | 4          |
| "e-invoice AND institutional theory AND SME AND China" | 25         |
| "e-invoice AND PLS-SEM AND SME AND China"              | 3          |
| Total                                                  | 37         |
| <i>After Removing Duplicates</i>                       | 30         |
| <b>RQ3</b>                                             |            |
| "e-invoice AND barriers and SME and China"             | 32         |
| <i>After Removing Duplicates</i>                       | 31         |
| <b>Total From ScienceDirect</b>                        | <b>107</b> |

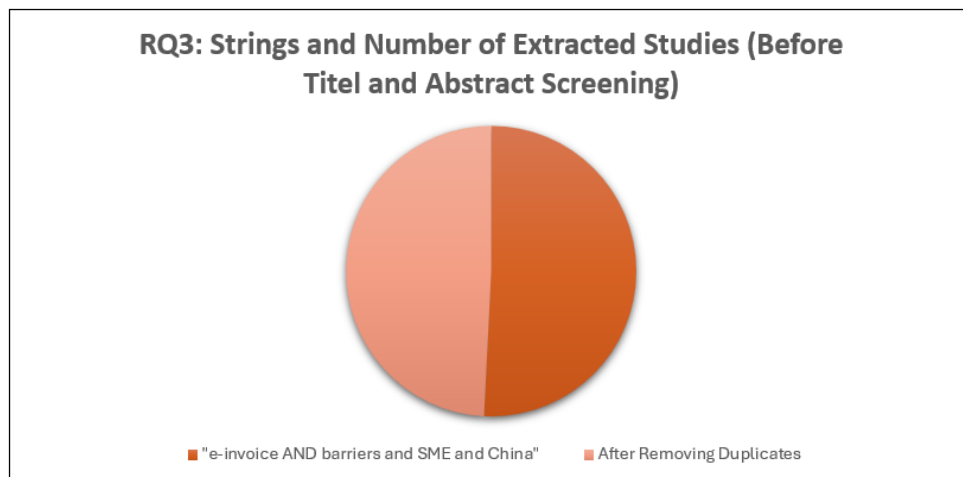
Figure 1 shows the number of studies extracted across each RQ string.



*Panel a: RQ 1*



*Panel b: RQ 2*



*Panel c: RQ 3*

**Figure 1: ScienceDirect Distribution of Studies Across RQs**

### 3.2.2 Google Scholar

**Filters:** Year 2015–2025; English only.

**Inclusion cues:** articles containing e-invoice, China, and SME (the word “e-invoice” was required as an exact phrase).

**Exclusions:** books, book sections, conference papers, reports, theses.

Table 2 captures the Google Scholar figures in detail.

*Table 2: Google Scholar Search Strings and Number of Articles Extracted*

| Google Scholar                                                             |            |
|----------------------------------------------------------------------------|------------|
| "e-invoice adoption across Chinese SMEs"                                   | 162        |
| After Removing Duplicates                                                  | 159        |
| After Removing Books, Book Sections, Conference Papers, Reports and Thesis | 132        |
| <b>After Removing Non-English Articles</b>                                 | <b>125</b> |

### 3.3 Eligibility Criteria (PICOS-Style)

**Population (P):** Primary focus on SMEs; studies were eligible across varied country and sector contexts due to the limited volume of China-only evidence. Preference was given to China or China-relevant settings, but non-China SME studies were included when constructs, institutional conditions, or policy mechanisms were transferable to Chinese SMEs (e.g., VAT e-invoice/clearance regimes, platform standards, SME digital readiness). Multi-country analyses with SME subgroups were eligible.

**Intervention/Exposure (I):** Given the scarcity of e-invoicing-only studies, the intervention was defined as digitalized invoicing and closely related SME digitalization that directly touches the invoice workflow or validly proxies willingness to adopt e-invoicing (e.g., ERP/cloud accounting, e-tax/clearance, blockchain e-invoice or receivables tokenization, supply-chain finance using invoice data, open-banking data access for working-capital). Broader digitalization studies were retained when adoption constructs and organizational/technological antecedents are the same as, or strongly predictive of, e-invoicing adoption (i.e., TOE/UTAUT determinants, security/privacy, interoperability, top-management support, training, institutional pressure). Pure e-billing or generic e-payment papers without invoice specificity were excluded.

**Comparators (C):** Not required. Where present, acceptable comparators included pre–post policy phases (e.g., VAT e-invoice mandates), adopters vs. non-adopters, or alternative digital configurations that affect invoicing (e.g., ERP with vs. without e-invoice module).

#### **Outcomes (O)**

- **Primary:** Adoption intention/decision and antecedents mapped to Technological/Organizational/Individual/Environmental domains (e.g., relative advantage, compatibility/complexity, security/privacy, top-management support, IT capability, trust/risk, institutional pressure).
- **Secondary:** Barriers/enablers, and policy/managerial implications; objective outcomes where available (e.g., compliance, reporting quality, processing time, liquidity/trade-credit effects) as impacts linked to digitalized invoicing or proximate digitalization.

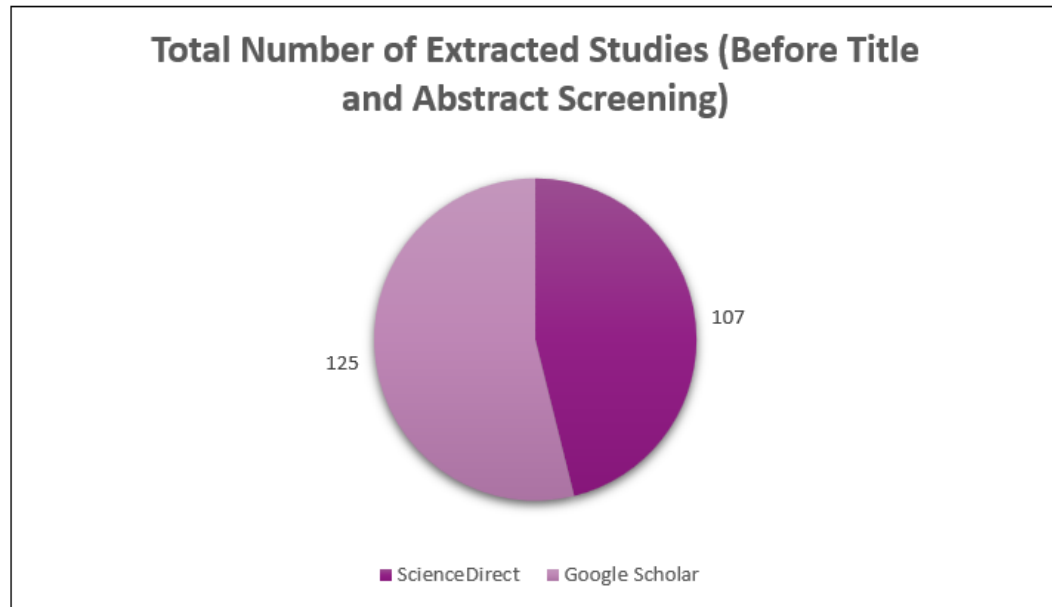
**Study types (S):** Empirical peer-reviewed journal articles and high-quality conference papers; mixed methods, quasi-experimental, survey/PLS-SEM, case/interpretive, and design-science studies were all eligible. Editorials, notes, theses/dissertations, books/book sections, and non-English outputs were excluded.

**Rationale for broad inclusion:** Because China-specific e-invoicing SME studies are scarce, the review adopts a domain-proximate inclusion strategy: SME digitalization adoption is treated as a credible proxy for e-invoicing readiness when it involves the same organizational capabilities, technological risks, and institutional pressures that govern e-invoice uptake (e.g., integration with ERP/finance, data standards, trust/security, regulatory compliance).

This preserves external validity for Chinese SMEs while ensuring adequate empirical coverage for the research questions.

### 3.4 Screening and Selection

**Identification.** From ScienceDirect The study identified 107 unique records after within-database deduplication. From Google Scholar, the pre-screen pool (after format/language exclusions) contributed 125 records to identification. The distribution has been shown in Figure 2.

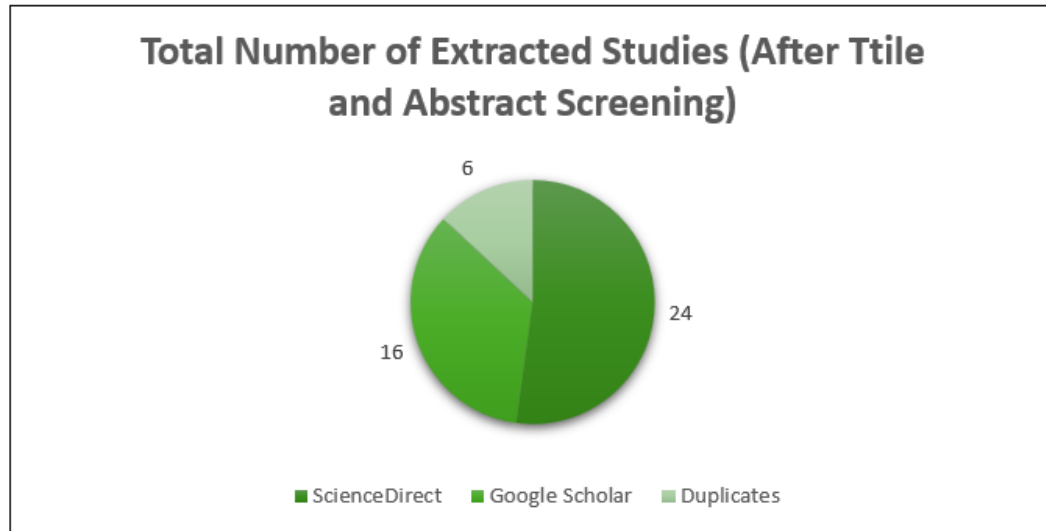


**Figure 2: Distribution across databases before Title & Abstract Screening**

**Screening (Title & Abstract):** Records were screened against the inclusion criteria and mapped to RQs. The study retained studies that (i) addressed SMEs and China (or were directly transferable to Chinese SMEs), and (ii) spoke to at least one RQ (determinants; theories/methods; barriers/enablers & implications). After title/abstract screening:

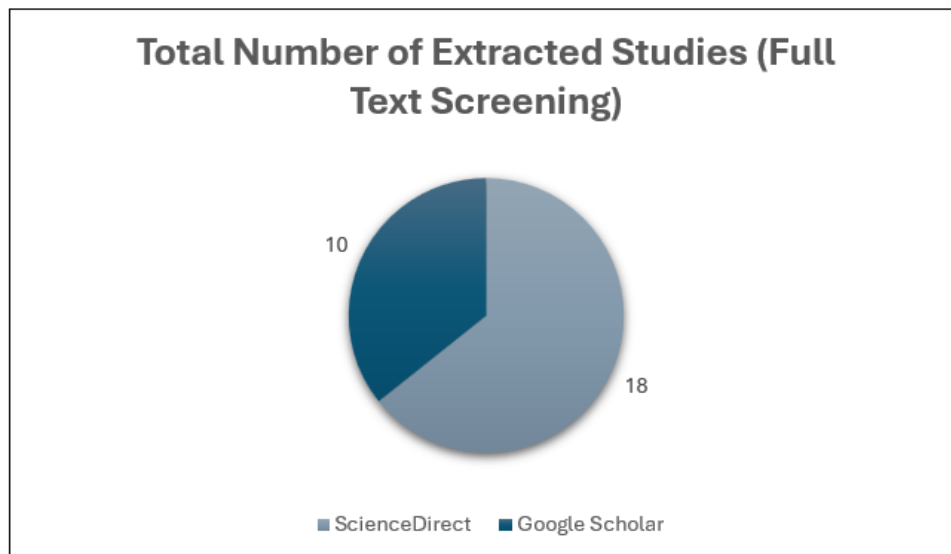
- ScienceDirect: 24 studies passed,
- Google Scholar: 16 studies passed,
- Duplicates across sources: 6 were flagged as they occurred across different RQs and databases. Only one copy of each study was retained.

Figure 3 graphically shows the distribution.



**Figure 3: Distribution across databases before Title & Abstract Screening**

Eligibility (Full text): Full texts were retrieved for all screened-in studies. Eligibility checks assessed explicit relevance to e-invoicing or to tightly coupled digitalization constructs that inform e-invoicing adoption in Chinese SMEs (e.g., blockchain e-invoice, VAT clearance, supply-chain finance using e-invoices). At this stage, only one overlapping article remained common to both sources. Additionally, studies such as Sossa et al. (2024) and Hmoud et al. (2025) were rejected due to irrelevance whereas Barbieri et al. (2023) was excluded as a English translated version of the file could not be extracted. Final distribution of 28 shortlisted articles across databases is shown in Figure 4.



**Figure 4: Final 28 studies distributed across databases**

Inclusion. The final set comprised:

- ScienceDirect: 18
- Google Scholar: 10
- Total included: 28 studies.

### 3.5 Synthesis Approach

For each included study, the following standardized fields were extracted to answer the three RQs: (i) study scope/context, (ii) theory/model, (iii) methods/data, (iv) determinants and effects with directions/significance, and (v) barriers/enablers and policy/managerial implications. Where applicable, The study captured constructs under TOE/UTAUT/Institutional/DOI families, measurement scales, analytical technique (e.g., PLS-SEM, DiD, case/interpretive, design-science), and outcome variables (e.g., behavioral intention, usage, compliance, reporting quality). Title/abstract screening was performed systematically against the inclusion criteria; full-text eligibility re-checked context (Chinese SMEs or transferability), construct coverage (determinants/theory/methods/barriers), and publication type.

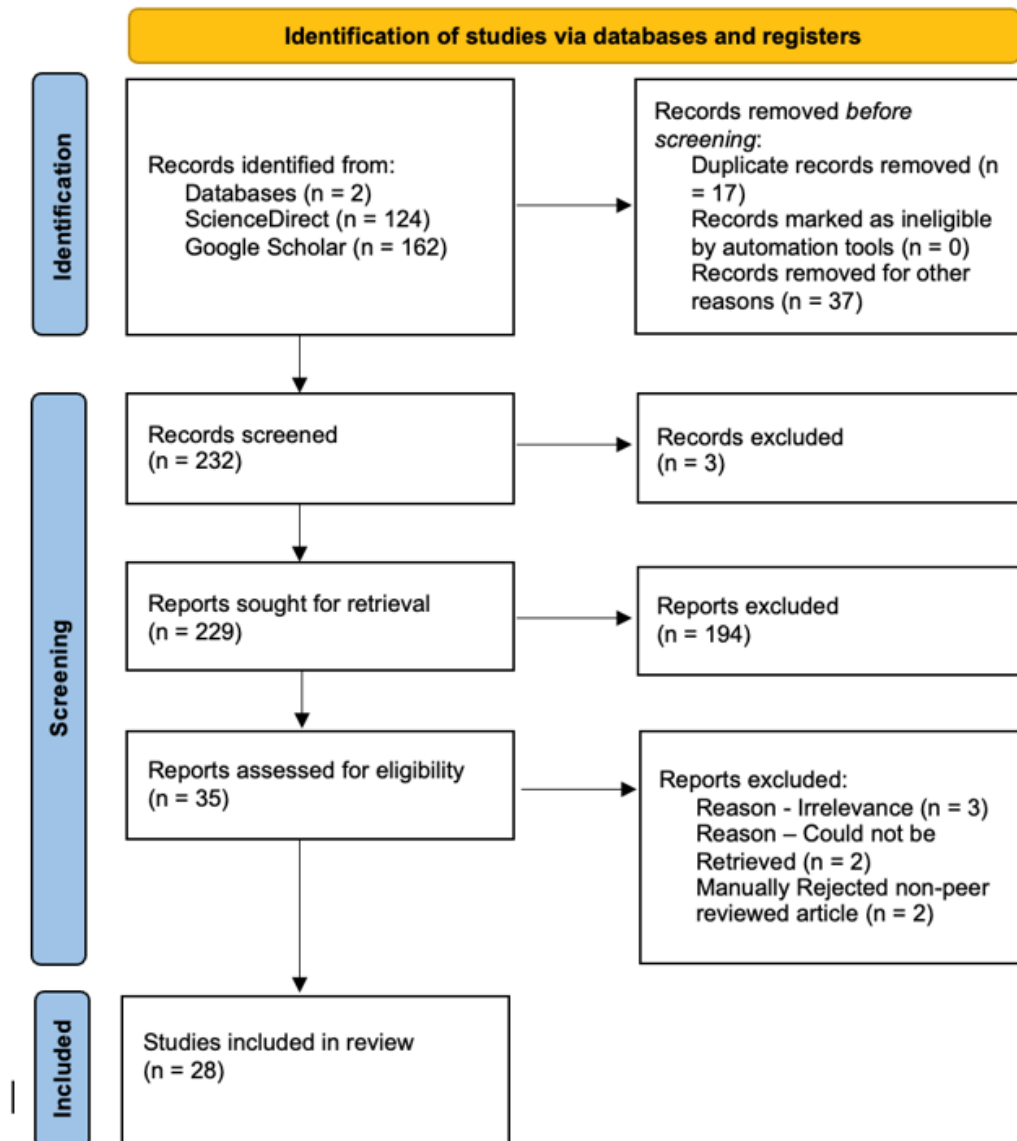
*Note: Zotero and Excel were the two-software used for the entire SLR. Zotero extracted bib texts from the databases whereas manual screening was conducted across excel.*

## 4. Findings

### 4.1 PRISMA Flow

The PRISMA Flowchart is given below in Figure 5.

**Figure 5: PRISMA Flowchart**



## 4.2 Descriptive Mapping

- Publications cluster in 2022–2025, with peaks in 2023 and 2025 (7 each) (see Figure 6), indicating a recent surge of evidence as e-invoicing and adjacent digitalization matured.
- Sparse early output (2015–2020) reflects limited empirical work specific to e-invoicing/SMEs before broader national rollouts and platform reforms.
- The upward trend aligns with rising interest in CTC/clearance regimes, blockchain e-invoice pilots, and SME digital-finance rails.
- **Figure 6: Year-wise Trend in Publications**
- TOE dominates, confirming emphasis on technological fit, organizational readiness, and environmental pressure for SMEs.
- DOI/IDT and Trust/Risk are frequent extensions, capturing perceived usefulness/compatibility and risk/trust pathways that shape intention.
- Institutional and Information-asymmetry/Principal–Agent lenses appear where mandates, governance, and data integrity are central.
- Single-study lenses (e.g., AMO, Stakeholder, Public Value, RBV, TTF, Force Field, Sensemaking) add context-specific nuance (capability building, actor salience, public-sector value).
- Designs split between Survey/PLS-SEM and Case/Qualitative, reflecting a mix of theory testing (belief models) and process/implementation insights.
- Econometric strategies (Regression with Fixed Effects, IV, DiD) support causal inference in policy or platform settings; GMM and Threshold appear in macro/finance panels.
- Design-science and Thematic/Content analyses address system architectures and barrier mapping; Bibliometric work charts the field’s evolution.
- The distribution indicates triangulation across methods—useful for linking intention models to outcomes such as compliance, reporting quality, and financing access.

See Table 3 below for the above counts across shortlisted studies.

**Table 3: Count by Theory and Method**

| Theory                                        | Count | Method               | Count |
|-----------------------------------------------|-------|----------------------|-------|
| TOE                                           | 4     | Survey               | 7     |
| DOI/IDT                                       | 3     | Case/Qual            | 7     |
| Trust/Risk                                    | 3     | PLS-SEM              | 5     |
| Institutional                                 | 2     | Regression           | 5     |
| Information Asymmetry (incl. Principal–Agent) | 2     | Fixed Effects        | 5     |
| Public Value                                  | 1     | IV                   | 4     |
| Stakeholder / TSIS                            | 1     | Mediation            | 3     |
| RBV                                           | 1     | Thematic/Content     | 3     |
| UTAUT                                         | 1     | Design-science       | 3     |
| TAM                                           | 1     | DiD                  | 2     |
| TTF                                           | 1     | CB-SEM               | 2     |
| Force Field                                   | 1     | GMM                  | 1     |
| Sensemaking                                   | 1     | Threshold regression | 1     |
| AMO                                           | 1     | Bibliometric         | 1     |

*Note: Some studies use more than one theory and method*

### 4.3 Thematic Analysis of Determinants

Across the corpus (see Appendix Table 1), determinants of SMEs' adoption intentions cluster consistently within the Technology–Organization–Environment (TOE) lens, with complementary individual- and governance-level moderators. Perceived relative advantage, process efficiency, data quality, and compliance benefits feature prominently as technological drivers of intention. In an e-invoicing context, survey evidence shows usefulness and process gains dominate benefit appraisals, while complexity and integration risk deter adoption (Tiwari et al., 2023). Quasi-experimental and administrative studies add that when digital tax controls reduce evasion opportunities and simplify filing, adoption/compliance improves, strengthening intention–use pathways (Bellon et al., 2022; Liao et al., 2024). From a broader digitalization angle, platform externalities and data-driven service bundles can act as an “external driving force,” nudging firms toward complementary digital innovations—conditions highly relevant to e-invoice ecosystems (Zhao et al., 2025).

Organizational readiness, leadership commitment, and digital maturity repeatedly surface as strong positive predictors, while skill gaps and change resistance depress intentions. Syntheses of SME technology adoption emphasize top-management support, technology readiness, and competitive pressure as robust enablers (Nautwima et al., 2025). Multi-country and sectoral evidence link digital maturity with greater openness to process innovations, creating a fertile context for e-invoicing (Tutak & Brodny, 2022). Qualitative and case-based work further shows that staged capability-building and workforce empowerment (ability–motivation–opportunity) help translate intention into sustained use of digital tools embedded in day-to-day workflows—e.g., routing invoices via enterprise systems (Zhen & Ding, 2024).

Environmental and regulatory pressures strongly condition intentions, particularly where governments introduce continuous transaction controls (CTC), clearance models, or real-time reporting. Evidence from public-sector/business-to-government interfaces indicates that standardized data flows and institutionalized information sharing materially lower uncertainty and administrative burden for firms willing to adopt (Rukanova et al., 2023). Latin American best-practice frameworks highlight how service design (guidance, pre-filled returns, user support) and maturity-model sequencing improve taxpayer experience and uptake of e-services such as e-invoicing (Reyes-Tagle et al., 2023). Studies of Asia's e-government service channels add a cautionary note: perceived risk and “algorithm aversion” may erode willingness to adopt purely automated front-ends unless trust is actively managed (Song et al., 2025).

At the individual level, trust (in providers and the state), perceived risk, effort expectancy, and task–technology fit emerge as recurrent micro-determinants. An integrated UTAUT/TTF model shows facilitating conditions, social influence, and task interdependence strengthen acceptance, while complexity and privacy concerns weaken it—patterns that map cleanly onto e-invoice roll-outs in SME settings (Awa & Ukoha, 2020). Bibliometric mapping of the e-invoicing literature corroborates the salience of coercive/regulatory pressure, integration costs, and resistance as central themes in SME adoption (Olaleye et al., 2023).

### 4.4 Evidence on Mechanisms

Regarding theories and methods, TOE is the modal framework, frequently extended with DOI/IDT, UTAUT (2), trust, and risk constructs to address intention formation and use. An SME cloud-adoption thesis operationalizes an extended TOE where intention mediates between TOE antecedents and actual use—an architecture directly portable to e-invoice contexts (Asiaei, 2021). Systematic reviews of e-government/cloud adoptions emphasize compatibility, relative advantage, complexity, top-management support, and security as repeatedly validated constructs under TOE/IDT (Alsalmami, 2015). Complementing survey-PLS designs (e.g., Tiwari et al., 2023), mixed-method and case approaches trace capability development across transformation stages (Zhen & Ding, 2024) and map barrier causalities using fuzzy-AHP/DEMATEL for SME blockchain-enabled finance (Kaur et al., 2022).

### 4.5 Measurement and Methodological Insights

Sector-adjacent evidence reinforces the mechanism logic. Work on blockchain-enabled accounting and supply-chain finance argues that distributed ledgers improve data integrity, traceability, and multi-party trust—capabilities that lower perceived risk and integration frictions around e-invoicing (Giang & Tam, 2023; Zhang et al., 2021; Guo et al., 2022). Studies in maritime supply chains similarly connect governance and interoperability design choices to adoption outcomes (Balci & Surucu-Balci, 2021). At the macro edge, digital finance studies show how data access regimes and fintech infrastructure shape firm behavior and resource allocation—mechanisms congruent with incentive

and capability channels behind e-invoicing uptake (Guo & Wang, 2025; Wu & Liao, 2025; Hmoud et al., 2025; Dafri & Al-Qaruty, 2023).

Barriers and enablers consolidate into five practical clusters. First, capability and change-management gaps—digital skills shortfalls, employee resistance, and weak process ownership—regularly stall implementations; targeted training, staged rollouts, and visible leadership commitment mitigate these frictions (Tiwari et al., 2023; Tutak & Brodny, 2022; Zhen & Ding, 2024). Second, integration and data-governance risks (security, privacy, interoperability) depress intention unless technical standards and vendor ecosystems reduce uncertainty; prioritizing “cause-group” barriers such as knowledge and organizational constraints yields leverage (Kaur et al., 2022; Alsalmami, 2015). Third, the cost–benefit equation matters: SMEs respond to tangible savings and working-capital visibility (Awan, 2023) and to user-centric service design that cuts administrative load (Reyes-Tagle et al., 2023). Fourth, external pressure and ecosystem readiness (partners, platforms, and real-time tax systems) amplify perceived inevitability and reduce coordination costs (Rukanova et al., 2023; Zhao et al., 2025). Fifth, trust in digital channels must be designed and signaled; when perceived risk rises—e.g., chatbot front-ends—adoption intention suffers unless mitigated by transparency and human-in-the-loop pathways (Song et al., 2025; Awa & Ukoha, 2020).

Methodologically, most quantitative studies rely on survey-based PLS-SEM under TOE/DOI/UTAUT families (Tiwari et al., 2023; Asiaei, 2021), with growing use of causal-mapping and prioritization tools for barrier management (Kaur et al., 2022). Policy-analytics and quasi-experimental approaches illuminate system-level effects of e-invoicing mandates and digital reporting on compliance and reporting quality (Bellon et al., 2022; Liao et al., 2024). Adjacent literatures on blockchain/accounting and fintech ecosystems help explain how trust architecture, interoperability, and data-access regimes shape SME perceptions and adoption decisions—insights especially pertinent to China’s platform-rich environment (Giang & Tam, 2023; Guo et al., 2022; Zhao et al., 2025).

In sum, SMEs’ adoption intentions toward e-invoicing are most sensitive to (i) visible, near-term benefits; (ii) organisational readiness and leadership sponsorship; (iii) credible, simple, and secure integration pathways; and (iv) trustworthy, service-oriented public digital infrastructures. Designing with these levers—supported by targeted training and standardization—consistently strengthens intention and accelerates transition from pilots to embedded use (Tiwari et al., 2023; Nautwima et al., 2025; Reyes-Tagle et al., 2023; Awa & Ukoha, 2020; Song et al., 2025).

## 5. Discussion

### 5.1 Integrative Framework

The study proposes a China-specific TOE–UTAUT–Institutional framework for SME e-invoicing intention. *Technological (T)*: perceived relative advantage (cycle time, accuracy, cash-flow visibility), compatibility with ERP/procurement, trialability, and security/interoperability risk. *Organizational (O)*: top-management support, IT capability/readiness, process governance, training and change management. Individual (UTAUT): performance and effort expectancy, social influence, facilitating conditions, trust in the e-service, and perceived risk; plus trust-transfer from government to the e-invoicing service. Environmental/Institutional (E): coercive pressure (CTC/clearance mandates, auditability), normative/mimetic pressure (buyers, peers), standards and accredited service providers, and platform quality (free SME portal, helpdesk, APIs). The study explicitly adds public digital-infrastructure quality (identity, payments, data governance) and data portability/financeability (ability to use e-invoice data for credit) as China-salient environmental enablers.

*Paths*: T and O shape UTAUT beliefs and perceived risk/trust, which drive intention. Institutional forces act both directly (mandates → use) and indirectly (standards/platforms → lower risk, higher FC). Trust-transfer reduces risk, strengthening the beliefs → intention path. Moderators: firm size/leverage, sector risk, buyer power, and regional digital maturity. Outcomes: actual use, compliance, process efficiency, reporting quality, and improved financing.

### 5.2 Theoretical Implications

First, adoption theories in compliance-heavy contexts should be dual-path: voluntary belief formation (UTAUT within TOE) and institutional conversion (mandates) that can bypass intention. Second, trust-transfer and risk deserve core status in UTAUT extensions for public digital services; intention depends not only on PE/EE/SI/FC but on perceived state competence and transparent safeguards. Third, the “E” in TOE must expand beyond generic pressure to include platform governance and public digital-infrastructure quality (standards, portals, identity, data rights). Fourth, viewing e-invoicing as an inter-organizational infrastructure highlights network effects and the role of anchor buyers and accredited providers—bridging TOE with IOIS and ecosystem theory. Finally, research designs should

marry PLS-SEM belief models with quasi-experimental and objective outcome tests (compliance, reporting quality, liquidity), and test moderators (size, leverage, regional maturity, mandate phase).

### *5.3 Policy Implications*

Policy implications are clear. Governments seeking to accelerate e-invoicing among SMEs should pair mandate-and-monitor approaches with service-design investments: one-stop portals, pre-populated forms, responsive helpdesks, and phased CTC regimes calibrated to SME capabilities (Bellon et al., 2022; Reyes-Tagle et al., 2023; Rukanova et al., 2023). Regulatory clarity on data protection and standardized schemas lowers compliance ambiguity and the perceived risk of integration (Kaur et al., 2022; Alsalmami, 2015). Targeted financial and advisory support—voucher schemes for software/connectivity, vendor accreditation, and SME-focused training—help relax resource constraints that otherwise suppress intention (Nautwima et al., 2025; Tutak & Brodny, 2022). Finally, policy can leverage complementarities with broader digital finance: data-access arrangements, trusted third-party platforms, and fintech partnerships that translate invoicing data into credit and cash-flow advantages for adopters (Guo & Wang, 2025; Wu & Liao, 2025; Giang & Tam, 2023).

### *5.4 Managerial Implications*

For managers, the studies converge on a sequenced playbook: (1) establish a credible business case emphasizing compliance simplification, cash-flow visibility, and process cycle-time gains; (2) de-risk integration via standards-based solutions and accredited vendors; (3) build people capabilities and trust through training, pilot-first deployments, and transparent data-governance; (4) embed e-invoicing into core workflows (ERP, procurement), using automation to lock in use; and (5) exploit spillovers (analytics, financing) to sustain momentum (Tiwarei et al., 2023; Awan, 2023; Balci & Surucu-Balci, 2021; Rivera et al., 2024). Evidence from jurisdictions with advanced CTC regimes shows that when these managerial moves align with supportive public digital services, adoption intention more reliably tips into persistent use (Bellon et al., 2022; Liao et al., 2024).

## **6. Conclusion**

This review synthesizes scattered evidence on Chinese SMEs' e-invoicing and closely related digitalization into one, usable narrative. For RQ1 (determinants), adoption intention is most robust where firms are able to see unambiguous process benefits, observe appropriate fit with current ERP/accounting processes, and have organizational readiness, leadership support, IT capacity, and education. Intention is reduced with complexity, integration price, and security/privacy fears. Public and platform trust, based on open data-governance, reduces perceived risk; institutional drivers—standards, phased clearance/CTC requirements, and buyer/platform coercion, often turn intent into usage. For RQ2 (theories and approaches), TOE is the foundation, supplemented by DOI/IDT and UTAUT (with risk/trust) and augmented by institutional and information-asymmetry perspectives. Methodologically, case/qualitative and survey/PLS-SEM designs prevail, with quasi-experimental and econometric research increasingly linking e-invoicing to quantifiable outcomes like compliance and reporting quality. For RQ3 (enablers/barriers and implications), barriers focus on capability and change-management gaps, interoperability and data-governance risk, vendor fragmentation, and transition cost; enablers focus on standardization, accredited providers, one-stop SME helpdesks/portals, training/vouchers, and data-access frameworks enabling invoice data to release working-capital finance.

Two limitations qualify these findings: China-specific studies of e-invoices are still rare and thus necessitate cautious application of transferable nearby evidence; and heterogeneity of constructs and measures precludes formal meta-analysis. Future studies should give high priority to China-based causal designs connecting intention to outcome (cycle time, compliance, liquidity), testing moderators like size, leverage, region, and power of buyers, and investigating trust-transfer and risk transparency in tax and platform interfaces. Field tests and design-science testing on standards, onboarding, and financeability of invoice data would further define scalable levers for the acceleration of SME e-invoicing.

## Appendix

*Table 1: Findings*

| STUDY                | SCOPE                                                                                                         | THEORY                                                                                                      | METHODS                                                                                                                     | DETERMINANTS AND EFFECTS                                                                                                                                                                               | BARRIERS/ENABLERS AND IMPLICATIONS                                                                                                                                                                                                                |
|----------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tiwari et al. (2023) | India; firms in manufacturing & services; B2B e-invoicing adoption                                            | TOE (+ DOI lens)                                                                                            | Survey (questionnaire); n=151 valid (25%); 5-point Likert; PLS-SEM for measurement; binary logistic regression for adoption | ↑ Relative advantage, compatibility, trialability, firm size, tech competence, top mgmt support, competitive & regulatory pressure; ↓ Complexity (negative).                                           | Barriers: cost/integration, complexity, fragmented vendors. Enablers: regulatory push, supply-chain alignment, IT capability. Policy: mandates/standards; Managerial: ensure TMS, partner alignment, capability building.                         |
| Bellon et al. (2022) | Peru; national VAT e-invoicing rollout; firms incl. SMEs; compliance outcomes post-mandate                    | Public finance/compliance framing (no single IS theory)                                                     | Quasi-experimental: panel admin tax data; firm & time FE; DiD + IV/LATE; dynamic effects                                    | Mandate (ITT) ↑ reported sales ~7.4%, purchases ~5.5%, VAT liabilities in year 1; stronger for smaller firms; effects grow over time.                                                                  | Barriers: adoption/IT costs, firm exit around mandate. Enablers: free SME portal, mandate. Policy: mandates raise compliance but VAT credits offset revenue; Managerial: lower processing costs, improved integration/access to finance.          |
| Zhao et al. (2025)   | China; private enterprises (multi-industry); digital platform (internet platform) use → commercial innovation | External environment & corporate dynamics; “visible hand” (government) vs “invisible hand” (market) framing | CEPS 2015; n=4,915; Probit / IV-Probit; PSM; KHB mediation; heterogeneity by gov. support & market competition/maturity     | Internet-platform use ↑ commercial innovation; mediated by market feedback (~6.5%) & development impetus (~29.3%); stronger with gov. support/subsidies /policy help and in competitive/mature markets | Enablers: gov. support/standard-setting, competitive markets. Barriers: limited digital readiness (esp. SMEs). Policy: strengthen platform ecosystems, subsidies/training. Managerial: use platforms for market feedback; invest in R&D/training. |

|                        |                                                                                                             |                                                                                         |                                                                                                                                              |                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Liao et al. (2024)     | China; staggered blockchain e-invoice rollout (6/36 regions by 2023); listed firms 2016–2022                | Efficiency-enhancement vs deterrence mechanisms of blockchain (no single IS theory)     | Staggered DiD; firm & time FE; robustness via PSM and entropy balancing; outcomes: accrual quality, earnings informativeness, market effects | Blockchain e-invoice adoption ↑ accrual quality (↓ abs. discretionary accruals; ↓ DD residual volatility) & ↑ earnings response coefficients; ↑ liquidity, ↑ analyst consensus, ↓ cost of equity; effects stronger for complex firms & tech/market-advanced regions; channel: accounting efficiency (not deterrence) | Enablers: government-led standardisation; scale effects. Barriers: partial regional adoption, interoperability/security/privacy, training & infra costs. Policy: expand standardized rollout to realize benefits. Managerial: adopt/integrate blockchain e-invoicing to boost reporting efficiency. |
| Nautwima et al. (2025) | Namibia (Windhoek); SMEs; general digital tech adoption (not e-invoice specific).                           | TOE; tests mediation by entrepreneurship education (not supported).                     | Mixed-methods; survey n=97 SME owners/managers; PLS-SEM (SmartPLS 4) + reflexive thematic analysis; purposive sampling.                      | Positive (+ve) Organizational (managerial support, internal capabilities); + Environmental (external support, competition); –/ns Technological (cost, complexity, incompatibility); mediation by entrepreneurship education ns.                                                                                      | Barriers: high costs, weak infrastructure/electricity, limited ICT skills, institutional gaps; Enablers: external support, leadership backing. Policy: strengthen support programs/infrastructure; tailor entrepreneurship education. Managerial: build capabilities, culture, resources.           |
| Kilay et al. (2022)    | Indonesia; MSMEs; e-payment & e-commerce use → supply-chain performance; digitalisation acceleration focus. | Open innovation framing (solutions orientation); no single adoption theory centerpiece. | Survey n=164 MSMEs; multiple linear regression + descriptive indicator analysis; expert interviews/discussions                               | Positive (+ve) E-payment use; + E-commerce use → higher supply-chain performance (significant). Identifies low-scoring indicators as obstacles.                                                                                                                                                                      | Barriers: low adoption/awareness, capability/resource gaps, connectivity; Enablers: government “Go Digital” push, platform/payment ecosystems. Policy: open-innovation solutions, training, infrastructure. Managerial: adopt e-payments/e-commerce, strengthen governance/skills.                  |

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|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rukanova et al. (2023) | Netherlands customs; international trade case (tire importer, SME) importing from China; voluntary sharing of invoice & Bill-of-Lading via TradeLens (blockchain). | Integrated framework: Public value (Twizeyimana & Andersson, 2019) + Voluntary B2G data sharing (Rukanova et al., 2020) + Blockchain governance (rights/control points). | Interpretive case (Living Lab). Data/workshops + document analysis; matched 1,106 BoLs to 926 ENS and 946 import declarations; manual check of 20 shipments / 62 containers for invoices. | Early access to source BoL/invoice data improves cross-validation for safety/security (ENS/ATO) and import risk assessment; assures reliability via blockchain design (off-chain docs + on-chain hash pointers; private/permissioned; PoA).                                               | Enablers: incentives for voluntary sharing (faster clearance), machine-readable BoL. Barriers: business reluctance, data confidentiality, tool access. Policy/managerial: design incentives; standardize data; integrate declaration systems; leverage blockchain audit trail.                |
| Cornelli et al. (2022) | 79 countries; digital lending (fin/big-tech) as macro digitalisation                                                                                               | Inductive thematic (ecosystem roles)                                                                                                                                     | Qualitative interviews (n≈34); thematic coding                                                                                                                                            | Drivers: transparency/traceability, automation, data sharing; Barriers: low knowledge, infra/reg gaps                                                                                                                                                                                     | Policy: clear regulation, gov lead & R&D. Managerial: collaborate, pair blockchain with IoT, agree standards.                                                                                                                                                                                 |
| Rivera et al. (2024)   | Mexico/Colombia supply chains; blockchain digitalisation                                                                                                           | Macro-institutional determinants                                                                                                                                         | Panel regressions (FE) + System-GMM                                                                                                                                                       | Enablers: GDP pc (concave), ease of business, investor protection, judicial efficiency, capital-market depth; Barriers: stricter banking regs; bank branches dampen fintech                                                                                                               | Policy: calibrate regs; strengthen business/legal environment; develop markets. Managerial: leverage enabling environments; manage risk/compliance.                                                                                                                                           |
| Babina et al. (2025)   | Cross-country & UK evidence on government-led Open Banking (OB): 49 countries tracked; UK microdata on consumers and SMEs (new lending relationships).             | Structural IO/finance model with consumer privacy preferences; policy adoption & innovation/entry framing.                                                               | Cross-country dataset; Cox hazard model for OB policy adoption; panel event-study on fintech VC activity; UK microdata analysis; calibrated structural model.                             | Determinants: consumer trust in data sharing predicts OB adoption; financial sector/institutional variables also used. Effects: OB spurs fintech entry; enables consumers to access advice/credit and SMEs to form new lending ties; welfare gains when used for advice; for credit, more | Enablers: strong data-sharing rights/design, consumer willingness to share data; OB reduces adverse selection and fosters entry/innovation. Barriers/risks: privacy concerns and distributional effects for privacy-conscious/costlier customers; policy needs to balance access and privacy. |

|                               |                                                                                                                                                          |                                                                                                                                                                                                             |                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |                                                                                                                                                          |                                                                                                                                                                                                             |                                                                                                                                                                                            | entry/competition but higher prices for costlier or privacy-conscious users.                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                            |
| Balci and Surucu-Balci (2021) | Maritime SC (containerized international trade): identifies blockchain adoption barriers & maps salient stakeholders.                                    | Stakeholder theory; Theory of Stakeholder Identification & Salience (TSIS); ISM–MICMAC perspective on barrier structure.                                                                                    | Expert interviews to elicit factors; survey of 30 experts; Interpretive Structural Modeling (ISM) + MICMAC; stakeholder mapping/classification.                                            | Key “driving” barriers: lack of government regulations, lack of support from influential stakeholders, lack of knowledge; trust & privacy concerns (linkage), plus resistance, lack of early adopters, and resource needs (dependent). Stakeholders with highest salience: container lines, ports, customs, freight forwarders, major cargo owners. | Implications: enact clear regulations; mobilize support of high-salience actors; build knowledge to reduce mistrust/privacy concerns; promote early adopters and address resource hurdles; keep data-sharing communications open among actors.                                                                             |
| Gui and Wang (2025)           | China; A-share listed firms, 2008–2022; FinTech (AI, blockchain, cloud, big data) + “data elements” → agile financial systems & supply-chain efficiency. | Mechanism model: Agile financial system → supply-chain efficiency, via innovation capability (+) and eased financing constraints (+); heterogeneity by SOE vs non-SOE, firm size; leverage threshold effect | Panel two-way fixed effects; mediation models; threshold regression; 31,834 firm-years; outcome: inventory-turnover-days; key regressor: capital-liquidity; extensive controls/robustness. | Positive agile finance → higher supply-chain efficiency; mediated by innovation & lower financing constraints; stronger for SOEs; size strengthens effect; high leverage dampens gains (threshold)                                                                                                                                                  | Enablers: FinTech tools, data infrastructure, government support. Barriers: high leverage; weak data/IT capability (esp. smaller firms). Policy: expand standardized FinTech/data infrastructure; support SME financing; manage leverage risks. Managerial: invest in digital finance & R&D; optimize working-capital/SCF. |

|                            |                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                                                |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                |
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| Wu and Liao (2025)         | China; firm-level panel 2011–2023; tests whether digital finance awareness improves business credit (trade credit).                               | Framing from information asymmetry, financial intermediation, institutional views; mechanisms: stronger intermediaries, supply-chain power, broader financing channels. | Two-way fixed effects; IV (industry-peer cognition), lag tests, PSM; quadratic term for nonlinearity; rich controls.                                                                           | Positive Digital-finance awareness → higher business credit (significant); inverted-U at high awareness levels; heterogeneous gains (e.g., SOEs; competitive industries).                                    | Enablers: digital literacy, data-driven intermediaries, blockchain/algorithmic SCF, diversified funding. Barriers: low cognition; diminishing returns at very high awareness. Policy: firm-level digital-finance training, standards for data transparency. Managerial: build digital-finance capability, use verifiable data signals to improve trade credit. |
| Guo et al. (2022)          | Supply Chain Finance (SCF) processes (orders, invoices, receivables, BoL) with SMEs; consortium blockchain + IoT to reduce information asymmetry. | Information asymmetry / principal–agent lens; blockchain governance (consortium, PBFT).                                                                                 | Design-science architecture (BC4Regu): technical layers, smart contracts; tokenization of invoices; AML/KYC workflow; theoretical validation via principal–agent model and use-case scenarios. | Expected effects: ↑ transparency & traceability, ↓ double-financing fraud via invoice tokenization, faster verification, lower ops risk/costs; improved asset registration/splitting and process automation. | Enablers: standardised data, shared KYC ledger, IoT data capture, regulator node. Barriers: SME IT capability gaps, information silos, confidentiality concerns, integration costs. Implications: build consortium standards, incent participation, embed KYC/AML on-chain.                                                                                    |
| Tsakalidou (2025)          | Kazakhstan national digital readiness (KZ-DRI) adapted from EU DESI; benchmarks progress and gaps.                                                | Framework development/adaptation of DESI (context-sensitive indicator set & weights; maintains comparability).                                                          | Mixed evidence base: national indicators + enterprise-level data; systematic design (problem → design → implementation → validation).                                                          | Findings: overall readiness near EU average, but strong digital public services vs gaps in digital skills & infrastructure; identifies leverage points for policy.                                           | Enablers: centralized implementation capacity, early institutional prioritization. Barriers: regional disparities, skills gaps, infrastructure limits. Implications: targeted skills & infrastructure investments; calibrated weights/indicators; replicable method for other emerging economies.                                                              |
| Dafri and Al-Qaruty (2023) | Global view of digital financial transformation in crises; emphasis on EMEs vs advanced economies; digital currency,                              | Framed around digital finance for efficient resource allocation and stability during crises; examines FinTech's                                                         | Analytical–descriptive study; purposive sampling of countries (AE/EME/LDC); narrative                                                                                                          | Highlights that digital finance tools/IDs/mobile money enable faster targeting of resources; cryptocurrencies                                                                                                | Enablers: digital IDs, mobile money, partnerships with FinTechs, AI/blockchain for AML-KYC & risk mgmt. Implications: adopt digital tech to                                                                                                                                                                                                                    |

|                         |                                                                                                                                 |                                                                                                                                             |                                                                                                                                                                            |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | AI, blockchain, big data.                                                                                                       | restructuring of value chains.                                                                                                              | synthesis (2020–2022 focus).                                                                                                                                               | reshape financial stability debates.                                                                                                                                                                                                  | improve stability/efficiency; design flexible regulation for crises.                                                                                                                                                                                                                                                                                     |
| Tutak and Brodny (2022) | EU-27 enterprises; compares digital maturity across countries using 8 Industry 4.0 indicators incl. e-invoices                  | Industry 4.0 & open innovation framing; digital maturity lens (no single adoption model)                                                    | Eurostat data; Gini/Lorenz for concentration; WASPAS (entropy weights) for maturity index; k-means clustering into maturity classes                                        | e-invoices show moderate concentration (Gini 0.375); strong co-movement with cloud (corr 0.73). Leaders: Denmark, Malta, Finland (“Expert”). Cluster patterns: some countries lead on robots/cloud/e-invoices; others on AI/big data. | Enablers: advanced cloud/AI/ERP uptake; data security practices. Barriers: uneven capabilities, skills/infrastructure gaps. Implications: target policies by cluster; standardise data (incl. e-invoice formats); invest in skills/infrastructure; use rankings to guide funding & cross-country cooperation.                                            |
| Zhang et al. (2021)     | SCF for SMEs; shows how blockchain can ease SME financing (China context emphasized) via transparent invoices/bills/receivables | Information-asymmetry & multi-agent coordination logic; distributed ledger + consensus + cryptography to build trust (no formal IS model)   | Conceptual/design paper; architecture for SCF platform; discusses tokenisation of invoices, regulator/bank/core-enterprise nodes; visualisation & data-integration modules | Expected effects: ↑ transparency/traceability, ↓ double-financing fraud, faster verification, broader credit spillover to downstream SMEs via tokenised e-bills/invoices; immutable, time-stamped records strengthen auditability     | Enablers: consortium governance, regulator node, shared KYC/AML, interoperable data standards. Barriers: “information islands,” SME data-quality gaps, blockchain storage/query inefficiency, integration costs. Implications: standardise payloads (invoices/bills), incentivise participation, embed KYC/AML on-chain, modular architecture for scale. |
| Olaleye et al. (2023)   | Global e-invoicing research, 1997–2021; 191 papers (WoS + Scopus); trends, authors, keywords, theories.                         | Proposes an integrated theory of e-invoicing; highlights use of DOI/TAM and related IS frameworks; notes many studies lack explicit theory. | Bibliometric analysis (Bibliometrix R): co-citation, coupling, collaboration, co-word; PRISMA for extraction.                                                              | Adoption often driven by mandates/directives; trending tech themes (automation, data mining, blockchain, ML) signal evolving drivers; regional diffusion patterns mapped.                                                             | Enablers: policy mandates, VAT digitisation; Barriers: uneven regional uptake; COVID-19 disrupted implementation timelines. Implications: develop common standards; strengthen theoretical grounding in future work.                                                                                                                                     |

|                    |                                                                                                                                                         |                                                                                                                                            |                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                           |
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| Awan (2023)        | Logistics sector (case illustrations incl. Nigeria); assesses e-invoicing's cost and efficiency outcomes.                                               | Practical transformation lens (no single IS theory stated); focuses on advantages/challenges & mitigation strategies.                      | Qualitative multiple case studies; document analysis; thematic synthesis of benefits/challenges.                                                | Effects: faster invoicing & approvals, higher accuracy, transparency/real-time monitoring, significant cost savings, shorter payment cycles, better cash-flow.                                                                                                                                                                    | Barriers: data-security concerns, employee resistance; Enablers: process automation, e-procurement integration. Implications: training & change-management; adopt secure platforms; invest in connectivity and software to scale benefits.                                                                                                                                |
| Kaur et al. (2022) | Indian SMEs; blockchain in SCF; 25 sub-barriers in 6 categories; 58 experts for identification/ranking; 15 experts for cause-effect analysis.           | Sensemaking; Force Field Theory; Resource-Based View; Information Processing Theory.                                                       | Fuzzy-AHP to prioritise barriers; sensitivity analysis to test robustness; fuzzy-DEMATEL to map cause-effect (experts: 58 → AHP; 15 → DEMATEL). | Priority weights (main): Technology (1st) > Organisation > Security > Knowledge > External > Financial. Top global sub-barriers: SB1 (data privacy), KB1 (lack of blockchain knowledge), TB1 (lack of tech infrastructure), TB6 (lack of infrastructure providers). DEMATEL: Cause group = OB, KB, SB, FB; Effect group = TB, EB. | Managerial: focus on high-priority tech upgrades; target cause-group barriers first. Policy: national blockchain infrastructure; fund R&D and workforce skilling; build SME confidence by addressing privacy, security, interoperability and e-invoice automation concerns.                                                                                               |
| Alsalmami (2015)   | Public sector/e-government (focus on developing countries); systematic review to identify adoption factors; 203 records screened → 12 studies included. | TOE most used (often with DOI constructs); notes critiques that TOE is more taxonomy than integrated theory; calls for more robust models. | Database SLR (IEEE Xplore, Emerald, ScienceDirect); explicit inclusion/exclusion; frequency analysis of factors across studies.                 | Most frequent predictors of adoption: compatibility (9), relative advantage (8), complexity (7), top management support (6), security (4), technology readiness (4), trust (4)                                                                                                                                                    | Barriers: environmental issues (bureaucracy, legal/political), low infrastructure & skills, security/privacy concerns. Enablers: cloud attributes (scalability, low cost, reliability) to overcome infra gaps; leadership support. Implications: standardize & secure cloud for gov't, build trust, strengthen readiness/TM support; expand empirical testing beyond TOE. |

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|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Song et al. (2025)        | China; e-government services; compares human agents vs government chatbots on citizen adoption intention. n=318 Chinese citizens.                  | Algorithm aversion, Trust-transfer theory, Perceived risk theory.                                                                                                   | Online scenario experiment; Mann–Whitney U + PLS-SEM; agent type moderation.                                                                                   | Agent type: chatbots → higher PR and lower EGA (algorithm aversion). TOG → TOE (+); PR → TOE (–); TOE → EGA (+). PR moderates trust-transfer (TOG→TOE); trust-transfer stronger for chatbots only when PR is low. | Barriers: higher perceived risk with chatbots. Enablers: high trust in government; low PR contexts. Implications: deploy GCs where PR is low; build TOG and reduce PR (risk transparency, careful rollout); consider human/AI mix in higher-risk services.           |
| Asiaei (2021)             | Malaysia; SMEs; cloud computing adoption (intention → actual use). n=203 SMEs.                                                                     | Extended TOE framework (Technology–Organisation–Environment) with intention mediating to usage.                                                                     | Survey; PLS-SEM; tests mediation of IACC between TOE factors and AUCC.                                                                                         | Significant predictors: Data security, Technology readiness, Cost saving, Top management support, Competitive pressure → ↑ adoption; Intention mediates TOE → Actual usage.                                       | Barriers: security/privacy concerns, low readiness/skills. Enablers: TMS, perceived cost savings, supportive competitive environment. Implications: set standards/guidelines, invest in readiness & training, leadership commitment to drive SME cloud uptake.       |
| Giang and Tam (2023)      | Manufacturing firms (n=195; 6 sectors); blockchain use in accounting/AIS; Vietnam context examples (e-invoice systems)                             | Factor model: IT capability (IT), Information-security infrastructure (SI), Training (TR), Legality/Regulation (LR) → Blockchain adoption; Blockchain → AIS quality | Survey; SEM (AMOS) to estimate effects on blockchain adoption and AIS quality                                                                                  | IT and Training → ↑ blockchain adoption (largest and second-largest effects); blockchain adoption → ↑ AIS quality; SI also positively influences AIS quality                                                      | Enablers: staff IT skills, training, secure IS infrastructure; Barriers: weak infrastructure/skills, unclear implementation interfaces. Implications: invest in training and IS security; standardize processes/interfaces; leverage e-invoice platforms within AIS. |
| Reyes-Tagle et al. (2023) | LAC tax administrations; comparative assessment of e-tax services (basic→advanced), incl. e-invoicing, digital bookkeeping, pre-filled VAT returns | Principles-based digital maturity framework (IDB/CIAT/OECD models) linked to good tax-admin principles; roadmap for staged digitalization                           | Comparative policy analysis; maturity benchmarking; legal constraints/taxpayer-rights review; best-practice case studies (incl. China, Estonia, Korea, Russia) | Effects: progressing from registration/e-filing/e-payment to e-invoicing and pre-filled returns improves service efficiency, compliance, and governance; sequencing                                               | Enablers: taxpayer connectivity, digitized documents, secure data management, clear legal basis; Barriers: legal/privacy constraints, limited infrastructure/capacity. Implications: follow tiered roadmap—start with basics, then adopt e-invoicing and             |

|                      |                                                                                                                                          |                                                                                 |                                                                                                                         |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                           |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      |                                                                                                                                          |                                                                                 |                                                                                                                         | depends on country maturity                                                                                                                                                                                                                      | advanced services; protect rights, use AI/cloud where mature.                                                                                                                                                                                                             |
| Awa and Ukoha (2020) | Nigeria; SMEs (fast-food chains); enterprise systems (ES) adoption.                                                                      | Integrated UTAUT + TTF + Perceived Trust (adds Hedonic Motivation from UTAUT2). | Survey (n=191 valid of 300); PLS + multiple regressions; dichotomous adoption framing.                                  | All hypothesised paths supported; Facilitating conditions and task interdependence = strongest (+); complexity = significant (-); PE, EE, SI, PT also positive. ~57% variance explained.                                                         | Barriers: complexity; privacy/security worries. Enablers: infrastructure, vendor/IT support, leadership backing, skills. Implications: invest in skills/infrastructure; strengthen trust and task fit; communicate/standardise to boost ES uptake.                        |
| Zhen and Ding (2024) | China; single-firm longitudinal case (Shangshang Cable); three DT stages: IT application → intelligent manufacturing → whole-process DT. | AMO (Ability–Motivation–Opportunity) empowerment model for DT.                  | Qualitative instrumental case; semi-structured interviews + documents + observation; Gioia coding; stage-wise analysis. | Stage-specific levers: Ability (IT skills training), Motivation (performance & pay redesign), Opportunity (participation). Effects: higher efficiency, collaboration, and sustained DT engagement. (E.g., ERP/OA use; OA routing of e-invoices.) | Enablers: standardised systems (ERP/OA/PLDM/CIM S/MES), training, transparent appraisal, involvement. Barriers: skills gaps, anxiety/resistance. Implications: tailor AMO by stage; build learning organisation & growth mechanisms; involve all employees in innovation. |

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