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Fiscal policies and regional digital gaps: Financing digital participation

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Research Article

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Abstract

Public investment can expand broadband coverage while leaving substantial inequalities in adoption and economic outcomes, making the distributional consequences of digital expenditure a central problem for regional fiscal policy (Bergantino et al., 2026; Duso et al., 2025). This critical integrative review examines 16 peer reviewed articles published from 2022 through 2026, selected through targeted searches and verified against accessible full texts, with explicit separation of empirical findings, modeled scenarios, and conceptual arguments (Sauer & Seuring, 2023). The evidence indicates that infrastructure subsidies, consumer assistance, and telecommunications taxation operate through distinct mechanisms, while participation barriers and local market conditions complicate their translation into equitable access (Galperin & Ha, 2024; Katz & Jung, 2023). The article develops an original framework linking regional fiscal capacity to coverage, sustained adoption, and practical digital participation, and proposes differentiated transfers, complementary assistance, and distributional evaluation as hypotheses for policy design rather than established treatment effects (Gianelle et al., 2026; Ibanescu et al., 2026). It concludes that regional digital policy should evaluate additional and sustained participation alongside within-region outcomes, because broader connectivity alone cannot establish either territorial convergence or an equitable distribution of benefits (Bergantino et al., 2026; Heeks, 2022).

JEL classification: H54; H77; L96; O18

Key contributions

- Connects infrastructure spending, consumer assistance, taxation, and intergovernmental finance within one regional policy framework
- Separates evidence about coverage, sustained adoption, practical participation, and economic distribution
- Introduces a transparent participation identity and three testable propositions for allocating fiscal support
- Provides a source verification register and an evaluation design that preserves the limits of the underlying evidence

1 Introduction

The fiscal challenge of regional digital inequality extends beyond financing network construction to determining who can use connectivity and who receives its economic benefits (Bergantino et al., 2026; Duso et al., 2025). Capital grants influence deployment, consumer subsidies affect household costs, and telecommunications taxes can alter both investment incentives and service prices (Katz & Jung, 2023). These mechanisms address different constraints, so an increase in expenditure or premises covered cannot, by itself, demonstrate that disadvantaged households have gained sustained and useful access. The central question is therefore how fiscal instruments should be combined and evaluated when the

policy objective is equitable digital participation across and within regions (Hawthorne & Grzybowski, 2025; Ibanescu et al., 2026).

Regional digital gaps require measures that distinguish geographic differences from inequalities among people living in the same place (Zhou et al., 2024). A narrowing national index can coexist with persistent local disparities, while a regional average may conceal differences in household resources, devices, and patterns of use (Ibanescu et al., 2026; Zhou et al., 2024). For this review, a region denotes the territorial unit relevant to a particular study or funding authority; municipalities, provinces, and larger administrative regions are identified separately rather than treated as interchangeable observations. This distinction also matters institutionally because regional and municipal governments can have different revenue powers, spending responsibilities, and dependence on transfers (Gianelle et al., 2026).

The selected literature examines several components of digital inclusion separately, including taxation, subsidy participation, and regional human capital (Galperin & Ha, 2024; Katz & Jung, 2023; Ramos-Poyatos et al., 2025). The contribution of this article is to connect those components through an explicit sequence from fiscal intervention to service availability, sustained adoption, practical participation, and distributional outcomes. The framework treats useful participation as an intermediate outcome and recognizes that greater digital engagement can expose disadvantaged users to unequal relationships of value capture (Heeks, 2022). Its purpose is to specify decisions and testable propositions that can guide regional evaluation without treating diverse national experiences as evidence of one universally effective fiscal package (Duso et al., 2025; Hawthorne & Grzybowski, 2025).

2 Review design and evidentiary boundaries

A transparent account of source selection is necessary even when a review seeks conceptual integration rather than an exhaustive estimate of the literature (Sauer & Seuring, 2023). Following the transparent search reporting advocated by Sauer and Seuring (2023), targeted searches on November 12, 2026 combined terms concerning broadband subsidies, telecommunications taxation, regional digital inequality, and fiscal decentralisation, followed by title, identifier, and full text checks. Eligibility required an English language, peer reviewed journal article published in 2022–2026, substantive or methodological relevance, and a complete text available without a paid subscription; working papers and sources whose relevant claims could not be checked were excluded. This purposive procedure supports a critical integrative review, but it does not constitute a preregistered systematic search, an exhaustive database census, or evidence that the retained corpus represents every eligible study (Sauer & Seuring, 2023).

Traceable extraction helps readers distinguish what an underlying study establishes from the interpretation developed in a review (Sauer & Seuring, 2023). The final corpus contains 14 substantive articles and two methodological articles, with an evidence register recording publication details, accessible full text links, study context, relevant locations, and restrictions on interpretation in Online Resource 1. Using the extraction logic described by Sauer and Seuring (2023), the register separated

fiscal instruments, geographic units, observation periods, research designs, outcomes, and supported claims; Table 1 presents selected studies most directly relevant to policy mechanisms. The extraction was checked against the full texts without independent duplicate screening or statistical reanalysis, so transparency improves inspectability but cannot eliminate selection or interpretation error (Sauer & Seuring, 2023).

Differences in identification strategies determine how confidently policy effects can be inferred from the retained evidence (Roth et al., 2023). The synthesis distinguishes quasi-experimental evaluations, observational associations, descriptive comparisons, structural counterfactuals, and agent-based simulations; each contributes a different kind of information (Agarwal & Canfield, 2024; Duso et al., 2025). No pooled effect size is calculated because the studies use different interventions, populations, territorial units, and outcomes, and the review does not supply a common estimand or a variance-based synthesis. Accordingly, an association is described as an association, a simulated response remains conditional on its model, and a causal interpretation remains conditional on the identifying assumptions of its research design (Hawthorne & Grzybowski, 2025; Roth et al., 2023).

Table 1

Selected evidence on fiscal mechanisms and digital outcomes

Study and setting	Design and period	Relevant finding	Interpretive boundary
Duso et al. (2025) Germany	Municipal instrumental variables analysis; 2010–2015	Subsidies increased coverage and entry; local offers increased and average prices fell.	Particular schemes and an earlier market; instrument validity remains necessary.
Katz and Jung (2023) Multiple countries	Econometric models and fiscal reform simulation	Taxes and charges affect investment, prices, and adoption through distinct channels.	Simulated reform; incomplete coverage of levies; revenue losses require appraisal.
Galperin and Ha (2024) United States	County models and matching; Lifeline and ACP	Stronger anti-welfare attitudes associated with lower program participation.	Ecological association; individual stigma and outreach effects not identified.
Horrigan et al. (2024) United States	ZIP code regressions; enrollment through January 2024	Economic and community factors associated with spatial variation in ACP enrollment.	Predictions are specification-dependent; associations do not identify causal mechanisms.
Galperin et al. (2026) United States	Eligibility contrasts, 2016–2023; weighted participation analysis, 2023	Favorable labor market results and evidence consistent with a remote work pathway.	Eligibility and participation analyses estimate different contrasts under different assumptions.
Hawthorne and Grzybowski (2025) South Africa	Discrete choice model and counterfactuals; 2009–2014	Isolated access interventions generated limited simulated gains among poorer households.	Modeled responses; contemporary applicability requires recalibration.
Bergantino et al. (2026) Italy	Continuous-treatment difference-in-differences; 2014–2022	Broadband expansion associated with higher provincial income inequality, with territorial variation.	Within-province distributions differ from between-region mean convergence.

Note. The entries summarize selected published analyses and retain their design-specific restrictions on inference (Duso et al., 2025; Roth et al., 2023). ACP denotes the Affordable Connectivity Program, and the program evidence refers to the study periods rather than its current availability. The findings are not pooled or ranked because their interventions, populations, and outcomes differ (Roth et al., 2023).

3 Evidence on fiscal instruments and regional outcomes

3.1 Infrastructure expenditure and market structure

Infrastructure subsidies can improve service availability and market conditions when their design permits competitive entry (Duso et al., 2025). Using German municipal evidence and an instrumental variables strategy, Duso et al. (2025) estimate increases in broadband coverage and provider entry, together with more local offers and lower average prices. Their findings concern particular subsidy schemes and an earlier broadband market, making extrapolation to contemporary fiber, mobile, or satellite procurement contingent on comparable institutional and competitive conditions. The defensible policy inference is that competitive effects belong within subsidy appraisal, while the study does not establish that every infrastructure grant improves competition or produces equitable household benefits (Duso et al., 2025).

Evidence of economic gains from broadband deployment strengthens the case for examining outcomes beyond network availability, although deployment effects do not identify the effect of a particular funding mechanism (Galperin et al., 2022). In rural Ecuador, Galperin et al. (2022) analyze staggered network expansion during 2011–2019 and report improvements in labor income and employment alongside a declining agricultural employment share. The study also finds differences by age, suggesting that an average territorial gain can coexist with unequal opportunities among residents. Its contribution to fiscal analysis is therefore an outcome pathway worth testing, rather than an estimate of the return to an additional unit of public expenditure (Galperin et al., 2022).

3.2 Telecommunications taxation and fiscal incidence

Telecommunications taxation can influence digital access through investment costs and the prices paid by users (Katz & Jung, 2023). Katz and Jung (2023) associate several taxes and regulatory charges with reduced investment or less favorable service outcomes, and use the estimated relationships to simulate a reform of sector-specific levies. Their data do not identify all relevant obligations, including the overall effect of universal service contributions, and the authors explicitly recognize the revenue tradeoff involved in tax reductions. Consequently, the evidence supports evaluating particular tax distortions but does not justify a general claim that telecommunications tax cuts are self-financing or distributively progressive (Katz & Jung, 2023).

The regional distribution of a tax reform depends on how changes in operator costs reach investment decisions and consumer prices (Katz & Jung, 2023). This article proposes that a regional appraisal record the intended tax base, the expected recipients of relief, and the mechanism through which additional investment or lower effective bills would arise. Because competitive conditions can change broadband offers and prices, that appraisal should test pass-through across markets with different provider structures rather than assume an identical response everywhere (Duso et al., 2025). A fiscal decision would then compare the observed distribution of benefits with the revenue forgone and the opportunities lost elsewhere in the budget, extending the tradeoff identified by Katz and Jung (2023).

3.3 Affordability support and program participation

Eligibility for broadband assistance does not ensure participation, because program uptake is associated with social attitudes as well as household need (Galperin & Ha, 2024). Galperin and Ha

(2024) find lower participation in Lifeline and the Affordable Connectivity Program in counties with stronger measures of opposition to welfare, after accounting for observed characteristics. The county-level design cannot demonstrate that an individual household declined assistance because of stigma, nor does it estimate the effect of a particular outreach intervention. These findings justify testing enrollment barriers and communication strategies, while leaving their individual mechanisms and causal effects open to further investigation (Galperin & Ha, 2024).

Local conditions also complicate comparisons of subsidy enrollment across places with different populations and institutions (Horrigan et al., 2024). Using ZIP code data, Horrigan et al. (2024) model Affordable Connectivity Program participation with economic, demographic, and community characteristics and allow associations to vary geographically. Their results suggest that raw enrollment rates are insufficient for judging implementation performance, but predicted enrollment is itself conditional on the variables and specification used. A regional funding authority should therefore investigate unexplained participation gaps rather than automatically treating a low enrollment rate as proof of administrative failure (Horrigan et al., 2024).

Consumer assistance may affect employment opportunities as well as subscription status, although the relevant treatment contrast must be stated precisely (Galperin et al., 2026). Galperin et al. (2026) combine eligibility-based difference-in-differences estimates with a separate weighted analysis of participation and report favorable labor market associations, including evidence consistent with a remote work pathway. The eligibility analysis estimates an intention-to-treat effect because individual enrollment is unavailable in that dataset, while the participation analysis depends on adequate adjustment for observed selection. These distinctions support investigating economic outcomes of affordability policy without equating eligibility, actual receipt, and sustained employment gains as if they were the same estimand (Galperin et al., 2026).

3.4 Capabilities and the distribution of benefits

Availability and affordability interventions can produce limited adoption responses when considered separately from household preferences and complementary resources (Hawthorne & Grzybowski, 2025). Using South African survey data from 2009–2014, Hawthorne and Grzybowski (2025) model substitution and complementarity between fixed and mobile services and simulate several access interventions. Their counterfactuals indicate limited gains among poorer households from isolated measures, but the simulated responses depend on the estimated model and an observation period preceding current digital markets. The findings motivate local diagnosis of service and device requirements instead of an assumption that extending one technology will automatically produce broad adoption (Hawthorne & Grzybowski, 2025).

Regional human capital is associated with differences in entrepreneurs' use of digital technologies, making capabilities relevant to the design of complementary expenditure (Ramos-Poyatos et al., 2025). Ramos-Poyatos et al. (2025) analyze 4,822 self-employed workers across 305 European regions and find relationships between regional general and digital human capital and individual technology use. The

cross-sectional 2015 data do not establish that a training subsidy causes those differences or that the observed comparisons demonstrate convergence over time. Capability grants consequently emerge as a plausible policy complement whose additional effects require prospective testing, rather than as an intervention already validated by this observational study (Ramos-Poyatos et al., 2025).

Broader connectivity can coexist with unequal economic outcomes when the capacity to benefit differs among residents and territories (Bergantino et al., 2026). Bergantino et al. (2026) link broadband expansion to higher income inequality in Italian provincial data, with heterogeneous results across territorial contexts, while Ibanescu et al. (2026) document Romanian disparities in access and use. The Italian analysis concerns income distributions measured within provincial units, whereas the Romanian survey offers descriptive evidence rather than a causal estimate of digitalisation policy. Taken together, these studies justify separate tests of territorial gaps, household participation, and within-region distribution instead of treating any single indicator as sufficient evidence of inclusion (Bergantino et al., 2026; Ibanescu et al., 2026).

4 A framework for equitable regional digital finance

4.1 Distinguishing coverage from practical participation

A multidimensional framework is needed because territorial access measures and practical digital use capture different conditions (Ibanescu et al., 2026; Zhou et al., 2024). Building on that distinction, this article proposes a household-based accounting identity in which regional participation is the joint occurrence of qualifying residential coverage, sustained subscription, and completion of a specified digital task. The task should be selected for the program's purpose, such as completing an employment application, while broader outcomes such as income or job retention remain separate measures consistent with the employment evidence (Galperin et al., 2026). This structure makes losses between availability and practical participation visible without treating a connection or a completed task as proof of equal economic benefit (Heeks, 2022; Ibanescu et al., 2026).

$$M_r \;=\; C_r \, A_r \, U_r$$

1

Operational definitions must preserve the distinction between network access and different levels of digital engagement documented in the literature (Ibanescu et al., 2026). In Eq. 1, C_r is the share of regional households with coverage meeting a prespecified quality threshold, A_r is the share of those covered households maintaining an active subscription over the observation period, and U_r is the share of those subscribers whose designated adult completes the specified task. Using the same household cohort and period makes M_r a conditional-probability identity rather than an estimated production function; where a conditional denominator is zero, M_r is defined as zero and the undefined component is reported as not applicable. The separation of these components responds to documented differences

between access and digital engagement, while the identity itself is an analytical construction proposed here (Ibanescu et al., 2026). The resulting participation measure remains an intermediate indicator whose relationship to welfare must be assessed rather than presumed, consistent with the distinction between inclusion and beneficial inclusion developed by Heeks (2022).

A fiscal framework must accommodate the fact that public powers and financial resources are distributed differently across governmental tiers (Gianelle et al., 2026). Figure 1 therefore separates fiscal instruments, intermediate access conditions, practical participation, and distributive outcomes, with regional fiscal capacity and market conditions treated as contextual influences. The arrows represent hypothesized pathways synthesized from the literature, not coefficients, established mediation effects, or evidence that all pathways operate in every jurisdiction (Duso et al., 2025; Katz & Jung, 2023). By keeping outcome distribution distinct from participation, the framework can accommodate both favorable employment findings and evidence of unequal gains from deployment (Bergantino et al., 2026; Galperin et al., 2026).

The framework synthesizes distinct fiscal, participation, and distributional mechanisms from the reviewed literature (Duso et al., 2025; Gianelle et al., 2026; Katz & Jung, 2023). Arrows indicate proposed relationships, and the diagram contains no estimated coefficients or empirical effect sizes. Economic and distributional outcomes remain separate from practical participation because digital engagement need not produce equitable benefits (Bergantino et al., 2026; Heeks, 2022).

4.2 Aligning transfers and expenditure with regional constraints

Different degrees of regional and municipal fiscal autonomy make a uniform local financing requirement an uncertain basis for equitable allocation (Gianelle et al., 2026). This article proposes assessing digital needs and standardized revenue capacity separately, then varying required local contributions so that limited fiscal resources do not automatically exclude high-need places. The proposal draws on the distinction between actual taxing power and aggregate subnational spending, but it is not a tested finding about broadband equalization transfers (Gianelle et al., 2026). Its justification is conditional: a differentiated contribution rule should be retained only if evaluation shows improved allocation to underserved populations without unacceptable displacement of local effort (Gianelle et al., 2026).

Subsidy design should make additional service provision and competitive conditions observable, given evidence that both can respond to infrastructure support (Duso et al., 2025). The proposed contracting approach begins with a documented service deficit, a credible assessment of deployment expected without assistance, and payment milestones tied to verified availability and service quality. Contracts could also monitor prices and provider participation, while reserving household outcome evaluation for measures that a network supplier can reasonably influence; these are design proposals informed by the German evaluation (Duso et al., 2025). This distinction reduces the risk of rewarding construction alone or assigning suppliers responsibility for every socioeconomic outcome, while preserving competition as a measurable part of public investment appraisal (Duso et al., 2025).

Fiscal appraisal must account for the resource tradeoffs behind both tax relief and continued support for participation (Katz & Jung, 2023). The framework therefore proposes a multiyear budget that identifies construction, operation, household assistance, skills provision, administration, and evaluation as separate commitments, with future obligations reported explicitly. Agarwal and Canfield's (2024) adoption simulation can inform scenario development about prices and social adoption dynamics, but it cannot substitute for observed demand or justify a guaranteed take-up forecast. Table 2 translates these considerations into proposed policy choices and evaluation measures, preserving the distinction between a model-informed planning assumption and an identified return on public funds (Agarwal & Canfield, 2024; Katz & Jung, 2023).

Table 2

Proposed fiscal choices and measures for regional evaluation

Instrument and diagnostic target	Proposed design choice	Primary verification measures
Infrastructure grants Unserved or inadequate networks	Competitive procurement and verifiable service milestones; informed by Duso et al. (2025).	Additional qualifying coverage; service quality; provider entry; effective prices.
Household assistance Unaffordable or interrupted service	Test targeted support and enrollment assistance; informed by Galperin and Ha (2024).	Eligibility, receipt, new adoption, prevented disconnection, and sustained participation.
Tax reform Documented fiscal price or investment distortion	Compare targeted relief with explicit revenue costs; informed by Katz and Jung (2023).	Price pass-through; investment additionality; benefits by income; revenue forgone.
Differentiated transfers Limited local fiscal capacity	Adjust local contributions using need and revenue capacity; motivated by Gianelle et al. (2026).	Applications and awards by need; project delivery; displacement of local expenditure.
Capability support Difficulty completing useful digital tasks	Test devices, instruction, and practical assistance alongside access; motivated by Ramos-Poyatos et al. (2025).	Task completion; retained skills; accessibility; incremental effect of combined assistance.

Note. The choices are original proposals informed by the cited evidence rather than policy packages evaluated in those studies (Duso et al., 2025; Gianelle et al., 2026). Costs, comparison conditions, and the time horizon would be specified before evaluation. Observed changes require a credible counterfactual before they can be attributed to a fiscal intervention (Roth et al., 2023).

4.3 Testable propositions

The limited responses to isolated interventions in Hawthorne and Grzybowski (2025), together with the conditional adoption dynamics in Agarwal and Canfield (2024), motivate a complementarity hypothesis. Proposition 1 extends the isolated-intervention counterfactuals in Hawthorne and Grzybowski (2025) by

predicting that, among covered households facing affordability and capability constraints, joint assistance produces a larger participation gain than the sum of the separate gains. A factorial evaluation should compare connection assistance, capability support, their combination, and a common comparison condition, estimating the interaction on the absolute participation scale with prespecified costs and uncertainty intervals. A precisely estimated nonpositive interaction would contradict this proposed complementarity, even if each component improves adoption separately, while an imprecise estimate would leave the hypothesis unresolved (Agarwal & Canfield, 2024; Hawthorne & Grzybowski, 2025).

Variation in actual subnational revenue powers motivates a distinct hypothesis about access to centrally financed digital programs (Gianelle et al., 2026). Proposition 2 states that reducing required local contributions for otherwise comparable, fiscally constrained jurisdictions increases their participation in infrastructure programs and the share of funding reaching underserved households. A test should combine variation in contribution rules, service-need measures, and records of unsuccessful applications with separate measures of implementation assistance and fiscal autonomy, respecting the institutional distinctions described by Gianelle et al. (2026). If lower contributions merely replace local spending or fund projects that would have proceeded anyway, the proposed equalization mechanism would lack additionality despite a larger central transfer (Gianelle et al., 2026).

The sensitivity of service prices to fiscal and competitive conditions motivates a hypothesis about the distribution of tax relief (Duso et al., 2025; Katz & Jung, 2023). Proposition 3 states that comparable consumer-facing tax reductions produce larger gains in sustained adoption where they generate larger reductions in effective bills for households near the affordability margin. An evaluation should measure effective bills, subscription retention, and operator responses by income and market structure, incorporating the revenue tradeoff identified by Katz and Jung (2023). The proposition would be weakened if relief remains with suppliers or mainly benefits households whose subscriptions would have continued unchanged, so statutory tax reductions alone cannot verify the mechanism (Katz & Jung, 2023).

5 Evaluation and fiscal accountability

Credible evaluation requires a defined treatment, counterfactual, and target population before regional outcomes are compared (Roth et al., 2023). The proposed primary estimand is the effect of an offer of support on sustained practical participation among baseline eligible households, with receipt effects reported separately when the design can identify them. This distinction follows the practical lesson from Galperin et al. (2026), whose eligibility-based and participation-based analyses address different empirical contrasts. Evaluation records should therefore retain unsuccessful applicants, nonparticipants, and interrupted subscriptions so that observed outcomes are not conditioned solely on successful program completion (Galperin et al., 2026; Roth et al., 2023).

Staggered regional implementation requires estimators that accommodate differences in treatment timing and heterogeneous effects (Roth et al., 2023). Where a difference-in-differences design is appropriate, the proposed analysis would specify eligible comparison groups, cohort-specific effects, anticipation periods, and inference at the level of policy assignment. Preintervention comparisons and sensitivity analyses should assess the credibility of parallel trends, because a nonsignificant pretrend test does not establish that assumption (Roth et al., 2023). Neighboring regions should also be examined as potentially exposed units, since evidence of spatial dependence in broadband-related inequality makes an unaffected-neighbor assumption a substantive issue rather than a default (Bergantino et al., 2026).

Distributional accountability requires regional averages to be accompanied by measures of who receives additional access and who captures subsequent benefits (Bergantino et al., 2026; Heeks, 2022). Building on the distributional concerns in Bergantino et al. (2026), the proposed reporting set combines Eq. 1's components with incremental participation, retention, household expenditure burdens, and prespecified employment or service outcomes by income and territorial disadvantage. Fiscal cost per additional sustained participant should include administrative expenditure and attributable tax expenditure, distinguish new adoption from prevented disconnection, and be withheld when the incremental denominator is too uncertain for meaningful interpretation. Social benefits and government revenue effects should be reported separately, because an improvement in household outcomes does not establish recovery of the public budget cost (Galperin et al., 2026; Katz & Jung, 2023).

6 Limitations and research priorities

A targeted integrative review provides an interpretable synthesis but remains vulnerable to choices about search coverage and source selection (Sauer & Seuring, 2023). The English language and unrestricted full text requirements may exclude relevant evidence, and the absence of independent duplicate screening prevents a claim that selection or extraction error has been eliminated. Publication recency also differs from data recency: the European entrepreneurship study uses 2015 observations, while the South African structural analysis uses 2009–2014 data (Hawthorne & Grzybowski, 2025; Ramos-Poyatos et al., 2025). The synthesis consequently identifies mechanisms and research questions rather than supplying a current forecast of household behavior or a comprehensive ranking of fiscal instruments (Hawthorne & Grzybowski, 2025; Sauer & Seuring, 2023).

The principal unresolved issue is whether coordinated fiscal packages produce additional and equitably distributed outcomes under the institutional conditions of a particular region (Duso et al., 2025; Gianelle et al., 2026). The reviewed evidence does not validate the proposed transfer rule, estimate the fiscal cost of achieving universal practical participation, or identify one optimal combination of grants, subsidies, and tax reform. Future studies should link administrative program records to repeated household observations and report whether gains persist after support changes, while testing spillovers and differences in local implementation capacity (Galperin et al., 2026; Roth et al., 2023). Such work would permit the framework's hypotheses to be revised or rejected on empirical grounds and would address

the gap between observed digital participation and demonstrated improvements in welfare (Heeks, 2022; Ibanescu et al., 2026).

7 Conclusion

Recent research supports a differentiated understanding of fiscal policy because network subsidies, affordability assistance, and taxation affect distinct parts of the digital participation process (Duso et al., 2025; Galperin & Ha, 2024; Katz & Jung, 2023). The proposed framework makes those distinctions explicit and places regional fiscal capacity alongside the household conditions that mediate useful participation. Its practical implication is to diagnose the constraint, select an instrument with a plausible mechanism, and evaluate additional and sustained outcomes rather than infer success from expenditure or coverage alone (Hawthorne & Grzybowski, 2025; Ibanescu et al., 2026). Equitable regional digital finance therefore requires evidence about both access to public support and the distribution of benefits generated after connectivity expands (Bergantino et al., 2026; Gianelle et al., 2026).

The possibility of favorable employment effects alongside unequal income outcomes makes distributional evaluation essential to the fiscal case for digital inclusion (Bergantino et al., 2026; Galperin et al., 2026). The article's original contribution is a participation identity, a mapping of policy instruments to observable constraints, and three propositions that can be tested without presuming that greater connectivity yields equal gains. Neither the identity nor the propositions constitute new empirical effect estimates; their value depends on evaluations that distinguish additional participation from support for existing users or suppliers under credible identification assumptions (Roth et al., 2023). The appropriate standard is consequently a demonstrable improvement in the opportunities of underserved residents, assessed with credible counterfactuals and attention to unequal value capture (Heeks, 2022; Roth et al., 2023).

Declarations

Author Contribution

M.E. is the sole author and was responsible for the study's conceptualization, methodology, and analytical framework. M.E. conducted the literature search, evaluated and synthesized the evidence, and prepared the tables, figure, and supplementary materials. M.E. drafted, reviewed, and revised the manuscript. M.E. accepts responsibility for all aspects of the work, including its accuracy and integrity.

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Figures

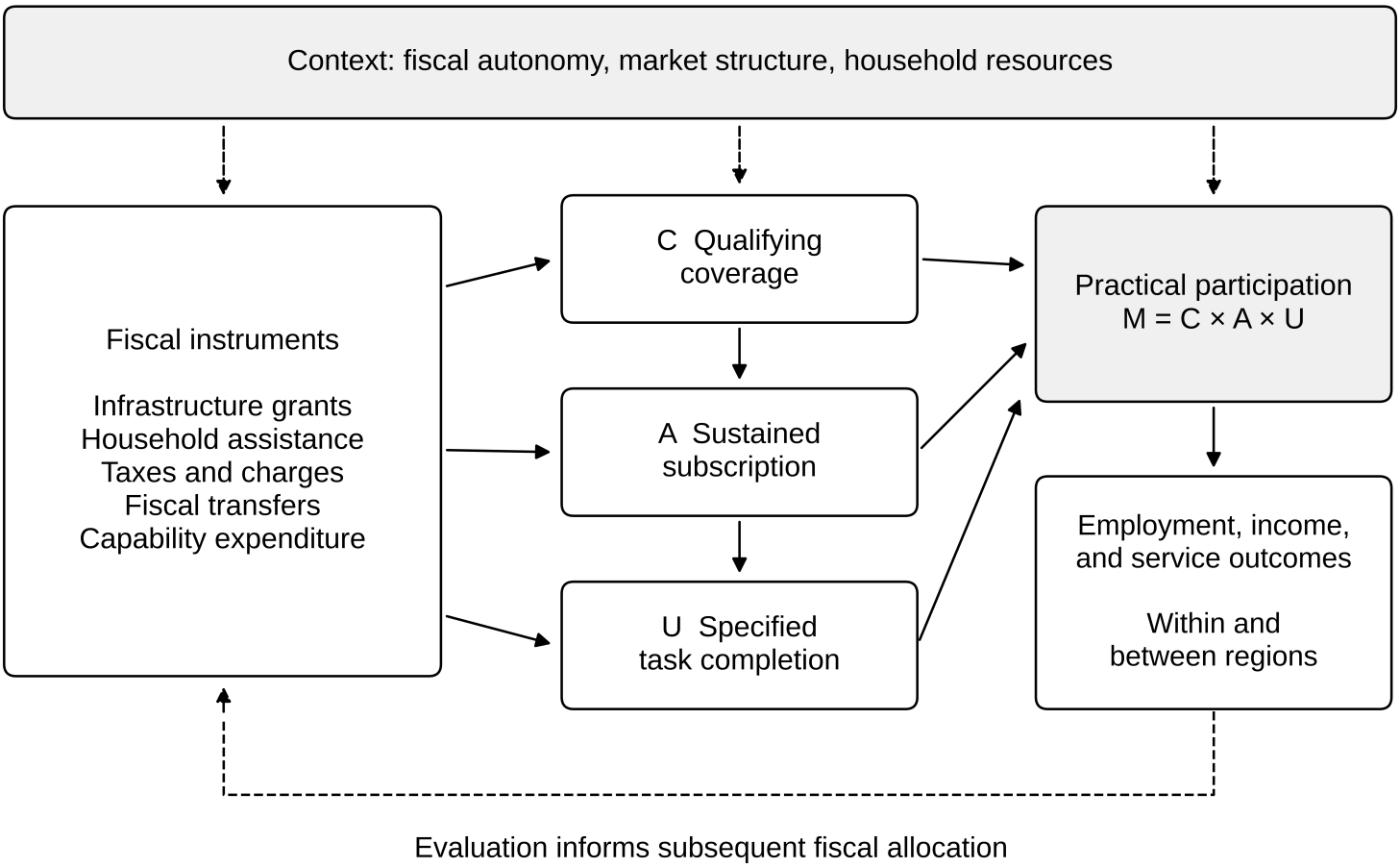


Figure 1

Hypothesized pathways from fiscal instruments to regional digital outcomes

The framework synthesizes distinct fiscal, participation, and distributional mechanisms from the reviewed literature (Duso et al., 2025; Gianelle et al., 2026; Katz & Jung, 2023). Arrows indicate proposed relationships, and the diagram contains no estimated coefficients or empirical effect sizes. Economic and distributional outcomes remain separate from practical participation because digital engagement need not produce equitable benefits (Bergantino et al., 2026; Heeks, 2022).