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Article

A theoretical model of co-production of public goods and services: A Systematic literature review and thematic synthesis

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Abstract: This study examines the transformative role of co-production in delivering public goods and services across diverse public-service contexts. It aims to examine the nature, application, drivers, barriers, and reported outcomes of co-production. A systematic literature review with thematic synthesis was conducted using 10 peer-reviewed studies selected through predetermined eligibility criteria. The findings identified stakeholder engagement, knowledge integration, resource availability, and motivational drivers as recurring factors associated with effective co-production. The reviewed evidence indicates that co-production can facilitate citizen participation, knowledge exchange, service improvement, learning, and responsiveness to public needs. However, implementation can be constrained by unequal participation, power imbalances, limited financial and institutional resources, technological barriers, weak trust, and difficulties in consistently measuring outcomes. Based on the synthesis, the study develops the Integrated Co-Production Impact (ICI) Theory, which proposes that motivational drivers promote stakeholder engagement, engagement facilitates knowledge integration, and resource availability enables integrated knowledge to contribute to co-production effectiveness. The study concludes that effective co-production depends on the interaction of these conditions and recommends inclusive participation, adequate resources, institutional support, and stronger evaluation mechanisms to enhance sustainable public-service outcomes.

Keywords: Co-production; public goods and services; stakeholder engagement; integrated co-production impact theory

1. Introduction

Co-production has become a key approach to the provision of public goods and services, promoting the participation of citizens, community organizations, public institutions, and private-sector actors. Co-production differs from the traditional service delivery model, in which governments are the primary service providers, by encouraging shared responsibility and stakeholder engagement throughout the development, delivery, and assessment of services (Haug, 2024). This alignment recognizes the unique knowledge, experience, and resources of service users, which can help improve public outcomes. The term 'co-production' has been used across a range of disciplines, including health and social care, education, environmental management, urban planning, and public governance, where societal challenges demand joint action and creative solutions. Co-production can lead to higher-quality services, increase public trust, improve resource use, and promote social inclusion by engaging stakeholders and sharing knowledge (Moallemi et al., 2023). Despite these advantages, considerable challenges remain, including inequitable participation, power imbalances, scarce resources, and difficulties in achieving long-term outcomes, all of which can affect the effectiveness and sustainability of co-production initiatives (Makey et al., 2023).

1.1. Problem statement

Co-production has increasingly been recognized as an approach for improving the provision of public goods and services; however, its conceptualization and implementation remain inconsistent across sectors and contexts. A major problem is the lack of consensus regarding what constitutes effective co-production, as the concept is understood and operationalized differently by various stakeholders. These differences can create inconsistent expectations, approaches, and outcomes across public-service settings (Eriksson, 2022). Consequently, there remains a need for greater clarity regarding how co-production is conceptualized and operationalized across different sectors.

The effectiveness of co-production is also influenced by barriers and enabling conditions that shape stakeholder participation and implementation. Unequal participation can exclude particular groups, while limited resources, resistance to change, power imbalances, weak coordination, and difficulties in sustaining stakeholder involvement may restrict the effectiveness of collaborative processes. These challenges can contribute to a gap between the theoretical potential of co-production and its practical implementation. Moreover, evidence concerning its effects on service quality, efficiency, and broader social outcomes remains varied across public-service contexts. Greater understanding of the conceptualization, barriers, enabling factors, and reported outcomes of co-production is therefore required, together with evidence-based approaches that can strengthen its sustainability, scalability, and inclusion (Jacob et al., 2025).

1.2. Purpose of study

The purpose of this study is to systematically review and synthesize evidence on the conceptualization, implementation, barriers, outcomes, and improvement of co-production in the provision of public goods and services across different sectors. Specifically, the study examines how co-production is conceptualized and operationalized across public-service contexts, identifies the principal barriers and enabling factors affecting its successful implementation, assesses its reported effects on service quality, efficiency, and social outcomes, and synthesizes evidence-based recommendations for improving the sustainability, scalability, and inclusion of co-production processes.

1.3. Research objectives

The following objectives guide the study:

1. To examine how co-production is conceptualized and operationalized across different public-service sectors.
2. To identify the key barriers and enabling factors affecting the successful implementation of co-production.
3. To assess the reported effects of co-production on service quality, efficiency, and social outcomes.
4. To identify evidence-based approaches for improving the sustainability, scalability, and inclusion of co-production processes.

1.4. Significance of the study

The importance of this study is driven by the need to understand the potential of co-production to enhance the provision of public goods and services in an increasingly complex social, economic, and environmental landscape. While there is growing interest in the potential of co-production to improve service delivery, significant differences have been observed across different sectors in how co-production is defined, implemented, and measured. This study adds to the literature by offering a detailed analysis of co-production, its drivers, barriers, and outcomes.

The questions and objectives of the study are directly related to the significance of the study. The study offers greater conceptual clarity and understanding of co-production by examining definitions and concepts in the various disciplines. The rationale and drivers behind co-production can be explored to justify why collaborative working has become a more popular form of working in public service provision. An understanding of the barriers and challenges of implementation can help inform and guide policymakers and practitioners who want to enhance stakeholder involvement and program performance. Finally, quantifying the measurable effects of co-production on public goods and services can help to measure its value for enhancing service quality, efficiency, accountability, and social outcomes. These results could help shape the transition towards more inclusive, sustainable, and evidence-based co-production processes in various fields.

1.5. Research questions

1. How is co-production conceptualized and operationalized across different public-service sectors?
2. What are the key barriers and enabling factors affecting the successful implementation of co-production?
3. What reported effects does co-production have on service quality, efficiency, and social outcomes?
4. What evidence-based approaches can improve the sustainability, scalability, and inclusion of co-production processes?

2. Literature review

2.1. Conceptual distinctions: Co-production, co-creation, co-design, public goods, and public services

Although co-production, co-creation, and co-design are closely related, they represent distinct forms of stakeholder involvement. Co-production refers to the active contribution of citizens, service users, and other stakeholders alongside professional providers in public-service activities. Participation may occur at different stages of the service cycle and vary by who participates, when, and the activities undertaken (Nabatchi et al., 2017). Co-design focuses specifically on involving stakeholders in designing or redesigning services, whereas co-creation broadly concerns collaborative processes through which multiple actors jointly create ideas, solutions, or public value. Masterson et al. (2022) confirm that co-production and co-design have overlapping but distinct conceptual foundations and should not be treated as interchangeable. Co-creation similarly encompasses broader processes of collaborative value creation within public-service systems

(Osborne et al., 2022).

An equally important distinction exists between public goods and public services. Public goods are generally characterized by non-rivalry, whereby one person's consumption does not substantially reduce availability to others, and non-excludability, whereby individuals cannot readily be prevented from benefiting from them (Bieber, 2025). Public services, including healthcare, education, policing, and social care, are organized to address societal needs but are not necessarily pure public goods because their access or consumption may be restricted. This study therefore treats public goods and public services as conceptually distinct.

2.2. The evolution of co-production

Co-production has become a key idea within public administration, public governance, and public service delivery, highlighting the role of public agencies in engaging citizens and the service providers to whom they belong (Eriksson, 2022). Co-production draws on a more nuanced understanding of public services as not just 'service to' citizens but 'public services with' citizens, where they are designed, delivered, and evaluated alongside citizens (McMullin, 2025). This idea has evolved significantly since it was first formulated and now finds use across a wide range of areas, from governance to healthcare and education, and even in the private sector for innovation.

2.3. Early applications for co-production

The innovative contributions of Elinor Ostrom are a precursor to co-production, as her empirical studies demonstrated the need for co-production to attain effective governance and public service delivery (Oswick, 2025). Ostrom showed that service users' involvement in the service production process could improve public outcomes rather than viewing citizens as passive recipients. One of the first examples of this was community policing, which involved citizens working with police officers to watch over what goes on in their neighborhoods and report crime, which led to a reduction in crime rates and better public safety (Andersen et al., 2026). The same was true in the education sector, with high levels of parental participation in school activities and learning improving educational outcomes (Kantova, 2024). For health promotion, disease prevention, and self-management in the health care sector, research demonstrated the effectiveness of public health services when patients and local communities participate in these processes (Lubega et al., 2023). This research will explore some early examples that showed how important, shared responsibility is, and how co-production is a process where citizens take part in the design and delivery of public services instead of just consuming them.

2.4. Theoretical development of co-production

2.4.1. Bovaird's contribution (2007)

Bovaird (2007) advanced understanding of 'co-production' by distinguishing between co-production as an individual and co-production as a collective. Individual co-production means that service users directly influence the outcomes of services, for example, patients who follow medical advice to improve their health (Nordin et al., 2023). Collective co-production occurs when groups or communities are involved in the co-production of public services, for example, community-led environmental or neighborhood improvement projects (Steiner et al., 2023). This distinction clarified the various scales and levels of co-production, enabling policymakers and researchers to develop more effective participatory strategies.

2.4.2. Brandsen & Pestoff's perspective (2006)

Brandsen and Pestoff extended the idea to examine co-production in the non-profit and voluntary sectors. They found that co-production was not confined to public administration, but could be used in third-sector organizations, where citizens were engaged in social services, community welfare, and local governance in an active role (Brandsen & Pestoff, 2006).

2.4.3. Osborne's public service logic (2016)

Osborne et al. (2016) related co-production to public service innovation and proposed that public services should be co-produced with users to maximize effectiveness and sustainability. This approach pointed to the need for governments to go beyond just engaging citizens to really involve them in the design of policy and services.

2.5. Expansion and practical applications

2.5.1. Co-production in governance and policymaking

In recent years, co-production has been increasingly adopted by governments globally as a means of empowering citizens and fostering participatory democracy. The method will allow citizens to become more active participants in the formulation of public policies and services and not just passive recipients (Goulart & Falanga, 2022). Participative budgeting programs in cities like Porto Alegre, Brazil, enable citizens to participate in public finance decisions, and e-governance programs provide space for citizens' input and co-production of policies (Gonçalves et al., 2026). These practices lead to greater public governance transparency, accountability, and responsiveness.

2.5.2. Co-production in healthcare

Co-production principles have become more commonplace in health systems, which are actively involving patients, families, and communities in health planning and service provision. This method helps facilitate collaborative decision-making, tailor-made treatment plans, and community health services (Smith et al., 2022). For instance, those with chronic diseases like diabetes and hypertension become agents of their own betterment by taking their medication and maintaining a healthy lifestyle (Alhazmi et al., 2024). Likewise, peer-supported interventions in mental health care allow people with lived experience to help others on their recovery

journey, contributing to recovery, engagement, and well-being (Simmons et al., 2023).

2.5.3. Co-production in education

Co-production has been embraced by educational institutions, with active engagement of students, parents, and communities in the design of educational experiences and outcomes (Elliott et al., 2021). This is a collaborative effort that helps in curriculum development, school governance, and innovative learning strategies aligned to the needs of the learners and stakeholders (Rubalcaba, 2022). These include project-based learning, collaborative learning models, in which students can participate in the educational process, and Parent-Teacher Associations (PTA), which allow parents to join in decision-making, policy development, and activities that promote student success and school improvement.

2.5.4. Co-production in business and innovation

In addition to the public sector, co-production is now an important tool for improving customer engagement, innovation, and services in private organizations. Businesses are becoming more customer-centric and are involving customers in their product development and improvement processes, treating them as active partners rather than passive consumers (Leonardi & Not, 2022). Examples include crowdsourcing and open innovation programs, such as LEGO Ideas (the two Danish words "leg godt," which translate to "play well" in English) and Starbucks' My Starbucks Idea, as well as models for user-generated content, such as YouTube, Wikipedia, and open-source software communities (Jhawar et al., 2025).

2.6. Contemporary trends and future directions

2.6.1. Digital co-production and artificial intelligence (AI)

Digital technologies and artificial intelligence have revolutionized the way co-production is realized, allowing for far more opportunities to involve stakeholders in real time, to use data to inform decisions, and to provide more responsive public services (Rossello et al., 2026). Citizens can share information, offer feedback, and engage in service improvement processes via digital platforms. New trends involve the use of digital technologies to generate and analyze citizen data for urban governance and policymaking. Artificial intelligence (AI) can also support the analysis of public discourse and feedback, helping policymakers identify public concerns and priorities and informing more responsive governance processes (Schiff, 2024).

2.6.2. Co-production in sustainability and climate action

In the face of increasing environmental hazards, co-production has proven to be a significant approach to sustainability and climate action. Co-production involves joint decision-making, including citizens, communities, governments, and organizations, which leads to more effective and locally relevant environmental solutions (Howarth et al., 2022). These include community-led renewable energy projects where community members participate in renewable energy projects, such as wind and solar; and citizen science programs where the public participates in monitoring programs, for example, air quality monitoring, biodiversity monitoring, and climate monitoring (Gooding et al., 2024).

2.6.3. Inclusive co-production models

The current development in co-production is oriented towards inclusiveness; that is, groups that are marginalized, disadvantaged, and vulnerable are provided with meaningful opportunities to participate in governance and service provision (Makey et al., 2023). Collaborative decision-making is part of inclusive co-production with the aim of minimizing inequalities and improving social equity. There are several key examples, such as policies that give underrepresented communities a say in public decisions, as well as co-production processes in disaster management in which citizens participate in preparedness planning, disaster response, and community-building to strengthen community resilience (Nipa, 2026).

2.7. Conceptualization and operationalization of co-production across sectors

Co-production is conceptualized and operationalized differently across sectors because the actors involved, forms of participation, resources contributed, and intended outcomes vary by the public-service context. Rather than a single standardized model, co-production may involve citizens and service users in the design, delivery, implementation, or evaluation of services. This variation aligns with the broader understanding that participation differs by who participates, when it occurs, and what activities participants undertake within the public-service cycle (Nabatchi et al., 2017). Consequently, examining sectoral applications is important for understanding how the general principle of shared participation is translated into practice.

In healthcare and social care, co-production is primarily conceptualized as collaboration between service users and professionals in developing, delivering, and improving services. Operationally, this may involve patients contributing experiential knowledge, participating in decision-making, or working alongside professionals in service interventions. Within UK mental health services, a co-produced and co-delivered relaxation course involved both staff and service users, illustrating how users can participate directly in-service delivery rather than functioning solely as recipients of care (Johnson et al., 2022). The operational goal in this context is therefore to combine professional and lived-experience perspectives in ways that improve service experience and responsiveness. However, balancing different voices and accommodating the additional time required for collaboration remain important considerations in healthcare co-production (West et al., 2022).

In urban planning and public governance, co-production places greater emphasis on citizen involvement in decisions about public resources, infrastructure, and community priorities. The Medellín Metrocable illustrates community participation through neighborhood committees that facilitated communication between residents and municipal authorities during infrastructure development (Galvin & Maassen, 2020). In Porto Alegre, participatory budgeting provided another operational mechanism through which citizens participated in neighborhood and thematic assemblies and contributed to decisions about municipal resources and services (Friant, 2019). These cases demonstrate that co-production in governance can be operationalized through participatory structures that create formal

opportunities for citizens to communicate priorities and influence public decisions.

In environmental management and climate adaptation, co-production is conceptualized around the integration of different forms of knowledge and collaborative responses to complex environmental problems. Climate-action co-production can bring together actors from science, policy, practice, and communities to develop responses that reflect different perspectives and forms of expertise (Howarth et al., 2022). In Bangladesh, community knowledge concerning climate risks and locally appropriate adaptation priorities demonstrated the potential contribution of local knowledge to adaptation planning alongside national frameworks (Sultana & Luetz, 2022). The operational emphasis in this sector is therefore on knowledge exchange, joint problem-solving, and connecting community experience with institutional planning.

In education, collaborative participation can involve educational authorities, teachers, researchers, schools, municipalities, students, parents, and other stakeholders. Finland's curriculum reform illustrates a participatory approach in which national and local actors contributed to curriculum development, while municipalities and schools were responsible for adapting curricula to national objectives and local priorities (Vitikka et al., 2016). Operationalization in education therefore centers on collaborative planning and coordination between different levels and actors to ensure that educational policies and practices respond to both broader objectives and local circumstances.

Across these sectors, the operational form of co-production varies by purpose. Healthcare emphasizes collaboration between professionals and service users; governance and urban planning emphasize citizen participation in public decisions; climate-related contexts emphasize the integration of scientific, policy, and local knowledge; and education emphasizes collaborative planning among national and local actors. These sectoral differences reinforce the need to treat co-production as a context-dependent approach rather than applying a uniform operational model across public services (Nabatchi et al., 2017). They also provide a conceptual foundation for examining, in the systematic-review findings, how different forms of participation, knowledge integration, resources, and institutional arrangements influence the implementation and outcomes of co-production.

3. Research design and methodology

3.1. Research design

This study aimed to review the approaches and practices in relation to co-producing public goods/services using a systematic literature review and thematic synthesis. A review was conducted to consolidate the literature on co-production from the governance, healthcare, education, urban planning, and environmental fields to draw patterns, enabling factors, challenges, and outcomes of co-production. The literature identification, screening, selection, and synthesis were based on a systematic approach that provided a transparent and reproducible process. Data were then analyzed thematically, grouping the findings into common themes across five areas: stakeholder engagement, knowledge integration, availability of resources, motivational drivers, and co-production outcomes. This design was appropriate because it allowed evidence from various public-service settings to be compared

and connected, and a conceptual framework for the Integrated Co-Production Impact (ICI) Theory could be developed.

3.2. Search strategy and information sources

A systematic review of the literature was conducted to identify peer-reviewed studies on the co-production of public goods and services. Literature published from 2015 to 2026 was searched to reflect the current state of co-production research and related developments. The 2015-2026 publication restriction and the requirement for peer-reviewed journals applied only to studies included in the systematic evidence synthesis. Where appropriate, earlier foundational publications and other scholarly sources were used to build the background for the conceptual, theoretical, and contextual work on co-production, but were not included as found studies and were not incorporated into the thematic synthesis. The electronic databases and search platforms included: Scopus, Web of Science, PubMed/MEDLINE, and Google Scholar. These sources were chosen to cover a range of disciplines, including public administration/governance, healthcare, environmental management, urban planning, and other public-service-related areas.

The search was based on keywords related to co-production and the factors that affect the implementation and results of co-production. Boolean operators AND and OR were used to combine search terms. The main search term was:

("co-production" OR "coproduction" OR "co-creation" OR "co-design") AND ("public service" OR "public goods") AND ("stakeholder engagement" OR participation OR "knowledge integration" OR resource OR motivation OR outcome) ***

Searches, where appropriate, have been further refined with the use of additional terms, such as “governance,” “healthcare,” “urban planning,” “environmental management,” “barriers,” and “enablers.” Only English-language scholarly literature relevant to the research questions of the study was searched. Titles and abstracts of retrieved records were first screened, and then the full text of those records was assessed for inclusion and exclusion according to predetermined criteria. The identification, screening, eligibility assessment, and reporting of the study-selection process were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021).

4. Data collection, analysis and findings

4.1. Data collection

The data collection was a systematic search and selection of relevant literature on the co-production of public goods and services. Records retrieved from the database were screened to identify records relevant to the research questions. Initial screening was done on titles and abstracts, followed by a full-text screening of potentially eligible articles. Studies were included or excluded according to the predetermined eligibility criteria presented in **Table 1**. Information pertaining to each included article was extracted, such as authors and year of publication, research context or sector, methodological approach, focus of the research, major findings, barriers and enablers, and reported co-production outcomes. Special focus

was paid to evidence related to stakeholder engagement, knowledge integration, resources, motivational drivers, and the effectiveness of co-production. Studies were selected according to the following inclusion and exclusion criteria.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication Year	Studies were published between 2015 and 2026.	Studies were published before 2015.
Language	Studies published in English.	Studies published in languages other than English.
Publication Type	Peer-reviewed journal articles relevant to co-production.	Non-peer-reviewed publications, conference abstracts, dissertations, theses, opinion pieces, and other grey literature.
Topic Relevance	Studies examining co-production, co-creation, or co-design in relation to public goods, public services, public-sector activities, or closely related service contexts.	Studies in which co-production/co-creation was unrelated to public goods, public services, or public-sector/service delivery.
Methodological Relevance	Empirical, systematic review, and conceptual/theoretical journal articles with a clearly described approach relevant to the research questions.	Articles with insufficient methodological or conceptual information contribute meaningfully to the synthesis.
Review-Question Relevance	Studies addressing evidence relevant to the conceptualization, implementation, barriers, enabling conditions, or outcomes of co-production.	Studies that did not provide evidence relevant to the processes, determinants, or outcomes of co-production.
Full-Text Availability	Full-text articles available for eligibility assessment and data extraction.	Articles for which sufficient full text could not be obtained for assessment.

4.2. Study selection process

The study selection process was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021). The PRISMA framework was used to document the identification, screening, eligibility assessment, and final inclusion of studies in the review. The initial database search identified 634 records. Before screening, 126 duplicate records were removed, leaving 508 records for title and abstract screening. Following this initial screening, 421 records were excluded because they did not sufficiently meet the scope and eligibility requirements of the review.

The remaining 87 reports were sought for full-text retrieval. Of these, seven reports could not be retrieved, resulting in 80 full-text articles being assessed against the predetermined inclusion and exclusion criteria. During the full-text assessment, 70 articles were excluded. Specifically, 34 articles were excluded because they were not sufficiently focused on co-production within public-service contexts, 21 articles did not meet the required publication-type or methodological criteria, and 15 articles provided insufficient evidence relevant to the research questions.

After screening and eligibility assessment, 10 peer-reviewed articles met the inclusion criteria and were retained for the final thematic synthesis. These studies provided evidence on stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production outcomes. Study selection was conducted by a single reviewer. The reviewer independently screened the titles and abstracts of all retrieved records against the predetermined eligibility criteria and then assessed the full texts of potentially eligible studies. Eligibility decisions were consistently based on the review's inclusion and exclusion criteria. The complete study-selection process is presented in the PRISMA flow diagram in **Figure 1**.

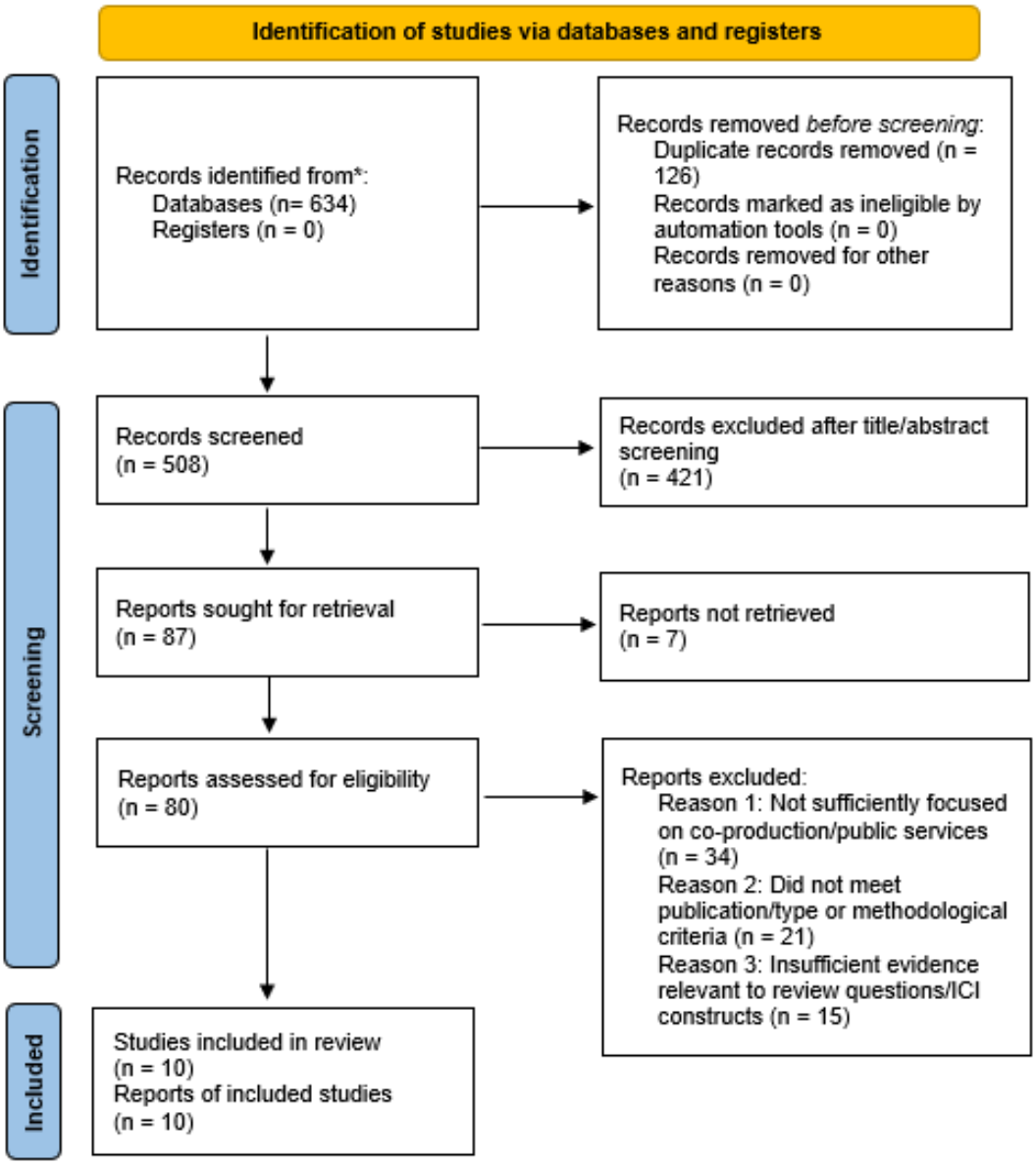

Figure 1. PRISMA Flow Diagram of the Study Selection Process.

4.3. Characteristics of included studies

The systematic review included 10 peer-reviewed studies that met the predetermined eligibility criteria. The characteristics of these studies are summarized in **Appendix A**, including the authors and publication year, study design, setting or context, sample or review corpus, and principal findings relevant to co-production. The included literature was methodologically diverse, comprising empirical quantitative and comparative studies, systematic literature reviews, evidence reviews, and conceptual or theoretical analyses. This diversity enabled the review to examine co-production from different methodological and disciplinary perspectives.

The studies covered several public-service contexts, including public administration, citizen participation, digital public services, health and social care, policing and criminal justice, climate action, and knowledge-policy collaboration. Empirical studies examined citizen participation and motivational influences, while

review-based studies synthesized broader evidence concerning facilitating conditions, actor roles, barriers, resources, and co-production outcomes. For example, Nordin et al. (2023) synthesized 43 empirical studies from 12 countries, whereas Haug (2024) reviewed 76 articles concerning actor roles in co-production. Neumann and Schott (2023) provided quantitative evidence from 966 citizens concerning motivation and digital co-production. Collectively, the included studies provided evidence relevant to stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production effectiveness. Detailed characteristics and principal findings of all 10 included studies are provided in **Appendix A**.

4.4. Quality appraisal of included studies

The methodological quality of the 10 included studies was critically appraised using the Critical Appraisal Skills Programmed (CASP) checklists appropriate to their respective research designs (Critical Appraisal Skills Programmed [CASP], 2024). The CASP Systematic Review Checklist was applied to the systematic and evidence-review studies by Sicilia et al. (2019), Clifton et al. (2020), Loeffler and Bovaird (2020), Bandola-Gill et al. (2023), Nordin et al. (2023), and Haug (2024). The CASP Cross-Sectional Studies Checklist was applied to the quantitative empirical studies by Bovaird et al. (2015) and Neumann and Schott (2023), while the CASP Qualitative Studies Checklist was applied to the comparative qualitative study by Howarth et al. (2022). As CASP does not provide a specific checklist for conceptual or theoretical studies, Nabatchi et al. (2017) was assessed according to conceptual clarity, coherence of argument, transparency of theoretical development, relevance to the review questions, and adequacy of supporting evidence. The appraisal examined methodological rigor, validity, analysis, reporting, and relevance without calculating cumulative numerical scores. The completed critical appraisal checklists and study-level assessments are presented in **Supplementary File**.

4.5. Data analysis

The systematic literature review and thematic analysis performed complementary but distinct functions in this study. The systematic literature review constituted the overall methodological approach used to identify, screen, appraise, and select relevant studies according to predetermined eligibility criteria. Thematic analysis was subsequently used as the analytical method for synthesizing findings extracted from the 10 included studies. Therefore, thematic analysis was not conducted as a separate research methodology independent of the systematic review; rather, it formed the evidence-synthesis stage of the review. This distinction enabled the study-selection process to remain systematic and reproducible while providing an analytical procedure for identifying recurring patterns, differences, and relationships across the included evidence.

The 10 studies included in the systematic review were analyzed using thematic analysis to identify, organize, and synthesize recurring patterns relating to the conceptualization, implementation, barriers, enabling conditions, and outcomes of co-production. Thematic analysis was appropriate because it enabled evidence from studies with different methodological designs and public-service contexts to be

compared systematically. The analysis was informed by the principles of thematic analysis described by Braun and Clarke (2021) and involved familiarization with the evidence, initial coding, comparison and clustering of codes, development of candidate themes, review and refinement of themes, and production of the final thematic synthesis.

The first stage involved familiarization with the included evidence. Each of the 10 articles was read closely, with particular attention to the study purpose, public-service context, methodological approach, participants or evidence base, and principal findings. Relevant findings concerning stakeholder participation, knowledge exchange, resources, motivation, barriers, enabling conditions, implementation processes, and reported outcomes were extracted into a structured evidence framework. This facilitated systematic comparison of relevant information across studies despite differences in their methodological designs and contexts.

The second stage involved descriptive coding of the extracted findings. Codes were assigned to recurring concepts identified across the studies. Findings on citizen involvement, shared decision-making, participant recruitment, and continuity of participation were initially grouped under engagement-related codes. Findings on professional, scientific, experiential, local, and policy knowledge were coded in relation to knowledge exchange and integration. Evidence on funding, infrastructure, technology, institutional capacity, time, and expertise was coded under resource-related concepts. Motivational evidence included public-service motivation, perceived benefits, solidarity, trust, commitment, and willingness to participate. Reported changes in participation, learning, relationships, services, and public-service outcomes were coded as outcome-related evidence.

The third stage involved comparing codes across the 10 studies to identify similarities, differences, and recurring relationships. Codes expressing related concepts were clustered into broader candidate themes. Attention was given not only to frequently reported findings but also to variations across sectors and study contexts. For example, technological access was particularly relevant to digital co-production, whereas boundary-spanning and the integration of different forms of knowledge were prominent in climate and knowledge-policy contexts. This cross-study comparison allowed contextual differences to be retained rather than treating co-production as a uniform process across public-service settings.

The fourth stage involved reviewing and refining the candidate themes against the extracted evidence and the research questions. Overlapping categories were consolidated, while conceptually distinct categories were kept separate. This iterative process yielded five final analytical themes: stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production effectiveness. These themes provided the analytical structure for synthesizing evidence on how co-production is conceptualized, what facilitates participation and implementation, what constrains successful co-production, and what outcomes are reported across public-service contexts.

Finally, relationships among the themes were examined to determine whether recurring patterns in the evidence could support subsequent theoretical development. The five themes were not predetermined as findings before the analysis; rather, they were refined through comparison of recurring evidence across the included studies. The resulting thematic structure subsequently informed the development of the

Integrated Co-Production Impact (ICI) Theory. Broader interpretation of the relationships among these constructs was undertaken in the Discussion and theoretical-development sections rather than being treated as an outcome of the systematic search itself. This distinction maintained a transparent analytical progression from extracted evidence to codes, from codes to themes, and ultimately to theoretical interpretation.

4.6. Findings

The findings presented in this section are derived exclusively from the 10 peer-reviewed studies included in the systematic review. The included studies examined co-production across diverse contexts, including public administration, digital public services, health and social care, climate action, knowledge-policy co-production, and community-based public services. Through these contexts, the studies provided evidence concerning the nature and conceptualization of co-production, factors influencing participation, barriers and enabling conditions affecting implementation, and reported outcomes associated with co-production in public-service delivery.

The thematic analysis identified five key themes across the included literature: stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production effectiveness. These themes provide the analytical structure for presenting the findings and addressing the four research questions. The section reports evidence from the included studies, including relevant quantitative findings where available. Broader interpretation of the findings and their theoretical implications is reserved for the Discussion and theoretical-development sections.

4.7. How research findings answer the research questions

Research Question 1: How is co-production conceptualized and operationalized across different public-service sectors?

The reviewed studies demonstrate that co-production is a multidimensional concept whose meaning and practical form vary across public-service sectors. In public administration, co-production concerns the participation of citizens and service users alongside public-service professionals at different stages of public-service processes. It can occur at individual, group, or collective levels and across four phases of the service cycle: commissioning, design, delivery, and assessment (Nabatchi et al., 2017). This framework shows that co-production extends beyond a single form of citizen participation because the actors involved, the timing of involvement, and the activities undertaken can differ by service context.

In knowledge and policy settings, co-production is conceptualized more broadly because different disciplinary traditions attach different meanings to collaborative knowledge production. Five perspectives identified in the literature include co-production as a science-politics relationship, knowledge democracy, transdisciplinary, boundary management, and an evidence-use intervention (Bandola-Gill et al., 2023). These perspectives illustrate that co-production can operate through different theoretical and practical approaches to mobilizing knowledge for policy and practice.

In climate-action settings, co-production involves bringing together scientific and practice-based knowledge held by stakeholders from science, policy, and

practice. Effective collaboration requires attention to different perspectives, roles, motivations, and epistemological boundaries, with boundary agency providing a mechanism through which participants can work across these differences (Howarth et al., 2022). Sustained engagement across these boundaries can support the development of communities of practice that are better positioned to contribute to climate action.

Digital public services provide another operational form of co-production in which information and communication technologies facilitate interactions between governments and citizens. However, ICT does not automatically produce successful collaboration because structural and cultural conditions can function as either barriers or enablers of technology-supported co-production (Clifton et al., 2020). The evidence therefore supports practical approaches that adapt co-production to its sectoral setting: clarifying who participates and at which service stage in public administration (Nabatchi et al., 2017), recognizing different forms of knowledge in policy settings (Bandola-Gill et al., 2023), supporting sustained cross-boundary engagement in climate action (Howarth et al., 2022), and addressing structural and cultural conditions when using ICT for public-service co-production (Clifton et al., 2020).

Research Question 2: What are the key barriers and enabling factors affecting the successful implementation of co-production?

The reviewed studies identified organizational arrangements, stakeholder motivation, resources, trust, technology, and institutional support as important enabling conditions for co-production. Organizational arrangements, professional roles, managerial tools, participant recruitment, participant preparation, and process design were identified as six factors that can facilitate co-production in public services (Sicilia et al., 2019). These findings indicate that successful implementation depends not only on citizens' willingness to participate but also on how public organizations' structure and manage opportunities for participation.

Motivation also influenced participation. Public-service motivation can encourage citizens to engage in digital co-production, although motivational influences differ according to the form of motivation and the type of participation involved (Neumann & Schott, 2023). Attempts to increase collective co-production through positive behavioral "nudges" produced statistically significant effects in only 6 of 15 potential activities, demonstrating that simple interventions do not consistently increase participation (Bovaird et al., 2015). Resources and relationships provide additional enabling conditions. Knowledge, skills, funding, infrastructure, and other resources can be contributed by service users, providers, and intermediary actors, while intermediaries can support relationships between participants in co-production processes (Haug, 2024). In ICT-enabled public services, trust, collaborative arrangements, and accessible technologies can also facilitate participation (Clifton et al., 2020).

However, the same evidence identified substantial barriers. Limited information, resources, and time can constrain participation, while self-selection during recruitment can introduce participation bias and reduce the representativeness of co-production processes (Sicilia et al., 2019). Unequal distributions of power and resources can further restrict meaningful participation because public-service providers may retain greater control than service users and

intermediaries (Haug, 2024). Digital co-production can be affected by social, ethnic, and language differences, distrust, and concerns that technology may replace established forms of social interaction (Clifton et al., 2020). Assessing effectiveness is also challenging. Diverse stakeholders, contexts, objectives, and measurement approaches make consistent evaluation and causal attribution difficult in health and social care co-production (Nordin et al., 2023). Differences in how co-production is understood across knowledge and policy traditions can also create tensions about whose knowledge should inform collaborative processes (Bandola-Gill et al., 2023).

Research Question 3: What reported effects does co-production have on service quality, efficiency, and social outcomes?

The reviewed studies reported a range of outcomes associated with co-production, although the type and strength of evidence varied considerably across sectors. In health and social care, co-production was associated with positive experiences of participation, learning, relationship development, and changes to services or products. However, considerable variation in the measures used across the 43 empirical studies reviewed made direct comparison of outcomes difficult and limited conclusions about the magnitude of these effects (Nordin et al., 2023).

Evidence concerning service quality was also identified in policing and criminal justice. Co-production was examined across pathways involving crime prevention, detection, victim support, offender rehabilitation, and quality-of-life outcomes. Evidence was identified for most of the proposed pathways connecting citizen co-production with public-service outcomes, although the strength of evidence differed considerably across activities and limitations in research designs restricted strong causal conclusions (Loeffler & Bovaird, 2020). These findings indicate that improvements in service outcomes may occur through different pathways rather than through a single uniform mechanism.

Evidence concerning efficiency was less consistent than evidence concerning participation and service-related outcomes. Co-production can involve citizens, service users, providers, and intermediaries contributing knowledge, skills, funding, infrastructure, and other resources to public-service processes. However, unequal access to these resources and differences in actors' capacities can influence how effectively they are mobilized within co-production arrangements (Haug, 2024). The reviewed evidence therefore does not support treating efficiency gains as an automatic consequence of co-production.

Social outcomes were particularly evident through citizen participation, relationships, motivation, and collaborative involvement. Collective co-production provides opportunities for citizens to contribute directly to public-service activities, although behavioral interventions designed to increase participation produced statistically significant effects in only 6 of 15 potential activities examined (Bovaird et al., 2015). In digital settings, citizen participation was associated with dimensions of public-service motivation, demonstrating the importance of motivational factors in explaining engagement in digital co-production (Neumann & Schott, 2023). In climate-action settings, collaboration across science, policy, and practice facilitated interaction among actors possessing different forms of knowledge and experience (Howarth et al., 2022). The evidence therefore demonstrates reported effects across service, resource, participation, learning, and relationship dimensions, while also showing that measurement inconsistency and methodological limitations constrain

definitive conclusions about effectiveness.

Research Question 4: What evidence-based approaches can improve the sustainability, scalability, and inclusion of co-production processes?

The reviewed studies provide evidence for several feasible approaches that can strengthen sustainability, scalability, and inclusion of co-production processes. Sustainable co-production requires supportive organizational arrangements and carefully designed participation processes. Organizational structures, professional roles, managerial tools, participant recruitment, participant preparation, and process design can facilitate the implementation of co-production (Sicilia et al., 2019). Particular attention to recruitment is important because self-selection can produce participation bias, while insufficient information, resources, and time can restrict continued involvement. These findings support designing participation processes that reduce barriers to involvement and provide participants with adequate preparation and opportunities to contribute.

Resource availability and the distribution of influence among participants are also important for sustaining co-production. Service users, providers, and intermediaries contribute different combinations of knowledge, skills, funding, infrastructure, and other resources, while intermediaries can connect actors and facilitate collaborative relationships. Unequal power and resource distributions can nevertheless restrict meaningful participation, indicating the importance of arrangements that enable different actors to contribute to decision-making and resource exchange (Haug, 2024).

For technology-enabled co-production, scalability requires attention to accessibility and the characteristics of the technology being introduced. Simpler and less costly ICT arrangements may encounter fewer barriers, while trust and collaborative relationships can facilitate citizen participation (Clifton et al., 2020). Digital expansion should therefore consider social, cultural, language, accessibility, and trust-related barriers rather than assuming that technology alone will broaden participation.

Inclusive and sustainable co-production also requires attention to motivation and knowledge diversity. Different forms of public-service motivation can influence citizens' willingness to participate in digital co-production, demonstrating the importance of understanding why citizens contribute rather than relying solely on external incentives (Neumann & Schott, 2023). In knowledge and policy settings, recognizing different understandings of co-production and different forms of expertise can help accommodate diverse perspectives within collaborative processes (Bandola-Gill et al., 2023). Sustained interaction across science, policy, and practice can similarly support collaboration across institutional and knowledge boundaries in climate-action settings (Howarth et al., 2022).

Finally, stronger evaluation is necessary to support the continuation and transfer of co-production approaches. The diversity of objectives, contexts, stakeholders, and outcome measures currently makes comparison and causal attribution difficult (Nordin et al., 2023). More consistent attention to outcomes and evaluation can therefore provide a stronger evidence base for determining which co-production approaches can be sustained or adapted across public-service settings.

4.7.1. Cross-study synthesis of barriers to effective co-production

The cross-study synthesis demonstrates that barriers to effective co-production occur at individual, organizational, technological, relational, conceptual, and evaluation levels. Although barriers were not the primary focus of every included study, each study provides evidence concerning conditions that may constrain participation, implementation, or the assessment of co-production. The barriers identified across the 10 included studies are summarized in **Table 2**.

Table 2. Cross-Study Synthesis of Barriers to Effective Co-Production

Included Study	Barriers or Challenges Identified
Bovaird et al. (2015)	Citizen participation was not consistently responsive to behavioral interventions, with positive nudges producing statistically significant effects in only 6 of 15 potential collective co-production activities.
Sicilia et al. (2019)	Self-selection and participation bias, inadequate information, limited resources and time, and organizational and procedural conditions can constrain participation and implementation.
Clifton et al. (2020)	ICT-enabled co-production can be restricted by accessibility and technological complexity, distrust, social, ethnic and language differences, and concerns about digital interaction replacing established social interaction.
Haug (2024)	Unequal distributions of power, resources, knowledge, funding and infrastructure among service users, providers and intermediaries can restrict meaningful participation.
Nordin et al. (2023)	Diverse contexts, stakeholders, objectives and outcome measures make outcomes difficult to compare and complicate causal attribution.
Bandola-Gill et al. (2023)	Different conceptualizations of knowledge co-production can create tensions regarding the purposes of co-production and whose knowledge is recognized within collaborative processes.
Howarth et al. (2022)	Differences in roles, perspectives, motivations and epistemological positions can create boundaries between science, policy and practice that participants must negotiate.
Loeffler and Bovaird (2020)	Methodological weaknesses and variations in the strength of available evidence make it difficult to establish causal relationships between co-production activities and public-service outcomes.
Neumann and Schott (2023)	Motivational dimensions do not influence digital co-production uniformly, indicating that citizen motivation cannot be treated as a single or universally effective driver of participation.
Nabatchi et al. (2017)	Barriers were not the primary focus; however, variation in who participates, when participation occurs, and what activities participants undertake demonstrates important design and participation considerations.

The synthesis shows that barriers are interconnected rather than isolated. At the participation level, self-selection, limited motivation, unequal opportunities, and differences in participant roles can influence who becomes involved and how participation occurs (Sicilia et al., 2019; Nabatchi et al., 2017). At the organizational and resource level, inadequate time, funding, infrastructure, information, and unequal control over resources can limit the capacity of stakeholders to contribute meaningfully (Sicilia et al., 2019; Haug, 2024). Digital approaches introduce additional technological and social barriers, particularly where accessibility, trust, technological complexity, language, or established patterns of social interaction affect participation (Clifton et al., 2020).

Barriers also arise from differences in knowledge, institutional positions, and expectations. Knowledge-policy co-production can involve competing understandings of what co-production should accomplish and whose knowledge should inform decisions (Bandola-Gill et al., 2023). Similarly, climate-action co-production requires actors to work across boundaries between science, policy, and practice and negotiate different perspectives and forms of expertise (Howarth et al., 2022). Finally, evaluation represents a cross-sector challenge. Variations in methods, objectives, contexts, and outcome measures restrict comparison and make

causal attribution difficult (Nordin et al., 2023; Loeffler & Bovaird, 2020). Thus, the reviewed evidence demonstrates that effective co-production depends on addressing multiple interacting barriers relating to participation, resources, power, technology, knowledge, institutional arrangements, and evaluation.

4.7.2. Cross-study synthesis of co-production impacts

The reviewed evidence demonstrates that the impacts of co-production can be considered across three interconnected dimensions: service quality, efficiency, and social outcomes, although the strength and measurement of evidence differ across contexts. Regarding service quality, co-production was associated with positive experiences of participation, learning, relationship development, and changes to services or products in health and social care (Nordin et al., 2023). Evidence from policing and criminal justice also identified pathways connecting citizen co-production with outcomes relating to crime prevention, detection, victim support, offender rehabilitation, and quality of life, although methodological limitations restrict strong causal conclusions (Loeffler & Bovaird, 2020).

Evidence concerning efficiency was comparatively limited and should therefore be interpreted cautiously. Co-production enables service users, providers, and intermediaries to contribute knowledge, skills, funding, infrastructure, and other resources to public-service processes (Haug, 2024). Such resource mobilization may support service delivery, but unequal access to resources and differences in stakeholder capacity can affect how effectively these contributions are used (Haug, 2024). The included studies do not provide sufficiently consistent evidence to conclude that co-production automatically produces cost savings or productivity improvements.

The social consequences of co-production were more evident in participation, relationships, motivation, inclusion, and knowledge exchange. Citizen involvement creates opportunities for direct participation in public-service activities, although behavioral interventions increased collective co-production significantly in only 6 of 15 potential activities examined (Bovaird et al., 2015). Public-service motivation was also associated with actual participation in digital co-production (Neumann & Schott, 2023). Collaboration across science, policy, and practice can facilitate interaction between actors possessing different forms of knowledge (Howarth et al., 2022). However, participation can also reproduce inequalities when self-selection, unequal resources, or power imbalances restrict meaningful involvement (Sicilia et al., 2019; Haug, 2024). Therefore, the evidence indicates potentially beneficial service and social impacts while demonstrating that efficiency effects remain less established and that outcomes depend substantially on implementation conditions.

5. Discussion

The findings demonstrate that co-production is a context-dependent and multidimensional process rather than a uniform model of public-service participation. Its conceptualization and operationalization vary according to the actors involved, stages of participation, institutional setting, and intended purpose. Nabatchi et al. (2017) conceptualized these differences according to who participates, when participation occurs, and what activities are undertaken, while Bandola-Gill et al. (2023) identified five meanings of co-production within

knowledge and policy contexts. In climate action, co-production emphasizes collaboration across science, policy, and practice boundaries (Howarth et al., 2022), whereas digital co-production involves citizen-government interaction facilitated through ICT (Clifton et al., 2020). These findings reinforce the view that participation is integral to public-service delivery rather than an additional activity (Osborne & Strokosch, 2022).

Stakeholder engagement emerged as an important condition for successful implementation, although participation alone does not guarantee effective co-production. Organizational arrangements, professional roles, managerial tools, recruitment, participant preparation, and process design can facilitate participation (Sicilia et al., 2019). Conversely, self-selection, inadequate information, limited resources, and time constraints may restrict involvement and contribute to participation bias (Sicilia et al., 2019). Positive behavioral nudges produced statistically significant effects in only 6 of 15 potential collective co-production activities, suggesting that opportunities and encouragement do not consistently generate participation (Bovaird et al., 2015). This interpretation is consistent with evidence that social networks and trust can support co-production among vulnerable citizens (Stougaard, 2021).

The cross-study synthesis further demonstrates that barriers operate at interconnected levels. Unequal power and resource distributions may restrict service users and intermediaries when providers retain greater institutional authority (Haug, 2024). Digital co-production introduces additional challenges involving accessibility, technological complexity, distrust, social and language differences, and concerns about replacing established social interaction (Clifton et al., 2020). Conceptual differences can also create tensions regarding the purpose of co-production and whose knowledge should inform collaborative processes (Bandola-Gill et al., 2023). Similarly, climate-action participants must negotiate different perspectives and boundaries between science, policy, and practice (Howarth et al., 2022). Effective implementation therefore requires attention to interacting with organizational, technological, relational, resource, and knowledge-related barriers.

Knowledge integration represents an important mechanism through which stakeholder engagement may contribute to outcomes. Co-production can connect scientific, professional, policy, local, and experiential knowledge within collaborative processes (Bandola-Gill et al., 2023). Boundary agency can similarly facilitate interaction among actors operating across different institutional and epistemological settings (Howarth et al., 2022). Evidence beyond the included synthesis also demonstrates how Indigenous knowledge co-production can establish shared priorities and direct research towards locally identified needs (Figus et al., 2022). Stakeholder involvement may therefore be most meaningful when participants' knowledge influences collaborative decision-making rather than participation being restricted to consultation.

Resource availability further influences whether engagement and knowledge integration can be translated into practice. Service users, providers, and intermediaries contribute knowledge, skills, funding, infrastructure, and other resources, although these resources may be distributed unequally (Haug, 2024). ICT can expand participation while simultaneously creating accessibility, affordability, complexity, and trust-related challenges (Clifton et al., 2020). These findings

support the broader argument that contextual conditions of co-production operate together rather than independently (Cepiku et al., 2022). Resources should therefore encompass financial capacity, institutional support, technological access, expertise, infrastructure, information, and time.

Motivation also emerged as an important antecedent of engagement. Evidence from 966 citizens demonstrated relationships between public-service motivation and actual digital co-production, although motivational dimensions differed in their effects (Neumann & Schott, 2023). This complements the limited effects of behavioral nudges reported by Bovaird et al. (2015). Participation therefore depends on more than external encouragement. Perceived competence, individual characteristics, task perceptions, and self- and community-oriented motivations may interact in shaping citizen participation (Van Eijk & Steen, 2016).

The impacts of co-production can be interpreted across service quality, efficiency, and social outcomes. In health and social care, positive experiences involving participation, learning, relationships, and changes to services or products were identified across 43 empirical studies from 12 countries, although inconsistent measurement restricted comparison (Nordin et al., 2023). In policing and criminal justice, evidence supported pathways linking co-production to crime prevention, detection, victim support, rehabilitation, and quality-of-life outcomes, although methodological weaknesses limited causal conclusions (Loeffler & Bovaird, 2020). Evidence for efficiency was less definitive. Although co-production can mobilize stakeholder knowledge, skills, funding, and infrastructure, consistent evidence of cost savings or productivity improvements was not established (Haug, 2024). Social consequences included participation, relationships, motivation, learning, and knowledge exchange, while self-selection and power inequalities could also create exclusionary effects (Sicilia et al., 2019; Haug, 2024).

The findings additionally support approaches for improving sustainability, scalability, and inclusion. Careful recruitment, participant preparation, process design, accessible technology, adequate resources, recognition of diverse knowledge, and attention to motivation can strengthen co-production processes (Sicilia et al., 2019; Clifton et al., 2020; Haug, 2024; Neumann & Schott, 2023). More consistent evaluation is also needed because heterogeneous objectives and outcome measures restrict comparison and causal attribution (Nordin et al., 2023; Loeffler & Bovaird, 2020).

Taking together, these findings provide the evidence base for the proposed Integrated Co-Production Impact (ICI) Theory. The synthesis proposes that motivational drivers encourage stakeholder engagement, engagement creates opportunities for knowledge integration, and resource availability conditions the translation of integrated knowledge into co-production effectiveness. These relationships are theoretical propositions derived from the systematic review rather than empirically established causal relationships, providing a foundation for future testing of the ICI Theory.

6. Policy implications

The findings of this study highlight the need for policy frameworks that support inclusive, collaborative, and sustainable co-production practices. Effective

co-production depends on meaningful stakeholder participation, adequate resources, strong governance structures, and clear accountability mechanisms (Gerlak et al., 2023). Policymakers play a critical role in creating conditions that enable collaboration among governments, communities, businesses, and service users while addressing barriers such as unequal participation and limited institutional support. Furthermore, policies should promote transparency, innovation, and long-term sustainability to maximize the benefits of co-production. The following policy recommendations are informed by the literature review, research findings, and discussion, and are intended to strengthen the effectiveness, scalability, and inclusiveness of co-production initiatives across public service sectors (Makey et al., 2023; McNaught, 2024).

6.1. Policy recommendation 1: Multi-level governance collaboration

The policy's intent is to facilitate the effective provision of public goods and services between federal, state, and local governments. This can be done by establishing formal communication channels to facilitate decision-making at all levels of government. Shared platforms need to be established to harmonize strategies, share resources, and co-develop policies. Further, joint task forces, representing federal, state, and local government bodies to ensure goal alignment and coordinated actions, should be established, and all levels of government should be effectively engaged in co-production (Agrawal et al., 2022).

6.2. Policy recommendation 2: Stakeholder engagement and capacity-building

The policy will work to build the capacity of stakeholders, such as businesses, non-profits, and local communities, to be active in the co-production process. To attain this, the technical, administrative, and collaborative capacities of stakeholders need to be improved through comprehensive training programs. Furthermore, there should be investment of funds in local organizations and community groups to allow for meaningful involvement in co-production processes. Grants for capacity-building initiatives will also help support communities by equipping them to be able to handle resources, policy frameworks, and collaboration so they can participate and contribute to co-production programs (Cosgrave et al., 2022).

6.3. Policy recommendation 3: Sustainability integration

The policy is intended to have services and products co-produced with long-term environmental and social resilience in mind. This can be realized by embedding sustainability targets into the co-production process, linking policies to environmental principles and targets, including carbon neutrality, resource efficiency, and social equity. Businesses and stakeholders should be encouraged to adopt sustainable business practices in public goods and services delivery through incentives. Secondly, mandatory sustainability reporting of all co-production activities should be established, highlighting their long-term consequences on the environment and on society, as well as providing accountability and a stimulus for ongoing improvements (Igwe et al., 2024).

6.4. Policy recommendation 4: Transparency and accountability

To improve transparency of the co-production process, build public trust, and ensure services meet quality standards. This should be done through transparency protocols, which should include regular reporting on co-production efforts, progress, and outcomes. Open data policies should also be adopted, enabling citizens and stakeholders to have access to information on the co-production process, such as budget allocations, project timelines, and project performance. Furthermore, an independent oversight body could be put in place that monitors and evaluates the efficiency, transparency, and accountability of co-production projects to make sure they are effective and in the public's best interests (Morkel & Sibanda, 2022).

6.5. Policy recommendation 5: Incentive and recognition

Policy supports all stakeholders to be actively involved and to be continually involved with each other, offering rewards and recognition for good cooperation in the co-production process. To do this, recognition programs should be established to promote good co-production relationships and innovative work. Also, tax incentives, subsidies, or grants should be provided to businesses and non-profits that participate in co-production activities that are consistent with public welfare (Sacchetti & Ianes, 2022). Communities or organizations that are exemplary in their collaboration on the co-production of public services should also receive financial rewards or public recognition for their efforts; their efforts should be recognized and valued, and they should build their confidence to continue.

6.6. Policy recommendation 6: Co-production innovation

The policy is designed to promote innovation in the design and provision of public goods and services through a collaborative process between the state, businesses, and civil society. To this end, innovation hubs or platforms should be established, providing a space where all stakeholders can meet and work together on innovative solutions for the delivery of public services. There should also be encouragement of R&D grants and funding opportunities to support the development of new technologies, tools, and approaches for co-production. Also, there is a need to enhance public-private partnership (PPP) as a means of building scalable solutions that are efficient and sustainable for public goods, with innovation embedded in the co-production process to improve public service outcomes (Russo & Simoni, 2025).

7. Theoretical implications

7.1. Definition of theory

A theory provides a systematic explanation of a phenomenon by identifying key concepts and specifying the relationships among them. Beyond describing what occurs, theory helps explain why particular outcomes emerge and under what conditions those outcomes are likely to occur. A well-developed theory should therefore provide conceptual clarity, establish relationships among relevant constructs, and generate propositions that can guide further empirical investigation (Sandberg & Alvesson, 2021). In the context of co-production, theory is particularly

important because the effectiveness of collaborative public-service arrangements depends on several interconnected factors rather than on stakeholder participation alone. Theoretical perspectives can help explain how stakeholder engagement, knowledge sharing, available resources, institutional conditions, and individual or collective motivations interact to influence co-production outcomes. Accordingly, this study uses existing theoretical perspectives as the foundation for developing the Integrated Co-Production Impact (ICI) Theory, which seeks to explain the mechanisms through which these factors contribute to effective co-production.

7.2. Reviewed major theories

7.2.1. Theory of science-policy links and knowledge democracy

The science-policy links and knowledge democracy perspective emphasize the integration of different forms of knowledge in collaborative decision-making. Rather than treating scientific or professional expertise as the only legitimate source of knowledge, co-production recognizes the value of experiential, local, practitioner, and policy knowledge contributed by different stakeholders (Bandola-Gill et al., 2023). This perspective suggests that effective co-production requires mechanisms through which diverse knowledge can be exchanged, interpreted, and incorporated into decisions. However, knowledge integration depends on meaningful stakeholder participation because knowledge cannot contribute to collective solutions when relevant actors are excluded from the process.

This perspective provides a theoretical foundation for two components of the Integrated Co-Production Impact (ICI) Theory: stakeholder engagement (X1) and knowledge integration (X2). Stakeholder engagement creates opportunities for participation by diverse knowledge holders, and knowledge integration provides a platform for them to contribute to shared knowledge and actionable solutions. The ICI Theory thus suggests that stakeholder engagement is an important aspect of effective co-production because it integrates knowledge.

7.2.2. Co-production, co-creation, and co-design theories

Co-production, co-creation, and co-design are related participatory approaches; however, they differ in scope and in the extent to which stakeholders are engaged. Co-design is a term used to describe services, programs, or solutions that are co-designed, meaning users and other stakeholders are actively included in the design process. Co-creation is more holistic and places an emphasis on value, ideas, or solution creation through co-action among several actors. Co-production involves greater citizen and service user involvement in delivery, implementation, and, in some instances, the evaluation of public services, and places citizens and service users in a much more active role than as passive recipients (Vargas et al., 2022). These differences are significant due to varying levels of stakeholder engagement and the frequency of participation across the three approaches.

End-user participation in the literature is also seen in various theoretical forms, according to the role given to end users and service providers (Khine et al., 2021). Stakeholder Engagement (X1) is the starting point in the Integrated Co-Production Impact (ICI) Theory. The levels of meaningfully engaging stakeholders in the design, delivery, and review of services affect the opportunities for exchange of knowledge, shared decision-making, and collective ownership. In this sense, the ICI

Theory makes stakeholder engagement a key tool for co-production to affect public-service results.

7.2.3. Theory on healthcare learning systems

Healthcare learning systems provide an important theoretical perspective for understanding how knowledge is continuously generated, shared, and applied to improve service delivery. Within learning health systems, co-production enables patients, healthcare professionals, researchers, and other stakeholders to contribute different forms of knowledge and experience to healthcare improvement. Gremyr et al. (2021) emphasize that co-production within learning health systems involves collaboration among stakeholders and the integration of knowledge generated through healthcare practice and patient experiences. This continuous exchange allows services to learn from practice and adapt to emerging needs.

This perspective primarily supports knowledge integration (X2) within the Integrated Co-Production Impact (ICI) Theory. Knowledge integration represents the process through which professional expertise, empirical evidence, and service-user experiences are combined to inform decisions and improve services. However, effective knowledge integration also requires adequate organizational capacity and resources to collect, share, and apply knowledge. Therefore, the healthcare learning systems perspective also supports resource availability (X3) as an enabling condition that can strengthen the translation of integrated knowledge into effective co-production outcomes.

7.2.4. Theory on boundary agency

Boundary agency provides a useful perspective for understanding how actors work across institutional, professional, and knowledge boundaries during co-production. In complex policy areas such as climate action, effective collaboration often requires scientists, policymakers, practitioners, and communities to negotiate different priorities, forms of expertise, and ways of working. Howarth et al. (2022) show that co-production can help bridge the boundaries between science, policy, and practice by creating opportunities for shared learning and coordinated action. In the same way, Masterson et al. (2022) illustrate the need for collaboration beyond boundaries, in which knowledge and practice are coordinated among different groups.

It is a perspective that supports stakeholder engagement (X1) and knowledge integration (X2) within the Integrated Co-Production Impact (ICI) Theory. Stakeholder engagement builds relationships that enable actors across domains to interact, and knowledge integration links their unique perspectives and expertise into coordinated solutions. The capacity to translate, negotiate, and integrate knowledge across institutional and disciplinary boundaries is thus a crucial aspect of co-production effectiveness, as explained by boundary agency.

7.2.5. Theories for public service motivations

The theory of public service motivation (PSM) is used to explain the motivation to engage in activities that benefit communities and the wider public. It focuses on motivations related to adding value to society, acting in the public interest, and contributing to the public good, over and above any benefits to individuals or their private interests. The importance of public service motivation for co-production is highlighted by Neumann and Schott (2023) when they discuss

the role of citizens' motivation in their willingness to participate in the provision of public services. This is especially significant because stakeholders must be willing to commit their time, knowledge, skills, and effort to collaborative activities, which is what effective co-production requires.

This is the main theoretical framework of motivational drivers (X4) in the Integrated Co-Production Impact (ICI) Theory. Motivational drivers are important for getting stakeholders engaged from the start and keeping them engaged over time. The ICI Theory thus suggests that greater motivation drives greater engagement of stakeholders (X1), which leads to opportunities for knowledge integration and better co-production results. Motivation is then considered an antecedent to meaningful and sustained stakeholder involvement, rather than a stand-alone factor contributing to successful co-production.

7.2.6. Theory on community values

Shared norms, ethical commitments, and collective priorities have been shown to influence participation in co-production, and community values offer a valuable theoretical lens for understanding this. If stakeholders feel a sense of belonging to shared social objectives and see consistency in collaborative activities focused on community interests, they may be more willing to invest their time, knowledge, and resources. The authors of Sacchi et al. (2022) underscore the significance of community values in fostering ethical and sustainable practices and argue that collective values can shape both participation and the long-term outlook of collaborative efforts.

This viewpoint enhances the theory regarding motivational drivers (X4) in the Integrated Co-Production Impact (ICI) Theory. Intrinsic motivation, a sense of shared responsibility, and commitment to shared results can emerge from shared community values. The motivational forces can then prompt increased, more enduring involvement among stakeholders (X1). The ICI Theory thus considers the values of a community as an important source of motivation; if these values reinforce participation and facilitate continuity and sustainability of co-production processes, this will be the case.

7.3. Synthesis of theories and development of the integrated co-production impact (ici) theory

The Integrated Co-Production Impact (ICI) Theory synthesizes the theoretical perspectives reviewed in Section 7.2 with evidence from the 10 studies included in the systematic review. The theory proposes that stakeholder engagement (X1), knowledge integration (X2), resource availability (X3), and motivational drivers (X4) interact to influence co-production effectiveness (Y). Rather than treating these constructs as an independent checklist of enabling factors, the ICI Theory specifies how they may operate sequentially and conditionally to influence public-service outcomes. This synthesis is supported by the thematic analysis, which identified stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production effectiveness as the five recurring themes across the included evidence.

Stakeholder engagement (X1) represents the active involvement of citizens, service users, professionals, and other relevant actors in co-production processes.

The theoretical importance of participation is supported by co-production, co-creation, and co-design perspectives, which emphasize meaningful stakeholder involvement in collaborative activities (Vargas et al., 2022). Evidence from the included studies further supports this construct. Co-production can vary according to who participates, when participation occurs, and what activities participants undertake across the service cycle (Nabatchi et al., 2017). Organizational arrangements, professional roles, managerial tools, participant recruitment, participant preparation, and process design also influence opportunities for meaningful participation (Sicilia et al., 2019). However, behavioral interventions designed to increase collective co-production produced statistically significant effects in only 6 of 15 potential activities examined, indicating that participation cannot necessarily be generated through simple encouragement alone (Bovaird et al., 2015).

Knowledge integration (X2) reflects the exchange and combination of scientific, professional, policy, local, and experiential knowledge within collaborative processes. Science-policy links and knowledge-democracy perspectives provide a theoretical foundation for this construct by recognizing multiple forms of knowledge in co-production (Bandola-Gill et al., 2023). Learning health-system theory similarly emphasizes the generation, exchange, and application of knowledge among service users and professionals (Gremyr et al., 2021). Empirical support is also provided by climate-action research, where co-production requires collaboration across science, policy, and practice and negotiation of different perspectives, roles, and epistemological boundaries (Howarth et al., 2022). These findings support the proposed relationship between X1 and X2 because meaningful engagement creates opportunities for different knowledge holders to contribute to collaborative processes.

Resource availability (X3) represents the financial, human, technological, institutional, informational, and time-related capacities required to sustain participation and translate collaborative knowledge into action. The included evidence shows that service users, providers, and intermediaries contribute different combinations of knowledge, skills, funding, infrastructure, and other resources (Haug, 2024). However, these resources are not distributed equally, and providers may retain greater control over resources and decision-making (Haug, 2024). Limited information, resources, and time can also constrain participation (Sicilia et al., 2019). In digital public services, accessibility, technological complexity, trust, and social inequalities may affect whether ICT facilitates or restricts co-production (Clifton et al., 2020). The ICI Theory therefore treats X3 as an enabling condition that influences whether integrated knowledge can be converted into effective outcomes.

Motivational drivers (X4) explain why citizens and other stakeholders initiate and sustain participation. Public Service Motivation and community-value perspectives provide the theoretical basis for this construct (Neumann & Schott, 2023; Sacchi et al., 2022). Quantitative evidence from 966 citizens demonstrated relationships between dimensions of public-service motivation and actual engagement in digital co-production (Neumann & Schott, 2023). The evidence also showed that motivational dimensions did not operate uniformly, reinforcing the view that motivation is multidimensional rather than a single willingness to

participate. The ICI Theory consequently positions motivational drivers as an antecedent to stakeholder engagement rather than assuming that opportunities for participation automatically generate involvement.

Co-production effectiveness (Y) represents the outcomes produced through the interaction of these conditions. Evidence from health and social care provides support for participation, learning, relationship development, and changes to services or products, although considerable variation in measurement limits direct comparison across the 43 empirical studies from 12 countries synthesized by Nordin et al. (2023). Loeffler and Bovaird (2020) similarly identified evidence connecting co-production with pathways involving crime prevention, detection, victim support, offender rehabilitation, and quality-of-life outcomes, while cautioning that methodological limitations restrict strong causal conclusions. Thus, effectiveness is conceptualized as multidimensional and context-dependent rather than as a single universal outcome.

The synthesis suggests that no single construct is independently sufficient for effective co-production. Motivation may encourage stakeholders to participate, but participation creates value only when relevant knowledge can be exchanged and integrated. Integrated knowledge, in turn, may have limited practical influence when financial, technological, institutional, human, or time resources are insufficient. The theoretical relationship is therefore represented as:

$$Y = F(X1, X2, X3, X4)$$

and more specifically as:

$$X4 \rightarrow X1 \rightarrow X2 \rightarrow Y, \text{ conditional on } X3$$

where X4 represents motivational drivers, X1 stakeholder engagement, X2 knowledge integration, X3 resource availability, and Y co-production effectiveness. The model proposes that X2 mediates part of the relationship between stakeholder engagement and effectiveness, while X3 moderates the translation of integrated knowledge into outcomes. These relationships represent theoretical propositions derived from the synthesis rather than causal relationships empirically tested by this systematic review. This distinction is important because the evidence included contains heterogeneous outcome measures and methodological limitations that constrain causal attribution (Nordin et al., 2023; Loeffler & Bovaird, 2020).

Through this evidence-supported synthesis, the ICI Theory moves beyond identifying general facilitators of co-production by proposing a mechanism explaining how motivation, engagement, knowledge integration, and resources may interact to influence effectiveness. The theory therefore provides propositions that can be empirically tested in future research across different public-service contexts. This theoretical model is represented in **Figure 2** below.

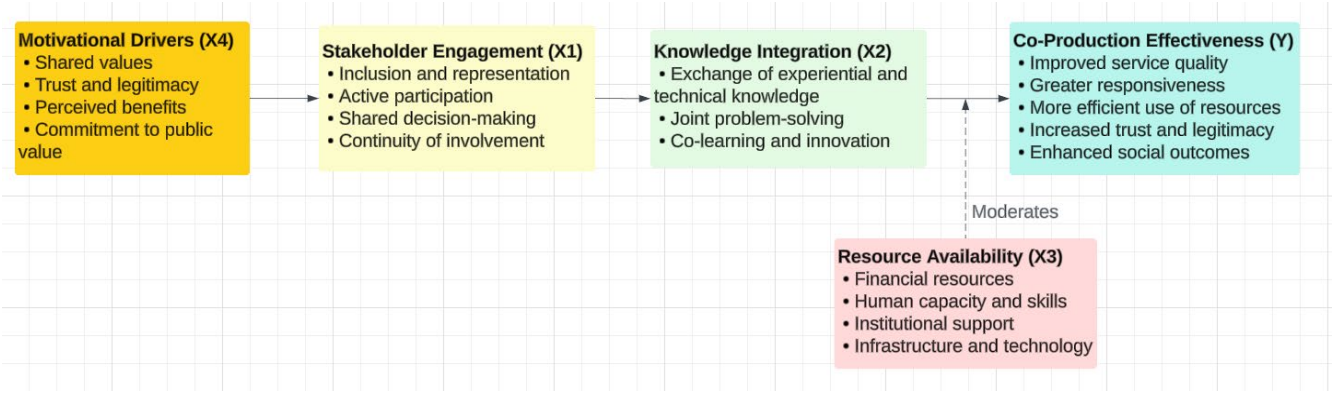

Figure 2. Integrated Co-Production Impact (ICI) Theory.

Note: X4 influences X1, X1 influences X2, and X2 influences Y. Resource Availability (X3) moderates the relationship between Knowledge Integration (X2) and Co-Production Effectiveness (Y). The relationships represent theoretical propositions developed from the systematic review and thematic synthesis and require further empirical testing.

7.4. Operational definitions of the ICI constructs

The Integrated Co-Production Impact (ICI) Theory has 5 constructs. Stakeholder engagement (X1) is the level and quality of citizen, service user, public institution, community organization, and other actors' involvement in co-production activities. It could be seen in representation, continuity, participation, shared decision-making, and impact on outcomes.

Knowledge integration (X2) involves the synthesis and application of scientific, professional, policy, local, and experiential knowledge in joint decision-making and service enhancement.

Resource availability (X3) is the financial, human, technological, institutional, and time resources needed for effective participation and implementation.

Motivational drivers (X4): These are the internal and external factors that influence participation and motivation to participate, such as public service motivation, shared values, trust, perceived benefits, recognition, and collective responsibility.

Co-production effectiveness (Y) is the level of effectiveness that co-production delivers in terms of service quality, responsiveness, efficiency, equity, transparency, sustainability, stakeholder satisfaction, and public trust.

7.5. Scope conditions and theoretical propositions

The Integrated Co-Production Impact (ICI) Theory aims to elucidate co-production in public-service environments in which citizens, service users, communities, professionals, public agencies, and other actors are involved in the design, delivery, implementation, and/or evaluation of services in meaningful ways. The theory is best suited in settings in which participation goes beyond consultation and in which the participants have opportunities to provide knowledge, to have an influence on decision-making, and to share responsibility for outcomes. It may not be as explanatory in a very centralized, coercive, or emergency environment, where fast decision-making reduces the stakeholders' important involvement. The relationships proposed in the theory may also vary according to institutional capacity, political context, organizational culture, and the level of trust among

participating actors.

Based on the relationships identified in the ICI Theory, the following propositions are advanced:

1. Proposition 1: Higher levels of meaningful stakeholder engagement (X1) are associated with greater co-production effectiveness (Y).
2. Proposition 2: Knowledge integration (X2) mediates the relationship between stakeholder engagement (X1) and co-production effectiveness (Y), such that meaningful participation improves outcomes partly through the exchange and application of diverse forms of knowledge.
3. Proposition 3: Resource availability (X3) positively moderates the relationship between knowledge integration (X2) and co-production effectiveness (Y), such that integrated knowledge is more likely to produce effective outcomes when adequate financial, human, technological, institutional, and time resources are available.
4. Proposition 4: Stronger motivational drivers (X4) are associated with greater initiation and continuity of stakeholder engagement (X1).
5. Proposition 5: The effect of stakeholder engagement on co-production effectiveness is stronger when meaningful knowledge integration and adequate resources are present than when either condition is weak.
6. Proposition 6: Co-production effectiveness is greatest when stakeholder engagement, knowledge integration, resource availability, and motivational drivers operate as complementary conditions rather than as isolated factors.

These propositions make the ICI Theory empirically testable and provide a foundation for future quantitative, qualitative, or mixed-methods research. They also clarify that the theory does not assume universal effects across all public service contexts, but instead recognizes that co-production outcomes depend on both the relationships among the core constructs and the conditions under which co-production occurs.

8. Conclusions

8.1. Summary

This study examined co-production as a collaborative approach to the delivery of public goods and services, with particular attention to stakeholder engagement, knowledge integration, resource availability, motivational drivers, and co-production effectiveness. The review showed that effective co-production depends on the active involvement of citizens, service users, professionals, public institutions, and other relevant actors. However, participation is not always equally distributed, as marginalized and disadvantaged groups may face barriers that limit their ability to engage meaningfully. Promoting inclusive participation is therefore important for strengthening trust, legitimacy, and responsiveness in public-service delivery.

The study also identified several barriers that may constrain co-production, including unequal power relations, limited resources, inadequate institutional support, technological difficulties, weak trust, and differences in stakeholder capacity. At the same time, co-production was associated with important potential benefits, including improved service quality, stronger stakeholder relationships,

increased learning, greater responsiveness, and more meaningful community involvement. These findings informed the development of the Integrated Co-Production Impact (ICI) Theory, which proposes that motivational drivers encourage stakeholder engagement, engagement facilitates knowledge integration, and resource availability conditions the extent to which integrated knowledge contributes to effective co-production outcomes.

Future research should examine how these relationships operate across different socioeconomic, cultural, institutional, and geographical contexts. Particular attention should be given to the participation of disadvantaged groups and the development of inclusive policy frameworks. Longitudinal, cross-cultural, comparative, and mixed-method studies may also provide stronger evidence on how co-production develops over time and how its outcomes can be measured more consistently across different public-service settings.

8.2. Future research

Digital platforms and technological involvement will also be crucial in co-production development. A new concept for the production process and involvement of participation will be enhanced by the digital elements. These innovations will also help to improve environmental and healthcare management. They were also required to design the long-term effects of the co-production process on trust in society, service quality, and community well-being, using a longitudinal research design (Schneider et al., 2021). This study highlights, through a comparison of different geographical regions and industries, scalable solutions and best practices. Future studies should also be centered around measurable effectiveness, standardized assessment, and the results of the co-production efforts.

8.3. Limitations of research

This systematic literature review has several limitations. First, the evidence synthesis was restricted to English-language peer-reviewed studies published between 2015 and 2026, which may have excluded relevant research published in other languages or outside the specified period. Such restrictions concerning language, publication period, and study type can affect the comprehensiveness of systematic reviews and should therefore be considered when interpreting their findings (Helbach et al., 2022). Earlier foundational studies were used to establish conceptual and theoretical background but were not included in the thematic synthesis. Second, the 10 included studies represented heterogeneous methodological approaches and public-service contexts, which limited direct comparison of findings across studies. Third, several included reviews identified inconsistencies in the measurement of co-production processes and outcomes, limiting the strength of causal conclusions that can be drawn. Finally, although critical appraisal was undertaken using design-appropriate CASP checklists, differences in study design and evidence quality should be considered when interpreting the synthesis. Future research should employ longitudinal, comparative, and primary empirical designs to test the relationships proposed in the ICI Theory.

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Appendix

Appendix A: Characteristics of Studies Included in the Systematic Review

Author(s), year	Study design	Setting/context	Sample/review corpus	Principal findings relevant to this review
Bovaird et al. (2015)	Empirical study	Public services/citizen co-production	Citizen survey examining collective co-production	Considerable potential existed to activate citizens' collective co-production. Experimental “nudges” produced statistically significant effects in 6 of 15 potential collective co-production activities.
Nabatchi et al. (2017)	Conceptual/theoretical study	Public administration and public services	Conceptual analysis of co-production literature	Developed a framework distinguishing variety of co-production according to who participates, when participation occurs, and what activities citizens undertake.
Sicilia et al. (2019)	Systematic literature review	Public-service co-production	53 empirical articles	Identified six major facilitating factors, including organizational arrangements and procedural conditions. Participation was affected by motivations, resources, information, relationships, timing and institutional conditions.
Clifton et al. (2020)	Systematic literature review	ICT-enabled public-service co-production	Published literature on ICT-enabled co-production	Digital technologies can facilitate co-production, but technological complexity, unequal access, distrust and social differences may create barriers. Simpler technologies and collaborative relationships can support participation.
Loeffler & Bovaird (2020)	Evidence review/pathways analysis	Policing and criminal justice	More than 1,500 references initially identified; 24 studies provided higher-level evidence of impact	Identified pathways connecting co-production activities with outcomes while also finding important methodological limitations in the evidence used to establish causal relationships.
Howarth et al. (2022)	Empirical comparative study	Climate action; science, policy and practice	Two empirical case studies	Co-production involved working across science-policy-practice boundaries. Boundary agency supported knowledge exchange, shared learning and collaboration among different actors.
Neumann & Schott (2023)	Empirical quantitative study	Digital public-service co-production, Zurich, Switzerland	966 citizens	Public Service Motivation and other intrinsic and extrinsic motivations were associated with citizens' engagement in digital co-production. Capacity, social connectedness and community-oriented motives were also relevant.
Bandola-Gill et al. (2023)	Systematic/conceptual literature analysis	Knowledge and policy co-production	Systematic literature and citation-network analysis	Identified five meanings of co-production: science-politics relationships, knowledge democracy, transdisciplinary, boundary management and evidence-use intervention, demonstrating substantial conceptual diversity.
Nordin et al. (2023)	Systematic review	Health and social care	43 empirical studies from 12 countries	Reported generally positive experiences, learning and outcomes associated with co-production; however, inconsistent and self-developed measures made comparison and attribution of outcomes difficult. Approximately 60% of included studies used mixed methods.
Haug (2024)	Systematic literature review	Public-service co-production and actor roles	76 included articles	Identified users, providers and intermediaries as important actors contributing knowledge, skills, experience, funding and infrastructure. Power imbalances can undermine co-production, whereas resource and power sharing can facilitate it.