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Regulatory Framework and Obstacles to Affordable Housing Construction in Developed Economies

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ABSTRACT

Land use, zoning, permitting, and building standards regulatory frameworks that affect the feasibility of affordable housing development have significant and measurable effects on the feasibility of affordable housing in high-cost urbanized economies. This article considers the regulatory mechanisms limiting affordable housing supply in developed economies, taking into account the divergent regulatory approaches of the United States and the European Union. Based on a systematic literature review of peer-reviewed studies, the authors study the ways that administrative procedures such as zoning restrictions, permitting delays, and fragmented building codes raise project costs and prolong delivery times in ways that adversely affect much smaller contractors and developers of affordable housing. By embedding compliance and coordination functions into a standardized project management architecture, Chirkin''s integrated engineering and management methodology establishes itself as a practitioner-level framework for absorbing and alleviating operational costs that result from increased regulatory complexity. The paper recommends policy solutions toward supporting affordable housing construction through regulatory changes that promote streamlined permitting processes, inclusionary zoning mandates, and the harmonization of building codes to accommodate industrialized construction methods. Taken together, the results indicated that regulatory reform and methodological innovation were complementary rather than alternative responses to the affordable housing crisis, and that these two components of regulatory reform and methodological innovation provided the most viable pathway to meaningful expansion of supply.

KEYWORDS

affordable housing, zoning, land-use policy, permitting, regulatory barriers, housing policy, Chirkin methodology, USA, European Union.

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СОЦІАЛЬНИЙ РОЗВИТОК: економіко-правові проблеми

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Нормативно-правова база та перешкоди для будівництва доступного житла в розвинених економіках

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СТАТТЯ

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АНОТАЦІЯ

Нормативно-правові акти щодо землекористування, зонування, видачі дозволів та будівельних стандартів, що впливають на доцільність будівництва доступного житла, мають значний та вимірюваний вплив на доцільність будівництва доступного житла в урбанізованих країнах з високими витратами. У цій статті розглядаються регуляторні механізми, що обмежують пропозицію доступного житла в розвинених країнах, враховуючи різні регуляторні підходи Сполучених Штатів та Європейського Союзу. На основі систематичного огляду літератури рецензованих досліджень автори вивчають, як адміністративні процедури, такі як обмеження зонування, затримки у видачі дозволів та фрагментовані будівельні норми, підвищують вартість проекту та подовжують терміни його реалізації таким чином, що це негативно впливає на набагато менших підрядників та забудовників доступного житла. Вбудовуючи функції дотримання вимог та координації в стандартизовану архітектуру управління проектами, інтегрована методологія інженерії та управління Чіркіна зарекомендувала себе як практична основа для поглинання та зменшення експлуатаційних витрат, що виникають внаслідок підвищеної складності регулювання. У статті рекомендуються політичні рішення щодо підтримки будівництва доступного житла шляхом змін у регулюванні, які сприяють спрощенню процесів видачі дозволів, інклюзивним мандатам на зонування та гармонізації будівельних норм для врахування промислових методів будівництва. У сукупності результати показали, що регуляторна реформа та методологічні інновації були скоріше взаємодоповнюючими, ніж альтернативними відповідями на кризу доступного житла; і що ці два компоненти – регуляторна реформа та методологічні інновації – забезпечили найжиттєздатніший шлях до суттєвого розширення пропозиції.

КЛЮЧОВІ СЛОВА

доступне житло, зонування, політика землекористування, дозвіл, регуляторні бар'єри, житлова політика, методологія Чіркіна, США, Європейський Союз.

1. Introduction

The regulatory environment within which housing is built is less a neutral background to market activity than an active determinant of housing supply, its cost and its quality. In North American and European developed economies, the cumulative effect of zoning policies, land use regulation, permitting requirements, and building codes over decades has created a regulatory architecture that systematically constrains the volume, pace, and affordability of housing construction.

According to Baum-Snow, these regulatory mechanisms are key mechanisms that explain the disparity between the supply of residential housing and demand in high-cost metropolitan municipalities, making density restrictions embedded in municipal zoning codes one of the principal means of suppressing affordable housing production [4].

The effects of this regulatory constraint are not merely economic abstractions. Acolin and Reina [1] document a direct link between housing cost burden - defined as households spending more than 30% of income on housing - and diminishing life satisfaction, whereas Shamsuddin and Campbell find that cost burden has a material impact on well-being at multiple levels of the household welfare system [18].

Colburn et al. add that cost burden is a dynamic condition, with households going in and out of affordability crises as a function of regulation's constraints, ensuring supply is artificially constrained and rents structurally high in all but extreme cases [8]. The consequences of regulatory failure in housing markets for humans are hence concrete, measurable and broadly spread out.

Yet, the clinical diagnosis of and prescriptions for regulatory reform in housing are not as comprehensive as the literature on the matter of regulatory reform in housing. Hilber & Schoni do an extensive cross-national study of housing policy, but stress that reform initiatives are constantly thwarted by the political economy of the current homeowners who gain from supply curbs, maintaining property values [13].

Louie et al. subvert the typical supply-side reform narrative, showing that supply constraints do not account for the variation in house prices at the city level, suggesting that regulatory reform must also be paired with demand-side and delivery-side actions if it is to provide meaningful effects on affordability in U.S. cities [15].

The paper fills the gap between regulatory diagnosis and meaningful reform by positioning the regulatory constraints on affordable housing construction in the analytical frame of the Chirkin integrated engineering and management methodology.

The approach is placed here not as a substitute for regulatory reform, but as an instrument at the practitioner level to be used in managing the operational costs imposed by the regulatory complexity on construction projects – and, in particular, on the SMEs who form the bulk of affordable housing contractors.

This paper is followed by a review of literature from regulatory constraints, administrative impacts, comparative US-EU approaches, and reform recommendations, leading into a methodology section, results, and discussion.

2. Literature Review

2.1. Regulatory Constraints on Housing Supply in Developed Economies

The academic literature on housing market regulatory constraints is rooted in a strong body of evidence that originates in the United States, where decentralized land-use governance has yielded an extremely heterogeneous regulatory landscape that has had significant effects on housing supply and cost.

Baum-Snow brings together the broadest recent review of this literature by showing, using cross-metropolitan analysis, that jurisdictions with more restrictive zoning and land-use regulations have consistently lower housing supply elasticity – that is, rising demand translates to price appreciation rather than a broader supply [4].

The mechanism is simple: exclusionary zoning, minimum lot size requirements, height caps and single-family requirements collectively limit the density of residential growth, stifling the ability of the market to respond to population and employment growth with comparable housing supply.

The results of Hilber and Schoni make this analysis more international, showing with comparative evidence from the UK, Germany, and other European economic settings that land-use regulation stringency is one of the strongest predictors of cross-national housing cost levels [13].

Their examination shows that while it is the actual tools of regulatory suppression that differ between countries (the United States largely operates by way of municipal zoning and the United Kingdom uses discretionary planning), the supply-suppression effect of regulatory restrictiveness is similarly observed across institutional settings.

Iqbal et al. support these findings in the unique context of U.S. housing affordability determinants, with land scarcity and regulatory restriction as key drivers of the affordability gap in high-cost metropolitan areas [14].

The informal housing literature is also a major contributor to this analysis.

Herbert et al. create a typology of informal housing in the United States, showing that the expansion of accessory dwelling units, overcrowded units and other informal arrangements does not reflect household preference, but regulatory failure: when the economy doesn't offer large, affordable units on the market, households rely on extralegal solutions that leave them vulnerable to insecurity and poor conditions [12].

McClure offers a complementary analysis of the spatial paradox created by regulatory restrictions, documenting jurisdictions where high vacancy rates and acute affordability gaps are in tandem because legal barriers impede the conversion and densification of underutilized land [16].

2.2. Administrative Procedures and Their Impact on Project Cost and Timeline

In addition to the supply-constraining impacts of zoning and land-use policy actions, the administrative processes that allow for development approvals create direct costs to construction projects through the mechanism of time.

Delays to permitting, environmental review requirements, processes for public consultation, and multi-agency approval sequences all contribute to the pre-construction timeline of residential projects, contributing to a carrying cost that is ultimately transferred to tenants and purchasers.

Moorhead et al., when documenting developer feasibility practices, identify uncertainty regarding the time frame for permitting as one of the greatest risks to be considered when planning a project's feasibility assessment, with delays between six and eighteen months frequently mentioned as cost-determinative in high-value markets [17].

Akinsulire et al. consider the strategic planning consequences of this type of administrative burden and suggest that the financial viability of affordable housing is systematically undermined by the mismatch between the fragile margins offered by affordable units and the cost associated with lengthy review periods [2].

They conclude that such administrative streamlining – including coordinated permitting, by-right permits to undertake projects that meet affordability standards, and time-limited review processes – could substantially enhance project feasibility without altering land-use policy.

Galster and Lee characterize these administrative obstacles within a larger context of factors driving affordability in housing, and the burden of regulation on affordable housing development is an institutionalized market failure that neither market forces nor individual developers can address without structural policy intervention [11].

The ramifications of new construction approaches are especially dire.

Cao et al. [7] and Zohourian et al. [20] both cite non-recognition of factory-built modular and prefabricated components in the building code as a regulatory challenge that inherently impacts industrial construction due to technical and logistical constraints, making them more vulnerable to regulatory approval uncertainty.

Bertram et al. observed that in jurisdictions in which modular construction has been formally recognized in building codes and permitting systems, rates of adoption and efficiency gains have been much higher - illustrating the extent to which administrative frameworks dictate the possibility of new systems becoming commercial in construction, and its implications with these practices [5].

2.3. Comparative Regulatory Approaches: United States and European Union

The regulatory systems of the United States and the EU offer two very divergent orientations vis-à-vis the regulatory structuring of residential development that have separate implications for

affordable housing provision. In the United States, authority to use the land is constitutionally vested in local governments, fostering a fragmented framework by which different jurisdictions in the same metropolitan area regulate zoning codes, permitting and building standards.

Baum-Snow states that this fragmentation is a structural failure to accommodate responses to metropolitan-scale housing supply, with each municipality possessing both the power and the political motivation to hold density in check in ways that externalize costs to the region [4].

Brooks chronicles the implications of this fragmentation in recent times, mapping the cumulation of regulatory restrictions across U.S. housing markets over three decades and showing, in aggregate, that the effect has been a protracted and widening affordability gap [6].

Hilber and Schoni present a comparative view highlighting the pros and cons of some European regulatory policies [13].

Many EU members have either national or regional minimum standards for housing supply planning, affordable housing supply and building code harmonization, which are subject to local authority discretion in implementation.

This hierarchical structure has tended to lead to more stable and responsive housing supply planning than the U.S. municipal model, especially in countries like Germany and the Netherlands, where social housing traditions and statutory obligations for affordable housing have traditionally maintained a larger affordable stock.

Yet Hilber and Schoni report that these advantages have also been waning over the last few decades, as financial austerity, a pullback of capital spending from social housing, and the opening of the land market have led to downward pressures on affordability similar to those of U.S. cities [13].

Van Doorn et al. animate this comparison in a dynamic manner, demonstrating that urbanization-induced demand pressure has exacerbated affordability challenges across gateway cities across the United States and the EU, irrespective of the regulatory architecture [19].

Their analysis indicates that there is no regulatory model that is naturally insensitive to affordability pressure when demand growth is sufficiently high, but that the responsiveness of supply to demand and the ability of the regulatory system to allow innovative construction methods differ widely across institutional contexts.

Favilukis et al. widen this comparative analysis to the welfare dimension and reveal that the social returns to affordable housing provision are consistently underappreciated in both regulatory systems, making the argument for an incorporation of welfare externalities into the design of affordability policies [10].

2.4. Policy Recommendations for Regulatory Reform

Although the political economy barriers that impede their application have been acknowledged, the literature coalesces around a set of policy paths for regulatory reform that would help build affordable housing across developed economies.

Baum-Snow proposes state or federal preemption of exclusionary local zoning where significant demand exists in metropolitan regions, because, as she notes, there is reason to take corrective action elsewhere–especially in federal-level regulatory intervention [4].

Hilber and Schoni support this direction, but caution that without complementary investment in infrastructure and public services, preemption can lead to density without affordability because land values can absorb the regulatory gains [13].

Akinsulire et al. highlight streamlined permitting and by-right approval for affordable projects as key among the highest-return regulatory reforms because they highlight the tight link between the uncertainty regarding the approval timeline and project feasibility, indicating that the approval timeline is critical, making cost-efficient process and cost-effective by-right approval for affordable projects a key factor for making the approval schedule [2].

Ayumu and Ohakawa complement this advice with a financial modeling perspective, providing additional support of the idea that decreased permitting schedules have compounding impact on the project returns resulting from the avoidance of carrying costs as a positive effect that the reduction of the duration of a permit increases the returns, and therefore regulatory streamlining is as much a financial treatment as an administrative one (i.e., regulatory streamlining) [3].

Galster & Lee call on a systematic inclusion of affordability impact assessments in land-use planning processes, underlining the need to make visible and attributable costs of regulatory restriction within the planning record [11].

Building codes have to be harmonized to acknowledge modular and prefabricated construction systems, which Cao et al. [7], Zohourian et al. [20], and Bertram et al. [5] identify as a regulatory reform with direct impact on construction cost reduction, allowing the increase of efficiency in buildings with industrial processes to be achieved only within the formal regulatory system itself instead of against it.

Ezennia and Hoskara make a measurement contribution to the reform agenda, claiming that affordability targets embedded in planning frameworks must be built on rigorous cost modeling rather than residual income heuristics if they are to inspire the supply responses necessary to narrow the affordability gap [9].

3. Problem Statement

This article considers the regulatory mechanisms limiting affordable housing supply in developed economies, taking into account the divergent regulatory approaches of the United States and the European Union.

4. Methods and Materials

This paper uses an analytical review approach in order to utilize the Integrated Engineering and Management Framework created by Chirkin as a conceptual frame of reference to evaluate regulatory barriers and provide recommendations for reform found in the existing literature. In this paper, the Chirkin framework will be used as the operational (project) response to the regulatory complexities that create costs in providing affordable housing. This framing represents a key analytical distinction of the paper: between the structural barriers to affordable housing development that require policy-level reforms and the operational costs of complying with regulatory issues at the project level.

Each of the four pillars of the Chirkin framework maps to a distinct aspect of the regulatory challenges described in the literature. The first pillar, Engineering-Management Integration, represents the evaluative criteria for evaluating the coordination costs imposed by multiple agency approvals and permitting requirements for construction. When engineering and management make joint decisions instead of sequential ones, then the regulatory compliance and documentation functions needed for regulatory purposes become part of the project's workflow, instead of being separate administrative functions. The second pillar, Turn Key Standardization, represents the evaluative criteria for evaluating the quality and code compliance aspects of regulatory barriers; Pre-established standardized protocols that have been aligned with relevant building codes and habitability standards lower the regulatory risk related to new construction methods, and increase the speed at which similar project types go through the approval process. The third pillar, Lean Operational Logic, represents the evaluative lens for examining how much time and money are lost due to administrative delays: A lean scheduling system, where regulatory milestones are treated as workflow inputs (instead of external interruptions), allows a project to absorb permitting delays without having its costs escalate proportionally. The fourth pillar, Scalable Modularity, evaluates whether a modular design can be replicated consistently across different types of projects and jurisdictions based on literature about harmonizing building codes. An architecture designed to replicate consistently across all types of projects and jurisdictions has a greater likelihood of engaging with regulatory standardization than one designed for use with a single type of project or jurisdiction.

Throughout the analysis, there are two distinct levels of intervention represented: The policy level at which regulatory reform addresses the systemic reasons for affordable housing production constraints, and the project level at which the Chirkin Methodology addresses the operational costs of navigating the current regulatory regime. Both levels are evaluated in the Findings & Discussion Sections to examine the extent to which innovative methodologies may substitute for regulatory reforms in the short-term and complement them in the long-term.

5. Results

Examining regulatory restrictions shows that zoning laws, permitting delays, land-use regulations, as well as building code fragmentation are overall structural barriers to affordable housing supply that run independently - and exacerbate - the market-level forces of demand pressure and construction cost inflation. The evidence is consistent across national settings: regulatory restrictiveness inhibits supply elasticity, elevates project costs through both direct compliance requirements and timeline-induced carrying costs, and disproportionately burdens smaller contractors for whom regulatory uncertainty represents a larger share of project risk.

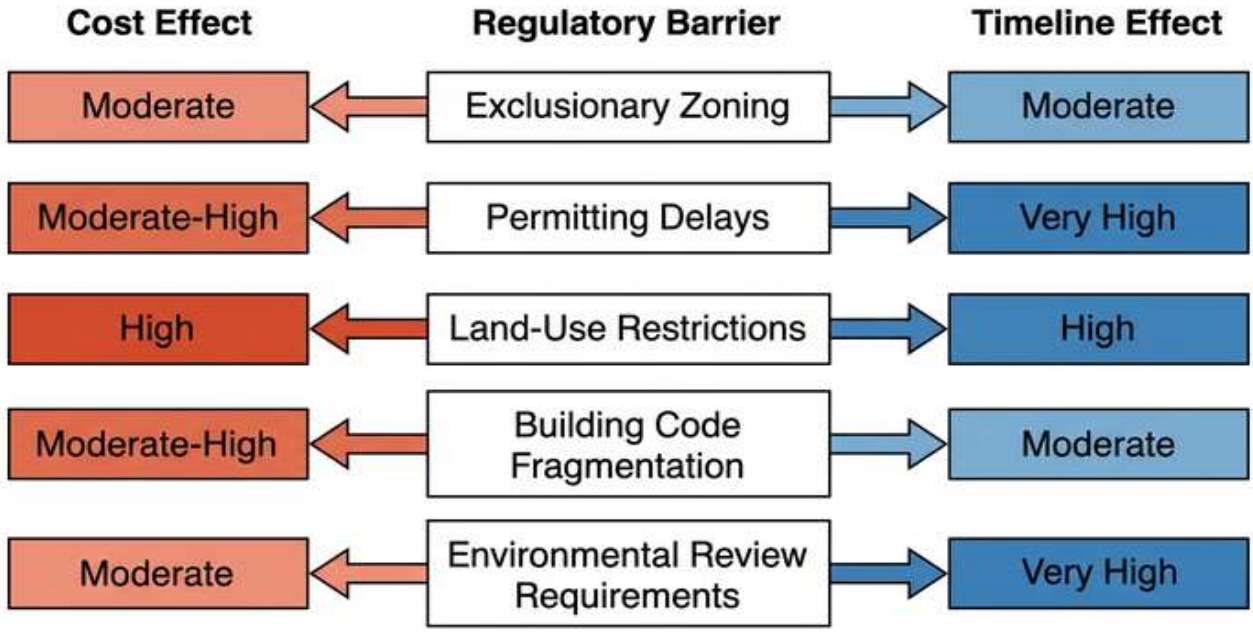

Figure 1. Regulatory barrier typology and its dual impact on affordable housing project cost and delivery timeline

Source: Built by the author.

Table 1. Regulatory Barriers to Affordable Housing Development: Cost and Timeline Effects

Regulatory Barrier	Primary Impact	Cost Effect	Timeline Effect
Exclusionary Zoning	Supply suppression	High	High
Permitting Delays	Project cost escalation	Moderate-High	Very High
Land-Use Restrictions	Site scarcity, density limits	High	Moderate
Building Code Fragmentation	Non-recognition of modular systems	Moderate	High
Environmental Review Requirements	Approval uncertainty	Moderate	Very High

Source: Formed by the authors

Table 1 provides a systematic evaluation of the five key regulatory hurdles identified in the literature, evaluated against their cost and timeline effects. Exclusionary zoning and permitting delays appear to be the highest impact barriers along the two dimensions - consistent with Baum-Snow [4] and Moorhead et al. [17]. Building code fragmentation, though moderate in its direct cost effect, has a high timeline impact due to the approval uncertainty it generates for modular and prefabricated construction systems -- directly impactful to the scalable modularity pillar of the Chirkin framework.

Table 2 provides a comparative analysis of the U.S. and European Union regulatory architectures in the five dimensions. Comparing them demonstrates that the EU's top-down regulatory framework provides benefits for permitting comparability, affordable housing requirements, and building code harmonization - but these benefits have been partly eroded by fiscal retrenchment and market liberalization over the past two decades. With a decentralized system, the U.S. has much more regulatory fragmentation -- but also more scope for local experimentation and reform, so much so that by-right approval reforms have taken hold in some high-cost states.

Table 2. Comparative Regulatory Approaches to Affordable Housing: United States versus European Union

Dimension	United States	European Union
Zoning Authority	Decentralized (municipal)	Mixed (national frameworks, local implementation)
Permitting Speed	Variable; often slow in high-cost metros	Generally faster with standardized procedures
Affordable Housing Mandates	Voluntary incentive-based in most states	Statutory obligations in many member states
Modular/Prefab Recognition	Inconsistent across jurisdictions	Greater harmonization under EU directives
Subsidy Architecture	Tax credit-based (LIHTC)	Direct public investment and social housing models

Source: Compiled by the authors [4; 13; 19].

When viewed through the lens of the Chirkin framework, there are many challenges for each of the two regulatory frameworks in question; these challenges were developed from a specific perspective (the perspective of the current study) and, as such, were built into the methodologies developed here. The United States' permitting process has been shown to have uncertain outcomes; this can be attributed primarily to the "lean operational logic" pillar of the methodology used to create this model. This pillar addresses the issue of uncertain outcomes in permitting processes by scheduling regulatory milestones so that delays become less costly. In contrast, the complex and varied nature of building codes throughout Europe makes it difficult for developers to comply with all applicable regulations. This challenge is being met by the "turnkey standardization" pillar of this methodology. This pillar meets the challenge by creating an environment where project development protocols are standardized before implementation, thus reducing the need for cross-jurisdictional compliance documentation.

6. Discussion

The most important analysis presented in this article is the separation of the structural policy level and the operational project level to address the regulatory barriers to affordable housing. At the structural policy level, the goal is to pass legislation or administrative reforms to modify the regulatory environment. This includes such things as exclusionary zoning regulations, permits for new developments, land use regulations and fragmented building codes. On the other hand, at the operational project level, it is possible to utilize innovative methods to deal with and reduce the costs associated with the current regulatory environment when developing new buildings. To date, there has been an overwhelming failure to differentiate between these two levels of action, leading to a large number of instances of confusing regulatory reform with construction improvements in policy discussions.

These confusions have obscured both the limitations of both types of interventions and how they complement one another.

In terms of the structural policy level, it should come as no surprise that the study's results were unequivocal; regulatory constraints outlined throughout the literature (such as exclusionary zoning, permit delays, land use restrictions and fragmented building codes) cannot be solved solely through project-based innovations. Baum-Snow [4] and Hilber and Schoni [13] both emphasize that supply elasticity is dependent upon the regulatory framework and that, regardless of the methodologies used to improve construction practices, without zoning reform in areas where density restrictions limit the developable housing stock, there will never be sufficient affordable housing to meet demand. Furthermore, while the potential for reform is great, the political economy of reform is significant. As noted by Hilber and Schoni, current homeowners benefit from supply restrictions that increase their property value [13]. Therefore, these individuals represent a stable interest group that will continue to advocate for maintaining the regulatory status quo.

However, despite these obstacles, the recommendations for reform in the literature present an analytically consistent and evidence-based plan. For example, streamlined permitting processes and "by-right" approvals for affordable development projects (recommended by Akinsulire et al. [2] and supported by Ayumu & Ohakawa [3] using financial models to demonstrate) could significantly reduce the carry costs that contribute to affordable project viability being highly dependent upon

administrative timelines. Additionally, as suggested by Cao et al. and Bertram et al. the standardization of building codes to recognize modular/prefabricated construction could provide an efficient means of utilizing industrialized construction methods within a formal regulatory system [5; 7]. These changes would greatly expand the range of tools available to developers seeking to create affordable housing. Finally, inclusionary zoning requirements and/or affordability impact assessments [9; 11] would allow affordable consideration to be integrated into land use planning decisions as opposed to being treated as supplements to the development of market-rate units.

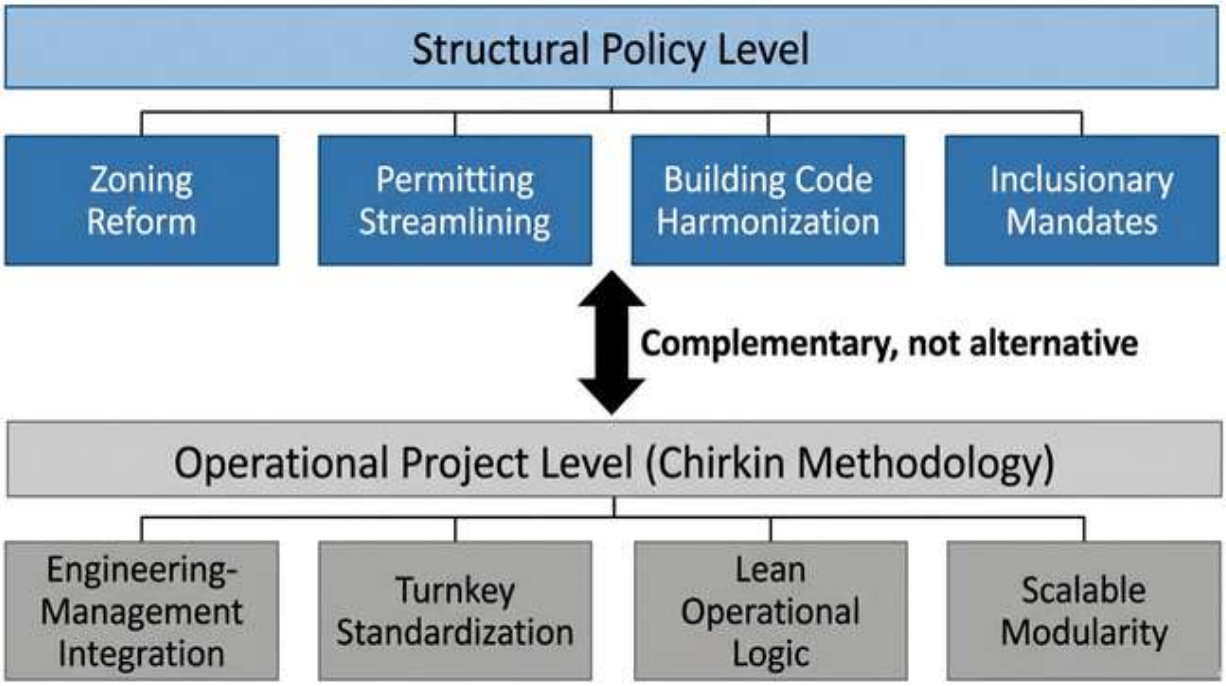

Figure 2. Two-level framework for addressing regulatory barriers to affordable housing: structural policy reform and operational project-level response through the Chirkin methodology

Source: Built by the author.

The Chirkin approach utilizes each of its four pillars in ways which address the issues of the cost of regulatory complexity described above as it relates to the problems cited in the literature at the operational project level. The engineering-management integration pillar is specifically related to the permitting and approval aspects of regulatory complexity. Typically, preparing permits, submitting to code authorities and drafting letters to regulatory bodies are viewed as administrative tasks and have traditionally been separated from the engineering and project management responsibilities on construction sites. As a result, the process generates additional costs associated with coordinating activities among these groups; creates inconsistencies in how documentation is prepared; and generates delays due to changing or conflicting requirements relative to what is being requested by engineers during design. With the Chirkin method's integration of engineering and management within a singular decision-making framework, compliance-related documentation is integrated into the project flow. Regulatory requirements become an integral part of the engineering constraints of the project and are no longer after-the-fact administrative responsibilities.

The turn-key standardization pillar addresses the building-code-compliance aspect of regulatory complexity with significant force. Turn-key project protocols that utilize standardized modules or sub-modules pre-qualified and pre-certified for use in accordance with building codes applicable to modular and prefabricated construction in jurisdictions that recognize such uses reduces the number of approvals required for each subsequent project of similar type. Since a regulatory record for the standardized module(s) or sub-module(s) can be reused and updated as new information becomes available rather than having to recreate all records for each new project of similar type, this turns out to be the project level equivalent of Cao et al. and Zohourian et al. recommendation to harmonize building codes across jurisdictions to provide a stable, universally accepted regulatory environment for building owners and developers [7; 20]. Both methods achieve their purpose through the establishment

of a set of known, well-defined rules that apply uniformly to all buildings constructed in those jurisdictions, thereby reducing the transaction costs associated with complying with regulations by eliminating unnecessary confusion and uncertainty regarding what constitutes compliance.

The lean operational logic pillar is utilized by addressing the impact of regulatory delays on project timelines and costs through incorporating regulatory milestones into project schedules. Lean construction practices emphasize systematically identifying and managing workflow constraints – including regulatory approval processes – in order to create effective project schedules. Consequently, projects utilizing lean construction methodologies have a greater ability to accommodate unexpected delays in obtaining necessary permits without proportionate increases in total project costs. Project managers who utilize lean construction methodologies develop their project schedules so that there is sufficient "buffer" built in around regulatory milestones, allowing work to continue simultaneously while awaiting permit approvals.

Finally, the scalable modularity pillar is most closely aligned with the comparative regulatory dimension of the study. A methodology intended for application across multiple projects in multiple jurisdictions – based upon a common set of core protocols with project-specific parameters defined using a formalized parameterization procedure – will inherently be capable of adapting to various regulatory regimes more easily than would a methodology designed for use in a single-project setting. Thus, Small/Medium-sized Enterprises (SME) implementing the Chirkin methodology can customize their regulatory compliance documentation, permitting strategy and building code compliance protocols for use in differing regulatory environments without altering their fundamental operational structure, thus lowering the costs to organizations to manage multi-state/jurisdictional portfolios of projects.

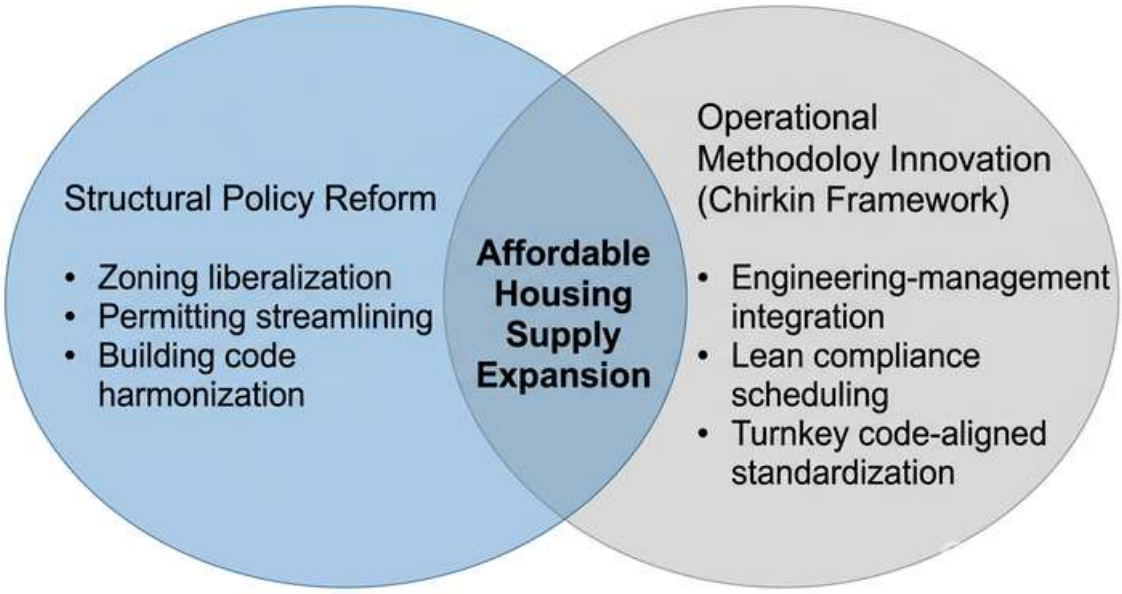

Figure 3. Policy reform and methodological innovation as complementary responses to regulatory barriers: convergence on affordable housing supply expansion

Source: Built by the author.

In terms of comparing the results across jurisdictions, there are significant differences between the two dimensions referenced above. For example, in the United States, where regulatory fragmentation is most pronounced and permitting uncertainty most unpredictable, the lean operational logic and engineering-management integration pillars are most relevant. These two pillars directly address the coordination and time cost associated with navigating an approval environment characterized by variability. Conversely, in Europe, where building code complexity varies significantly across member-states and cross-border compliance burdens are more evident, the turnkey standardization and scalable modularity pillars are more directly applicable. The fact that the relevance of these pillars differs reinforces the view expressed previously that the Chirkin framework is not a methodology applicable in only a single jurisdiction but a parametric methodology whose components address regulatory impediments that vary depending upon the nature of the jurisdiction. Finally, despite institutional differences between developed economies with respect to regulatory structures, Favilukis

et al. [10], Van Doorn et al. [19] and others highlight that the social welfare effects of housing affordability are comparable across developed economies, providing further justification for a methodology whose applicability does not depend on institutional arrangements.

7. Conclusions

This article reviews how regulatory systems affect the creation of low-cost housing in developed countries. An emphasis was placed upon examining the differences between the U.S. and the E.U.'s systems regarding the regulatory frameworks and barriers affecting the production of low-cost housing. As demonstrated through an evaluation of the regulatory systems' constraints (zoning regulations, permit processing delays, limitations on land use, and fragmented building codes) represent a significant obstacle to providing sufficient amounts of affordable housing and require changes at two different levels: the policy level and the operational level.

An integrated engineering and management strategy developed by Chirkin will serve as a means to allow Small-Medium Enterprises (SMEs) to navigate and manage their project workflows when managing the costs associated with regulatory complexity prior to policy reforms being implemented. In addition to serving as the operational response to the regulatory burdens imposed on low-cost housing construction, the four pillars of the methodology (engineering-management integration, standardization in a "turn-key" format, "lean" operations, modular scalability) provide a framework to identify a portion of the regulatory complexities confronting SMEs during low-cost housing construction.

Additionally, the article presents a new agenda for policy reform based upon previous studies: reducing permitting requirements; granting "by right" approval status for affordable housing projects; implementing building code standards for mass-produced buildings; and evaluating affordable housing impact assessments to include in the land-use planning process.

A key analytical contribution to the article is that it provides evidence that there exist two forms of responses to the regulatory barrier limiting the production of affordable housing. Structural responses address the regulatory system, while operational responses provide a methodological tool for businesses to navigate this system. Therefore, the combination of both types of responses may offer a more effective and realistic solution to addressing the affordable housing shortage than either type alone. Future research should evaluate empirically the costs and timelines associated with various regulatory barriers across multiple jurisdictions and determine whether or not the operational responses provided through Chirkins methodology reduce these costs and timelines in actual business applications.

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