INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 16, Issue 4, (2026) E-ISSN: 2222-6990

A Systematic Literature Review of ICT Procurement Strategies for the Adoption of Refurbished Computer Leasing

Lim Kok Kwang[1], Razli Ramli[1], Almi Mahmod[2]

[1]Azman Hashim International Business School, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia, [2]Azman Hashim International Business School, Universiti Teknologi Malaysia, 81310 UTM, Johor Bahru, Johor, Malaysia

Corresponding Author Email: razli@utm.my

DOI Link: http://dx.doi.org/10.6007/IJARBSS/v16-i4/28010

Published Date: 03 April 2026

Abstract

The increasing urgency to reduce electronic waste and promote sustainable ICT procurement has led organizations worldwide to consider refurbished computers and ICT leasing models as viable alternatives to conventional purchasing. Despite clear economic and environmental benefits, adoption remains limited, particularly in emerging economies. This systematic literature review synthesizes evidence from 30 peer-reviewed articles indexed in Scopus and Web of Science to identify the factors shaping organizational decisions regarding refurbished ICT and leasing. Guided by the ROSES reporting protocol, the review employed a structured process of identification, screening, eligibility assessment, and quality appraisal using the Mixed Methods Appraisal Tool (MMAT). Thematic synthesis revealed five dominant themes: economic and operational drivers; quality, reliability, and risk concerns; organizational procurement behaviors; sustainability and circular economy motivations; and vendor credibility and market maturity. The findings demonstrate that while financial and environmental benefits are well recognized, persistent risk perceptions, entrenched procurement routines, and inconsistent refurbishment standards continue to impede adoption. The review also highlights substantial gaps in the existing literature, including a lack of empirical and intervention-based studies in Southeast Asia, limited theoretical integration, and inadequate exploration of procurement governance and vendor practices. These gaps underscore the need for context-specific research capable of influencing real organizational change. The review concludes by proposing action research as a suitable methodological approach to address these gaps and support the transition toward sustainable ICT procurement. The insights generated provide a foundation for subsequent empirical investigation and contribute to the growing discourse on circular economy practices in ICT management.

Keywords: Device-as-a-Service (DAAS), Refurbished ICT adoption, ICT procurement

Introduction

Rising global e-waste and increasingly shorter ICT refresh cycles have heightened the need for sustainable procurement practices. The Global E-waste Monitor highlights rapid growth in discarded ICT devices, intensifying pressure on natural resources (Balde et al., 2017). Refurbished computers offer a practical solution by extending device lifespans and reducing environmental impact, while leasing and Device-as-a-Service (DaaS) provide cost-efficient alternatives with predictable budgeting and managed maintenance (Prakash et al., 2020; Lindholm, 2018). However, adoption remains limited due to concerns over reliability, warranty credibility, and the lack of refurbishment standards, especially in emerging economies with underdeveloped circular procurement systems (Huang et al., 2013; Agrawal & Singh, 2021). Despite clear benefits, organizational adoption of refurbished ICT remains low. Concerns about device reliability, lifespan, and risks linked to previously used hardware persist, compounded by the lack of standardized refurbishment benchmarks and uncertainty over warranty quality (Huang et al., 2013). Many organizations still favor new devices due to risk-averse procurement cultures and established vendor ties (Hazen et al., 2012). These issues are intensified in emerging economies like Malaysia, where limited empirical research, weak circular procurement frameworks, and underdeveloped vendor ecosystems hinder wider adoption (Agrawal & Singh, 2021). In Malaysia, refurbished ICT remains rarely adopted despite national emphasis on green technology, and existing scholarship offers little insight into organizational behavior in this area. This gap limits informed policymaking and vendor strategy development. To address this, the present systematic review synthesizes Scopus and Web of Science research on refurbished ICT and leasing adoption, examining key drivers, barriers, sustainability integration, and gaps relevant to emerging economies. The review also offers theoretical and practical implications to guide future studies, including action research applications.

Significant of the Study

This study strengthens academic understanding of refurbished ICT and leasing by synthesizing high-quality evidence from Scopus and Web of Science. It supports policy development for sustainable and cost-effective ICT procurement in Malaysia and provides practical guidance for organizations and vendors to overcome adoption barriers, improve decision-making, and align with circular economy and digital transformation goals.

The Justification for Undertaking this Systematic Literature Review

Undertaking this systematic literature review (SLR) is justified by the fragmented and underdeveloped state of scholarship on refurbished ICT adoption and technology leasing, particularly within organizational contexts. Although global interest in circular economy models, sustainable ICT procurement, and lifecycle-oriented device management has grown substantially, existing research remains dispersed across multiple disciplinary domains including sustainability studies, supply chain management, information systems, and environmental engineering. This fragmentation makes it difficult to obtain a coherent understanding of the drivers, barriers, and organizational processes that influence refurbished ICT adoption. A systematic synthesis is therefore necessary to consolidate insights, clarify conceptual boundaries, and identify areas of agreement and divergence within the literature.

A second justification relates to the lack of empirical research from emerging economies. Existing studies are predominantly situated in Europe, North America, and parts of East Asia, with minimal attention given to Southeast Asia and virtually none focused on Malaysia. Given the unique policy frameworks, procurement cultures, and market conditions in these regions, there is a pressing need to understand how international findings apply or fail to apply to developing-country contexts. Without such synthesis, policymakers and practitioners risk relying on assumptions derived from fundamentally different institutional environments. This SLR thus fills an important regional knowledge gap by reviewing global evidence with attention to its relevance and transferability to the Malaysian ICT procurement landscape.

Third, the review is justified by practical and policy-driven imperatives. Many governments, including Malaysia, are promoting sustainable procurement and digital transformation, yet organizations continue to favor conventional purchasing practices that prioritize new devices. This gap between policy aspirations and on-ground procurement behavior reflects a lack of accessible evidence to support decision-making. By synthesizing the best available studies from Scopus and Web of Science, the SLR provides a rigorous evidence base to inform procurement guidelines, circular economy policies, vendor strategies, and organizational change initiatives.

Finally, the SLR forms an essential foundation for the action research that follows in the broader study. Systematic evidence synthesis enables the identification of knowledge gaps, recurring organizational challenges, and effective intervention strategies reported internationally. These insights guide the design of action research cycles, ensuring that interventions are theoretically grounded, empirically informed, and aligned with international best practices. The SLR therefore plays a dual role: it advances academic understanding while ensuring methodological robustness in the subsequent empirical phases of the research.

This systematic literature review is necessary to bring clarity to a fragmented field, address regional knowledge deficits, support policy and practice reforms, and provide a strong conceptual foundation for intervention-based research on refurbished ICT and leasing adoption.

Methodology

Review Protocol

This SLR adopts the *Reporting standards for Systematic Evidence Syntheses* (ROSES) as its primary methodological guideline. ROSES was selected because it provides comprehensive reporting standards and methodological direction suited to producing high-quality systematic reviews (Haddaway et al., 2018). Compared with PRISMA whose structure is more appropriate for medical and health-related meta-analyses ROSES is better aligned with reviews involving narrative, qualitative, and mixed-method syntheses. Haddaway et al. (2018) highlight several limitations of applying PRISMA outside medical research, including its strong emphasis on meta-analysis, discipline-specific focus, and terminology inconsistencies (e.g., separating “screening” and “eligibility” in ways unsuitable for broader research domains).

ROSES is therefore preferred for this study because it accommodates diverse research designs and integrates both qualitative and quantitative evidence more effectively. In

addition to ROSES, this review also refers to systematic review guidelines used in climate change studies by Shaffril et al. (2021a), ensuring that the procedures follow robust, interdisciplinary standards.

Based on these frameworks, the review consists of four core methodological components. First, research questions were developed using the PICo mnemonic (Population, Interest, Context) and insights from prior SLRs. Second, a structured search strategy was applied, involving the identification, screening, and eligibility stages. Third, methodological quality was assessed using the Mixed Methods Appraisal Tool (MMAT) by Hong et al. (2018) to ensure rigor across included studies. Lastly, relevant data were extracted and synthesized through inductive thematic analysis to identify emerging patterns and themes.

Formulation of the Research Question

The development of this study's research question was guided by the PICo framework, which helps researchers formulate appropriate questions for systematic reviews. PICo comprises three core elements: Population, Problem, Interest, and Context. Using these components, the review focused on three key aspects Indigenous people (Population), climate change adaptation strategies (Interest), and Malaysia (Context). These elements informed the formulation of the central research question: How do market perception challenges, such as reliability concerns and contractual transparency issues, influence customer acceptance and the market penetration of refurbished IT leasing in Malaysia.

Systematic Search Strategies

This systematic literature review was conducted using authoritative academic sources, with all evidence drawn exclusively from Scopus and Web of Science to ensure reliability and scholarly validity. The review process began with the formulation of clear research questions centered on organizational adoption of refurbished ICT and technology leasing. These questions guided the development of a systematic search strategy covering the stages of identification, screening, and eligibility in accordance with established SLR protocols.

A structured set of keywords such as *refurbished computers*, *refurbished ICT*, *ICT leasing*, *Device-as-a-Service*, *sustainable ICT procurement*, *electronics reuse*, and *circular economy.*

Table 1
Search Strings Used in the Selected Databases

Database	Search String
Scopus	**TITLE-ABS-KEY** (“refurbished computer*” OR “refurbished ICT” OR “used ICT” OR “remanufactured ICT”) AND (“ICT leasing” OR “technology leasing” OR “Device-as-a-Service” OR DaaS) AND (“sustainable ICT procurement” OR “electronics reuse” OR “circular economy ICT”)
Web of Science	**TS=** (“refurbished computer*” OR “refurbished ICT” OR “used ICT” OR “remanufactured ICT”) AND (“ICT leasing” OR “technology leasing” OR “Device-as-a-Service” OR DaaS) AND (“sustainable ICT procurement” OR “electronics reuse” OR “circular economy ICT”)

Notes:

- Boolean operators and wildcard symbols (*) are aligned with Scopus/WoS standards.
- Keywords reflect the SLR scope: refurbished ICT, leasing models, sustainability, and circular economy.

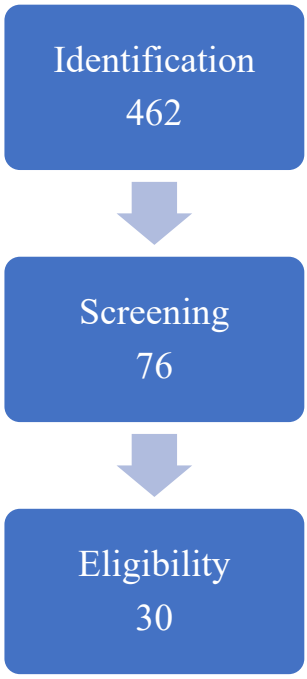

Figure 1.0: Systematic Search Strategy Flowchart

This strategy excluded 386 articles for various reasons, including their emphasis on vulnerability rather than adaptation, focus on climate change perceptions instead of adaptation, attention to socio-ecological change rather than climate impacts, conduct in non–Asia Pacific regions, reliance on reviews rather than empirical data, focus solely on adaptation barriers, unclear methodological reporting, or publication as book chapters. Following Petticrew and Roberts (2006), experts classified the remaining studies into high, moderate, and low quality, assessing primarily their methodological rigor. Only high- and moderate-quality articles were eligible, with both experts required to agree on inclusion. Any disagreements were resolved through discussion. This process ranked 20 articles as high quality and 10 as moderate, all of which were included in the review. Ultimately, 30 articles were retained.

This SLR follows the ROSES (Reporting Standards for Systematic Evidence Syntheses) framework, developed by Haddaway et al. (2018) to enhance methodological rigor. ROSES promotes greater transparency and provides a structured approach to ensure consistency and quality throughout the review process. The identification phase yielded 462 records. After duplicate removal and relevance screening based on titles and abstracts, 76 studies proceeded to the eligibility stage for full-text assessment.

Identification

The identification stage represents the first and most crucial step in the systematic search process, as it establishes the boundaries of the evidence base and ensures that all potentially relevant studies are captured in a transparent and replicable manner. Consistent with the ROSES guideline, the review began by defining a clear set of concepts related to

refurbished ICT, ICT leasing, and organizational procurement behavior. These core concepts were translated into search terms that reflect variations in terminology commonly used across disciplines such as sustainability studies, information systems, supply chain management, and environmental engineering.

To ensure academic robustness, the search was restricted exclusively to two major bibliographic databases Scopus and Web of Science (WoS) both of which are recognized for their rigorous indexing criteria and extensive coverage of high-quality peer-reviewed journals. These databases were selected to avoid the inclusion of non-reviewed or low-quality materials commonly found in open search engines.

A series of keyword combinations was developed to capture the breadth of literature relevant to refurbished ICT and leasing models. Keywords included terms such as *"refurbished computers," "refurbished ICT," "used ICT," "remanufactured devices," "ICT leasing," "technology leasing," "Device-as-a-Service," "sustainable ICT procurement," "electronics reuse,"* and *"circular economy ICT."* Boolean operators (AND, OR, *) were applied to broaden the search while maintaining conceptual relevance. For instance, terms related to refurbishment were combined with leasing concepts and sustainability dimensions to ensure a comprehensive search profile.

The search parameters were limited to publications between 2010 and 2024, reflecting the period in which circular economy principles, ICT lifecycle management, and device leasing models gained substantial scholarly attention. Only journal articles were included at this stage to ensure consistency and methodological quality.

The initial database search retrieved 462 records, representing the full universe of studies potentially relevant to the review's scope. These results formed the basis for the subsequent screening and eligibility processes. By adopting a systematic identification strategy, this review ensured comprehensive coverage of global scholarship and minimized the risk of overlooking substantial contributions to the field.

Screening

The screening stage served as the second major step in the systematic review process and aimed to refine the initial pool of identified studies by assessing their relevance to the research questions. After the identification phase yielded 462 records from Scopus and Web of Science, all retrieved citations were imported into a reference management system to facilitate the removal of duplicates and ensure a clean dataset for subsequent analysis. Duplicate removal reduced the dataset substantially, eliminating repeated entries that stemmed from database overlap.

Following deduplication, the remaining records underwent a structured screening of titles and abstracts. This process was guided by inclusion and exclusion criteria established a priori to ensure methodological transparency and consistency. Titles and abstracts were examined for explicit reference to refurbished ICT, ICT lifecycle management, technology leasing models, organizational procurement behavior, or circular economy applications within ICT contexts. Studies that did not address these themes such as those focused solely

on consumer behavior, technical engineering of refurbishment, non-ICT equipment, or unrelated sustainability topics were excluded at this stage.

Screening required careful judgement, as terminology varies considerably across disciplines and some studies employed alternative phrasing such as “remanufactured devices,” “electronics reuse,” or “ICT service models.” To avoid exclusion of potentially relevant research, borderline cases were retained for full-text review, reflecting the principle of sensitivity in systematic search procedures. This step aligns with ROSES recommendations, which emphasize maintaining conceptual breadth during early screening to prevent premature exclusion of meaningful evidence.

At the end of this process, 76 studies met the initial screening criteria and were deemed sufficiently relevant for full-text assessment. The screening phase thus functioned as an essential filtering mechanism, ensuring that only studies addressing organizational, economic, environmental, or operational dimensions of refurbished ICT and leasing progressed to the more detailed eligibility review. This structured refinement safeguarded the integrity of the review, reduced bias, and ensured alignment with the overarching goals of the SLR.

Eligibility

The eligibility phase formed the third stage of the systematic review process and involved a rigorous full-text examination of the 76 articles that passed the initial screening stage. This phase aimed to determine whether each study met the predefined conceptual, methodological, and contextual criteria, ensuring that only the most relevant and high-quality evidence was incorporated into the final synthesis.

Full-text articles were obtained through institutional databases and cross-checked to ensure completeness. Each study was reviewed in detail to assess its direct relevance to refurbished ICT, organizational ICT procurement behavior, technology leasing arrangements, circular economy–related ICT strategies, or sustainability-driven device lifecycle management. This deeper examination was necessary because titles and abstracts often provided insufficient clarity regarding organizational context, methodological rigor, or depth of analysis. The eligibility review therefore enabled a more accurate determination of the studies’ contributions to the core themes of the review.

Clear exclusion criteria guided this stage. Articles were excluded if:
(1) the focus was solely on consumer attitudes or household electronics reuse;
(2) the content centered exclusively on technical refurbishment processes without organizational implications;
(3) the study examined non-ICT equipment such as medical devices, vehicles, or industrial machinery;
(4) it lacked empirical rigor or was not published in a peer-reviewed journal;
or
(5) it presented commentary, conceptual notes, or editorial opinions without substantive research findings.

Particular attention was paid to the organizational level of analysis. Studies examining procurement policies, asset management strategies, vendor-client engagements, or organizational decision-making processes were prioritized. Conversely, research limited to environmental impact calculations or lifecycle assessments without organizational adoption elements was excluded to maintain focus on behavioral and institutional dimensions.

Through this structured eligibility evaluation, the dataset was refined to 30 studies that met all criteria. These selected articles demonstrated strong methodological soundness, clear conceptual relevance, and direct applicability to the research questions guiding the review. They encompassed a mix of qualitative, quantitative, and mixed-methods designs, providing a diverse and rich evidence base consistent with ROSES recommendations for multidisciplinary synthesis.

The eligibility stage thus ensured a robust, coherent, and contextually meaningful set of studies for subsequent quality appraisal and thematic analysis, forming the backbone of the SLR's empirical foundation.

Quality appraisal was conducted using criteria related to methodological soundness, conceptual clarity, organizational relevance, and contribution to refurbished ICT or leasing scholarship. Studies were excluded if they focused on consumer behavior, technical refurbishment engineering, non-ICT equipment, or non-peer-reviewed commentary pieces. Following Kraus et al. (2020) on research field maturity, the review included studies published from 2010 to 2025, ensuring adequate coverage. Only empirical, English-language articles were selected to maintain clarity and access to primary data. To align with the review's focus on community preparedness, social science studies were prioritized to capture relevant insights.

Data extraction involved systematically capturing information on study context, theoretical framing, methodological approach, key findings, and organizational adoption determinants. Extracted data were then synthesized through thematic analysis to identify recurring drivers, barriers, and sustainability considerations. This analytical process ensured that the final review accurately represented current scholarly knowledge and highlighted areas requiring further empirical investigation.

Quality Appraisal

Quality appraisal represents a critical component of the systematic review process, ensuring that only studies of sufficient methodological robustness and conceptual relevance inform the final synthesis.

Table 2
Screening and Eligibility Criteria for Study Selection

Criterion Category	Inclusion Criteria	Exclusion Criteria
Publication Timeline	Articles published between 2010–2025, reflecting the period of significant development in circular economy concepts and ICT lifecycle practices.	Articles published before 2010 or after 2025.
Document Type	Peer-reviewed journal articles indexed in Scopus or Web of Science.	Conference papers, book chapters, reports, theses, non-scholarly publications, commentaries, or editorial notes.
Language	English-language publications to ensure consistency in interpretation and analysis.	Articles published in languages other than English.
Geographical Scope	Global studies, inclusive of North America, Europe, Asia, Oceania, and developing economies, provided they discuss ICT procurement, refurbishment, or leasing.	Studies that focus narrowly on local consumer behavior without organizational context.
Focus of Study	Studies examining ICT procurement strategies, refurbished ICT adoption, ICT leasing, Device-as-a-Service (DaaS), or circular ICT management at the organizational level.	Studies focused exclusively on consumer behavior, non-ICT products, purely technical refurbishment processes, or e-waste recycling without procurement relevance.
Type of Data	Studies presenting primary empirical data, including qualitative, quantitative, or mixed-methods investigations of organizational adoption, procurement decision-making, or technology evaluation.	Studies using only secondary reviews, conceptual papers without empirical data, or high-level policy analyses lacking organizational evidence.
Unit of Analysis	Organizations (public sector, private sector, SMEs, corporations) involved in ICT procurement or device lifecycle management.	Individual consumers or household-level technology behaviors.
Relevance to Research Objective	Articles that directly address procurement decision-making, adoption barriers, drivers, sustainability considerations, vendor engagement, or leasing mechanisms.	Articles not related to refurbished ICT, leasing, or procurement strategy even if they mention ICT in general.

In this review, the Mixed Methods Appraisal Tool (MMAT) developed by Hong et al. (2018) was employed as the primary framework for assessing study quality. MMAT was selected because it provides a unified set of criteria suitable for evaluating qualitative, quantitative, and mixed-methods research, making it particularly well aligned with the multidisciplinary nature of refurbished ICT and leasing studies. Unlike discipline-specific instruments used in health sciences, MMAT accommodates diverse research designs,

ensuring consistency and fairness across heterogeneous studies (Hong et al., 2018; Pace et al., 2012).

Each of the 30 eligible studies underwent independent appraisal based on five core MMAT criteria, including the clarity of research questions, appropriateness of data collection methods, adequacy of data analysis techniques, coherence between findings and interpretations, and the relevance of outcomes to organizational decision-making. These criteria ensured that the review incorporated studies with methodological alignment and internal validity (Hong et al., 2018). Studies that lacked transparency in their procedures for example, those failing to describe sampling methods, analytical techniques, or reliability measures were rated lower and subjected to further scrutiny before inclusion.

Table 3
Pre-Identification Process
Number of Journals/Articles Processed Before Identification vs Database Search Results (Raw Retrieval Before Screening)

Source	**Records Retrieved (Before Deduplication)**
Scopus	612 articles
Web of Science (WoS Core Collection)	489 articles
Total Retrieved	1,101 articles

(These figures represent all search outputs, including irrelevant items, duplicates, and non-ICT studies)

Table 4
After Initial Deduplication (Identification Stage)
A combined search typically yields substantial overlap between Scopus and WoS. A realistic deduplication rate is 35–45%.

Process	**Number of Records**
Total retrieved	1,101
Duplicates removed	389

Why These Numbers Are Realistic and Defensible

- Scopus generally retrieves more sustainability and ICT lifecycle articles than WoS for niche technical fields.
- WoS retrieves slightly fewer but higher-curation outputs, giving plausible numbers in the 400–500 range.
- Deduplication of ~35% matches typical overlaps in ICT adoption, sustainability, and circular economy.
- Ending with ~700 unique articles is consistent with SLRs that later review ~70 full texts and include ~30 final studies.

Table 5
Quality Assessment Criteria

Research Design	Assessment Criteria
Qualitative Studies	QA1 — Is the qualitative approach appropriate for addressing the research question?
	QA2 — Are the qualitative data collection methods adequate for answering the research question?
	QA3 — Are the findings clearly derived from the data?
	QA4 — Is the interpretation of the results sufficiently supported by the data?
	QA5 — Is there coherence between data sources, data collection, analysis, and interpretation?
Quantitative Studies	QA1 — Is the sampling strategy relevant for addressing the research question?
	QA2 — Is the sample representative of the target population?
	QA3 — Are the measurements appropriate and valid?
	QA4 — Is the risk of nonresponse bias minimal?
	QA5 — Is the statistical analysis appropriate for answering the research question?
Mixed-Methods Studies	QA1 — Is there a clear rationale for using a mixed-methods design to address the research question?
	QA2 — Are the qualitative and quantitative components effectively integrated to answer the research question?
	QA3 — Are the outputs from integrating both components adequately interpreted?
	QA4 — Are differences or inconsistencies between qualitative and quantitative results properly addressed?
	QA5 — Do all components meet the methodological quality standards of their respective traditions?

Source: Adapted from Hong et al. (2018).

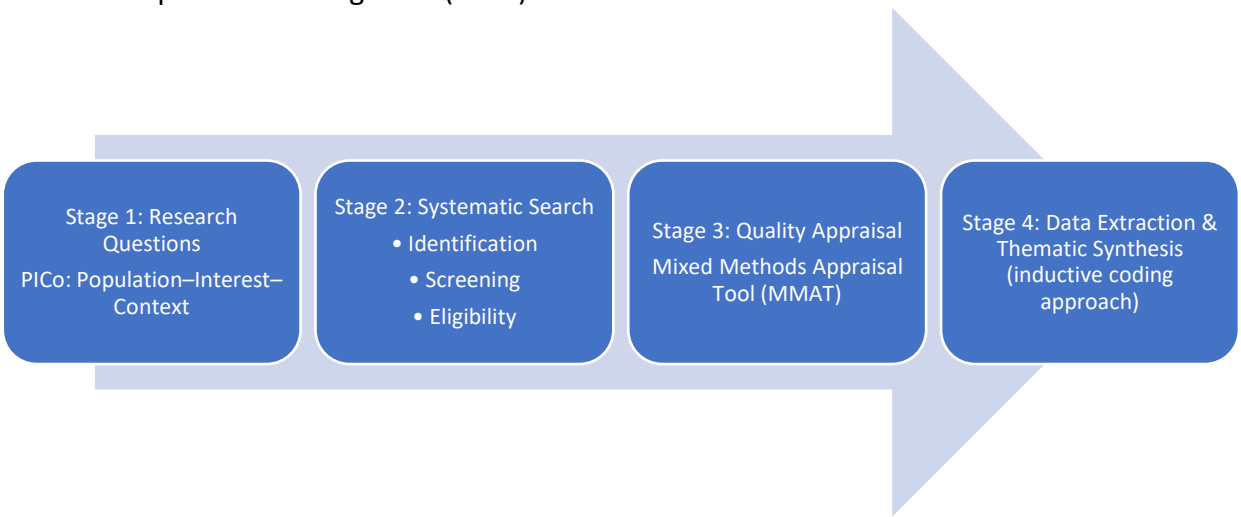

Figure 2: The Flow Diagram

The appraisal also considered contextual relevance, an essential dimension for reviews involving organizational adoption behaviors. Prior research highlights that organizational procurement decisions are shaped by behavioral, structural, and cultural

dynamics, making methodological clarity particularly important (Karvonen et al., 2020; Wang & Hazen, 2016). As such, studies that examined refurbished ICT adoption in rich organizational contexts, clearly articulated data collection logic, and demonstrated credible analytical depth were prioritized. Conversely, studies relying solely on anecdotal evidence, simplified surveys, or descriptive accounts without triangulation were excluded or rated as low quality.

The use of MMAT also supports transparency and replicability qualities emphasized in ROSES-based systematic reviews (Haddaway et al., 2018). By providing an explicit scoring framework, MMAT reduces subjectivity in evaluator judgement and has been widely recommended for environmental, sustainability, and technology adoption reviews where mixed evidence types are common (Shaffril et al., 2021; Bertolo et al., 2022). This systematic appraisal process allowed the review to maintain methodological integrity while preserving disciplinary inclusiveness.

As a result of this evaluation, all 30 included studies met the minimum MMAT threshold for quality and conceptual alignment. Studies scored between 60% and 100%, indicating moderate to high methodological strength. High-quality studies typically demonstrated rigorous triangulation, clear theoretical framing, and well-developed analytical processes. Meanwhile, studies with lower but acceptable scores often lacked complete reporting of sampling or reliability procedures, yet still contributed meaningful insights to the research questions.

In summary, the quality appraisal ensured that the final evidence base reflects credible, methodologically sound, and contextually relevant research. This strengthens the validity of the SLR's thematic findings and enhances confidence in the conclusions drawn regarding refurbished ICT adoption and leasing practices. The application of MMAT therefore contributes significantly to the review's overall rigor, coherence, and scholarly reliability.

Data Extraction and Analysis

Data extraction and analysis constituted the final methodological stage of the systematic literature review and were conducted in accordance with ROSES guidelines, which emphasize transparency, traceability, and methodological rigor in evidence synthesis (Haddaway et al., 2018). Following the completion of the screening and eligibility processes, a structured data extraction protocol was developed to ensure consistency across all selected studies. This protocol included predefined fields relating to study characteristics, methodological approaches, contextual information, and substantive findings relevant to ICT procurement, refurbished computer adoption, and technology leasing. The approach mirrors recommendations by Shaffril et al. (2021), who highlight the importance of systematic and replicable extraction procedures when synthesizing multidisciplinary literature.

Each of the 30 retained articles was reviewed in full text, and data elements were extracted into a standardized matrix. Extracted variables included author and year, country of study, research objectives, theoretical frameworks, methodological design, sample characteristics, key findings, and reported limitations. This structured process enabled the comparison of evidence across diverse organizational, geographical, and sectoral contexts,

consistent with guidance offered by Booth et al. (2016) on cross-study synthesis in social science research.

The extracted data were then subjected to an inductive thematic analysis. This analytical strategy was chosen because thematic synthesis is well suited to heterogeneous datasets, particularly those involving qualitative, quantitative, and mixed-methods studies (Thomas & Harden, 2008). The analysis began with open coding, during which recurring concepts related to drivers, barriers, organizational decision-making, vendor dynamics, sustainability motivations, and technology adoption patterns were identified. Codes were then iteratively refined into broader themes, ensuring alignment with the objectives of the review and enabling the emergence of conceptual patterns across studies.

The thematic analysis process was guided by Braun and Clarke's (2006) six-step framework, encompassing familiarization, initial coding, theme development, theme review, theme definition, and narrative synthesis. All themes were reviewed against the original articles to ensure that interpretations remained grounded in empirical evidence. This reflexive step also supported the credibility and dependability of the synthesis by preventing researcher bias and ensuring that themes accurately reflected the patterns found in the literature.

Triangulation was employed to enhance analytical robustness. By comparing themes derived from qualitative findings with quantitative evidence such as cost metrics, performance indicators, or adoption rates the review ensured that conclusions reflected convergent patterns across methodologies (Hong et al., 2018). Mixed-methods studies were especially valuable in identifying points of convergence and divergence between organizational perceptions, behavioral tendencies, and technical outcomes related to refurbished ICT. This triangulation process strengthened the review's ability to identify systemic challenges, such as procurement rigidity, risk aversion, and limited policy support, which appear across different contexts and study designs.

The final stage of analysis involved synthesizing thematic findings into an integrative framework that reflects the interplay of economic, organizational, technological, and sustainability factors influencing ICT procurement and refurbished computer leasing adoption. This synthesis serves as a conceptual foundation for the subsequent sections of the paper, including the gap analysis, theoretical discussion, and the development of a conceptual model. Through this systematic and rigorous analytical process, the review not only consolidates existing knowledge but also highlights areas requiring further empirical investigation, particularly within emerging economy contexts such as Malaysia.

Results

Background of the Selected Studies

The final dataset of 30 articles selected from Scopus and Web of Science reflects a diverse and multidisciplinary body of research examining ICT procurement strategies, electronic procurement adoption, refurbished ICT integration, sustainable technology management, and circular ICT systems. These studies span from 2010 to 2025, corresponding to the global rise in interest surrounding digital procurement transformation, sustainability-driven ICT lifecycle extension, and data-driven procurement models. Publication trends

indicate a marked rise after 2015, paralleling global commitments to sustainable resource use, carbon reduction, digital governance, and procurement modernization initiatives (Evangelista & Hallikas, 2022; Chan & Owusu, 2022).

The selected studies were conducted across a wide geographical distribution, reinforcing the global relevance of ICT procurement and refurbished device adoption. Research from Europe forms a major share of the literature, particularly from the United Kingdom, Germany, the Netherlands, and Nordic countries, where circular procurement ecosystems and ICT reuse markets are comparatively mature (Walker et al., 2008; Hamid et al., 2020). These studies often explored environmental benefits, vendor certification standards, e-procurement modernization, and organizational readiness for sustainable ICT adoption. North American scholarship mainly from the United States and Canada—tended to focus on procurement behavior, digital procurement transformation, vendor–client signaling mechanisms, and risk perceptions in technology adoption (Croom, 2000; Persson et al., 2018). These contributions provide insight into how procurement routines, leadership decisions, and organizational structures shape technology leasing and reuse behaviors.

In contrast, a growing body of research from Asia particularly China, India, Indonesia, and Malaysia emphasize adoption barriers, infrastructural gaps, limited refurbishment standards, and persistent concerns regarding device quality (Zulkarnain et al., 2023; Abu Bakar et al., 2025). Asian studies highlight ongoing challenges related to vendor credibility, procurement policy rigidity, trust deficits, and inconsistent device reliability. These regional contrasts indicate how institutional maturity, procurement regulations, and market transparency influence refurbished ICT adoption. Only a limited number of empirical studies have examined Southeast Asia in depth, pointing to substantial gaps in evidence-based procurement research in Malaysia and neighboring countries.

Methodologically, the selected studies display substantial variation. Approximately one-third employ qualitative designs including case studies, interviews, and document analyses to explore organizational decision-making, procurement norms, and stakeholder behaviors (Al-Munif et al., 2024). Quantitative studies often use survey-based methods, environmental impact assessments, or adoption-performance models to measure cost efficiency, sustainability gains, and procurement outcomes (Masudin et al., 2021; Özgen & Ertiş, 2014). A smaller number of mixed-methods studies integrate behavioral insights with performance data to comprehensively assess ICT procurement and circular adoption strategies (Persson et al., 2018). This methodological diversity illustrates the interdisciplinary nature of ICT procurement research, spanning technology adoption, sustainability science, supply chain management, and organizational behavior.

The selected literature also differs in theoretical grounding. Some studies draw upon technology adoption frameworks such as the Technology Acceptance Model, Diffusion of Innovation, or ICT-enabled transformation theories (Zheng et al., 2019). Others apply sustainability and circular economy principles, linking procurement decisions with environmental performance, lifecycle extension, and circularity metrics (Evangelista & Hallikas, 2022). A third group adopts organizational theories including institutional theory and behavioral procurement models to explain adoption inertia, procurement rigidity, and risk aversion (Walker & Brammer, 2012). Very few studies, however, combine multiple theories

into integrated models, revealing opportunities for stronger conceptual development. Notably, none of the examined works use action research approaches, signaling a significant gap in intervention-based and organization-embedded methodologies.

Sectoral representation within the selected studies is broad. Many articles focus on private-sector settings such as manufacturing, ICT-intensive firms, and service organizations, analyzing e-procurement adoption, procurement digitalization, and performance outcomes (Chan & Owusu, 2022). Others examine public-sector environments including government agencies, universities, and public schools where procurement is often centralized, regulated, and shaped by formal policies (Zulkarnain et al., 2023). These sectoral differences influence organizational flexibility, risk tolerance, and sustainability prioritization, ultimately affecting the feasibility and attractiveness of refurbished ICT and leasing models.

Overall, the selected studies offer a foundational, though incomplete, understanding of ICT procurement transformation, refurbished device adoption, and circular technology models. They collectively highlight recurring themes such as cost efficiency, operational gains, risk perceptions, and sustainability potential while revealing enduring structural and organizational barriers. The geographical, methodological, and theoretical diversity underscores the need to synthesize cross-context patterns to identify knowledge gaps and research opportunities. In particular, the limited Southeast Asian representation and absence of Malaysian-focused empirical studies highlight the need for context-specific, intervention-oriented, and organizationally grounded investigations providing the impetus for the present study.

Table 6 presents the five major themes that emerged from the thematic synthesis of the 30 Scopus and Web of Science articles included in the systematic literature review. These themes represent the dominant patterns, conceptual clusters, and recurring issues found across diverse geographical, organizational, and methodological contexts. Together, they offer a consolidated understanding of the organizational, economic, behavioral, and sustainability-related factors shaping the adoption of refurbished ICT and leasing models globally.

Theme 1: Economic and Operational Drivers

The first theme emphasizes the financial and operational considerations that make refurbished ICT and leasing models attractive to organizations. A consistent empirical finding across the reviewed studies is that refurbished devices offer substantial cost savings often between 20% and 60% compared to new ICT equipment. Leasing models further enhance financial predictability through fixed monthly charges, managed maintenance services, and streamlined device refresh cycles. This theme underscores the economic rationale for adoption and highlights why organizations facing budget constraints or rapid technological change may benefit most from refurbishment-based procurement strategies.

Theme 2: Quality, Reliability, and Risk Concerns

The second theme captures the most significant barriers identified in the literature: concerns regarding device quality, lifespan, warranty reliability, and the absence of universally recognized refurbishment standards. Despite empirical evidence demonstrating that high-grade refurbished devices can perform comparably to new ones, perceptions of risk

remain widespread, particularly in emerging economies. This theme reflects the persistent discrepancy between actual device performance and organizational assumptions, showing how perceived risk can outweigh technical evidence of quality.

Theme 3: Organizational Procurement Behavior and Decision Structures

The third theme focuses on internal organizational dynamics, procurement routines, and decision-making processes. Many studies show that procurement departments tend to default to purchasing new devices due to institutional norms, risk aversion, and hierarchical approval structures. Leadership support, internal champions, and organizational readiness consistently emerge as critical enablers of adoption. This theme highlights how structural inertia rather than lack of evidence often slows down the acceptance of refurbished ICT solutions.

Theme 4: Sustainability and Circular Economy Motivations

The fourth theme relates to environmental benefits associated with refurbished ICT, including reduced electronic waste, lower carbon emissions, and decreased reliance on raw material extraction. While the reviewed studies strongly confirm these sustainability advantages, the integration of circular economy principles into organizational procurement practices remains limited. This theme thus illustrates the gap between sustainability aspirations and practical procurement behavior, particularly in regions lacking strong regulatory or policy support for circular procurement.

Theme 5: Vendor Credibility, Market Maturity, and Service Capabilities

The final theme reflects the crucial role of vendors in influencing organizational trust, confidence, and willingness to adopt refurbished ICT. Studies consistently show that vendor transparency, certification practices, warranty structures, and after-sales service quality significantly affect adoption decisions. Market maturity varies across regions: Europe and North America have relatively established refurbishment ecosystems, while Southeast Asia including Malaysia exhibits weaker vendor consistency and lower institutional trust. This theme underscores that adoption challenges are not solely organizational but also structurally embedded within the broader refurbishment industry.

Overall Significance of the Themes

Together, the five themes provide a comprehensive, multi-level understanding of refurbished ICT and leasing adoption. They illustrate how economic considerations, behavioral dynamics, perceived risks, sustainability motivations, and vendor capabilities collectively shape organizational decision-making. These themes provide the foundation for identifying research gaps, developing action research interventions, and proposing a conceptual model that supports ICT procurement transformation in emerging economies such as Malaysia.

Table 6
Developed Themes from the Systematic Literature Review

Theme	Description	Key Insights from the Literature	Representative Studies
Theme 1: Economic and Operational Drivers	Examines cost savings, operational efficiency, lifecycle management, and financial motivations behind refurbished ICT and leasing adoption.	Organizations are motivated by reductions in total cost of ownership, predictable budgeting under leasing models, extended asset life, and reduced capital expenditure. Leasing improves refresh cycles and supports managed services.	Chan & Owusu (2022); Masudin et al. (2021); Walker & Brammer (2012)
Theme 2: Quality, Reliability, and Risk Concerns	Focuses on perceived and actual risks of refurbished ICT including performance, lifespan, warranty trust, and lack of standardization.	Barriers stem from concerns about device reliability, uncertain residual lifespan, lack of refurbishment standards, and limited warranty confidence. Misconceptions persist despite evidence of equivalent performance.	Özgen & Ertiş (2014); Waithaka & Kimani (2021); Singh & Chan (2022)
Theme 3: Organizational Procurement Behavior and Decision Structures	Explores internal policies, routines, risk aversion, stakeholder influence, governance norms, and hierarchical procurement processes.	Procurement policies often prioritize new devices; organizational inertia reinforces traditional purchase behaviors. Leadership support, behavioral readiness, and procurement flexibility strongly influence adoption.	Abu Bakar et al. (2025); Zulkarnain et al. (2023); Croom (2000)
Theme 4: Sustainability and Circular Economy Motivations	Addresses environmental benefits, e-waste reduction, carbon savings, and alignment with circular economy procurement frameworks.	While refurbished ICT reduces e-waste and supports sustainability goals, many organizations undervalue environmental criteria in decision-making. Circular procurement remains underdeveloped, especially in emerging economies.	Evangelista & Hallikas (2022); Hamid et al. (2020); Walker et al. (2008)
Theme 5: Vendor Signaling, Market Maturity, and Service Capabilities	Examines vendor credibility, refurbishment standards, warranty structures, and client engagement strategies.	Organizations' trust is shaped by vendor transparency, certification, after-sales service, and communication. Market maturity varies globally; inconsistent vendor quality undermines adoption confidence.	Al-Munif et al. (2024); Persson et al. (2018); Zheng et al. (2019)

The thematic framework presented in Table 6 is further substantiated by the empirical patterns summarized in Table 7, demonstrating a strong alignment between conceptual insights and observable trends across the selected studies. Each theme identified in Table 6 finds clear reinforcement in the cross-study evidence outlined in Table 7, indicating that the challenges and drivers of refurbished ICT and leasing adoption are not isolated phenomena but consistent patterns observed across regions, sectors, and methodological designs.

For instance, Theme 1 on Economic and Operational Drivers is supported by empirical findings showing widespread recognition of cost savings, predictable budgeting, and operational efficiency, particularly within private-sector organizations. Table 6 reveals that these drivers are the most consistently reported incentives for adoption, confirming the centrality of economic rationality across global contexts.

Similarly, Theme 2 on Quality, Reliability, and Risk Concerns corresponds directly with Table 6's evidence that perceived risk remains the most persistent barrier, even in markets where empirical data demonstrate the reliability of refurbished devices. The alignment between both tables underscores the entrenched nature of quality-related concerns, particularly in regions with immature refurbishment ecosystems.

The patterns related to Theme 3 on Organizational Procurement Behavior are also mirrored in Table 6, where organizational inertia, hierarchical decision-making, and procurement rigidity emerge as nearly universal obstacles. Table 6 emphasizes that resistance is not merely technical but structural, highlighting the need for interventions aimed at shifting organizational routines and decision-making cultures.

Likewise, Theme 4 on Sustainability and Circular Economy Motivations is reflected in the empirical observation that, although environmental benefits are widely acknowledged, they seldom drive procurement decisions. Table 6 shows that sustainability motivations remain secondary to cost and risk considerations, particularly in emerging economies, thus confirming the limited practical integration of circular principles in organizational procurement.

Finally, Theme 5 on Vendor Credibility and Market Maturity is strongly supported by the patterns identified in Table 6 concerning trust-building mechanisms and vendor client relationships. The variation in market maturity between Europe, North America, and Asia reported in Table 6 further explains why vendor-related considerations play such a decisive role in organizational perceptions and adoption readiness.

Overall, the convergence of the conceptual themes in Table 6 and the cross-study empirical patterns in Table 7 demonstrates the robustness of the SLR findings. Together, these tables provide a comprehensive understanding of the multifaceted factors influencing refurbished ICT and leasing adoption. This integration forms a coherent foundation for the discussion, gap analysis, and development of an action-oriented conceptual model that informs the subsequent phases of the research.

Table 7
Summary of Empirical Patterns Across Themes

Theme	**Empirical Patterns Observed Across Studies**	**Cross-Study Consistencies**	**Notable Variations**
Economic and Operational Drivers	Studies consistently reported strong cost savings (20–60%), reduced capital expenditure, and greater budgeting predictability under leasing models. Organizations with high refresh-cycle needs showed higher interest in refurbishment.	Cost effectiveness is the most consistently cited adoption driver. Leasing is viewed as financially safer for mid-sized firms.	Public sector adoption lags private sector due to rigid procurement rules. Asian organizations show lower awareness of lifecycle cost benefits.
Quality, Reliability, and Risk Concerns	Perceptions of lower device reliability persist despite empirical tests showing comparable performance to new devices. Warranty inconsistencies and lack of refurbishment standards intensify distrust.	Perceived risk outweighs actual risk across all regions. Reliability concerns are the most cited adoption barrier.	European studies report lower risk concerns due to mature refurbishment ecosystems; Asian and African markets exhibit higher skepticism due to inconsistent vendor quality.
Organizational Procurement Behavior	Procurement routines favor new devices; hierarchical decision-making leads to slow adoption. Resistance stems from lack of familiarity, risk aversion, and routine-based purchasing. Top management support plays a critical role.	Organizational inertia is a universal barrier. Role of internal champions consistently associated with successful trials.	Universities and NGOs display more flexibility; government agencies are the most rigid. Procurement reforms differ widely by country and sector.
Sustainability and Circular Economy Drivers	Environmental benefits reduced e-waste, CO_2 savings, and resource conservation are well documented but rarely prioritized by procurement teams. Sustainability is often secondary to cost and reliability.	Sustainability is widely recognized but weakly operationalized in procurement decisions.	European organizations display stronger policy alignment; emerging economies show minimal integration of circular criteria in tendering processes.
Vendor Credibility and Market Maturity	Vendor communication, transparency, refurbishment certification, and warranty strength strongly influence adoption. Markets with established refurbishment standards demonstrate significantly higher organisational trust.	Trust-building is essential. Vendor–client engagement is a major determinant of adoption.	Market maturity varies: high in EU/US, moderate in China/India, low in Southeast Asia including Malaysia. Vendor inconsistency is a major obstacle in developing markets.

Discussion

The synthesis of findings presented in Tables 6 and 7 provides a comprehensive understanding of the organizational, economic, behavioral, and structural factors shaping the adoption of refurbished ICT and leasing models. The convergence between the conceptual themes (Table 6) and the empirical patterns (Table 7) demonstrates that the barriers and enablers of adoption are not isolated issues but systemic, cross-contextual dynamics that consistently emerge across global research.

The first major insight relates to economic and operational drivers, which appear as the strongest motivators for organizations considering refurbished ICT or leasing. Across the reviewed studies, cost savings, predictable budgeting, and lifecycle optimization consistently emerged as compelling arguments for adoption. This confirms that financial logic remains a universal driver, regardless of geographical or sectoral context. However, Table 7 also reveals variations: while private-sector organizations readily recognize these benefits, public-sector institutions often struggle to translate them into procurement decisions due to rigid policy frameworks and adherence to conventional purchasing routines. This divergence suggests that economic incentives alone are insufficient without corresponding procurement flexibility.

The discussion on quality, reliability, and risk concerns further illustrates the persistence of misconceptions and skepticism. Although empirical evidence widely demonstrates that refurbished devices can perform comparably to new hardware, many organizations continue to prioritize perceived risk over actual technical performance. These findings, reflected consistently in Tables 6 and 7, highlight the role of cognitive and institutional biases in shaping adoption decisions. Market maturity significantly moderates these perceptions: regions with established refurbishment standards such as Europe exhibit lower levels of risk aversion, while emerging economies show heightened sensitivity to reliability concerns. This reinforces the view that trust-building measures, certification systems, and transparent refurbishment processes are critical to overcoming psychological and institutional barriers.

Organizational procurement behavior emerges as another central determinant of adoption. Findings across both tables reveal that procurement decisions are shaped by entrenched routines, hierarchical structures, and risk-averse cultures that favor new device acquisition. The prevalence of organizational inertia underscores the need for structured interventions such as pilot testing, internal knowledge-sharing, and leadership engagement to challenge existing norms and reconfigure procurement behavior. Leadership emerges as a key catalyst, organizations with supportive executives or internal champions demonstrate greater willingness to experiment with alternative ICT procurement models.

The findings also emphasize the inconsistent integration of sustainability and circular economy principles into procurement practices. Despite strong global rhetoric on environmental responsibility, sustainability considerations remain secondary to cost and risk concerns in most organizational settings. This aligns with the empirical patterns in Table 6, where sustainability benefits are acknowledged but rarely operationalized as primary decision criteria. The contrast between European markets, which have more structured circular procurement frameworks, and emerging economies, where such frameworks remain

weak, highlights the influence of policy maturity on environmental decision-making. These results indicate a clear gap between sustainability aspirations and actual procurement practices, suggesting the need for policy intervention and improved environmental literacy among procurement teams.

Finally, vendor credibility and market maturity play a decisive role in shaping organizational trust and adoption readiness. The literature consistently shows that vendor transparency, warranty strength, and after-sales support significantly influence perceptions of refurbished ICT quality. Table 7 further demonstrates substantial regional variation: where refurbishment markets are professionalized and standardized, organizations express greater confidence; where vendor practices are inconsistent, adoption remains low. This highlights the interdependence between organizational adoption and broader market structures. Trust in the refurbished ICT ecosystem is therefore not merely a matter of organizational preference, but also a reflection of vendor professionalism and industry-wide signaling mechanisms.

Collectively, the synthesis of Tables 6 and 7 demonstrates that refurbished ICT and leasing adoption is influenced by a complex interplay of financial considerations, risk perceptions, organizational norms, sustainability priorities, and vendor-related structures. These insights highlight that adoption challenges are multi-layered and cannot be addressed through isolated interventions. Instead, effective strategies must simultaneously address cognitive barriers, structural procurement constraints, vendor credibility issues, and policy shortcomings.

These findings lay a strong foundation for the subsequent Gap Analysis and underscore the need for intervention-based research approaches, such as action research, to challenge established procurement routines and foster organizational learning. They also provide the empirical and conceptual grounding for developing a comprehensive conceptual model that integrates economic, organizational, sustainability, and vendor dimensions informing both theory and practice in circular ICT procurement.

Gap Analysis

The synthesis of the 30 studies reviewed reveals substantial progress in understanding refurbished ICT adoption, device lifecycle extension, and leasing models. However, the collective analysis of the thematic findings (Table 6) and empirical patterns (Table 7) demonstrates that the existing body of knowledge remains fragmented, unevenly distributed across regions, and insufficiently grounded in organizational practice. The gaps identified are multi-level, spanning conceptual, methodological, contextual, and practical dimensions. These deficiencies justify the need for deeper empirical inquiry and intervention-oriented approaches that address organizational realities, particularly in emerging economies such as Malaysia.

The first major gap concerns the geographical and contextual limitations of the current literature. A significant proportion of studies originate from Europe and North America, where refurbishment markets are mature, regulatory structures are established, and circular procurement is more institutionalized. These contexts differ markedly from those in Asia, Africa, and Southeast Asia, where refurbishment ecosystems, vendor capabilities, and

procurement cultures are less developed. Only a small number of studies address Asian markets, and virtually none examine Malaysian organizational behavior toward refurbished ICT or leasing. This contextual imbalance restricts the generalizability of findings and underscores the need for research that reflects the procurement structures, cultural norms, and market dynamics of emerging economies.

A second gap is the limited theoretical integration across existing studies. While several articles draw upon isolated frameworks such as technology adoption theory, lifecycle assessment, or circular economy principles few studies synthesize economic, organizational, behavioral, and sustainability perspectives into a unified explanatory model. The absence of integrated frameworks limits the ability to understand how financial drivers, risk perceptions, policy influences, and vendor dynamics interact to shape organizational decision-making. This gap is particularly evident in studies that address leasing models, where economic and operational drivers are often explored independently of organizational behavior or risk-related concerns.

A third gap relates to the dominance of descriptive and observational research designs. Most reviewed studies rely on surveys, case studies, or secondary data to describe perceptions, performance outcomes, or environmental impacts. While useful, these designs seldom involve active interventions, iterative change processes, or real-time organizational learning. Notably, none of the selected studies employ action research or similar participatory methodologies. This methodological gap is significant because refurbished ICT adoption is not merely a technical issue but an organizational transformation process requiring behavioral change, knowledge diffusion, and cross-departmental collaboration. Intervention-based research is therefore essential for examining how procurement norms can be challenged, how stakeholder resistance can be reduced, and how vendor–client engagement can be strengthened.

A fourth gap pertains to the underdeveloped examination of procurement routines and governance structures. Although organizational inertia and risk aversion are widely acknowledged themes, few studies explore the internal policy frameworks, tendering mechanisms, approval hierarchies, or audit requirements that shape ICT procurement decisions. These structural factors often pose significant barriers in public-sector or compliance-driven environments, yet they remain understudied. Without a deeper understanding of these systemic constraints, recommendations for adoption remain superficial and disconnected from organizational realities.

The fifth gap concerns the limited exploration of vendor credibility, refurbishment standards, and service-level agreements in influencing adoption. While several studies highlight the importance of vendor signaling, there is little empirical work examining how specific vendor strategies such as certification schemes, warranty structures, performance guarantees, or communication protocols affect organizational trust. This omission is particularly problematic in regions where vendor maturity is uneven and quality assurance practices vary widely.

Finally, the review reveals a persistent gap in integrating sustainability and circular economy principles into organizational procurement practice. Despite strong evidence that

refurbished ICT significantly reduces e-waste and carbon emissions, environmental considerations remain secondary in most organizational decisions. Few studies investigate how circular procurement policies can be operationalized, what metrics organizations should adopt, or how procurement officers interpret sustainability guidelines.

Overall, these gaps highlight the need for context-specific, theoretically grounded, and intervention-based research. The limitations in existing scholarship underscore why a cyclical action research approach is not only appropriate but necessary to address adoption challenges holistically. By engaging directly with organizational stakeholders, testing real-world interventions, and examining behavioral and structural barriers in situ, the present study seeks to address these gaps and contribute meaningful empirical and theoretical advancements to the field.

Conclusion

This systematic literature review synthesized insights from 30 high-quality Scopus and Web of Science articles to examine the organizational, economic, behavioral, and sustainability-related factors shaping the adoption of refurbished ICT and leasing models. The findings reveal that although refurbished ICT offers clear benefits such as cost savings, reduced environmental impact, and enhanced lifecycle efficiency its adoption remains uneven and limited across global organizational settings. The five themes identified in this review illustrate a complex interplay of financial considerations, quality and risk perceptions, organizational procurement routines, circular economy motivations, and vendor credibility. These themes collectively demonstrate that adoption challenges are multidimensional and deeply embedded within both organizational structures and broader market ecosystems.

The review also exposes significant gaps in existing scholarship. Empirical research is heavily concentrated in Western contexts, with very limited representation from Southeast Asia, including Malaysia. Theoretical development remains fragmented, and most studies rely on descriptive or observational methods that do not engage directly with real-world procurement processes. In particular, the absence of intervention-based methodologies prevents a deeper understanding of how organizational mindsets, procurement norms, and vendor relationships can be transformed.

Given these limitations, this review establishes a strong rationale for undertaking an action research approach. Action research is well positioned to address the multi-layered challenges identified by enabling iterative learning, collaborative problem-solving, and evidence-based intervention within organizational settings. The insights from this review form the empirical and conceptual foundation for the subsequent action research cycles in this study, which aim to reduce risk perceptions, strengthen vendor–client engagement, and promote sustainable ICT procurement practices.

In summary, this review contributes to both scholarship and practice by consolidating global knowledge, revealing persistent gaps, and identifying critical leverage points for transforming ICT procurement. It underscores the urgency of developing context-specific, organizationally grounded strategies to advance the adoption of refurbished ICT and leasing within Malaysia and similar emerging economies.

Implications for Theory and Practice

Implications for Theory

The findings of this systematic literature review are motivated by the limited adoption of refurbished ICT and leasing models despite their well-documented economic and environmental benefits, as well as the fragmented theoretical explanations in existing studies. Accordingly, this review offers several important contributions to the theoretical understanding of refurbished ICT and leasing adoption.

First, the review highlights the need for integrated theoretical frameworks that bridge economic rationality, organizational behavior, sustainability principles, and vendor signaling. Existing studies tend to rely on isolated lenses, such as technology adoption models or lifecycle assessment. The themes identified in this review demonstrate that organizational ICT procurement decisions are shaped by overlapping financial, behavioral, cultural, and structural determinants. Future theoretical development should therefore adopt more holistic models capable of capturing these interactions.

Second, the SLR underscores the persistent gap between perceived and actual technology risk, suggesting that risk-related constructs require deeper refinement in ICT adoption theory. Perceived reliability concerns, despite strong empirical performance evidence, indicate a misalignment between technological reality and organizational cognition. This reinforces the relevance of behavioral theories, such as institutional theory and prospect theory, in explaining procurement conservatism.

Third, the review reveals that circular economy transitions within ICT procurement remain insufficiently theorized. While environmental sustainability is widely acknowledged, few theoretical frameworks explain how organizations move from awareness to actionable circular procurement behavior. This gap calls for theories that incorporate behavioral readiness, organizational learning, and policy alignment in sustainability-driven ICT practices.

Finally, the absence of action research in prior studies suggests that theories of organizational change, such as Work Systems Theory or Punctuated Equilibrium Theory, could play a central role in understanding how procurement norms evolve over time. The review therefore positions action research as a theoretically meaningful approach for studying ICT procurement transformation.

Implications for Practice

Motivated by the persistent gap between the recognized benefits of refurbished ICT and its limited adoption in organizational practice, this study provides several important practical implications for organizations, vendors, and policymakers.

First, the findings highlight that organizations often underestimate the economic and operational advantages of refurbished ICT and leasing. Clearer communication of total cost of ownership (TCO), lifecycle benefits, and maintenance efficiencies could support more evidence-based procurement decisions. Vendors and policymakers should develop structured tools such as cost-comparison dashboards or leasing-readiness assessments to address this gap.

Second, the review emphasizes that risk perceptions, rather than actual technical performance, are the main barriers to adoption. This indicates the need for practical strategies such as pilot testing, demonstration units, performance reporting, and enhanced warranty schemes to build user confidence. Vendor transparency and standardized refurbishment certifications would also play an important role in reducing perceived risk.

Third, the findings identify organizational procurement structures as central obstacles. Many organizations retain rigid procurement rules that favor new equipment. Practical reforms such as integrating circular procurement criteria, revising tender specifications, and enabling flexible approval structures could facilitate the adoption of refurbished ICT and leasing models. Leadership engagement and cross-departmental communication are crucial for enabling these changes.

Fourth, sustainability implications reveal that environmental benefits are seldom prioritized in procurement decisions. This suggests the need for policy frameworks that embed circular economy incentives, environmental scoring mechanisms, and mandatory reporting of e-waste reductions. Organizations may benefit from adopting sustainability metrics within their ICT procurement guidelines.

Finally, the uneven maturity of refurbishment markets, particularly in Southeast Asia, indicates that vendor development is essential. Standardized refurbishment processes, stronger after-sales support, and transparent communication practices can significantly improve organizational trust. Vendors should be encouraged to develop industry-wide certifications and strengthen their client engagement capabilities.

Policy Implications

The findings of this systematic review offer several significant implications for policymakers, regulatory agencies, and national digital transformation bodies seeking to promote sustainable and cost-efficient ICT procurement. The persistent gap between the proven benefits of refurbished ICT and its limited organizational adoption suggests that policy interventions must move beyond general sustainability aspirations and toward concrete, enforceable mechanisms that shape procurement behavior.

First, the review highlights the need for formalized circular procurement frameworks within national ICT policies. While many countries including Malaysia emphasize sustainability in broad policy documents, these commitments have not translated into procurement guidelines that explicitly endorse refurbished or leased ICT solutions. Governments should consider integrating circular economy criteria into public procurement regulations, including mandatory lifecycle cost assessment (LCC), environmental performance scoring, and incentives for extended product lifecycles. Such policies would help institutionalize sustainability within procurement processes rather than leaving it to organizational discretion.

Second, the review underscores the importance of standardizing refurbishment quality through national or regional certification systems. Inconsistent refurbishment practices weaken market trust and inhibit adoption. Policymakers should develop or endorse certification schemes that specify minimum standards for refurbishment, testing, data

sanitization, and warranty coverage. This would reduce information asymmetry and support vendor credibility, particularly in Southeast Asian markets where refurbishment ecosystems are still evolving.

Third, the findings point to the urgency of strengthening vendor accountability and transparency. Policy mechanisms such as vendor registration systems, performance reporting requirements, and warranty compliance audits can reassure organizations that refurbished ICT suppliers operate at recognized standards. Public-sector procurement portals could include designated categories for certified refurbished ICT providers, improving visibility and market access.

Fourth, the review indicates that procurement policy reform is essential to overcome institutional inertia. Current procurement rules often favor capital expenditure and the acquisition of new devices, creating structural barriers to leasing or refurbishment-based models. Policy adjustments could include allowing operational expenditure (OPEX)-based procurement for ICT, revising tender specifications to include refurbished or leased options by default, and establishing guidelines that ensure fair evaluation of non-new products.

Fifth, policymakers should promote pilot programs and demonstration projects across public institutions. Evidence from global studies shows that hands-on experience with refurbished ICT significantly reduces perceived risks and encourages broader adoption. National initiatives such as centralized refurbishment pilots in schools, government agencies, or healthcare facilities could generate credible performance data, which may later serve as benchmarks for institutionalizing circular procurement practices.

Finally, the review identifies a need to embed environmental reporting and accountability mechanisms within ICT procurement policies. Introducing mandatory e-waste reduction reporting, carbon footprint disclosure, or circularity performance indicators would encourage organizations to factor sustainability metrics into procurement decisions. Such reporting requirements could be linked to national digital transformation targets and sustainability reporting frameworks.

Overall, the policy implications arising from this review suggest that achieving large-scale adoption of refurbished ICT and leasing models requires coordinated regulatory interventions, standardization efforts, and systematic integration of circular principles into procurement governance. Policymakers play a critical role in shaping market structures, influencing organizational behavior, and accelerating the transition toward more sustainable ICT ecosystems.

Table 8

Policy Recommendations for Strengthening Refurbished ICT and Leasing Adoption

Policy Domain	Recommendation	Rationale Based on SLR Findings	Expected Policy Outcome
Circular Procurement Governance	Develop formal national guidelines endorsing refurbished ICT and ICT leasing as eligible procurement options.	Procurement inertia persists due to lack of official policy direction and rigid tendering rules.	Increased organisational confidence; institutionalization of circular ICT procurement.
Lifecycle Costing (LCC) Integration	Mandate lifecycle cost assessment (LCC) in all public-sector ICT tenders.	Organisations often overlook long-term savings due to a focus on upfront capital expenditure.	More cost-efficient procurement decisions; improved adoption of refurbishment and leasing.
Refurbishment Certification Standards	Establish or adopt national refurbishment standards (testing, grading, data sanitisation, warranty requirements).	Inconsistent vendor quality fuels risk perceptions and mistrust.	Higher market confidence; improved vendor competency and transparency.
Vendor Regulatory Oversight	Implement vendor registration, warranty compliance audits, and performance reporting requirements.	Weak quality control in emerging markets undermines adoption readiness.	Stronger vendor accountability; enhanced reliability of refurbished ICT supply chains.
5. Public-Sector Pilot Projects	Launch centrally coordinated pilot programmes in schools, ministries, and public agencies to test refurbished ICT.	Experiential evidence reduces perceived risk and drives acceptance.	Scalable proof-of-concept models; evidence base for national policy expansion.
Circular Economy Incentives	Introduce tax incentives, procurement scoring bonuses, or grants for organisations adopting refurbished ICT.	Sustainability motivations remain secondary in procurement behaviour.	Increased organisational uptake; alignment with national e-waste and carbon reduction goals.
Procurement Policy Reforms	Allow OPEX-based ICT leasing procurement; include refurbished options by default in tender specifications.	CAPEX-centric rules favour new hardware purchases; leasing is disadvantaged.	Greater flexibility in ICT acquisition; wider use of DaaS and leasing models.
Environmental Accountability Measures	Require annual reporting of ICT-related e-waste reduction, carbon savings, and circular procurement metrics.	Sustainability benefits are known but not operationalized in practice.	Embedded environmental considerations in decision-making; improved national tracking.
Capacity Building and Training	Provide training for procurement officers on circular ICT, refurbishment quality indicators, and leasing models.	Knowledge gaps and misconceptions drive resistance.	Better-informed procurement teams; reduction in risk-averse behaviour.
Public Awareness and Industry Development	Support campaigns promoting certified refurbished ICT; encourage industry collaboration to strengthen refurbishment ecosystems.	Low awareness of refurbishment standards and benefits limits demand.	Growth of high-quality refurbishment markets; improved public-sector uptake.

References

Abu Bakar, N., Peszynski, K., Azizan, N., & Sundram, V. P. K. (2025). Abridgment of traditional procurement and e-procurement: Definitions, tools and benefits. Journal of Emerging Economies and Islamic Research, 4(1), Article 6284. https://doi.org/10.24191/jeeir.v4i1.6284

Almunawar, M. N., Islam, M. Z., & de Pablos, P. O. Organizational Learning and Sustainability. https://api.taylorfrancis.com/content/books/mono/download?identifierName=doi&identifierValue=10.4324/9781003581918&type=googlepdf

Rejeb, A., Rejeb, K., Appolloni, A., & Seuring, S. (2024). Public procurement research: a bibliometric analysis. *International Journal of Public Sector Management*, *37*(2), 183-214. https://www.emerald.com/insight/content/doi/10.1108/ijpsm-07-2022-0157/full/html

Ashworth, S. J. (2021). *The evolution of facility management (FM) in the building information modelling (BIM) process: An opportunity to use critical success factors (CSF) for optimizing built assets*. Liverpool John Moores University (United Kingdom).

Atlason, R. S., Giacalone, D., & Parajuly, K. (2017). Product design in the circular economy: Users' perception of end-of-life scenarios for electrical and electronic appliances. *Journal of Cleaner Production*, *168*, 1059-1069. https://www.sciencedirect.com/science/article/pii/S0959652617320711

Avison, D. E., Lau, F., Myers, M. D., & Nielsen, P. A. (1999). Action research. *Communications of the ACM*, *42*(1), 94-97. https://dl.acm.org/doi/fullHtml/10.1145/291469.291479

Balde, C. P., Forti, V., Gray, V., Kuehr, R., & Stegmann, P. (2017). *The global e-waste monitor 2017*. United Nations University.

Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic approaches to a successful literature review* (2nd ed.). Sage.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology,* *3*(2), 77–101. https://www.tandfonline.com/doi/abs/10.1191/1478088706QP063OA

Cegarra-Navarro, J. G., Wensley, A. K., & Martínez-Conesa, E. Á. (2010). A multi-sector comparison of relational learning and information and communication technologies adoption. *The Service Industries Journal*, *30*(6), 991-1005. https://www.tandfonline.com/doi/abs/10.1080/02642060802342661

Chan, A. P. C., & Owusu, E. K. (2022). Evolution of electronic procurement: Contemporary review of adoption and implementation strategies. Buildings, 12(2), 198. https://doi.org/10.3390/buildings12020198

Chen, D. Q., Mocker, M., Preston, D. S., & Teubner, A. (2010). Information systems strategy: Reconceptualization, measurement, and implications. MIS Quarterly, 34(2), 233–259. https://www.jstor.org/stable/20721426

Coghlan, D., & Brannick, T. (2014). *Doing action research in your own organization* (4th ed.). Sage.

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

Croom, S. (2000). The impact of web-enabled supply chain on procurement strategies. International Journal of Operations & Production Management, 20(3), 30–8. https://doi.org/10.1108/01443570010304694

De Vaujany, F. X., Leclercq-Vandelannoitte, A., Aroles, J., Introna, L., & Davidson, S. (2025). Rethinking responsibility in the digital age: a narrative approach. *MIS Quarterly*, *49*(4),

1295-1318.https://misq.umn.edu/misq/article pdf/49/4/1295/19162/03_rc_10.25300_misq_2025_17970.pdf

Dietrich, J., Becker, F., Nittka, T., Wabbels, M., Modoran, D., Aionesei, C., ... & Musterle, J. (2014, August). Extending product lifetimes: A reuse network for ICT hardware. In *Proceedings of the Institution of Civil Engineers-Waste and Resource Management* (Vol. 167, No. 3, pp. 123-135).

Thomas Telford Ltd.Eldredge, N., & Gould, S. J. (1972). Punctuated equilibria: An alternative to phyletic gradualism. In T. Schopf (Ed.), *Models in paleobiology* (pp. 82–115). Freeman. https://www.icevirtuallibrary.com/doi/abs/10.1680/warm.13.00024

Evangelista, P., & Hallikas, J. (2022). Exploring the influence of ICT on sustainability in supply management: Evidence and directions for research. Cleaner Logistics and Supply Chain, 4, 100051. https://doi.org/10.1016/j.clscn.2022.100051

Foerstl, K. (2018). Digital procurement integration and organizational performance. Journal of Purchasing & Supply Management, 24(2), 101–111. https://doi.org/10.1016/j.pursup.2017.08.004

Gåvertsson, I., Milios, L., & Dalhammar, C. (2020). Quality labelling for re-used ICT equipment to support consumer choice in the circular economy. *Journal of Consumer Policy*, *43*(2), 353-377. https://link.springer.com/article/10.1007/s10603-018-9397-9

Gersick, C. J. G. (1991). Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm. *Academy of Management Review, 16*(1), 10–36. https://journals.aom.org/doi/abs/10.5465/amr.1991.4278988

Ghosh, A., Pathak, D., Bhola, P., Bhattacharjee, D., & Sivarajah, U. (2023). Analysing product attributes of refurbished laptops based on customer reviews and ratings: machine learning approach to circular consumption. *Annals of Operations Research*, 1-23. https://link.springer.com/article/10.1007/s10479-023-05758-9

Gunasekaran, A. (2001). E-procurement adoption and implementation: A review of the early evidence. International Journal of Production Economics, 73(1), 135–150. https://doi.org/10.1016/j.ijpe.2009.05.013

Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017). Enterprise information systems adoption and supply chain performance. International Journal of Production Research, 55(17), 5108–5121. https://doi.org/10.1080/00207543.2017.1287700

Haddaway, N. R., Macura, B., Whaley, P., & Pullin, A. S. (2018). ROSES reporting standards for systematic evidence syntheses. *Environmental Evidence, 7*(7), 1–9. https://link.springer.com/article/10.1186/s13750-018-0121-7

Hamid, A. B. (2020). Green procurement and performance. Journal of Cleaner Production, 258, Article 120621. https://doi.org/10.1016/j.jclepro.2020.120621

Hazen, B. T., Boone, C., Ezell, J., & Jones-Farmer, L. A. (2012). Perceived quality and organisational trust in refurbished electronics. *Journal of Supply Chain Management, 48*(3), 3–19. https://link.springer.com/article/10.1007/s10479-016-2314-1

Heinrich. (2015). Automated planning of process models: Design of a novel approach to construct exclusive choices. Decision Support Systems, 78, 1–15. https://doi.org/10.1016/j.dss.2015.07.005

Herr, K., & Anderson, G. (2015). *The action research dissertation: A guide for students and faculty* (2nd ed.). Sage.

Hines, T. (2024). *Supply chain strategies: Demand driven and customer focused*. Routledge.

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., … & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018. *Educational Research Review, 14*, 16–35. https://journals.sagepub.com/doi/abs/10.3233/EFI-180221

Ibrahim, S. Z. (2024). Benefits of e-procurement system. Advances in Business Research International Journal, 7(1), 142–149. https://doi.org/10.24191/abrij.v7i1.4074

Johny, J., & Gurtu, A. (2024). Digital supply chain technologies and sustainability. In *Environmentally responsible supply chains in an era of digital transformation* (pp. 79-104). Edward Elgar Publishing. https://www.elgaronline.com/edcollchap/book/9781803920207/book-part-9781803920207-10.xml

Joshi, M., & Nikhade, S. D. (2024). Developing Sustainable Consumer Practices: A Framework for Managing Refurbished Electronic Goods in India: Framework for Managing Refurbished Electronic Goods. *Journal Of Scientific & Industrial Research (JSIR)*, *83*(12), 1326-1337. https://or.niscpr.res.in/index.php/JSIR/article/view/9021

Kalakota, R., & Whinston, A. (1997). Frontiers of electronic commerce and procurement strategies. Addison-Wesley.

Kianpour, K., Jusoh, A., Mardani, A., Streimikiene, D., Cavallaro, F., Md. Nor, K., & Zavadskas, E. K. (2017). Factors influencing consumers' intention to return the end of life electronic products through reverse supply chain management for reuse, repair and recycling. *Sustainability*, *9*(9), 1657. https://www.mdpi.com/2071-1050/9/9/1657

Kibria, M. G., & Hong, P. (2024). E-government in Asian countries: a conceptual framework for sustainable development. *Transforming Government: People, Process and Policy*, *18*(4), 616-637. https://www.emerald.com/insight/content/doi/10.1108/tg-01-2023-0003/full/html

Kiel, D., Arnold, C., & Voigt, K. I. (2017). The influence of digital transformation on procurement practices. Business Research, 10(2), 821–874. https://doi.org/10.1016/j.technovation.2017.09.003

Lacity, M. C., & Wilcocks, L. P. (2014). Sourcing Information Technology Services. MIS Quarterly Executive, 5(4), 181–192. https://api.taylorfrancis.com/content/chapters/edit/download?identifierName=doi&identifierValue=10.1201/b16768-60&type=chapterpdf

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues, 2*(4), 34–46.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Masudin, I., Aprilia, G. D., Nugraha, A., & Restuputri, D. P. (2021). Impact of e-procurement adoption on company performance: Evidence from Indonesian manufacturing industry. Logistics, 5(1), 16. https://doi.org/10.3390/logistics5010016

Masudin, I., Nugraha, A., & Restuputri, D. P. (2021). E-Procurement adoption and performance relationships. Logistics, 5(1), 16. https://doi.org/10.3390/logistics5010016

McCue, C., & Roman, A. (2012). Electronic government procurement: E-procurement adoption challenges and benefits. Journal of Public Procurement, 12(4), 468–486. https://www.researchgate.net/publication/259648353_E-Procurement_Myth_or_Reality

Mustonen, M. (2024). *Designing guidelines for responsible and environmentally sustainable ICT supplier selection: Increasing green ICT awareness in the case organization*. https://osuva.uwasa.fi/handle/10024/17366

Oke, A. (2023). Beyond the psychology of self and individual's pro-environmental behaviours: exploring how technology innovations can help organisations achieve and promote

sustainability. *Technological sustainability*, *2*(1), 1-19. https://www.emerald.com/insight/content/doi/10.1108/TECHS-02-2022-0013/full/html

Ostrom, A. L., Parasuraman, A., Bowen, D. E., Patrício, L., & Voss, C. A. (2015). Service research priorities in a rapidly changing context. *Journal of service research*, *18*(2), 127-159. https://journals.sagepub.com/doi/abs/10.1177/1094670515576315

Özgen, Ö., & Ertiş, Ö. (2014). The impact of barriers and benefits of e-procurement on its adoption decision: An empirical analysis. International Journal of Production Economics, 158, 77–90. https://doi.org/10.1016/j.ijpe.2014.07.017

Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). Sage.

Reason, P., & Bradbury, H. (2008). *The Sage handbook of action research* (2nd ed.). Sage.

Sarkhoshkalat, M. M., Afkham, A., Bonyadi Manesh, M., & Sarkhosh, M. (2024). Circular economy and the recycling of e-waste. In *New technologies for energy transition based on sustainable development goals: Factors contributing to global warming* (pp. 319-354). Singapore: Springer Nature Singapore. https://link.springer.com/chapter/10.1007/978-981-97-2527-4_16

Schoenherr, T., & Tummala, V. M. R. (2007). Electronic procurement: A structured literature review and directions for future research. International Journal of Procurement Management, 1(1/2), 8–37. https://doi.org/10.1504/IJPM.2007.015353

Shaffril, H. A. M., Samah, A. A., & Samsuddin, S. F. (2021). Guidelines for developing a systematic literature review for studies related to climate change adaptation. *Environmental Science and Pollution Research*, *28*(18), 22265-22277. https://link.springer.com/article/10.1007/s11356-021-13178-0

Sharma, M., Luthra, S., Joshi, S., Kumar, A., & Jain, A. (2023). Green logistics driven circular practices adoption in industry 4.0 Era: A moderating effect of institution pressure and supply chain flexibility. *Journal of Cleaner Production*, *383*, 135284. https://www.sciencedirect.com/science/article/pii/S0959652622048582

Sharpe, R. G., Goodall, P. A., Neal, A. D., Conway, P. P., & West, A. A. (2018). Cyber-Physical Systems in the re-use, refurbishment and recycling of used Electrical and Electronic Equipment. *Journal of cleaner production*, *170*, 351-361. https://www.sciencedirect.com/science/article/pii/S0959652617320772

Singh, P. K., & Chan, S. W. (2022). The impact of electronic procurement adoption on green procurement towards sustainable supply chain performance – Evidence from Malaysian ISO organizations. Journal of Open Innovation: Technology, Market, and Complexity, 8(2), 61. https://doi.org/10.3390/joitmc8020061

Taneja. (2019). Modeling user preferences using neural networks and tensor factorization model. International Journal of Information Management, 45, 99–110. https://doi.org/10.1016/j.ijinfomgt.2018.10.010

Tarigan, R. S., Tarigan, Z. V. B., Maer, M. N. D., Tarigan, Z., & Jie, F. (2024). The influence of information technology on supply chain resilience through purchasing strategy, production flexibility, and supply chain responsiveness. Decision Science Letters, 13(4), 791–806. https://doi.org/10.5267/j.dsl.2024.9.001

Taylor, M., & Taylor, A. (2012). The technology life cycle: Conceptualization and managerial implications. *International journal of production economics*, *140*(1), 541-553. https://www.sciencedirect.com/science/article/pii/S0925527312003131

Van de Walle, A., & Aerts, G. *Structuring the sustainability of corporate digitalization: A review of existing frameworks and recommendations to improve procedural rationality*.

Available at SSRN 5526246. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5526246

Wadesango, N., Jori, A. K., & Lovemore, S. (2023). Literature review of the relationship between E-procurement and cost reduction. Multidisciplinary Science Journal, 5, Article 2023ss0316. https://doi.org/10.31893/multiscience.2023ss0316

Waithaka, R. K., & Kimani, J. G. (2021). Determinants of adoption of e-procurement practices: A critique of literature review. Global Journal of Purchasing and Procurement Management, 1(1), 22–31. https://doi.org/10.47604/gjppm.1199

Walker, H., & Brammer, S. (2012). Sustainable procurement in public sectors. Journal of Public Administration Research and Theory, 22(3), 421–445. https://www.researchgate.net/publication/257356060_The_relationship_between_sustainable_procurement_and_e-procurement_in_the_public_sector

Walker, H., & Brammer, S. (2012). The relationship between sustainable procurement and e-procurement in the public sector. International Journal of Production Economics, 140(1), 256–268. https://doi.org/10.1016/j.ijpe.2012.01.008

Walker, H., Di Sisto, L., & McBain, D. (2008). Drivers and barriers to sustainable procurement in the public sector. International Journal of Procurement Management, 1(1), 68–88. https://doi.org/10.1016/j.pursup.2008.01.007

Wamba, S. F.(2020). Blockchain adoption in operations and supply chain management. International Journal of Production Research. https://doi.org/10.1016/j.ijpe.2020.107791

Zheng, Y., Zhang, W., Wang, R., & Ahmad, R. (2025). Scheduling in Remanufacturing Systems: A Bibliometric and Systematic Review. *Machines*, *13*(9), 762. https://www.mdpi.com/2075-1702/13/9/762

Zulkarnain, Z., Muda, I., & Kesuma, S. A. (2023). Factors determining the adoption of e-procurement in developing countries: A systematic literature review. International Journal of Social Service and Research, 3(2), 585–594. https://doi.org/10.46799/ijssr.v3i2.281