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Career trajectories of women in logistics ecosystems: A systematic review and institutional pathways model

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Abstract

Research on women's participation in logistics and supply chain management has expanded considerably; however, existing evidence remains fragmented across subsectors and largely focuses on representation rather than career development processes. This study examines how women's careers evolve within logistics ecosystems and identifies the institutional mechanisms shaping career trajectories. A systematic literature review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 and PRISMA-S guidelines. Forty-seven studies were identified through comprehensive database searches and analysed using a multi-level coding framework encompassing macro-level institutional conditions, meso-level organisational practices, and micro-level career experiences. The findings reveal that women's career trajectories are shaped by institutionally structured pathways that operate across the entry, progression, leadership, and retention stages. Key mechanisms include occupational segregation, unequal access to developmental assignments, mobility constraints, legitimacy bias, organisational culture, and work–life demands. These factors interact cumulatively across institutional levels, creating persistent barriers to career advancement and leadership participation. While the nature and intensity of barriers vary across logistics subsectors such as trucking, maritime logistics, warehousing, procurement, and supply chain management, common patterns of disadvantage are evident throughout the ecosystem. Based on the synthesis, the study develops an Institutional Pathways Model that integrates institutional theory, gendered organisation theory, cumulative disadvantage, and career-stage analysis. The model explains how macro-level institutional conditions are translated through organisational practices, accumulate across career transitions, and generate feedback effects that may reproduce or disrupt gendered career outcomes.

Keywords: Women in logistics; Career paths; Logistics ecosystems; Institutional theory; Gender inequality; Supply chain management; Systematic literature review

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1. Introduction

The logistics industry is crucial to the global economy and trade. However, its workforce and career paths remain highly gendered. In areas such as road freight, warehousing, ports, maritime logistics, third-party logistics, procurement, and supply chain management, women's access to entry, advancement, leadership, and career sustainability varies widely. Although research on gender diversity in logistics is growing, much of it remains fragmented and largely descriptive. Few studies consider how women's careers develop over time or how institutional factors shape these career paths.[1,2]

Globally, the transport and logistics industry remains highly gender-segregated despite increasing efforts to promote workplace diversity and inclusion. For example, women occupy only approximately 10% of jobs in the United States rail industry, with even lower representation in some technical and operational roles.[3] The Deloitte Global Boardroom Program's Women in the Boardroom Report indicates that women hold only 19.7% of corporate board seats globally, 6.7% of board-chair positions, and 5.0% of chief executive officer roles.[4] The Global Gender Gap Report 2022 similarly shows that transport, logistics, and supply chain management remain among the least gender-diverse industries.[5] More recent evidence from the 2023 and 2025 reports confirms the continued underrepresentation of women in senior leadership across transport, logistics, supply chain, and storage.[6,7] Collectively, these statistics demonstrate that gender inequality within logistics extends beyond workforce participation to encompass career progression, leadership representation, and access to strategic decision-making positions, thereby providing a compelling rationale for examining the institutional mechanisms that shape women's career pathways within the sector.

This gap is important for both theory and practice. Theoretically, earlier studies have not linked logistics career patterns to theories such as institutional theory, gendered organisational theory, or cumulative disadvantage. Practically, there is a need to examine the processes that shape gendered career outcomes, rather than merely describing inequality. Viewing women's participation in logistics as a simple diversity issue may conceal the cumulative processes that generate disadvantage, including occupational sorting, unequal access to developmental opportunities, limited mobility, and exclusion from leadership. [8-11]

A trajectory-based approach is more effective for understanding these issues. Careers in logistics develop over time through stages such as entry, skill development, advancement, leadership, retention, and exit.[12,13] This perspective is especially relevant within logistics ecosystems, where specialised work, operational complexity, mobility requirements, and occupational cultures influence perceptions of legitimate work.[14,15] Research further demonstrates how occupational segregation, work–life demands, professional identity, and workplace culture influence women's logistics careers.[10,16,17]

Careers in logistics develop within entire ecosystems, not just within individual organisations. An ecosystem generally refers to a group of interacting organisations that depend on one another's activities.[18] The logistics ecosystem therefore comprises the organisations, people, resources, and activities involved in the flow of goods, services, and information from suppliers to end users.[19] It also encompasses economic, collaborative, customer, and societal value creation across interconnected organisations.[20] Institutional theory helps explain how formal rules, professional norms, and shared assumptions influence organisational practices and career outcomes.[21,22]

Because women's career trajectories in logistics are shaped by interacting influences that extend beyond either the individual or the organisation, this study adopts a multi-level perspective that distinguishes among macro-, meso-, and micro-level factors. The macro level encompasses laws, public policies, labour-market structures, and prevailing societal gender norms that shape employment opportunities and career expectations.[22-24] The meso level focuses on organisations and other ecosystem actors whose practices influence career development.[20,22] At the micro level, individuals navigate these structures through their skills, aspirations, experiences, identities, and career decisions.[24,25] The review follows Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 and PRISMA-S reporting guidance.[26,27]

The rest of the paper is organised as follows. **Section 2** presents the theoretical foundations of the study by drawing on institutional theory and gendered perspectives on organisations and career stages. This is followed by a description of the systematic review design and methodology, the findings, and the development of the Institutional Pathways Model.

2. Theoretical foundations

2.1. Institutional theory and logistics careers

Institutional theory provides a key framework for understanding women's careers in logistics ecosystems by explaining how organisational fields are shaped by formal institutions, informal norms, shared social rules, and culturally embedded assumptions that influence organisational behaviour and decision-making.[22,23] Within

logistics and supply chain management, these institutional influences are reflected in formal regulations, organisational policies, professional standards, credentialing systems, and socially constructed beliefs about who is considered suitable for operational and leadership roles.[21,22] Consequently, career progression and opportunities are determined not only by individuals' qualifications and experience but also by institutionalised expectations, legitimacy pressures, and prevailing gender norms that shape recruitment, promotion, and leadership practices.[21,23]

The concept of institutional isomorphism is especially relevant here. Organisations within the same organisational field tend to become similar because of regulatory pressures (coercive isomorphism), professional standards (normative isomorphism), and uncertainty (mimetic isomorphism).[21] In the gendered labour market of logistics, these combined isomorphic pressures may produce a career system that appears meritocratic but sustains inequality. Persistent gender disparity may therefore be understood as a product of the organisational field rather than an isolated organisational anomaly.

Scott's three-pillar framework further enriches this explanation.[22] The regulative dimension encompasses labour laws, anti-discrimination regulations, safety standards, and transport-sector regulations. The normative dimension includes standards concerning professionalism, time commitment, geographical flexibility, and managerial conduct. The cultural-cognitive dimension encompasses shared beliefs that logistics is predominantly men's work, assumptions that operational roles require particular physical capabilities, and expectations that the ideal worker should be continuously available, geographically mobile, and able to work irregular hours.[8,22] These institutionalised beliefs shape not only organisational structures and practices but also the career scripts available to women within the logistics profession.

This perspective extends beyond the human capital approach, which explains labour-market and career outcomes primarily through individuals' investments in education, skills, training, and work experience.[28,29] Although human capital theory assumes that comparable qualifications and experience should produce comparable career rewards, women and men with similar human capital may follow different career trajectories when their competence is interpreted through gendered expectations and institutionalised judgements of occupational and leadership legitimacy. In logistics, this is evident in the differential valuation of roles, the gendered structuring of career pathways, and the continued association of legitimate leadership with masculine ideals of availability, mobility, authority, and endurance. [8,30]

2.2. Gendered organisations and cumulative career barriers

Although institutional theory explains how organisational fields are shaped by formal institutions, informal norms, and legitimacy pressures, it offers limited insight into the organisational mechanisms that reproduce gender inequality in everyday work.[22,23] Acker's Theory of Gendered Organisations addresses this limitation by demonstrating that organisations are structured through gendered assumptions embedded in work design, performance evaluation, promotion systems, and definitions of the "ideal worker."[8] Organisational arrangements that appear neutral may privilege masculine career patterns by presuming continuous labour-market participation, unrestricted availability, geographical mobility, and freedom from caregiving responsibilities.[8] Consequently, inequalities arise not only from overt discrimination but also from routine organisational practices that systematically advantage some employees while constraining others.

Gendered organisational processes are reinforced by informal institutions, including workplace cultures, professional norms, and shared beliefs about suitability for leadership and operational roles in male-dominated industries.[30] In logistics, where work frequently involves time-sensitive operations, irregular schedules, geographical mobility, and physically demanding tasks, these institutionalised assumptions often align with masculine norms. This alignment creates structural barriers to women's recruitment, career progression, and leadership opportunities.[1,10] Gender inequality in logistics therefore arises not only from individual prejudice but also from organisational and institutional arrangements that normalise unequal career opportunities.

Kanter's Theory of Tokenism further explains how numerical underrepresentation shapes workplace experiences and career outcomes.[31] When women constitute a small minority within an organisation or occupational group, they may become tokens, resulting in heightened visibility, stereotyping, performance pressure, and social isolation.[31] Rather than being evaluated solely according to their competence, women may be viewed as representatives of their gender, increasing their exposure to biased evaluations, exclusion from informal professional networks, and restricted access to influential assignments and leadership roles. These dynamics are particularly relevant in logistics subsectors such as road freight, ports, warehousing, maritime transport, and senior supply chain management, where women remain substantially underrepresented. Tokenism may therefore affect both women's daily workplace experiences and their long-term career progression, leadership attainment, and retention.

Leadership perspectives, particularly Role Congruity Theory and the leadership-labyrinth perspective, further emphasise the cumulative nature of women's career barriers.[9,32] The labyrinth metaphor proposes that women's career progression is rarely obstructed by a single barrier. Instead, it is shaped by interconnected obstacles encountered at different career stages, including gender stereotypes, unequal access to developmental opportunities, limited mentoring and sponsorship, work-family demands, exclusion from informal networks, and biased promotion processes.[9] These cumulative barriers progressively constrain women's advancement into senior leadership positions, resulting in their lower representation at the highest organisational levels.[9] This perspective is consistent with logistics evidence showing disadvantages at different transition points, including occupational entry, access to high-quality roles, mentoring and sponsorship, mobility-intensive assignments, and progression into leadership positions.[10,11]

Consequently, these theoretical perspectives demonstrate that gender inequality in logistics careers is both structurally embedded and cumulatively produced.

2.3. Toward an institutional pathway perspective

Integrating institutional theory with gendered organisation theory supports the development of an institutional pathways approach to women's careers in logistics ecosystems. Career processes are dynamic and shaped by interactions across the macro, meso, and micro levels.

The macro level refers to the broader institutional environment, including legal frameworks, labour markets, transport policies, and societal gender norms. These conditions affect the legitimacy of women's participation in logistics and their ability to establish and sustain careers within the sector.[22,23,33]

The meso level comprises the ecosystem actors that translate broader institutional conditions into practice, including firms, carriers, ports, training institutions, recruitment agencies, and professional associations. These actors influence women's career conditions through recruitment, job allocation, scheduling, promotion, mentoring, and access to professional networks.[20,22,34]

At the micro level, individuals engage with these structures through their career decisions, identity work, and adaptive practices. Women's experiences of entry, progression, leadership, and retention demonstrate how institutional constraints and organisational practices are lived and negotiated in practice.[1,24,25]

Women's career pathways are therefore neither entirely structural nor purely agentic. Rather, they are path-dependent processes shaped by the continuing interaction of macro-level institutional environments, meso-level organisational and ecosystem practices, and micro-level individual agency. This multi-level approach integrates quantitative evidence on occupational segregation, wage disparities, and leadership representation with qualitative insights into workplace experiences, work-life balance, professional identity, and belonging. Consequently, the Institutional Pathways Model provides a comprehensive framework for understanding the interconnected determinants of women's career trajectories in logistics.[35]

The framework moves beyond descriptive classification by explicitly connecting institutional mechanisms to career stages and outcomes. It therefore provides the theoretical foundation for the Institutional Pathways Model developed in the subsequent sections and guides the systematic review.

The framework developed here is a significant step beyond descriptive cataloguing and moves toward a theory-building approach by explicitly connecting mechanisms to career stage and outcome. This framework serves as the basis for the Institutional Pathways Model developed in the second half of the manuscript and guides the systematic review. The framework moves beyond descriptive classification by connecting institutional mechanisms to specific career stages and outcomes. The theoretical architecture guiding the systematic review is summarised in Table 1 and provides the foundation for developing the Institutional Pathways Model.

This theoretical perspective underpins the study's overall premise, and it is from this perspective that the systematic review methodology is designed and subsequently synthesised.

3. Methods

3.1. Review design and reporting standards

The current study employed a systematic literature review methodology to synthesise and integrate existing research on women's career trajectories within logistics ecosystems. The review was designed to accommodate the methodological diversity inherent in this field, including qualitative studies examining lived experiences and organisational culture, quantitative studies investigating wage gaps and representation, mixed-methods research, and a limited body of institutional and policy reports used for contextualisation.

The systematic review protocol was developed in accordance with internationally recognised best practices for evidence synthesis. The review followed PRISMA 2020 guidelines to enhance transparency

Table 1. Core theoretical architecture for the systematic review

Analytical level	Theoretical perspective	Analytical focus	Career implications
Macro	Institutional pillars (regulative, normative, cultural-cognitive)	Laws, policies, norms, and gendered beliefs shaping logistics participation	Entry access, mobility expectations, and leadership legitimacy
Meso	Ecosystem actors and organisational translation	Firms and institutions translating field pressures into human resource practices and career systems	Job assignment, mentoring, promotion pathways
Micro	Career stages and agency	Individual navigation of career transitions under unequal conditions	Promotion velocity, retention, identity work
Cross-level	Gendered organisational design	"Ideal worker" norms and masculine occupational coding	Exclusion from opportunities, cumulative barriers
Outcome	Career trajectories	Observable pathways across logistics careers	Representation, pay, and leadership access

throughout the identification, screening, eligibility, and inclusion stages.[26] The search strategy was reported in accordance with PRISMA-S to ensure transparency regarding database selection, search strings, and filtering procedures.[27]Additionally, all electronic database search strategies were developed in line with the PRESS peer-review guidelines to minimise omissions and strengthen methodological rigour.[36]

3.2. Eligibility criteria

The review framework is based on the population, phenomenon, context, outcomes, and study design. The included studies had to focus on women or gender-based comparisons within logistics ecosystems, such as trucking, warehousing, ports, maritime logistics, procurement, humanitarian logistics, and supply chain management. The phenomenon of interest was career trajectories, which are a staged process involving entry, progression, access to leadership positions, and retention. This includes mechanisms such as occupational segregation, mentoring, mobility, compensation inequality, and culture.

The review considered both objective outcomes (career progression rates, pay gaps, access to leadership roles, and turnover) and subjective outcomes (barriers to career advancement, work–life balance, and feelings of belonging), and included qualitative, quantitative, mixed-methods, and conceptual studies focusing on gender and careers in logistics, while excluding studies without a logistics context, gender analysis, or career-related mechanisms, as well as opinion pieces and non-systematic sources. No lower publication-date limit was imposed during the database searches. Scopus, Web of Science Core Collection, PubMed, and Google Scholar were searched across their full available coverage periods up to March 2026, supplemented by Google Scholar, citation tracking, and controlled grey literature searches. The earliest publication meeting the eligibility criteria was published in 1996; therefore, the studies included in the final analysis covered 1996 to March 2026.

3.3. Information sources and search strategy

The information search and retrieval strategy included a multi-database search. This is because the phenomenon of interest is an interdisciplinary research area. The search included Scopus, Web of Science Core Collection, and PubMed. Google Scholar was included for citation and grey literature searches. The search strategy included three main concept clusters: gender, career trajectories, and logistics ecosystems. A sensitivity-first approach was adopted. The search was refined iteratively and compared with known relevant studies. The database-specific Boolean search strings are presented in Table 2.

The database searches were supplemented by backward and forward citation tracking. Backward citation tracking involved screening the reference lists of studies that met the inclusion criteria, whereas forward citation tracking involved identifying later publications that cited these studies through Scopus, Web of Science, and Google Scholar. This supplementary procedure was necessary because evidence on women's career trajectories in logistics is interdisciplinary, uses inconsistent terminology, and is distributed across logistics, transport, maritime, gender, management, and labour journals. Citation tracking can identify relevant studies that may not be retrieved through keyword searches because of differences in terminology or database indexing.[27,37,38] All records identified through citation tracking were screened using the same eligibility criteria as records retrieved from the bibliographic databases.

Table 2. Core Boolean search strings

Source	Core Boolean Search Strings
Scopus (TITLE-ABS-KEY)	(TITLE-ABS-KEY(women OR woman OR female OR gender OR "gender diversity" OR "gender equality") AND TITLE-ABS-KEY("career trajectory" OR "career path" OR "career progression" OR "career advancement" OR promotion OR leadership OR retention OR turnover OR attrition OR "occupational segregation" OR "glass ceiling" OR mentoring OR sponsorship OR "pay gap" OR wage) AND TITLE-ABS-KEY(logistics OR "supply chain" OR "supply chain management" OR "physical distribution" OR warehous OR trucking OR "road freight" OR "freight transport" OR "third party logistics" OR 3PL OR maritime OR shipping OR port OR "freight forward" OR procurement))
Web of Science (TS=)	TS=(women OR female OR gender OR "gender diversity" OR "gender equality") AND TS=("career trajectory" OR "career progression" OR "career advancement" OR promotion OR leadership OR retention OR turnover OR attrition OR "occupational segregation" OR mentoring OR sponsorship OR "pay gap" OR wage) AND TS=(logistics OR "supply chain" OR warehous OR trucking OR "road freight" OR "freight transport" OR maritime OR shipping OR port OR procurement OR "physical distribution")
PubMed ([tiab])	(women[tiab] OR female[tiab] OR gender[tiab]) AND ("career"[tiab] OR "career progression"[tiab] OR promotion[tiab] OR leadership[tiab] OR retention[tiab] OR turnover[tiab] OR wage[tiab] OR "pay gap"[tiab]) AND (logistics[tiab] OR "supply chain"[tiab] OR warehouse[tiab] OR trucking[tiab] OR maritime[tiab] OR transport[tiab]) ABI/INFORM (ProQuest NOFT): NOFT((women OR female OR gender OR "gender diversity") AND ("career trajectory" OR "career progression" OR "career advancement OR promotion OR leadership OR mentoring OR sponsorship OR "occupational segregation" OR "pay gap" OR wage) AND (logistics OR "supply chain" OR warehouse OR trucking OR "freight transport" OR maritime OR shipping OR port OR procurement))
Google Scholar	("women" OR female OR gender) ("career progression" OR "career advancement" OR "career trajectory") (logistics OR "supply chain" OR trucking OR warehousing OR maritime OR shipping OR ports)

3.4. Screening and study selection

Study selection consisted of a two-reviewer process with third-reviewer adjudication. A two-stage screening process of the identified articles was employed: title/abstract screening and full-text screening.

A total of 3,586 records were identified: 3,463 through database searches and 123 through backward and forward citation tracking. After removing 1,124 duplicate records, 2,462 records underwent title and abstract screening. Of these, 2,081 were excluded for not meeting the predetermined eligibility criteria, leaving 381 reports for full-text assessment. Following full-text assessment, 334 reports were excluded because they lacked a relevant logistics context, a gender focus, or a career-related mechanism. Consequently, 47 studies met the eligibility criteria and were included in the qualitative synthesis. Given the methodological and contextual heterogeneity of the included studies, a quantitative meta-analysis was not performed.

3.5. Data extraction and coding framework

A structured template, based on a trajectory-oriented framework, was designed to align with the Institutional Pathways Model. Data extraction was conducted using the designed template for each included study. Study codes were applied to bibliographic information, subsector, geography, population, design, theoretical perspective, career-stage focus, and mechanisms. Mechanism codes were applied at three levels: macro (policy and norms), meso (organisational practice and ecosystem actors), and micro (individual experience and agency). This three-level coding framework enabled a direct connection between the synthesised results and the theoretical framework, promoting integrative synthesis rather than descriptive aggregation of evidence.

3.6. Quality appraisal

Methodological quality was assessed using design-appropriate appraisal tools. Qualitative studies were evaluated using the Critical Appraisal Skills Programme qualitative checklist, which considers the clarity of the research aims, appropriateness of the design, recruitment, data collection, researcher–participant relationships, ethical considerations, analytical rigour, and credibility of the findings.[39] Quantitative descriptive and non-randomised empirical studies and mixed-methods studies were assessed using the relevant design categories of the Mixed Methods Appraisal Tool.[40] The mixed-methods assessment considered both the quality of the qualitative and quantitative components and the adequacy with which the components were integrated.

Two reviewers independently appraised each eligible study. Differences were resolved through discussion, and a third reviewer was consulted when agreement could not initially be reached. Rather than relying exclusively on aggregate numerical scores, the appraisal recorded item-level judgements and principal methodological strengths and limitations because the appraisal instruments assessed different design-specific criteria.

Methodological quality was not used as an automatic exclusion criterion. This decision reflected the limited and heterogeneous nature of research on women's career trajectories in logistics ecosystems. Quality was instead incorporated into the synthesis by giving greater interpretive weight to findings supported by methodologically stronger studies and by convergence across independent studies and methods. Findings derived solely from studies with substantial methodological limitations were classified as tentative and were not used independently to establish the model's central mechanisms or propositions.

3.7. Synthesis strategy

The review employed an integrated thematic and narrative synthesis. A statistical meta-analysis was considered but was not performed because the quantitative studies were insufficiently comparable. They examined different outcomes, including occupational representation, wage disparities, job satisfaction, career perceptions, promotion, mobility, leadership participation, and retention. These outcomes were measured using different instruments and reported through incompatible effect measures, including frequencies, proportions, mean differences, correlations, and regression coefficients. The studies also covered heterogeneous populations and settings, including truck drivers, warehouse employees, seafarers, logistics managers, and supply chain professionals across different countries and institutional contexts. Consequently, pooling the quantitative results would not have produced a meaningful common effect estimate.

Quantitative findings were therefore synthesised narratively by comparing the direction, consistency, and contextual meaning of reported associations without statistically combining their estimates. Qualitative findings were synthesised thematically through iterative coding of barriers, enablers, and career experiences. Mixed-methods studies were initially examined at the level of their respective qualitative and quantitative components and subsequently integrated within common career-stage and institutional-level themes. All evidence was organised across four career stages, entry, progression, leadership, and retention, and three analytical levels, macro, meso, and micro. This integration informed the development of the Institutional Pathways Model.

4. Results

4.1. Descriptive overview of the evidence base

The systematic search and screening process yielded 47 studies, indicating a highly diverse and fragmented body of knowledge on women's careers in logistics ecosystems. Figure 1 illustrates how the evidence base was derived from an initial pool of 3,586 records and refined through a rigorous screening and eligibility process.

Literature on women's careers in logistics ecosystems remains fragmented and diverse. Although recent systematic reviews have increased scholarly attention to gender issues in logistics and supply chain management, much of the evidence addresses gender diversity broadly rather than women's careers as staged and path-dependent processes.[1,2]

This finding reinforces the central rationale for the present review: the literature lacks an integrative framework explaining how women's careers evolve across entry, progression, leadership, and retention. The evidence is also unevenly distributed across logistics subsectors. Of the 47 included studies, 17 (36.2%) examined logistics broadly, while 12 (25.5%) focused on supply chain management-related fields. Seven studies (14.9%) examined transport contexts, while six (12.8%) focused on maritime and shipping. Three studies (6.4%) focused specifically on trucking, while distribution and humanitarian logistics each accounted for one study (2.1%). The concentration of research in general logistics and supply chain management may reflect the availability of formal workforce data, established scholarly networks, and greater attention to managerial and leadership careers. Conversely, operational areas such as trucking, warehousing, procurement, freight forwarding, distribution, and humanitarian logistics remain comparatively under-researched.

Within trucking, the literature primarily highlights occupational segregation, job stratification, recruitment barriers, and wage inequality.[10,41,42] Maritime and seafaring studies complement these findings by emphasising cultural exclusion, institutional barriers, and constraints on women's participation.[43,44] Studies of supply chain management concentrate mainly on managerial career progression, compensation disparities, and women's representation in leadership positions.[45-47]

National-level qualitative studies also provide insights into contextual influences, including work–life balance, educational systems, and labour-market complexity.[17] The literature draws on diverse but insufficiently integrated theoretical perspectives. These include institutional theory,[21-23] gendered organisation theory,[8] human capital theory,[28,29] and leadership perspectives such as tokenism, Role Congruity Theory, and the leadership-labyrinth perspective.[9,31,32] Their limited integration further supports the Institutional Pathways Model developed in this review.

The methodological appraisal demonstrated that the evidence base was generally of moderate-to-good quality, although reporting and design limitations were evident.

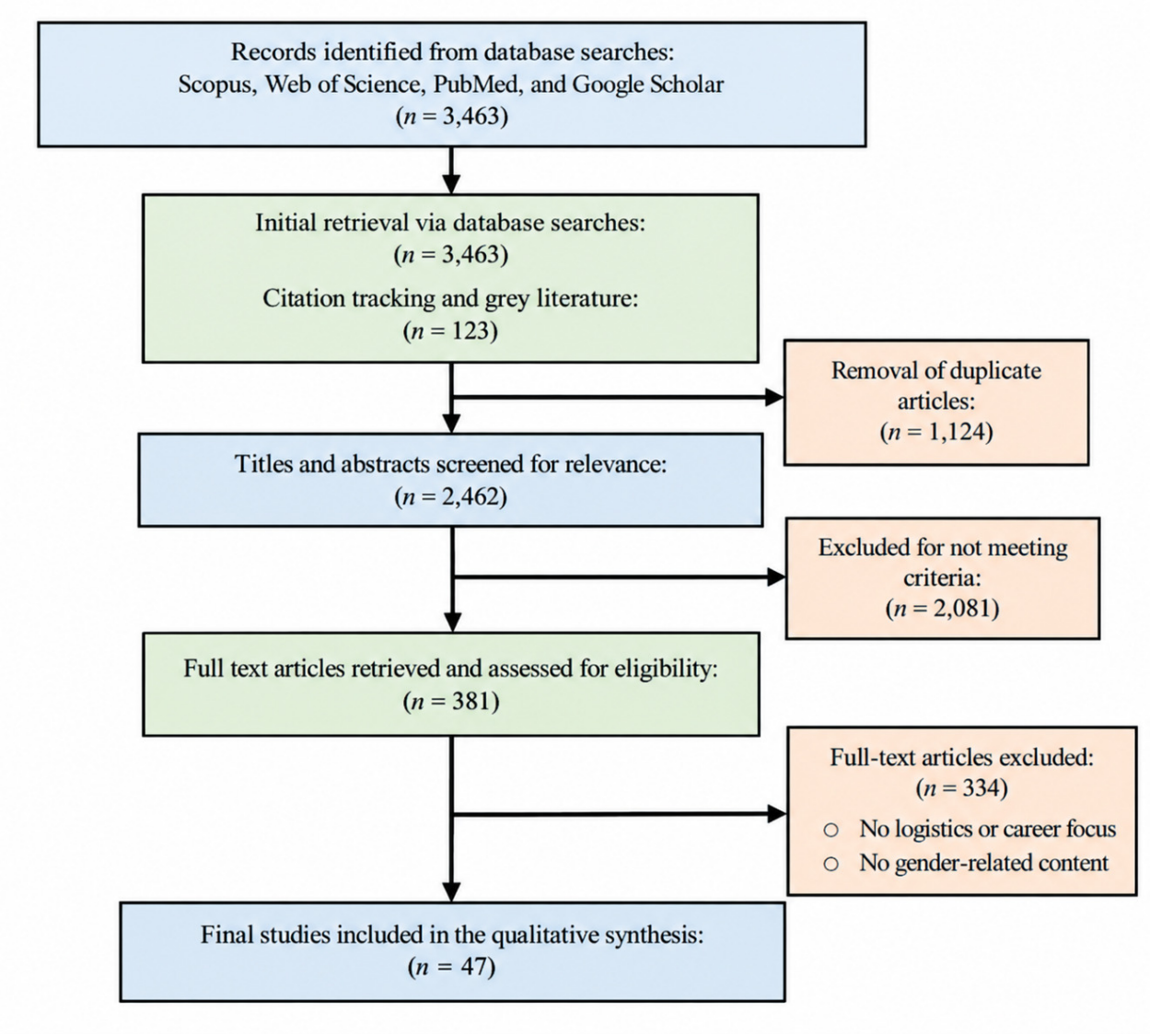


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 flow diagram for study selection

Of the 47 included studies, 33 (70.2%) were primary empirical studies, 8 (17.0%) were review studies, and 6 (12.8%) were conceptual or editorial contributions. The primary empirical and review studies were subjected to methodological appraisal, while conceptual and editorial publications were used primarily for theoretical interpretation and contextual discussion.

Among the 12 qualitative studies, the majority demonstrated few or some methodological concerns. These studies generally benefited from clearly stated research aims, context-sensitive designs, and detailed accounts of workplace and occupational experiences, although limitations included insufficient researcher reflexivity, limited explanation of recruitment decisions, and inadequate discussion of researcher-participant relationships.

The 18 quantitative and survey-based empirical studies contributed evidence on occupational representation, compensation, career perceptions, job satisfaction, advancement, executive participation, and career trajectories. Their principal limitations included cross-sectional designs, reliance on self-reported measures, limited information about non-response, and inadequate control for potential confounding variables. Two additional studies employed mixed-methods designs and integrated qualitative and quantitative evidence.

The nine review-based studies synthesized existing evidence on women's participation, workforce patterns, barriers, and career development across logistics and transport contexts. The six conceptual or editorial publications were not assigned empirical risk-of-bias ratings and were used primarily to support theoretical interpretation and contextual discussion.

Therefore, of the 47 included publications, 41 empirical or review-based studies underwent formal methodological appraisal, while 6 conceptual or editorial publications were assessed for theoretical relevance but were not assigned empirical quality ratings. Overall, the appraised evidence was predominantly of moderate-to-good methodological quality, although limitations relating to reporting, study design, reflexivity, non-response, and methodological transparency were identified across some studies. The evidence was considered sufficiently credible to support the review's principal mechanism bundles, although conclusions concerning causal ordering, career re-entry, intervention effectiveness, and institutional feedback remain tentative.

4.2. Integrated thematic and narrative synthesis across career stages

This section presents the integrated synthesis of the included evidence. Qualitative findings are organised into recurring themes concerning women's experiences, barriers, and enabling conditions. Quantitative findings are reported narratively by comparing the direction and consistency of results, while mixed-methods evidence is integrated into the relevant career-stage themes. The synthesis is structured around entry, progression, leadership, and retention, with each mechanism classified at the macro, meso, or micro level.

One key contribution of this review is its ability to organise existing evidence by career stage, enabling a dynamic, process-based understanding of inequality. Generally, the 47 studies reviewed indicate that gender disadvantage is not limited to any specific stage but is compounded by successive transitions.

4.2.1. Entry stage: Occupational sorting and access constraints

At the entry stage, gender inequality is evident not only in women's overall representation but also in the occupations and assignments they can access. Trucking studies demonstrate intra-occupational segregation and gendered recruitment, with women less represented in some specialised and more desirable driving assignments.[10,41,42] Research across logistics and transport similarly indicates gendered differences in occupational perceptions, job descriptions, recruitment, and access to core operational roles.[48-50] Maritime studies identify women's concentration in shore-based or support positions and their limited access to seagoing, vessel command, and senior port operational roles.[43,51,52] These patterns can restrict access to the operational experience, networks, visibility, and credentials required for later promotion.

Entry-stage perception studies also identify gender differences in perceptions of occupational suitability and future prospects in logistics.[48,53] These findings suggest that occupational sorting may begin before formal labour-market entry. Quantitative and qualitative evidence further indicates that the perception of logistics as a male-coded industry may influence women's access to and self-selection into particular occupations.[43,51]

Evidence from maritime and port settings also shows that institutional and cultural conditions influence women's employment opportunities.[44] Entry into logistics is therefore filtered through occupational coding, education, training opportunities, recruitment practices, and labour-market conditions.

4.2.2. Progression stage: Unequal access to developmental opportunities

Career advancement in logistics is strongly influenced by access to high-value assignments, complex operational responsibilities, training, mentoring, sponsorship, and mobility opportunities. Evidence suggests that women may have less access to core operational assignments and developmental opportunities associated with strategic decision-making and innovation.[45,54]

Access to mentoring and sponsorship is another important career-development mechanism, but these opportunities remain unevenly distributed. Studies identify gaps in mentoring, informal networks, career support, and professional sponsorship.[55,56] Geographical mobility and expatriation also influence advancement in supply chain management, but these opportunities may be less accessible to women.[11]

Qualitative evidence further demonstrates that organisational culture, work design, scheduling, and work–life demands shape career continuity and advancement.[16,17] Gender inequalities are therefore reproduced through organisational practices governing access to developmental opportunities, rather than solely through formal promotion decisions.

4.2.3. Leadership stage: Cumulative disadvantage and legitimacy barriers

At the leadership stage, disadvantages accumulated during entry and progression are reflected in women's

underrepresentation in senior logistics positions. Kroes *et al.*[47] found that women held only 6.29% of executive positions in their sample of supply-chain executives. Von Eben-Worlée *et al.*[57] similarly identified women's limited representation in executive supply-chain career pathways, particularly at the highest hierarchical and board levels. In maritime shipping, the scarcity of women leaders limits the visibility and availability of role models for women seafarers.[52]

Compensation research also identifies gender differences among supply chain managers, indicating that inequality may continue into senior career stages.[46] Empirical and theoretical evidence further highlight legitimacy and evaluation biases in leadership selection.[58,59] Women may be assessed against gender-stereotyped leadership expectations that conflict with dominant organisational norms concerning authority, influence, and power.

These findings align with the leadership-labyrinth perspective, which conceptualises women's advancement as constrained by interconnected barriers encountered throughout their careers.[9] Access to professional networks and sponsorship relationships is particularly important because these relationships influence how leadership opportunities are identified and allocated.[46]

4.2.4. Retention, exit, and career sustainability

Retention and career sustainability remain comparatively under-researched dimensions of women's careers in logistics. In trucking, mobile-work requirements and prolonged periods away from home can make long-term career participation difficult.[16,42] Maritime studies similarly identify prolonged absence from home, limited organisational support, gender-insensitive working conditions, stereotypes, and workplace exclusion as constraints on women's retention.[43,51,60]

Evidence from transport, logistics, and supply chain settings links career sustainability to work–life imbalance, inflexible working arrangements, hostile workplace practices, and insufficient professional support.[61-63] These findings suggest that women's retention is shaped by the interaction between occupational demands and organisational conditions rather than solely by individual career preferences.

Although re-entry has received limited direct attention, available evidence suggests that returning after a career interruption may be difficult where progression depends on continuous tenure, accumulated operational experience, professional networks, and geographical mobility.[11,60,61,63] Career interruptions may therefore weaken subsequent employment, developmental, and advancement opportunities.

4.3. Cross-cutting mechanism bundles

Throughout the various stages of a career, evidence points to recurring mechanisms that collectively shape women's career trajectories in logistics ecosystems. First, occupational segregation is identified as a foundational mechanism that influences women's entry into the field and, in turn, affects subsequent career transitions. Second, compensation inequality is recognised as a fundamental mechanism that influences the characteristics of women's careers in occupation-specific ways. Third, mobility and work–life constraints serve as institutional filters that impact career development. Fourth, organisational culture and operational complexities also function as key mechanisms. Lastly, institutionalised gender norms further influence the development and progression of women's careers.

4.4. Integration with evidence tables

The review integrates its results into the broader literature base through two evidence structures. Table 3 presents a comprehensive study-level overview of the 47 included studies. It ensures traceability by linking studies to the subsector, methodological approach, career-stage focus, and mechanisms. It provides the empirical basis of the review by illustrating the breadth, diversity, and distribution of the evidence. Table 3 provides an overview of the integrated results of the individual studies. It presents a cohesive set of mechanisms across career stages and levels within the institution. It organises the barriers and enablers of women's careers into entry, progression, leadership, retention, and cross-cutting themes. It integrates the scattered results of individual studies into a coherent structure. The evidence shows that gender inequality in logistics careers cannot be reduced to individual barriers at specific career stages. The evidence shows a systemic, cumulative process in which institutional norms, organisational approaches, and career-stage transitions shape women's careers. From this integrated structure of evidence, the Institutional Pathways Model is presented.

Building on the study-level evidence presented in Table 3, Table 4 synthesizes the recurring mechanisms across the entry, progression, leadership, and retention stages and identifies the institutional levels at which these mechanisms operate.

4.5. Critical comparative synthesis of the evidence

Although the reviewed studies consistently identify gender inequality within logistics careers, closer comparison reveals important contradictions and variations across interventions, geographical settings, publication periods,

Table 3. Evidence mapping of gendered career mechanisms in logistics ecosystems (n = 47)

Study	Sector	Study design	Evidence category	Career-stage focus	Barrier/enabler or mechanism	Institutional level
Scott and Davis-Sramek[10]	Trucking	Quantitative	Primary empirical	Entry–progression	Occupational segregation	Macro–meso
Schollmeier and Scott[41]	Logistics	Quantitative	Primary empirical	Entry–progression	Wage-gap variation	Meso
Knemeyer *et al.*[48]	Logistics	Quantitative	Primary empirical	Entry	Career-perception bias	Micro
Lynagh *et al.*[53]	Logistics	Quantitative	Primary empirical	Entry	Occupational expectations	Micro
Lynagh *et al.*[55]	Distribution	Quantitative	Primary empirical	Progression	Mentoring inequality	Micro
Johnson *et al.*[56]	Logistics	Quantitative	Primary empirical	Progression	Job-satisfaction differences	Micro
Kafa *et al.*[45]	Supply chain management	Qualitative	Primary empirical	Progression	Advancement barriers	Meso
Ruel and Jaegler[11]	Supply chain management	Quantitative	Primary empirical	Progression	Mobility constraints	Micro
Zinn *et al.*[64]	Supply chain management	Editorial	Conceptual/editorial	Progression	Unequal access to skills	Micro
Maloni *et al.*[65]	Logistics	Quantitative	Primary empirical	Progression–retention	Mentoring and work–life balance	Meso
Larson and Morris[46]	Supply chain management	Quantitative	Primary empirical	Progression–leadership	Compensation inequality	Meso
Murphy and Poist[66]	Logistics	Longitudinal quantitative	Primary empirical	Leadership	Skill and advancement barriers	Meso
Kroes *et al.*[47]	Supply chain management	Quantitative	Primary empirical	Leadership	Executive underrepresentation	Macro
Paché [67]	Logistics	Conceptual	Conceptual/editorial	Leadership	Representation gap	Meso
Vo *et al.*[60]	Maritime	Qualitative	Primary empirical	Retention	Work–life conflict and flexibility	Micro–meso
Ferreira *et al.*[61]	Logistics	Quantitative	Primary empirical	Retention	Work–life imbalance	Micro
Hopkins[16]	Trucking	Qualitative	Primary empirical	Retention	Mobile-work culture	Meso
Narayanan *et al.*[51]	Maritime	Qualitative	Primary empirical	Entry–retention	Participation and retention barriers	Micro
Iddagoda *et al.*[17]	Logistics	Qualitative	Primary empirical	Entry–progression	Culture and education	Meso
García-Echalar *et al.*[44]	Maritime	Mixed-methods	Primary empirical	All stages	Gender equity and participation	Macro
Lyu and Li[43]	Maritime	Qualitative	Primary empirical	Entry–retention	Harassment and stereotypes	Micro
Arslan *et al.*[68]	Maritime	Empirical	Primary empirical	Entry–retention	Discrimination and exclusion	Macro
Agarwal *et al.*[69]	Logistics	Quantitative	Primary empirical	Entry–retention	Inclusion drivers	Macro
Min[70]	Logistics	Conceptual	Conceptual/editorial	All stages	Workforce challenges	Macro
Keller and Ozment[71]	Logistics	Review	Review evidence	All stages	Workforce gaps	Meso

(*Cont'd...*)

Table 3. (*Continued*)

Study	Sector	Study design	Evidence category	Career-stage focus	Barrier/enabler or mechanism	Institutional level
Carter and Easton[72]	Supply chain management	Review	Review evidence	All stages	Sustainability and institutional context	Macro
Kovács and Tatham[73]	Humanitarian logistics	Conceptual	Conceptual/editorial	All stages	Gender-performance relationship	Macro
Yang *et al.*[1]	Logistics and supply chain management	Review	Review evidence	All stages	Fragmentation of gender research	All levels
Akbari *et al.*[2]	Operations and supply chain management	Review	Review evidence	All stages	Gender-inequality themes	All levels
Sohaimi *et al.*[33]	Logistics	Review	Review evidence	Progression–Career success	Career-development mechanisms	Micro–meso
Merkert and Hoberg[13]	Logistics and supply chain management	Conceptual	Conceptual/editorial	Entry–progression	Career preparedness and changing skills	Micro–meso
Sowers[14]	Logistics	Conceptual	Conceptual/editorial	Entry–retention	Workforce inequality	Macro–meso
French and Strachan[49]	Transport	Quantitative	Primary empirical	Entry–retention	Recruitment, promotion, training, and equal-employment policies	Macro–meso
Fraszczyk and Piip[74]	Transport	Review	Review evidence	Progression–leadership	Networks, visibility, and career support	Meso
Murphy *et al.*[75]	Transport	Qualitative	Primary empirical	Entry–retention	Working conditions and occupational exclusion	Macro–meso
Von Eben-Worlée *et al.*[57]	Logistics and supply chain management	Review	Review evidence	Progression–leadership	Executive career progression	Micro–meso
Parnell *et al.*[76]	Transport	Scoping review	Review evidence	Entry–retention	Masculine work systems and gender-insensitive job design	Macro–meso
Sachdeva *et al.*[50]	Transport	Qualitative	Primary empirical	Entry	Social norms, job descriptions, and organisational policies	Macro–meso
Gligor *et al.*[54]	Logistics	Quantitative	Primary empirical	Progression	Access to training, job complexity, and innovation	Micro–meso
Changa and Ndawana[62]	Transport	Qualitative	Primary empirical	Entry–retention	Patriarchal norms, work-family conflict, and hostile workplace practices	Macro–meso
Narkhede *et al.*[77]	Logistics and supply chain management	Mixed methods	Primary empirical	Entry–progression	Gender bias and women's empowerment	Micro–meso

(*Cont'd...*)

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Table 3. (*Continued*)

Study	Sector	Study design	Evidence category	Career-stage focus	Barrier/enabler or mechanism	Institutional level
Dragomir *et al.*[52]	Maritime and shipping	Survey-based quantitative	Primary empirical	Progression–leadership	Women leaders, role models, and leadership visibility	Micro–meso
D'Souza and Tapas[63]	Supply chain management	Qualitative	Primary empirical	Entry–progression–retention	Stereotypes, workplace struggles, and professional support	Micro–meso
Naysmith and Rubincam[42]	Trucking	Exploratory qualitative	Primary empirical	Entry–retention	Segregation, recruitment, and workplace integration	Micro–meso
Dontoh *et al.*[3]	Rail transport	Literature re-view and case-study analysis	Review evidence	En-try-retention	Industry perceptions, re-cruitment and retention of women in rail careers	Macro-meso
Flöthmann and Hoberg[12]	Supply chain management	Quantitative career-pattern analysis	Primary empirical	Progres-si-on-leadership	Prior experience and career routes into executive posi-tions; gender representation requires separate extraction	Micro-meso
Nantongo *et al.*[82]	Logistics	Quantitative cross-sectional survey	Primary empirical	Leadership	Industry context, gender composition and female role models associated with women's engagement in de-cision-making	Macro-meso

Table 4. Integrated mechanisms across career stages and institutional levels

Career stage	Mechanism	Type	Level	Primary empirical support	Review support	Theoretical/ conceptual foundation
Entry	Occupational segregation and gendered recruitment	Barrier	Macro–meso	Scott and Davis-Sramek[10]; Naysmith and Rubincam[42]; French and Strachan[49]	Keller and Ozment[71]	Acker[8]; England[78]
Entry	Occupational stereotypes and perceived role suitability	Barrier	Macro–micro	Lyu and Li[43]; Narayanan *et al.*[51]; Sachdeva *et al.*[50]	Parnell *et al.*[76]	Acker[8]; Ridgeway[59]
Entry	Inclusive recruitment and participation pipelines	Enabler	Macro–meso	Agarwal *et al.*[69]; Arslan *et al.*[68]	Yang *et al.*[1]	Scott[22]
Progression	Unequal developmental assignments	Barrier	Meso	Kafa *et al.*[45]; Gligor *et al.*[54]; Murphy and Poist[66]	Akbari *et al.*[2]	Acker[8]
Progression	Mentoring and network inequality	Barrier	Micro–meso	Lynagh *et al.*[55]; Johnson *et al.*[56]; Maloni *et al.*[65]	Fraszczyk and Piip[74]	Kanter[31]
Progression	Mobility and expatriation constraints	Barrier	Micro–meso	Ruel and Jaegler[11]; D'Souza and Tapas[63]	von Eben-Worlée *et al.*[57]	Baruch and Sullivan[24]
Leadership	Executive underrepresentation	Barrier	Macro–meso	Kroes *et al.*[47]; Dragomir *et al.*[52]	von Eben-Worlée *et al.*[57]	Eagly and Carli[9]
Leadership	Legitimacy and evaluation bias	Barrier	Macro–meso	Castilla and Benard[58]; Kroes *et al.*[47]	Akbari *et al.*[2]	Ridgeway[59]; Eagly and Karau[32]

(*Cont'd...*)

Table 4. (*Continued*)

Career stage	Mechanism	Type	Level	Primary empirical support	Review support	Theoretical/ conceptual foundation
Leadership	Network exclusion and sponsorship gaps	Barrier	Meso	Larson and Morris[46]; Maloni *et al.*[65]	Fraszczyk and Piip[74]	Kanter[31]
Retention	Work-life conflict and mobility pressure	Barrier	Micro–Meso	Hopkins[16]; Vo *et al.*[60]; Ferreira *et al.*[61]	Sohaimi *et al.*[33]	Powell and Greenhaus[79]
Retention	Workplace culture, harassment and safety	Barrier	Micro–meso	Naysmith and Rubincam[42]; Lyu and Li[43]; Narayanan *et al.*[51]	Parnell *et al.*[77]	Acker[8]; Galea *et al.*[30]
Cross-cutting	Compensation inequality	Barrier	Macro–meso	Schollmeier and Scott[41]; Larson and Morris[46]	Yang *et al.*[1]	Blau and Kahn[80]
Cross-cutting	Organisational translation of institutional pressures	Mechanism	Meso	French and Strachan[49]; Maloni et al[65]; Kafa *et al.*[45]	Akbari *et al.*[2]	DiMaggio and Powell[21]; Scott[22]

and research methods. These variations caution against treating the evidence as uniform and help distinguish mechanisms that recur across the logistics ecosystem from those that are context-dependent.

4.5.1. Convergence, contradictions, and policy-practice gaps

The strongest area of convergence concerns the persistence of occupational segregation and unequal access to career-building opportunities. Studies across trucking, maritime transport, logistics, and supply chain management consistently show that women are concentrated in particular roles and have unequal access to operational experience, developmental assignments, networks, mobility opportunities, and leadership positions.[10,11,41_47] Nevertheless, the evidence differs regarding the effectiveness of organisational interventions.

Some studies identify equal-employment policies, mentoring programmes, inclusive recruitment, and flexible working arrangements as potential enablers of women's participation, advancement, and retention.[49,55,60] Other studies show that formal policies do not necessarily eliminate occupational sorting, informal network exclusion, masculine work cultures, or mobility-based advancement requirements.[10,16,42,43,51] This is not necessarily a direct contradiction. Instead, it suggests a distinction between the formal adoption of gender-equity practices and their substantive implementation. Organisations may comply with equality expectations at the policy level while continuing to allocate assignments, evaluate commitment, and select leaders through established gendered norms.[8,21,30]

A similar tension emerges in relation to mentoring. Earlier and more recent studies acknowledge mentoring and professional support as important for career development, but they differ regarding women's actual access to these resources.[55,56] Organisational mentoring programmes may provide formal career support, while informal sponsorship and influential professional networks remain unevenly distributed. This distinction is theoretically important because formal mentoring may support adjustment and skill development without necessarily providing the advocacy and access to senior decision-makers required for leadership advancement.

The evidence on flexible work is also conditional. Flexible arrangements and work-family support may strengthen retention, particularly in maritime and organisational settings where such arrangements are operationally feasible.[60] However, flexibility is more difficult to implement in trucking, seafaring, and other roles requiring physical presence, irregular schedules, extended travel, or prolonged absence from home.[16,42,43]

Consequently, flexibility should not be treated as a universally effective intervention; its effect depends on work design, managerial support, and the extent to which employees using flexible arrangements remain eligible for valued assignments and promotion.

4.5.2. Geographical and institutional variation

The geographical distribution of the evidence indicates that gendered career mechanisms are widespread but institutionally differentiated. North American studies of trucking, logistics, and supply chain management tend to emphasise intra-occupational segregation, compensation differences, career perceptions, and executive underrepresentation.[10,41,46,47] These studies often examine measurable labour-market and organisational outcomes, including job allocation, salary, and representation in senior positions.

Evidence from South Africa places greater emphasis on gendered recruitment, occupational integration, and the difficulties women experience entering and remaining in trucking work.[42] Research concerning Chinese women seafarers highlights cultural stereotypes, workplace exclusion, and the gendered organisation of maritime employment.[43] Indian transport evidence similarly emphasises social norms, gender-coded job descriptions, organisational policies, and barriers to entry into male-dominated railway occupations.[50] These studies demonstrate that formal qualifications alone may be insufficient when cultural expectations define operational transport work as unsuitable for women.

Despite these contextual differences, occupational coding, work design, and leadership legitimacy recur across geographical settings. The distinction lies primarily in how the mechanisms are expressed. In some contexts, inequality appears through measurable wage and executive-representation gaps; in others, it is expressed through recruitment restrictions, safety concerns, cultural exclusion, and limited access to operational work.[41-43,47,50] The findings therefore support analytical generalisation at the level of mechanisms, but not the assumption that their magnitude or consequences are identical across countries.

Geographical interpretation must nevertheless remain cautious. The evidence is concentrated in a limited number of countries and predominantly published in English. Several regions, particularly parts of Africa, Latin America, the Middle East, and lower-income logistics markets, remain weakly represented. The apparent cross-context consistency may therefore partly reflect the geographical concentration of the available literature rather than universal equivalence.

4.5.3. Changes in the literature over time

The evidence base covered 1996 to March 2026. Earlier research predominantly examined women's occupational expectations, job satisfaction, mentoring, and participation within logistics and distribution. These studies generally approached inequality as a workforce participation or career-development problem. Later studies increasingly examine structural mechanisms such as occupational segregation, compensation inequality, mobility constraints, masculine work systems, organisational culture, workplace exclusion, and leadership representation.[10,11,41,43_47,51]

This temporal shift indicates a move from asking whether women participate in logistics to examining the quality, sustainability, and consequences of that participation. Recent research is more likely to distinguish among entry, progression, leadership and retention and to examine how organisational and institutional conditions shape transitions between these stages. However, the literature does not provide clear evidence that gender inequality has declined over time. Recent studies continue to report occupational segregation, wage inequality, exclusion and limited executive representation.[10,41,43,47]

The literature therefore shows greater conceptual and methodological sophistication, but not necessarily corresponding improvement in career outcomes. Moreover, the studies do not constitute repeated observations of the same organisations, occupations, or national systems. Differences between earlier and later findings may reflect changes in research questions, geographical coverage, and methodology rather than genuine longitudinal change. Temporal conclusions should therefore be treated as changes in the evidence base, not definitive evidence of changes in women's career experiences.

4.5.4. Methodological variation and its influence on findings

Methodological differences significantly influence the types of conclusions produced. Quantitative studies are particularly useful for establishing patterns in occupational representation, compensation, job satisfaction, progression, and executive participation.[10,41,46,47] Their findings demonstrate the existence and magnitude of gender differences but generally provide limited explanation of how the differences are produced.

Qualitative studies provide greater insight into the processes underlying these outcomes. They identify gender stereotypes, cultural exclusion, mobile-work demands, workplace struggles, identity negotiation, work–life conflict, and informal organisational practices.[16,42,43,51] These studies explain how women experience and respond to gendered career structures, although their smaller and

context-specific samples limit statistical generalisation.

Mixed-methods studies potentially bridge these approaches by linking outcome patterns to contextual explanations. Nevertheless, only a small proportion of the evidence base applies mixed methods. Reviews and conceptual studies provide broader theoretical coverage but depend on the quality and geographical distribution of existing primary research. Their conclusions may therefore reproduce gaps already present in the empirical literature.

An important limitation is the dominance of cross-sectional designs. Murphy and Poist's[66] longitudinal analysis is an exception within a literature that generally measures experiences or outcomes at one point in time. Consequently, relationships among early occupational allocation, later developmental opportunities, leadership attainment, and retention cannot be interpreted as conclusively causal. The evidence supports the plausibility of cumulative disadvantage, but longitudinal studies are required to demonstrate how disadvantages experienced at one stage directly affect subsequent career transitions.

4.5.5. General interpretation of the evidence

The critical comparison produces three conclusions. First, the evidence converges on the existence of gendered barriers, but the mechanisms vary across subsectors and institutional settings. Second, formal organisational interventions do not generate uniform outcomes because their effects depend on implementation, work design, and informal organisational practices. Third, methodological differences explain part of the variation across studies: quantitative research identifies outcome disparities, while qualitative research reveals the mechanisms through which they are produced.

The synthesis therefore does not support a single deterministic career pathway for all women in logistics. Instead, it indicates a family of institutionally structured pathways whose specific form depends on national institutions, logistics subsector, organisational practices, career stage, and individual circumstances. This interpretation provides the analytical foundation for the Institutional Pathways Model developed in **Section 5.5**.

5. Discussion

5.1. Women's logistics careers as institutionally structured pathways

The reviewed evidence indicates that gender inequality in logistics cannot be explained solely by individual qualifications, preferences, or career choices. The mechanisms identified in the review emerge partly from the operational organisation of logistics work. Continuous service requirements, irregular schedules, geographical mobility, rapid responses to disruptions, and the need for physical presence can make availability and mobility appear to be objective indicators of occupational commitment. However, these expectations are not socially neutral. They often reflect an "ideal worker" model based on continuous employment, limited caregiving responsibilities, and unrestricted availability.[8]

Gendered organisation theory helps explain why practices that appear operationally necessary may produce unequal outcomes.[8] Job descriptions, scheduling systems, assignment allocation, and promotion criteria may not explicitly refer to gender, yet they can privilege employees whose circumstances correspond with established masculine career patterns. For example, mobility may be genuinely necessary for some operational roles, but organisations can extend mobility expectations to positions where they are not essential or treat mobility as an informal indicator of leadership potential. The resulting inequality arises through the design and interpretation of work rather than through explicit exclusion alone.

Institutional theory provides a complementary explanation. Organisational decisions are shaped by regulative requirements, professional norms, and culturally embedded beliefs about legitimate workers and leaders.[21-23] Logistics organisations may reproduce common employment practices because they are viewed as technically appropriate, professionally accepted, or historically normal. Through coercive, normative, and mimetic pressures, similar assumptions about availability, mobility, and leadership can spread across firms, ports, carriers, professional associations, and training institutions.[21] Gender inequality may consequently become embedded across an organisational field rather than being confined to individual employers.

This interpretation also explains why formal equality policies do not always generate substantive change. Organisations may adopt diversity policies in response to regulatory or reputational pressures while continuing to rely on informal assignment practices, manager discretion, and established professional networks. Formal policy adoption can therefore coexist with unequal access to

operational experience, sponsorship, and promotion. The relevant theoretical issue is not simply whether an organisation has an inclusion policy, but how institutional expectations are translated into everyday career decisions.

At the macro level, labour-market structures, regulatory systems, and institutionalised gender norms influence the legitimacy of women's participation in logistics and their access to career opportunities. Institutional theory explains how regulatory, normative, and cultural-cognitive pressures shape organisational fields, while gendered organisation theory demonstrates how apparently neutral structures and employment practices may reproduce inequality.[8,21-23] Evidence from logistics-specific settings supports this interpretation by demonstrating that gender inequalities are embedded in occupational structures, recruitment practices, mobility expectations, and the allocation of operational roles.[10,42,43,49]

At the meso level, organisations translate broader institutional conditions into employment and career practices. The reviewed evidence indicates that women may experience unequal access to developmental assignments, complex operational responsibilities, mentoring, professional networks, and mobility opportunities.[11,45,54,55,64] Compensation structures may reinforce these inequalities because pay differences vary across occupational categories and career levels.[41,46] Organisations therefore function as important intermediaries between institutional conditions and women's career outcomes.

At the micro level, women interpret, negotiate, and respond to these institutional and organisational conditions through their career decisions, professional identities, and adaptive practices. Evidence from trucking, maritime transport, and broader logistics settings highlights the influence of belonging, workplace experiences, gender stereotypes, and identity work on career trajectories.[16,17,43,51] Identity work refers to the process through which individuals construct, maintain, and revise their understanding of who they are within organisational settings.[81] In logistics, it describes how women negotiate their professional identities while responding to gendered expectations within male-dominated workplaces.

Collectively, the evidence supports a shift from static accounts of workforce representation towards a process-oriented understanding of women's careers. Gender inequality is produced and reproduced through interconnected mechanisms operating across institutional levels and successive career stages.

5.2. Subsector differentiation and the heterogeneity of logistics ecosystems

The evidence presented in Table 3 demonstrates that logistics ecosystems are heterogeneous in both their structural characteristics and their gendered career dynamics. Of the 47 included studies, 17 (36.2%) examined logistics broadly, 12 (25.5%) focused on supply chain management-related fields, seven (14.9%) examined transport, six (12.8%) addressed maritime or shipping contexts, and three (6.4%) focused on trucking. Distribution and humanitarian logistics were each represented by one study (2.1%). This distribution demonstrates both the breadth of the logistics ecosystem and the limited evidence available for several occupation-specific subsectors.

Trucking studies identify intra-occupational segregation, job stratification, gendered recruitment, mobile-work demands, and wage inequality.[10,16,41,42] Maritime and seafaring research highlights cultural marginalisation, harassment, limited workplace inclusion, restricted participation in seagoing work, and the scarcity of women in visible leadership positions.[43,44,51,52] Supply chain management research focuses more strongly on managerial mobility, career advancement, compensation disparities, access to executive positions, and leadership representation.[11,45-47,57] Transport studies additionally identify gendered recruitment, occupational exclusion, masculine work systems, and organisational barriers to women's entry and retention.[49,50,62]

These differences caution against treating logistics as a homogeneous employment setting. For example, geographical mobility may be especially important in trucking, seafaring, and international supply chain careers, whereas access to strategic assignments and professional networks may be more influential in managerial supply chain positions. Nevertheless, recurring mechanisms, including occupational segregation, mentoring gaps, work–life conflict, organisational culture, and leadership bias, are evident across multiple subsectors. The Institutional Pathways Model therefore incorporates both subsector-specific conditions and cross-cutting institutional mechanisms.

5.3. Cumulative disadvantage across career stages

A central contribution of the review is its identification of cumulative disadvantage across women's logistics careers. The evidence indicates that inequality is not confined to one career stage but develops through interconnected disadvantages whose effects may extend into subsequent transitions.

At entry, occupational segregation, gendered recruitment, occupational stereotypes, and unequal access to operational roles influence women's initial positioning within logistics.[10,42,48-53] Women may consequently enter roles offering less access to mobility, operational experience,

professional visibility, or advancement opportunities.

As they progress, unequal access to mentoring, sponsorship, training, developmental assignments, and geographical mobility may constrain professional growth.[11,45,54-56,64] These mechanisms can reinforce entry-stage disadvantages because employees initially allocated to less strategically valued roles may have fewer opportunities to acquire the experience and networks required for promotion.

At the leadership stage, restricted access to influential networks, gendered evaluation standards, and limited leadership visibility continue to constrain women's advancement.[46,47,52,57-59] The low representation of women in executive supply chain positions and senior maritime roles therefore cannot be understood independently of the disadvantages experienced during entry and progression.

Retention represents a further dimension of cumulative disadvantage. Mobile-work demands, extended absence from home, inflexible scheduling, work–life conflict, hostile workplace practices, and insufficient organisational support can undermine women's ability to sustain logistics careers.[16,43,51,60-63] Career interruptions may subsequently weaken access to operational experience, networks, and promotion opportunities, although direct research on re-entry remains limited.

These mechanisms do not operate independently. Earlier occupational allocation affects access to later opportunities, while progression experiences influence leadership attainment and retention. This pattern aligns with the leadership-labyrinth perspective, which conceptualises women's advancement as constrained by multiple interconnected barriers rather than a single obstacle.[9] The present review extends this perspective by specifying the institutional and organisational mechanisms operating across logistics career stages. Tables 3 and 4 present the studies and integrated mechanisms supporting this interpretation.

5.4. Institutional pathways and mechanism interaction

The synthesis presented in Tables 3 and 4 demonstrates that gender inequality in logistics careers cannot be attributed to a single mechanism. Instead, it emerges through interactions among institutional, organisational, and individual conditions.

Occupational segregation interacts with compensation structures to influence women's earning potential and advancement opportunities.[41,46] Women's concentration in particular occupational categories can affect their access to higher-paying assignments, operational experience, promotion pathways, and long-term career sustainability. Mobility requirements similarly interact with work–life demands and organisational flexibility.[11,16,60] Advancement may depend on geographical mobility, expatriation, or irregular working schedules, while caregiving responsibilities and inflexible employment practices can restrict women's access to these opportunities.

Organisational culture also interacts with broader institutional gender norms. Gendered assumptions about the ideal worker, occupational suitability, and leadership capability influence how assignments are allocated and how women's performance and leadership potential are evaluated.[8,30,43,62] Exclusion from operational assignments may limit skill development, while exclusion from professional networks may reduce access to mentoring, sponsorship, and leadership opportunities.

Career outcomes therefore emerge from complex multi-level interactions rather than straightforward cause-and-effect relationships. This reinforces the need for an integrative framework that explains how different mechanisms combine and accumulate over women's logistics careers.

5.5. The Institutional Pathways Model and its theoretical contribution

Drawing on the systematic synthesis presented in Tables 3 and 4, this review developed an Institutional Pathways Model of women's career trajectories in logistics ecosystems. The model is not presented as an entirely independent theory. Rather, it is an integrative, theory-building framework connecting institutional theory, gendered organisation theory, cumulative disadvantage and career-stage analysis.[8,9,21-25] Table 5 links career stages, mechanism bundles, institutional levels, anticipated outcomes, and propositions P1–P14, while Figure 2 illustrates the relationships among institutional conditions, organisational practices and women's career experiences.

The model advances existing perspectives by specifying the processes through which institutional conditions are converted into career outcomes. Institutional theory explains how regulative, normative, and cultural-cognitive pressures structure organisational fields and influence organisational conduct.[21-23] However, it does not fully explain how these institutional pressures affect successive career transitions. Gendered organisation theory shows how apparently neutral work arrangements, performance standards, and promotion systems can reproduce inequality through embedded assumptions about the ideal worker.[8] Nevertheless, it pays comparatively less attention to how the effects of these practices accumulate across career stages and interconnected organisations. Similarly, career

literature identifies entry, development, advancement, leadership, and retention as important career processes, but does not always explain how these transitions are structured by multi-level institutional forces.[24,25] The Institutional Pathways Model connects these analytical perspectives within a single process-oriented framework.

The first explanatory mechanism is institutional translation. Macro-level laws, labour-market structures, professional norms, and cultural assumptions do not automatically influence women's careers. They are interpreted and enacted by organisations and other ecosystem actors through recruitment requirements, job design, assignment allocation, promotion systems, mobility expectations, performance evaluation, and sponsorship arrangements.[20-23,34] These organisational practices function as meso-level translation mechanisms that may reproduce, intensify, modify, or resist gendered institutional expectations. Organisations are therefore active intermediaries between the wider institutional environment and women's career experiences.

The second mechanism is stage-linked accumulation. The effects of institutional and organisational conditions depend on the career stage at which they occur. Occupational sorting at entry may restrict women's access to operationally important roles and developmental assignments. Limited operational exposure can subsequently reduce access to professional networks, promotion opportunities, and leadership positions.[8,9,31] Similarly, unequal access to mentoring and sponsorship during career progression may weaken women's organisational visibility and consideration for senior appointments. The model therefore explains career barriers as sequentially connected mechanisms rather than as separate or independent influences.

The third mechanism is path dependence. Opportunities and constraints experienced at one stage influence the range of opportunities available during subsequent stages. Career trajectories are shaped by earlier job placements, assignments, mobility experiences, network access, and organisational evaluations.[24,25,34] Early advantages may widen access to later opportunities, whereas early disadvantages may progressively restrict advancement, remuneration, leadership attainment, and career retention. This extends static accounts of workplace inequality by highlighting the sequence through which gendered differences emerge and accumulate over time.[9]

The fourth mechanism concerns feedback and institutional reproduction. Career outcomes can reinforce or challenge the institutional and organisational conditions from which they arise. Women's underrepresentation in leadership may reduce the availability of role models, mentors, and sponsors while reinforcing cultural assumptions that logistics leadership is predominantly masculine.[8,30-32] Such outcomes may subsequently influence recruitment, assignment, and promotion decisions, reproducing inequality across successive cohorts. Conversely, increasing women's representation, authority, and visibility may challenge established occupational beliefs and contribute to organisational and institutional change.[22,23] Career outcomes are therefore treated as both consequences of institutional pathways and potential sources of institutional reproduction or transformation.

Table 5. Institutional Pathways Model of women's career trajectories in logistics ecosystems

Pathway	Mechanism	Level	Primary empirical support	Theoretical foundation	Proposition
Entry	Occupational sorting	Macro–meso	Scott and Davis-Sramek[10]; Naysmith and Rubincam[42]; French and Strachan[49]	Acker[8]	**P1:** Early-stage occupational sorting constrains subsequent access to developmental and higher-reward career opportunities.
Progression	Unequal assignment allocation	Meso	Kafa *et al.*[45]; Gligor *et al.*[54]; Murphy and Poist[66]	Acker[8]	**P3:** Unequal access to developmental assignments produces divergence in career progression.
Leadership	Legitimacy bias	Macro–meso	Castilla and Benard[58]; Kroes *et al.*[47]	Ridgeway[59]; Eagly and Karau[32]	**P6:** Gendered legitimacy expectations constrain women's leadership advancement.
Retention	Work-life and mobility constraints	Micro–meso	Hopkins[16]; Vo *et al.*[60]; Ferreira *et al.*[61]	Powell and Greenhaus[79]	**P9:** Inflexible work and mobility requirements increase the likelihood of career discontinuity.
System level	Institutional feedback	All levels	Limited direct empirical evidence	DiMaggio and Powell[21]; Scott[22]	**P14:** Career outcomes may reproduce or challenge subsequent organisational practices and institutional expectations.

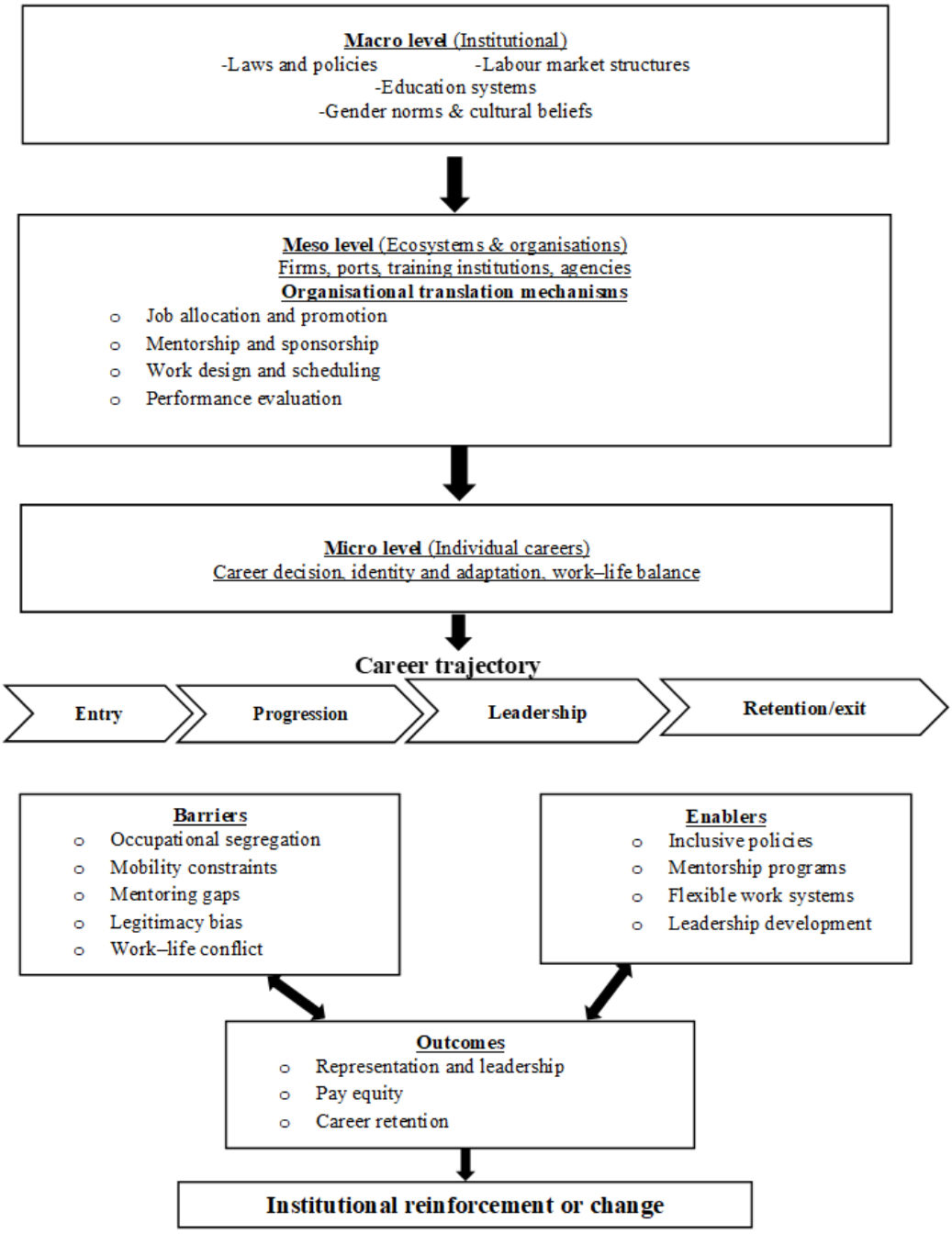


Figure 2. Institutional Pathways Model of gendered career trajectories in logistics ecosystems

The fifth contribution is the model's logistics-ecosystem orientation. Women's career trajectories are not shaped solely within individual organisations. They develop across interconnected firms, carriers, ports, professional associations, training institutions, regulators, and labour markets.[18-20] Because these actors jointly establish occupational requirements, mobility expectations, professional norms, and progression opportunities, career inequality may be reproduced across organisational boundaries. This ecosystem perspective also explains why some mechanisms cut across logistics subsectors while others vary among trucking, maritime logistics, warehousing, procurement, and supply chain management.

These interconnected mechanisms distinguish the Institutional Pathways Model from a simple catalogue of barriers. Its theoretical contribution lies in explaining how macro-level institutional conditions translate through meso-level organisational practices, are experienced at particular micro-level career transitions, accumulate through path-dependent sequences, and are reinforced or disrupted through feedback effects.[8,21-25,34] The model consequently shifts theoretical attention from whether gender barriers exist to how, when, and through which institutional pathways they influence women's careers.

The model nevertheless makes a bounded theoretical contribution. It organises established theoretical insights into a process explanation specifically developed for women's careers across logistics ecosystems, rather than claiming to replace the theories from which it is derived. Consistent with conceptual framework development, its value lies in identifying relationships among previously fragmented concepts, specifying explanatory mechanisms, and generating propositions for empirical testing.[35] Because the propositions are derived from secondary evidence rather than longitudinal primary data, future research should test the proposed stage-linked, path-dependent, and feedback relationships across countries and logistics subsectors

Drawing on the systematic synthesis presented in Tables 3 and 4, this review developed an Institutional Pathways Model of women's career trajectories in logistics ecosystems. Table 5 links the career stages, mechanism bundles, institutional levels, empirical foundations, and propositions that constitute the model.

The relationships among these institutional conditions, organisational translation mechanisms, career-stage processes, and feedback effects are synthesised visually in Figure 2.

5.6. Limitations and boundary conditions

The study recognises a range of limitations to keep in mind when interpreting its findings and theoretical contributions. Although the systematic review followed a rigorous PRISMA protocol and drew on 44 studies, the literature remains methodologically diverse, incorporating qualitative, quantitative, and conceptual approaches. This provides depth to interpretation but limits the potential for a meta-analytic approach to data integration.

Although the Institutional Pathways Model draws on the secondary evidence synthesised in Tables 4 and 5, it remains a theoretical framework that has not been tested longitudinally. Its propositions are grounded in empirical evidence, but longitudinal primary research is required to test the proposed relationships and examine how women's career trajectories develop over time.

Moreover, language and publication biases may have affected the review's coverage. Despite efforts to include diverse sources, non-English and region-specific studies may remain underrepresented, particularly those addressing emerging logistics contexts.

Additionally, logistics ecosystems differ considerably in their work designs, mobility requirements, institutional environments, and cultural contexts. Although the model incorporates these differences conceptually, its generalisability may remain limited until it is empirically tested across specific subsectors and geographical settings.

As noted in Figure 2, the study's model incorporates dynamic interaction effects between institutional levels that are underexplored in terms of outcomes such as representation and leadership effects on institutional conditions.

5.7. Practical and policy implications

The review indicates that increasing the number of women entering logistics is insufficient if organisational practices continue to restrict access to operational experience, developmental assignments, professional networks, mobility opportunities, and leadership positions. Practical interventions should therefore address the entire career pathway, including recruitment, progression, leadership development, retention, and re-entry.

Logistics companies and third-party logistics providers should begin by examining how employees are distributed across operational, technical, administrative, and managerial roles. Recruitment and promotion data should be disaggregated by gender, occupational category, and organisational level to determine whether women are concentrated in positions offering limited advancement opportunities.[10,41,42] Additionally, vacancies should use competency-based requirements and avoid unnecessary conditions that indirectly exclude women, such as

unrestricted geographical mobility when occasional travel would be sufficient. Recruitment panels should use standardised assessment criteria, document appointment decisions, and include gender-diverse membership where practicable.

Ports, shipping companies, and maritime organisations should undertake gender-sensitive assessments of vessels, terminals, sanitation facilities, accommodation, protective equipment, transport arrangements, and reporting systems. Evidence from maritime settings indicates that unsuitable facilities, isolation, harassment, and limited organisational support can affect women's participation and retention.[43,51,52] Moreover, where prolonged absence from home is unavoidable, employers should improve the predictability of rotations, provide advance scheduling, and facilitate planned leave. Such measures may reduce avoidable work-family conflict without lowering professional or promotion standards.[60]

Human resource managers should replace informal promotion practices with transparent, competency-based systems. Promotion criteria, required experience, and available development opportunities should be communicated to all eligible employees. Shortlisting and promotion decisions should be documented and periodically examined for gender differences. Mentoring and sponsorship should be treated as related but distinct interventions. Mentors provide guidance and professional development, while sponsors actively recommend employees for influential assignments and senior roles. Organisations should establish structured programmes with clear eligibility criteria, mentor or sponsor training, scheduled meetings, and measurable development objectives.[55,56] Furthermore, organisations should also establish career re-entry arrangements for employees returning after maternity leave, caregiving responsibilities, or other career interruptions. These may include structured reorientation, refresher training, gradual restoration of operational responsibilities, and protection from unjustified loss of promotion eligibility.

Professional logistics and supply chain associations should develop women's professional networks, sponsorship platforms, technical certification programmes, and leadership-development initiatives. Programmes should connect early-career women with experienced operational and executive professionals rather than limiting support to general networking events. Universities and training institutions should engage women before labour-market entry through career information, industry placements, role-model programmes, and exposure to technical and operational logistics roles. Partnerships with employers can provide internships and practical assignments that strengthen women's transition into operational and managerial careers.

Policymakers should require large logistics employers, ports, and public transport organisations to report gender-disaggregated workforce information by occupational category and organisational level. Aggregate participation figures may conceal women's concentration in administrative or lower-mobility positions. Labour and transport regulators should strengthen enforcement of equal-employment, workplace-safety, and anti-harassment requirements across logistics subsectors. Public procurement and licensing systems may also incorporate proportionate requirements for gender-inclusive employment practices, provided that compliance is assessed through substantive outcomes rather than policy statements alone.

Governments should support technical training, professional certification, and career-entry programmes for women in transport, maritime, warehousing, and supply chain occupations. Policy interventions should also recognise differences among subsectors: the needs of women in trucking and seafaring may differ from those of women in corporate supply chain management.

6. Conclusion

This review addresses an important knowledge gap in logistics and supply chain management by providing a trajectory-sensitive and institutionally informed explanation of women's careers within logistics ecosystems. The synthesis of 47 studies demonstrates that gender inequality cannot be adequately explained by static measures of representation or isolated organisational practices. Rather, it emerges through institutionally structured pathways whose effects accumulate across career stages.

Women's career trajectories are shaped by interactions among macro-level institutional conditions, meso-level organisational and ecosystem practices, and micro-level career experiences and responses. Occupational segregation, unequal access to developmental opportunities, mobility constraints, leadership-legitimacy biases, and retention pressures operate across these levels and reinforce one another over time. Gender inequality in logistics should therefore be understood as a cumulative and multi-level process.

The principal theoretical contribution is the Institutional Pathways Model, an integrative, process-oriented framework rather than an entirely independent theory. It explains how institutional conditions are translated into organisational practices, how the consequences of these

practices accumulate across career stages, and how resulting career outcomes may reinforce or challenge prevailing institutional expectations. The model consequently shifts attention from static descriptions of representation and individual barriers to the sequencing, interaction, and reproduction of gendered career mechanisms.

The evidence further indicates that logistics is not homogeneous in its gendered career dynamics. In fact, gendered career dynamics differ between subfields; the nature and intensity of barriers vary across trucking, maritime logistics, warehousing, transport, and supply chain management because these subsectors differ in their work arrangements, mobility requirements, occupational cultures, and career structures. Nevertheless, recurring mechanisms across these settings reveal systemic patterns that extend beyond any single logistics subsector.

Methodologically, the review applied a transparent, reproducible approach consistent with PRISMA 2020 and PRISMA-S standards, supported by detailed evidence mapping. The combination of study-level traceability in Table 3 and mechanism-level synthesis in Table 4 provides a foundation for cumulative research in this field. Thus, gender inequality in logistics ecosystems is neither random nor inevitable; it is produced and sustained through institutional pathways that shape career opportunities and constraints over time. Understanding these pathways is therefore essential for advancing theory and developing effective interventions that support more inclusive and sustainable logistics careers.

First, longitudinal research designs are essential for analysing career trajectories over time. Much of the existing literature has relied on cross-sectional designs, which cannot directly observe cumulative disadvantage processes. To better understand how early-career placements shape long-term career paths, future research should use longitudinal designs to examine their impact on outcomes such as promotion and salary progression.

Second, subsector-sensitive comparative research is critical for understanding gender inequality in logistics ecosystems. This systematic review has revealed substantial structural heterogeneity within logistics ecosystems, and only a handful of studies have explicitly examined career dynamics across subsectors such as trucking, maritime logistics, warehousing, and supply chain management. Comparative research is critical for distinguishing context-specific mechanisms from those that generalise across logistics ecosystems.

Third, there is a need to develop cross-national and institutional comparative analysis. Although the Institutional Pathways Model emphasises the significance of macro-level institutions, the existing evidence base is heavily geographically concentrated. In the future, researchers should examine how variations in labour regulations, training systems, cultural contexts, and policy frameworks affect career progression across countries.

Fourth, future research should incorporate intersectional perspectives. Currently, the literature focuses solely on women, without acknowledging the variations among them. It is vital to consider the intersectional perspectives of women, as they are essential to developing a comprehensive theoretical framework.

Fifth, there is an opportunity to deepen our understanding of the organisation's translation mechanisms. Although the review indicates that the institution is translated into the organisation, empirical research is vital to deepen our understanding of the organisation's translation mechanisms. In the future, researchers should examine the processes of job allocation, promotion, performance appraisal, and mentor allocation for women.

Sixth, the field would benefit from intervention and evaluation research. Although the literature has identified various barriers and facilitators of women's career progression, few studies have examined the impact of intervention strategies. In the future, researchers should evaluate the impact of various strategies to increase women's representation in the labour force.

Lastly, the changing nature of the logistics industry due to digitalisation, automation, and platformisation is an area of future research. Although the logistics industry is changing due to technological advances, the impact of this change on women's career structures is not well understood. Future research should evaluate the impact of technology on women's career structures.

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Availability of data

The data supporting the findings of this study are available in the article and its references. No new datasets were generated or analysed beyond those reported in the published literature included in this systematic review. Further information regarding the search strategy, screening process, and included studies is available from the corresponding author upon reasonable request.

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