Sketching out a middle theory for Placemaking Value in Transport Oriented Development
Value in exchange, Value in Use and Shared Value

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Abstract

Transit-Oriented Development (TOD) is widely promoted and implemented as a strategy for urban and transport sustainability, yet its theoretical account of how it intersects with placemaking and value distribution, remain underdeveloped. This paper proposes a middle-range theoritical framework for TOD that systematically links urban design choices, stakeholder interests, the generation and the distribution of value realisation. Drawing on anthropological and economic theories, the middle-range theoritical framework distinguishes between Value in Exchange, Value in Use, and Shared Value, and maps value accruing to diverse stakeholder groups. The framework integrates welfare economics through Pigouvian, Coasean, and Tieboutian perspectives to address externalities, property rights, and resident mobility, and is operationalised through a results chain that connects interventions to outcomes. The framework is evaluated against Merton's criteria for middle-range theory characteristics: abstraction, logical derivation, and adaptive explanation and offers guidance for empirical research, policy design and intervention. By making value distribution explicit, the framework aims to support effective TOD outcomes across varied land tenure regimes.

Keywords

welfare economics, anthropological theory of value, urban morphology, 5Ds, placemaking

1. Introduction

Transit-Oriented Development (TOD) has emerged as a central paradigm in contemporary urban planning and design, promising to integrate transit infrastructure with vibrant, walkable communities and increase sustainable transport ridership and various associated outcomes (Ibraeva, et al., 2020). However, despite its widespread adoption and implementation and a growing understanding of impact on ridership and related outcomes (Cervero & Kockelman, 1997; Ewing & Cervero, 2001; Ewing & Cervero, 2010; Lee & Jeon, 2025; Ogra & Ndebele, 2014), a persistent and critical lack of theoritical account linking TOD, with placemaking and transport planning remains. This is most evident in the weakness of conceptual connections between placemaking choices, such as the design of public spaces, streetscapes, the configuration of amenities, and the tangible value these choices generate and distribute among diverse TOD stakeholders.

Research has repeatedly noted that, while TOD is rich in empirical studies, practical guidelines, and aspirational goals, it lacks a robust middle-range theory that systematically links design decisions to outcomes in equity, liveability, and stakeholder benefits. Carlton (2009) examines TOD's position within the historical evolution of social and urban theories, highlighting a fundamental disconnect between theoretical frameworks and practical implementation in early TOD implementation (Calthorpe, 1993).

Hale (2014) goes further, suggesting that the field must ask deeper questions about its theoretical foundations, as current approaches often fail to establish clear, outcome and impact-based standards for success.

The literature (Vega, et al., 2023; Sun, et al., 2022) also points to inconsistencies in how practitioners identify and pursue TOD opportunities, often relying on oversimplified or incomplete theories that do not align with research findings (Joshi, et al., 2017; Carlton, 2019). Jamme et al. (2019) argue that the concept of TOD remains open to interpretation and that early allegations of utopianism remain valid due to the absence of a solid theoretical framework. Mottee et al. (2020) discuss the limitations of technical approaches in transport planning, particularly for urban rail infrastructure projects, finding that they overlook social impacts and overemphasise real estate, financial, and engineering considerations. Yip et al. (2024) note that the lack of a comprehensive framework grounded in justice concepts and theories for analysing TOD led to injustices being examined individually, case by case.

The very rich empirical findings of the TOD literature and the lack of theoretical clarity has real-world consequences: placemaking choices are often made without a clear understanding of how they will affect the distribution of value, be it financial, and as public health, economic, social, or environmental, among stakeholders such as residents, businesses, workers, visitors, developers and investors, TOD agencies, and local authorities.

More recent research (Su, et al., 2021; Paulhiac Scherrer, 2019) calls for innovation in TOD the-

ory and practice, advocating the development of conceptual models that bridge the gap between TOD design and value creation.

There is growing recognition that technical approaches to transport planning, which prioritise financial and engineering considerations, often overlook the social impacts and distributional equity central to urban planning and design theory. Without a middle-range theory to guide the integration of placemaking and value distribution, TOD risks falling short of its transformative potential.

This paper aims to address this gap in theory by exploring a middle-range theory framework in TOD, one that can connect the dots between placemaking choices, stakeholder interests, and the equitable generation and distribution of value. Developed by sociologist Merton (1949, 2007), middle-range theory focuses on explaining specific, delimited aspects of social phenomena rather than attempting to explain the entire social world. A middle-range theory connects the contrasting approaches of grand theory, e.g., sustainable urbanism (Farr, 2011), with empirical research and practice. Middle-range theory provides a middle ground between the two approaches. Grand theory is abstract theorising that emphasises the order and arrangement of concepts rather than the comprehension of phenomena. Conversely, empirical research is research derived from observation and experience rather than from theory. As its name implies, the middle-range theory lies between these two approaches. It asserts that theory should be empirically based, and observation and experience should be theoretically based. Middle-range theory prevents a discipline from becoming either too speculative (grand theory) or too fragmented (isolated empirical data points). It provides a roadmap for researchers and practitioners to build a cumulative body of knowledge that can be reliably tested and refined over time. By synthesising insights from both academic literature and practitioner experience, the research seeks to lay the groundwork for a more conceptually grounded and practically effective approach to TOD.

2. A middle-range theory of Placemaking and Transport-Oriented Development

The proposed middle-range theoritical framework is summarised in Fig. 1 as high level theory of change. The framework expands a range of previous research that systematically weaves together an original definition of placemaking, design and an anthropological perspective on value mapping, specifically, Exchange, Use, and Shared values (Chiaradia, et al., 2017; Chiaradia, et al., 2020; Chiaradia & Waters, 2020; Sieh, et al., 2021), expanding this earlier work with a novel extension, that integrates welfare economics and spatial economic concepts such as government intervention, property rights, accessibility pricing, and externalities with a focus on Transport Oriented Development. Placemaking is defined as "the activity which involves coordinated manipulation of spatial form and marshalling the corresponding multiple stakeholders' values to deliver acceptable spatial configurations and achieve acceptable

value configurations." (Chiaradia, et al., 2017). Chiaradia et al. (2020) and Sieh et al. (2021) developed non-discursive graphic techniques for mapping values that placemaking creates.

TOD creates walkable communities centred around mass transit hubs that promote public transport ridership and active modes. By integrating land-use planning, placemaking, and real estate finance, TOD fosters sustainable, high-density environments within a 10–15-minute walk/cycle/bus ride of stations.

The case of the TOD conceptual and operational model below systematically maps the chain of inputs and activities to resulting outcomes and impacts, ultimately categorising the value generated into three types: Value in Exchange, Value in Use, and Shared Value, derived from Graeber's universal anthropological review and theory of value (Graeber, 2001; Sieh, 2014).

2.1. Core Structure: A Results Chain

The framework operates as a results chain, a high level "theory of change", linking interventions to long-term objectives across three main stages:

2.1.1. Input and Activities (Investment configuration and magnitude)

This stage represents the initial investments and interventions in a city transit network and Transport Oriented Development (TOD). Various ac-

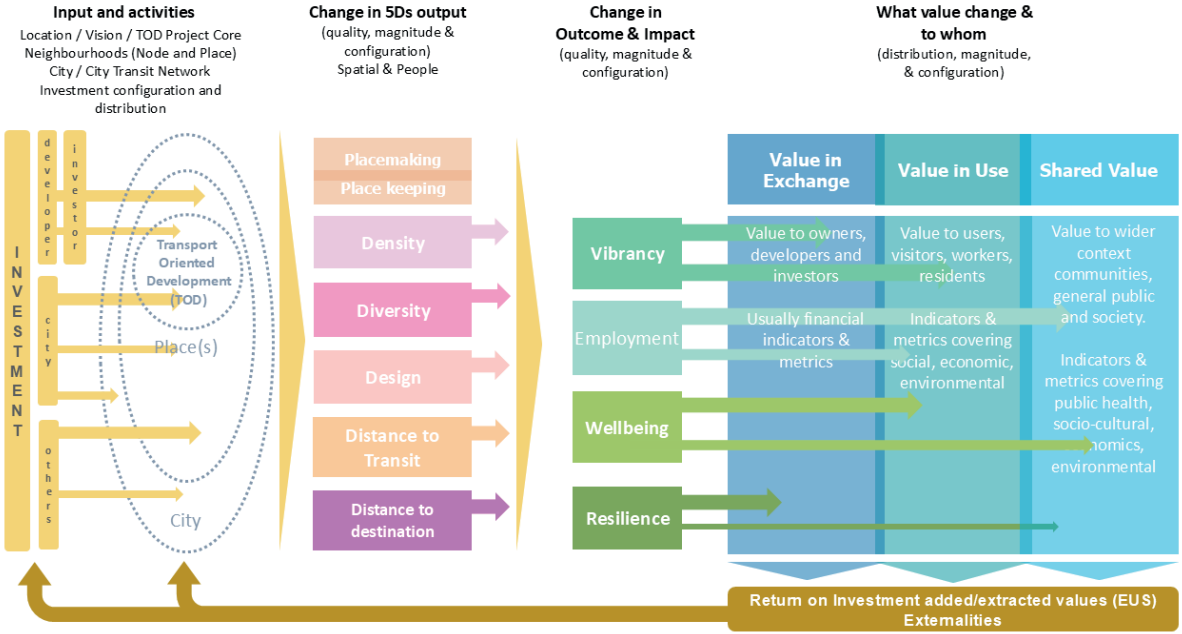

Figure 1. Placemaking, Placekeeping Value Chain and Management: an Analytical and Generative Framework

tors are involved, including city local authorities, TOD agencies, placemakers, investors/developers, local communities and others. Investing and intervening are spatial, placebased/people policy.

2.1.2. Change in 5Ds Output (Magnitude, Quality, and Configuration)

These are the direct products of the activities, measured by the well-known "5Ds" of the built environment:

1. Density

2. Diversity

3. Design

Accessibility, local and beyond

4. Distance to Transit

5. Distance to destination

Placemaking/Placekeeping are shown as overarching activities that influence how these 5Ds manifest.

2.1.3. Change in Outcome & Impact (Magnitude, Quality, and Configuration)

These are the short- to medium-term effects and long-term goals of the interventions, including improvements in Vibrancy, Employment, Wellbeing, and Resilience.

The Three Dimensions of Value, the most critical part of the framework, is how it categorises and to whom the realised values are accrued:

- Value in Exchange (VE): The value captured by private market transactions, primarily going to owners, developers, and investors. VE is typically measured by financial indicators such as Return on Investment (ROI), property price premiums, occupancy rate, rent levels, and their resilience through the business cycle, which mainly correspond to the capitalised value in property prices, the book value and relate closely to Value in Use.

- Value in Use (VU): The benefits experienced by the direct users of the place, residents, workers, and visitors. VU is measured by indicators covering social, economic, and environmental factors (e.g., accessibility, quality of life), much of which are not necessarily "accounted for" in exchange value alone.

- Shared Value (SV): The broad value that benefits wider society and the general public, including public health, socio-cultural, and environmental impacts (positive or negative externalities). SV are the one that most often requires methods like "shadow pricing" to estimate its full magnitude.

The framework suggests that successful placemaking/placekeeping balances the pursuit of all three types of value, the understanding of their distribution, and the integration of the often monetised "Value in Exchange." If the scales are tipped too far in favour of developers, the project may be seen as promoting developer profits at the expense of local people, and gentrification with or without displacement could be an externality. The hybrid framework above enables the explicit specification and mapping of value distributions for the different stakehold-

ers. Yet when there is a common fixed cost to be shared across stakeholders, economic theory does not offer a single, straightforward, definitive method for addressing it. To clarify how value is created and distributed within TOD, the framework draws on key concepts from welfare economics and spatial economics.

The following subsections explain how Pigouvian, Coasean, and Tieboutian's theoretical perspectives inform the mechanisms of value generation, stakeholder mobility and coordination in urban environments.

2.2. Welfare economics, spatial economics and externality

The framework draws on Coase's institutional economics (Coase, 1998) crucial to understand and manage complex stakeholders' interactions in mixed-use, high-density area. Tiebout's and Pigou's complementary theories where choice meets intervention (Tiebout, 1956; Boadway & Tremblay, 2012; Pigou, 2017; Zodrow & Mieszkowski, 1986) to explains sorting, affordability and choice, how "people vote with their feet" for preferred local amenities bundles and to address urban value creation and negative and positive externality (pollution, congestion vs public transit, green spaces, community art), i.e., market failure by correcting social costs/benefits in the built environment to ensure the creation of those bundles is socially legitimate, not just privately profitable.

2.2.1. Pigouvian Perspective (Government Intervention)

The framework reflects a Pigouvian perspective by acknowledging significant positive and negative externalities.

- Public Intervention: The reliance on planned elements like 'City/City Transit Network' and 'Location/Vision/TOD Project' reflects a Pigouvian logic in which government shapes initial conditions or corrects externalities when private incentives are insufficient to achieve socially optimal outcomes.

- Taxes/Subsidies: The 'Investment' and 'Return on Investment' arrows highlight the need for public-finance tools, such as taxes or subsidies (e.g., R+P model (Cervero & Murakami, 2009; Suzuki, et al., 2015), to bridge the gap between 'Value in Exchange' (private financial metrics) and the broader 'Shared Value' (public health and environmental benefits) that markets alone may overlook.

2.2.2. Coasean Perspective (Bargaining and Property Rights)

From a Coasean perspective, the diagram's multi-stakeholder "Value" section highlights the central challenge of coordinating actors with divergent interests in a shared urban environment.

- Stakeholder Interaction: The distinction between stakeholders' groups, owners, developers, and investors; users, visitors, workers, and residents and wider context communities illustrates a classic Coasean setting in which

multiple parties derive different benefits from and impose different externalities on a shared urban place. These overlapping claims mirror the Coasean problem: how to allocate rights and responsibilities so diverse stakeholders can negotiate efficient outcomes.

- Defining Rights: In urban contexts, effective placemaking/placekeeping would require clear and enforceable property rights or well-specified governance rules. Without clarity about who manages property interface, maintenance, public space quality, amenity provision, or nuisances such as noise and congestion, transaction costs rise sharply, undermining the possibility of reaching a socially beneficial level of "Shared Value."

2.2.3. Tiebout Perspective (Voting with Feet)

A Tieboutian lens emphasises how households choose among places based on the bundle of local public goods, services, and taxes they offer. This logic is reflected in the framework's "Placemaking/Placekeeping" dimension and several of the "5Ds" outputs.

- Mobility/Accessibility: Indicators such as "Distance to Transit" and "Distance to Destination" shape residents' accessibility and daily experience, but more importantly, they contribute to the broader public-goods bundle that defines a place's attractiveness. In line with Tiebout's reasoning, the framework suggests that if a place does not provide the preferred mix of accessibility, density, diversity, amenity provision, and wellbeing, residents may "vote with their feet" and relocate to communities that better align with their affordances.

- Competition: The "Value in Use" section captures the benefits perceived by users and residents, embodying the Tiebout principle that places operate in a competitive environment. Cities and TOD neighbourhoods must curate local amenities, services, and regulatory conditions, funded through their "own tax" or cost structures, to attract and retain residents. This competitive dynamic pushes places to differentiate themselves through superior public-goods provision and overall quality of life within the urban rail network, also accounting for network effects.

The proposed middle-range theory framework operates as a layered hybrid drawing on neoclassical and institutional economics: Pigouvian interventions establish the initial urban structure and correct non-negotiable externalities; Coasean bargaining provides the mechanism for project-level coordination among stakeholders; and Tiebout dynamics ensure the long-term desirability and sustainability of the place through resident mobility and choice.

However, the presence of strong multi-scale spatial, social, and economic network effects fundamentally disrupts the assumptions underpinning all three models, externalities become dynamic rather than static, interdependent rather than separable, and complex to price or assign to individual actors. As these feedback loops amplify or diffuse value in very complex ways, the effectiveness of Pigouvian, Coasean,

or Tieboutian perspectives is weakened, underscoring the need for adaptive governance and continuous recalibration of the value-generation system.

3. Ownership predominant regimes

With this theoretical framework in place, we now examine how the framework operates across various predominant land tenure regimes. By analysing private, state, and collective as predominant ownership models, we illustrate the framework's adaptability and relevance to diverse urban contexts. This is particularly important as TODs have been implemented in comparatively distinct land tenure systems without being explicitly discussed as such in meta-reviews (Ibraeva, et al., 2020; Jamme, et al., 2019; Doulet, et al., 2017).

3.1. The predominantly Private Ownership Regime

3.1.1. Analysis

Spillovers create market failures (developer free-riding on public goods). Value is primarily extracted as value in exchange for private landowners.

3.1.2. Resolution Mechanisms

Focus on value capture regulatory tools: TIF, developer exactions, negotiated planning agreements. These attempt to claw back shared value indirectly (Sharma & Dehalwar, 2025).

3.2. The State Land Ownership Regime (HK/ Singapore/China)

3.2.1. Analysis

Integrated "Rail + Property" model. The state, as the primary owner, directly captures value in exchange for subsidising shared Value in Use (public transit. Spillovers are internalised within the state's balance sheet.

3.2.2. Resolution Mechanisms

Direct land sales/leases, MTR Corporation R+P model, integrated master planning. The "public domain problem" is solved institutionally (Cervero & Murakami, 2009; Haila, 2000).

3.3. The Collective/Indigenous/Informal Ownership Regime

3.3.1. Analysis

Value definitions clash. Shared value (cultural stewardship, community cohesion) often supersedes value in exchange. Spillovers must respect cultural protocols.

3.3.2. Resolution Mechanisms:

Focus on co-governance, community benefit agreements (CBAs), and respect for Free, Prior, and Informed Consent (FPIC), prioritising procedural justice over pure economic efficiency (Suzuki, et al., 2015 ; Wang, et al., 2019).

4. Evaluation: How good is such a middle-range theoretical framework of TOD?

There are four different pathways to evaluate the proposed middle-range theory framework.

1. Internal consistency: Does the proposed framework fulfil the required characteristics of middle-range theory?

2. Original contribution to the existing literature on value frameworks in real estate and TOD.

3. Literature validation pathway using empirical literature as case studies, re-analyse selected studies through the lens of the proposed framework.

4. Direct empirical application involves applying the framework to real-world TOD projects, collecting primary data (e.g., interviews, surveys, urban metrics, etc.), and analysing how well the framework explains value generation and distribution.

The last two pathways are beyond the scope of this paper, however we will outline operationalisations. We focus on the two first pathways.

4.1. Required characteristics of middle-range theory

Merton (1967), as discussed extensively in Pawson (2008), defines the main characteristics of middle-range theory in terms of three key rules:

- **Rule 1. 'Sufficient abstraction'**

'Sufficiently abstract to deal with different spheres of social behaviour and social structure, so that they transcend sheer description or empirical generalisation' (Merton, 1967: 68).

- **Rule 2. 'Logical derivation'**

'Limited sets of assumptions from which specific hypotheses are logically derived and confirmed by empirical investigation' (Merton, 1967: 68)

- **Rule 3. 'Adaptive, cumulative explanations'**

'The middle range orientation involves the specification of ignorance. Rather than pretend to knowledge where in fact it is absent, it expressly recognises what still must be learned to lay the foundations for still more knowledge.' (Merton, 1967: 68).

In the following section, we review the proposed middle-range theoretical framework and map it against the three rules.

4.1.1. Sufficient Abstraction

- **Transferable Structure**: The framework is intentionally designed to be applicable across diverse urban contexts, for example, across a variety of predominant land tenure models, mainly private, state-owned (e.g., China, Hong Kong, Singapore), indigenous collective land (e.g., China's urban village) and informal land tenure models and their hybridisation. This suggests abstraction beyond any single empirical setting.

- **Conceptual Integration**: It systematically connects anthropological concepts of value (exchange, use, shared value) with spatial economic theories (Pigou, Coase, Tiebout), transcending mere description and enabling analysis across different spheres of social behaviour and structure.

- **Results Chain/Theory of Change**: The framework's "results chain" (inputs/activities → 5Ds outputs → outcomes/impacts → value types → return and externalities) is a generic analytical and generative tool, not tied to a specific case, and can be adapted to various urban interventions.

- **Multi-scale spatial nesting**: The included graphic visually abstracts the value creation and distribution process across a multi-scale nested spatial setting, making it interpretable for different stakeholders and contexts.

These elements ensure the framework is not just a descriptive model for a single TOD project or typology but a sufficiently abstract tool for theorising about placemaking and value in a range of urban environments.

4.1.2. Logical Derivation

- **Limited Set of Assumptions**: The framework assumes that value in placemaking can be categorised into three value types (Exchange, Use, shared), which are empirically universal (Graeber, 2001) yet with differentiated configurations, that these are distributed among stakeholders, and that economic theories can clarify mechanisms for value creation and distribution.

- Causal Logic: The "results chain" provides a logical sequence from interventions to outcomes, supporting the derivation of hypotheses about how specific actions (e.g., increasing accessibility or diversity) affect the distribution of value.

- Testable Propositions: The framework enables the formulation of hypotheses such as: Increasing the diversity of land use in a TOD will increase shared value, as measured by public health and environmental indicators, more than the Value in Exchange.

- Empirical Anchoring: While the summary itself does not present empirical tests, it cites prior papers that conduct empirical investigations, indicating that the framework is intended to be empirically grounded.

The framework's structure supports the logical derivation of hypotheses that can be empirically tested, fulfilling Merton's requirement that theory be more than a loose collection of concepts.

4.1.3. Adaptive, Cumulative Explanations

- **Acknowledgement of Limits**: The framework explicitly recognises the limitations of Pigouvian, Coasean, and Tieboutian models in the face of complex, dynamic network effects, and calls for adaptive governance and continuous recalibration.

- **Specification of Ignorance**: It highlights areas where knowledge is incomplete, such as the dynamic and non-linear interplay of

externalities and the challenge of pricing or assigning value in complex urban systems.

- **Generative Orientation**: The framework is positioned as a tool for ongoing empirical investigation, comparative analysis and TOD design as value distribution hypotheses, not a closed explanatory system. It invites further research to refine and adapt its components across both empirical research and generative design (Jiang, et al., 2023).

- **Transparency and Explainability**: most recent methodology like Explainable AI (xAI) and SHAP values methodology for making value generation and distribution transparent would support the adaptive, cumulative orientation, as these tools are designed to reveal drivers and gaps in understanding (Salih, et al., 2025).

By specifying what is not yet known and encouraging further empirical work, the framework aligns with Merton's vision of theory as a cumulative, adaptive enterprise.

4.2. A review of value framework in real estate and TOD

To contextualize our proposed theoretical framework within the broader TOD research, the next section reviews existing value frameworks in real estate and TOD literature. This comparison highlights the original contributions and advances offered by our approach.

4.2.1. Real estate

The mapping of value in real estate has evolved from a narrow focus on financial returns to a broader, multi-dimensional perspective that incorporates social, environmental, and stakeholder-driven outcomes. Several key studies reinforce and extend these concepts. For instance, Lindholm and Leväinen (2006) present a structured model for measuring the tangible and intangible effects of real estate on firm performance, aligning with the framework's emphasis on linking real estate strategy to broader organizational goals. Roulac et al. (2006) further highlight the dynamic nature of value, noting that both creation and destruction are inherent in real estate development and investment, with initial concepts and perceived opportunities serving as primary value drivers.

Other contributions, such as Anker Jensen (2010), expand the discussion to facilities management, illustrating how service-oriented strategies can add value beyond cost reduction. Khanna et al. (2013) introduce the dimension of corporate branding, demonstrating how real estate decisions can reinforce organizational identity. Meanwhile, Jonikas (2014) and Awale & Rowlinson (2014) operationalize the concept of shared value, integrating corporate social responsibility (CSR) and competitiveness into the value creation chain.

Recent works also address the challenges of stakeholder integration (Heitel, et al., 2015), the role of design in value creation (Wang, et al., 2019), and the impact of financialization on strategic decision-making (Botzem & Dobusch, 2017). Visser (2017; 2018) advances the discourse by proposing integrated value frame-

works that respond to fragmentation and advocate for systems thinking. Empirical studies by Mehera and colleagues (2018; 2021) provide practical insights into the adoption of shared value models in the property sector, emphasizing stakeholder engagement and alternative business models. Haase et al. (2024) extend value mapping into the circular economy, highlighting the importance of stakeholder co-creation and innovation in sustainable real estate development.

4.2.2. TOD

Early foundational works, such as Belzer & Autler (2002), sought to clarify the TOD debate by moving beyond rhetoric to performance-oriented definitions and by situating TOD within broader socio-economic and historical contexts. Their emphasis on inclusivity and benefits beyond land value set the stage for later critiques of narrow, market-centric approaches. Similarly, Singh et al. (2012) advanced the field by proposing a flexible, participatory design framework for measuring TOD, yet they also highlighted the persistent lack of a standard definition, a challenge that continues to complicate comparative analysis and policy transfer.

A significant body of literature has focused on the financial underpinnings of TOD. Cervero & Murakami (2009) introduced the Rail + Property (R+P) model, demonstrating how transit finance and urban planning and design can be synergistically linked, particularly in the context of Hong Kong. Their work, along with Suzuki et al. (2015), who explored Development-Based Land Value Capture (DBLVC) in Asian megacities, underscores the centrality of value capture mechanisms in funding and sustaining TOD projects. However, these studies often foreground financial and market-based value (exchange value), with less attention to the distribution of benefits among diverse stakeholders or the broader societal impacts.

The operational realities of TOD are addressed in works Thomas et al. (2018), who interrogated the international transferability of TOD as a policy concept. These studies reveal the importance of context, cultural, institutional, and political, in shaping the success or failure of TOD initiatives. They also highlight the challenges of transferring "softer" lessons, such as actor relationships and governance practices, across different settings. Recent scholarship has begun to address the limitations of a narrow focus on exchange value. Loo & du Verle (2017) advocate for broadening success metrics beyond transit patronage, while Yu et al. (2018) employ spatial econometric models to reveal the heterogeneous impacts of TOD on property values. Yet even these advances often stop short of systematically integrating social, environmental, and governance dimensions into the value equation. The institutional context of TOD is critically examined by Wang et al. (2019), who analyse informal land value capture strategies in China and the barriers posed by existing governance structures. Their findings (Sharma & Dehalwar, 2025) reinforce the need for adaptive, context-sensitive approaches to value creation and distribution.

Against this backdrop, the framework outlined

above makes several original contributions:

- **Holistic Value Typology**: By explicitly categorizing value into exchange, use, and shared value, and mapping these to specific stakeholders, the framework transcends the limitations of prior models that focus predominantly on financial or user value or environmental social and economics. This tripartite value structure enables a more nuanced understanding of who benefits from TOD and how.

- **Integration of Economic Theories**: The synthesis of Pigouvian, Coasean, and Tieboutian perspectives provides a robust theoretical foundation for understanding the interplay between government intervention, stakeholder bargaining, and resident mobility. This integration is largely absent from the reviewed literature, which tends to privilege one perspective over others.

- **Adaptive Governance and Dynamic Externalities**: The framework's recognition of the dynamic, interdependent nature of urban externalities, and its call for adaptive governance, marks a significant departure from static or one-size-fits-all approaches. This is particularly salient given the complex feedback loops and non-linear network effects inherent in contemporary intra- and inter-urban systems.

- **Explicit Value Mapping and Cost Sharing**: By enabling the explicit specification and mapping of value distributions for different stakeholders, and by addressing the challenge of sharing fixed costs, the framework fills a critical gap in the literature, which often overlooks the complexities of multi-actor coordination and cost allocation.

- **The 5Ds** serve as concrete morphological dimensions that translate broad strategic objectives into specific, observable changes in the urban environment. This makes it possible to assess whether interventions, such as investments in transit infrastructure, zoning changes, or placemaking initiative, are actually producing the intended effects.

Building on these theoretical and empirical insights, we outline how the framework can be operationalised in both research and practice. The following section details methods for hypothesis development, indicator selection, stakeholder analysis, and policy evaluation.

5. Operationalising the Framework in Empirical Research and Practice

The following section outline operationalisation as empirical research and intervention

5.1. Empirical research

5.1.1. Hypothesis Development

- Use the framework to derive specific, testable hypotheses about the relationships between interventions (e.g., changes in density, diversity, design, etc.) and outcomes (e.g., vibrancy, wellbeing, value types).

- Example: "Does increasing accessibility in a TOD context lead to a greater increase in shared value than in value in exchange?"

5.1.2. Indicator Selection and Measurement

• Operationalise the "5Ds" and value types using measurable indicators:

o Density: population or job density metrics

o Diversity: land use mix indices

o Design: placemaking quality assessments

o Accessibility: average distance to transit

o Value in Exchange: property prices, ROI

o Value in Use: user satisfaction, accessibility scores

o Shared Value: public health, environmental quality

5.1.3. Comparative Case Studies

• Apply the framework to multiple TOD projects across different land-ownership models (predominantly private, predominantly state-owned, predominantly indigenous/informal) to compare how value is generated and distributed.

• Use the framework to structure data collection and analysis, ensuring comparability across cases.

5.1.4. Stakeholder Analysis

• Map the stakeholders (owners, developers, users, and the wider community) and analyse how interventions affect the distribution of value among them.

• Use interviews, surveys, and participatory methods to capture diverse perspectives on value.

5.1.5. Policy and Governance Evaluation

• Assess the effectiveness of different governance arrangements (property rights, public finance tools, negotiation mechanisms) in achieving preferred value outcomes.

• Test the framework's predictions about the role of government intervention, bargaining, and resident mobility in shaping outcomes.

5.1.6. Adaptive Learning and Model Refinement

• Use empirical findings to refine the framework, specifying where its assumptions hold or need adjustment.

• Employ explainable AI tools (e.g., SHAP) to analyse large datasets and make the drivers of value generation transparent, supporting iterative learning.

5.2. Intervention

5.2.1. Strategic Urban Planning and Design and Policy Design

Planners and policymakers, as well as large private estate owners, master planners, and communities, can use the framework to evaluate, map and balance the different types of value generated by TOD projects. The framework supports decisions about investment, design, and the alignment of public and private interests by making the distribution of benefits and return on investment visible.

5.2.2. Stakeholder Coordination and Value Distribution

The framework clarifies how value is created and distributed among owners, developers, users, and the wider community. The framework supports negotiation, coordination, and governance design to address market inefficiencies and ensure fair outcomes.

5.2.3. Assessment and Management of Urban Externalities

By identifying and measuring externalities (positive and negative), the framework guides government interventions, taxes, subsidies, incentives, and regulations to bridge gaps between private and public value, ensuring broader societal goals are met. Urban designers can link generative placemaking and placekeeping activities to measurable outcomes in vibrancy, employment, wellbeing, and resilience, while accounting for stakeholders' values, ideologies, and preferences in value distribution. An understanding of value distribution guides generative design interventions that allocate value from developer, user, and community perspectives and evaluate TOD project objectives.

Operational Key Insights

- Successful TOD requires deliberate management of multi-scalar value effects across various land-ownership structures.
- Balancing the pursuit and distribution of all three types of value is essential; overemphasis on developer profits can lead to gentrification and social inequity.
- The hybrid framework enables explicit analytical and generative specification of value distributions for different stakeholders, drawing on complementary economic theories to address urban value creation and externalities.
- Strong spatial, social, and economic network effects disrupt the assumptions of Pigouvian, Coasean, and Tieboutian models, requiring adaptive governance and continuous recalibration of value-creation systems.
- Explainable AI (xAI) using SHAP (SHapley Additive exPlanations) values makes the drivers of value generation and distribution transparent, supports balanced governance in TOD placemaking/placekeeping, and helps communicate the outcomes and impact of value distribution to stakeholders.

In summary, the operationalisation of the framework could provide actionable guidance for researchers, planners, policymakers, developers and stakeholders in general. The concluding section reflects on the framework's limitations and suggests directions for future research.

6. Conclusion, limitations and further research

This paper advances a middle-range theoretical framework for Transit-Oriented Development by bridging the gap between placemaking, value creation, and stakeholder value configurations. By categorising value into Exchange, Use, and Shared dimensions, and integrating economic theories of externalities, property rights, and

resident choice, the framework provides a robust tool for analysing and guiding TOD projects. Its operationalisation enables both empirical research and practical application, supporting hypothesis development, indicator selection, and stakeholder analysis. However, the framework's effectiveness depends on its empirical validation and adaptability to diverse urban contexts, particularly those with complex land tenure and governance structures.

A key limitation of the framework is information cost; implementation of the framework would require a substantial primary and secondary data collection over time and at different spatial scale. An interim way around would be a meta-analysis of the existing TOD literature using the framework lens.

Future research should focus on applying and refining the model through comparative case studies, direct empirical deployment and use to guide generative TOD design. Ultimately, the proposed framework offers a pathway toward more effective, equitable, vibrant, and resilient TOD environments.

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