

Prescriptive-Based Building Regulations: Challenges and Recommendations for Modernization in the Case of Bangkok

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ABSTRACT

Prescriptive building codes have long structured urban development by offering rule-based standards that ensure safety, uniformity, and ease of enforcement. Despite widespread reliance on prescriptive codes in developing countries, there is limited empirical evidence guiding their modernization or hybridization. This research investigates the challenges of prescriptive-based building regulations in the context of Bangkok, Thailand, and explores pathways toward more effective and modernized regulatory frameworks. Through regulatory review, focus groups, and public discussions with professionals, government officials, and private sectors, the study identifies four core problems: complexity, inconsistency, redundancy, and obsolescence. It then proposes a hybrid approach that improves existing prescriptive systems while integrating performance-based elements to enhance regulatory flexibility, clarity, and efficiency. Key recommendations include simplifying legal structures, ensuring regular updates, resolving overlapping provisions, and introducing visual legal tools and digital platforms. The findings contribute to both academic and practical discussions, serving as a foundational reference for regulatory reform, particularly in developing urban contexts where institutional capacities and resources may vary. Future studies are recommended to test proposed reforms empirically and explore their applicability in diverse legal and administrative settings.

Keywords: building codes, prescriptive building codes, performance-based regulation, regulatory frameworks, regulatory reform

INTRODUCTION

Building control legislation, when rigorously enforced, plays a critical role in ensuring multiple benefits across safety, efficiency, sustainability, and economic resilience (Meacham, 2019). These regulations are foundational in mitigating risks to life and property, particularly in areas prone to natural disasters (e.g., earthquakes), with empirical studies confirming their effectiveness in reducing damage and loss (Ainuddin et al., 2014; Dixit & Esteban, 2009). Beyond structural safety, building codes also serve vital public health functions by mandating minimum standards for factors that directly impact occupant health and well-being, such as sanitation, ventilation, and natural lighting. Moreover, modern building codes promote universal accessibility, including provisions for people with disabilities, thereby fostering inclusive and equitable built environments. In recent years, building regulations have increasingly focused on environmental sustainability by including green building standards that reduce environmental impact and lower operational costs, with studies showing savings of up to 20% (Green Building Consulting & Engineering, 2024; Pinich et al., 2023). Furthermore, building control legislation supports economic stability by helping to maintain property values and lower insurance premiums, contributing to the overall resilience of the built environment (World Bank, 2021).

Historically, building codes have predominantly adhered to a prescriptive-based approach in which detailed specifications are outlined for architectural design, construction methods, material use, and technical standards. While this method ensures regulatory compliance and uniformity, it can restrict innovation and adaptability, particularly in today's rapidly evolving and complex construction environment (Oster & Quigley, 1977). Furthermore, prescriptive regulations may lead to inefficiencies when applied in diverse or contextually distinct settings. A notable example is the export of Australia's prescriptive code to the Cook Islands, which resulted in impractical requirements, such as an excessive number of accessible restrooms (Loveridge, 2007). In response to these limitations, performance-based regulation has gained increasing attention. This approach

emphasizes the achievement of specific outcomes or performance criteria without prescribing the methods by which they must be attained. It offers greater design flexibility and encourages innovative solutions tailored to the specific needs of individual projects.

Despite extensive discourse and development surrounding performance-based regulatory approaches, significant research gaps remain. While performance-based regulation offers flexibility and innovation, it also presents several limitations, such as the need for expert oversight, complex compliance verification, and inconsistent expectations among stakeholders (Laovisutthichai et al., 2025b). This has led many countries to adopt hybrid regulatory models that combine both prescriptive and performance-based elements (Fauth et al., 2023; Meacham, 2016). Moreover, in practice, many developing countries continue to rely heavily on prescriptive systems due to constraints in financial resources, institutional capacity, and technical expertise. There is a notable lack of research addressing the current status, limitations, and potential improvement strategies of prescriptive-based building regulations, particularly in rapidly urbanizing, resource-constrained contexts. This gap is especially relevant given that prescriptive systems remain the foundation of building control in many parts of the world, including Bangkok.

To address this gap, the study is guided by the following research questions:

- What are the key challenges associated with the implementation of BMA Ordinance on Building Control B.E. 2544 in Bangkok's regulatory context?
- How can prescriptive-based building regulations be improved to better align with current urban development needs?

It aims to examine challenges associated with the implementation of prescriptive-based building regulations and develop policy recommendations for enhancing the effectiveness of prescriptive-based regulations further. It centers on Bangkok Metropolitan Administration (BMA) Ordinance on Building Control B.E. 2544, with references to other national laws included only where relevant for comparison or context.

Background

Prescriptive- and Performance-based Building Regulations

The origins of building control legislation can be traced back over 4,000 years to the Code of Hammurabi, enacted around 2100 BCE during the Babylonian era. This early legal framework included explicit provisions related to construction, notably imposing severe penalties on builders whose structural failures resulted in fatalities. In 1666, the Great Fire of London catalyzed the development of more formal building regulations, with a new emphasis on fire prevention and urban planning. The evolution continued into the modern era: In 1905, the American Insurance Association issued the first National Building Code in the United States. In 1994, the International Code Council (ICC) was established to provide a unified framework and disseminate building safety information to both members and the broader public (Fakunle et al., 2020).

Early building regulations were predominantly prescriptive-based, specifying strict requirements for construction methods, materials, and technical standards. This approach gained prominence particularly after major urban fires, which prompted regulations on allowable construction materials, building heights, and road widths (McLean, 2004). Nowadays, many countries still rely heavily on prescriptive-based systems. For example, the United States, while increasingly integrating performance-based methods, still largely adheres to prescriptive codes such as the International Building Code (IBC), which mandates precise standards on elements such as egress widths and approved materials. These codes are typically adapted by local jurisdictions to align with specific regional contexts and enforcement needs (Shapiro, 2016). China similarly enforces a highly codified system through its National Building Standard, which prescribes detailed construction procedures and material specifications, regularly monitored by central government inspections (Li & Yao, 2012). However, in recent years, the country has begun to explore other approaches, particularly within its Special Economic Zones, where greater flexibility and innovation are encouraged (Li & Shui, 2015). While prescriptive

regulation offers clarity and ease of enforcement, critics argue that it is often overly rigid, lacking contextual flexibility and stifling innovation (Oster & Quigley, 1977). Furthermore, such systems can reduce international competitiveness by creating compliance burdens (Porter & Linde, 1995).

During the 1980s and 1990s, performance-based regulation began gaining traction globally. Rather than prescribing how design and construction should be executed, this model focuses on whether the result meets defined performance criteria, often aligning with best available technologies. Early adopters included New Zealand, Australia, and Singapore, which implemented full-scale performance-based codes in the 1990s.

- New Zealand introduced its Performance-Based Building Code in 1992, which outlined safety, structural integrity, and sustainability goals without dictating methods (Duncan, 2005). It went through several revisions aimed at improving effectiveness (Duncan, 2005; May, 2015; Nwadike & Wilkinson, 2021).

- Australia implemented its *Building Code of Australia* in 1996, allowing for two compliance pathways, i.e., *Deemed-to-Satisfy Solutions* (prescriptive options) and *Performance Solutions* (alternative methods that meet performance targets) (Visscher & Meijer, 2007).

- Singapore adopted its *Performance-Based Approach* in 2004, enabling architects and engineers to propose alternative methods if they could demonstrate equal or superior outcomes. This approach has proven successful due to robust oversight from the Building and Construction Authority (BCA) (Chow, 2015).

Compared to prescriptive-based regulation, performance-based regulation offers greater design flexibility and promotes more cost-effective and efficient solutions, particularly in areas such as fire safety (May, 2003). However, these systems also present significant challenges, including the need for expert oversight, complex compliance verification processes, and inconsistent expectations regarding performance outcomes (Meacham et al., 2005; Meacham & van Straalen, 2018). Implementation failures can result in serious consequences, such as widespread building leakage in New Zealand (May, 2003) and

structural miscalculations in Japan (Meacham, 2010). In addition, ongoing concerns remain regarding industry readiness, over-reliance on self-certification, and suboptimal use of available data (Meacham, 2010).

Recognizing the limitations of using performance-based regulation alone, many countries have shifted toward hybrid models that integrate both prescriptive and performance-based elements (Meacham, 2016). Nations such as Canada, Japan, and the United States have begun adopting frameworks that allow performance-based options alongside traditional prescriptive codes (May, 2003), where the level of performance-based adoption varies depending on institutional capacity and national readiness (Visscher & Meijer, 2007).

- The United Kingdom has employed a hybrid system based on functional requirements since the enactment of the Building Act in 1984, allowing stakeholders to select either prescriptive or performance-based approaches, providing flexibility while retaining clarity (Meacham, 2016).
- Sweden shifted from a fully prescriptive system in 1994 toward a model emphasizing performance, particularly in energy efficiency and sustainability, in alignment with national environmental policy (Boverket, 2019; Mjörnell et al., 2014).
- Japan revised its building code in 1998 to allow developers to choose between prescriptive and performance-based pathways, with an emphasis on seismic and fire safety (Honjo et al., 2010; Takeichi et al., 2003).
- France has moved from a rigid prescriptive model to a dual-level system known as *double niveau de réglementation* since 2005, comprising both general requirements (*règles générales*) and optional performance pathways, particularly in energy performance (Dandy, 2019).

While prescriptive-based regulation offers clarity, consistency, and ease of enforcement, it often limits innovation and the ability to respond to specific contextual needs. In response, many countries have not fully replaced prescriptive systems with performance-based regulation; instead, they have adopted hybrid frameworks that integrate the strengths of both approaches. These hybrid systems allow regulatory strategies

to be tailored to each country's institutional capacity, policy objectives, and industry readiness. This ongoing evolution highlights the need for building control regulations that are not only technically robust but also adaptable to diverse local contexts and emerging challenges.

Situations in Bangkok

Building control in Bangkok traces its origins to the reign of King Rama IV during the Rattanakosin period, when Western urban planning principles were first introduced as part of broader efforts to modernize the city. Initial regulatory efforts focused primarily on public hygiene, driven by growing concerns over disease prevention and public health. As the city expanded and incidents of urban fires became more frequent, the government recognized the need for fire prevention and response mechanisms. This led to the enactment of the Building Construction Control Act in Fire-Prone Areas in 1933, which applied only to areas previously affected by fire. With continued urban development, more complex construction issues emerged. Authorities increasingly encountered unsafe and structurally deficient buildings, often designed without professional oversight, lacking sanitation standards, and violating basic urban planning principles. In response, the government passed the Building Construction Control Act of 1936 (B.E. 2479), which expanded regulatory oversight but still lacked an integrated framework for land use planning and jurisdictional enforcement.

A more comprehensive and modern regulatory structure was introduced with the Building Control Act of 1979 (B.E. 2522), which consolidated and replaced both earlier acts. This legislation significantly broadened the scope of building control to address the demands of an increasingly urbanized and complex city. It also aimed to ensure structural safety, sanitation, and alignment with broader urban planning objectives. Currently, building regulation in Bangkok is governed primarily by the 1979 act and an extensive body of ministerial regulations issued under its authority. The legal framework comprises over 60 prescriptive-based laws and regulatory instruments, supplemented by ministerial announcements and local administrative rules (Chantrarat, 2020). These

laws are continually revised to adapt to evolving technological, societal, and urban conditions. Despite these efforts, numerous public complaints and legal disputes have emerged, pointing to persistent challenges related to the enforcement, clarity, and effectiveness of a system based solely on prescriptive regulation (Chullabodhi et al., 2022; Kosump, 2011).

RESEARCH METHODS

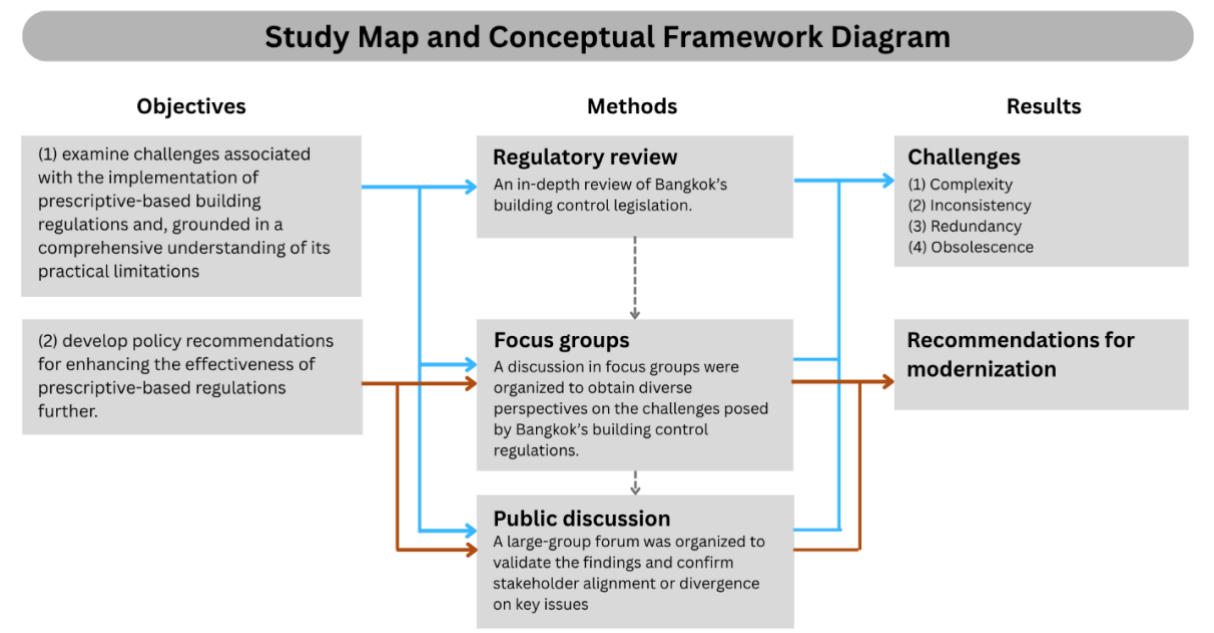
This study is grounded in the pragmatist paradigm, which holds that knowledge is most valuable when it can be applied to generate practical solutions and drive positive changes in society (Morgan, 2014). Pragmatists acknowledge the complexity of socio-legal phenomena and adopt the view that reality is co-constructed through the interaction between individuals and their environments (Kelly & Cordeiro, 2020). Accordingly, a qualitative research design was adopted, emphasizing participatory engagement with stakeholders to gain in-depth insights, validate findings, and co-develop actionable policy recommendations. This research methodology has been used widely in the field, e.g., design decision-making process refinement and modular building design

guidelines (Laovisutthichai et al., 2025a). In this research, data were collected through three main methods (see Figure 1):

- 1. Regulatory review: A qualitative document analysis to identify gaps and overlaps provisions, providing a legal-context baseline for subsequent inquiry,
- 2. Focus groups: Structured discussions with selected stakeholder groups to capture sector-specific challenges and variations in regulatory interpretation, and
- 3. Public discussions: Cross-sectoral forums modeled on deliberative dialogue principles to validate preliminary findings and refine proposed solutions.

All qualitative data were then analyzed using thematic analysis, following an iterative coding process to identify, compare, and refine emergent themes, ensuring analytical rigor through triangulation between document review and stakeholder narratives. The integration of these methods enabled methodological triangulation, improving the robustness of findings and ensuring the grounding of recommendations in both legal analysis and lived practitioner experience. The details are as follows.

Figure 1
Study Map and Conceptual Framework Diagram



Regulatory Review

The first stage involved an in-depth review of Bangkok's building control legislation. The primary focus was on BMA Ordinance B.E. 2544 (2001), which serves as the core local regulation derived from Building Control Act B.E. 2522 (1979) and its amendments in B.E. 2535 (1992), B.E. 2543 (2000), B.E. 2550 (2007), and B.E. 2558 (2015). While the study concentrates on this local ordinance, additional legal instruments (e.g., the Town and City Planning Act, the National Environmental Quality Promotion and Preservation Act, the Energy Conservation Promotion Act, and the Land Allocation Act) were selectively reviewed to identify relevant overlaps, gaps, or inconsistencies. The comparative legal analysis formed the foundation for identifying regulatory challenges and supported the subsequent stakeholder engagement phases.

Focus Groups

In line with research supporting stakeholder participation in regulatory development (Bikdeli, 2025; Nwadike & Wilkinson, 2021), focus groups were organized to obtain diverse perspectives on the challenges posed by Bangkok's building control regulations. A total of 17 focus group sessions lasting approximately 2–3 hours were conducted, with 93 participants selected based on professional expertise and relevance to the building control framework. To ensure productive dialogue, participants were grouped based on shared expertise and experience. Group sizes included small groups (3–5), medium groups (6–8), and large groups (9–12), with participants organized as follows:

- The professional and academic expert group had 28 participants and consisted of representatives from professional associations, academic institutions, and private-sector architects and engineers. They participated in six sessions.
- The government official group had 32 participants and included representatives from the Bangkok Metropolitan Administration (BMA), such as the Department of Public Works, 50 District Offices, Department of City Planning, Environment Office, Drainage Office, Traffic and Transportation Office, Legal Office, and

Municipal Police. They took part in three sessions.

- The private-sector developer and real estate organization group had 28 participants and comprised members of the Thai Real Estate Association, the Condominium Association of Thailand, the Housing Business Association, and custom home builders. They joined eight sessions.

The discussions addressed five key areas derived from practical experience and stakeholder concerns:

- Conflicts or inconsistencies between BMA Ordinance B.E. 2544 and national ministerial regulations,
- Redundancies and outdated provisions regarding restricted construction zones,
- Procedural inefficiencies in building permit application, inspection, and approval processes,
- Regulatory overlaps with other legal domains such as urban planning, environmental protection, energy conservation, and land allocation, and
- General suggestions, including the need for improved databases, technology adoption, personnel development, and institutional restructuring.

Public Discussion

Following the focus groups, a large-group forum was organized to validate the findings and confirm stakeholder alignment or divergence on key issues (Viryasiri et al., 2024). The forum synthesized feedback from all three stakeholder groups and focused on evaluating the coherence of identified problems and proposed solutions. A single-day forum was held in two sessions (morning and afternoon), each lasting approximately 3 hours. A minimum of 120 participants was targeted, with actual registration reaching 148 participants (see Table 1). They were divided into three stakeholder groups: (1) professional association representatives, academics, and expert consultants, (2) BMA government agency representatives, and (3) private-sector developers and related business

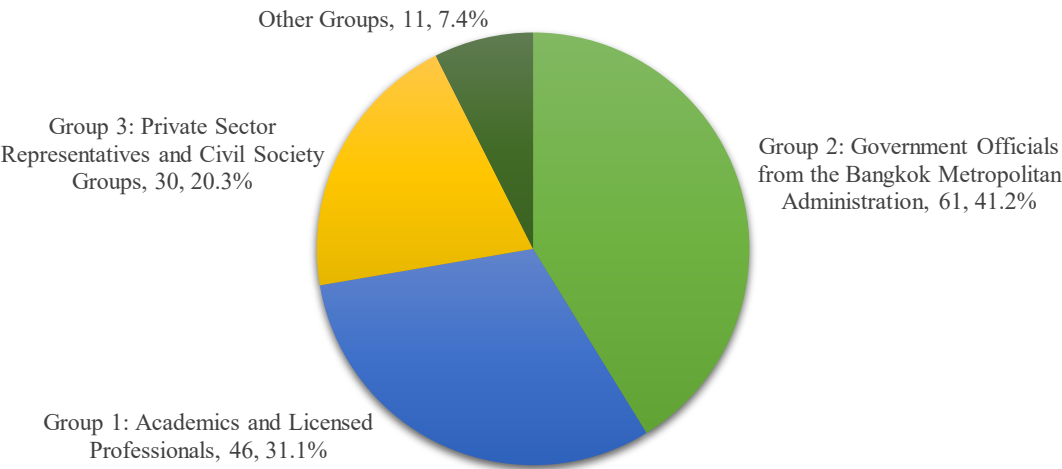
stakeholders. Sessions began with a technical presentation by the research team, followed by open-floor discussions. Participants were also asked to complete a structured questionnaire to evaluate the priority level of different issues and offer additional recommendations for improving the building control framework. This participatory validation process ensured that the findings reflected a wide range of perspectives and could inform actionable policy recommendations grounded in practice (Viryasiri et al., 2024).

In both focus group sessions and public discussion forums, all participants were informed of their rights, including the option to withdraw at any time without consequence. Audio recordings were conducted with consent, and all data were anonymized to protect individual identities. Recordings were then transcribed and analyzed using thematic coding analysis, allowing the

researchers to identify recurring patterns, key issues, and stakeholder perspectives relevant to the current building control regulatory framework in Bangkok (Neuendorf, 2018). The analysis followed a systematic process provided by Mills et al. (2009), including (1) reviewing the audio recordings, (2) thoroughly reading the transcripts, (3) identifying relevant patterns and themes based on study objectives (e.g., regulatory practices, implementation challenges, and proposed improvements), (4) formulating interpretations and arguments and, most importantly, (5) refining findings through repeated cycles of review and reflection. The research team then synthesized these insights to articulate current practices, highlight existing limitations, and propose actionable recommendations for enhancing the prescriptive-based regulatory framework in Bangkok.

Table 1
Participant Groups in the Public Discussion

Participant Group	Number of Participants	Percentage
Group 1: Academics and Licensed Professionals	46	31.1%
Group 2: Government Officials from the Bangkok Metropolitan Administration	61	41.2%
Group 3: Private Sector Representatives and Civil Society Groups	30	20.3%
Other Groups	11	7.4%
Total	148	100%



RESULTS

Through a comprehensive examination of building control regulations in Bangkok, relevant legislation, 17 stakeholder focus groups, and one large public discussion forum, this research reveals four primary challenges within Bangkok's current building control regime: (1) complexity, (2) inconsistency, (3) redundancy, and (4) obsolescence (see Table 2).

Challenges

Complexity

Bangkok's building control regulations are governed by multiple legislative instruments, many of which were enacted at different times without systematic consolidation. This fragmented legal landscape creates three forms of complexity:

- **Expanded local ordinances:** BMA Ordinance on Building Control B.E. 2544 (2001) often contains additional provisions beyond the corresponding ministerial regulations, particularly under Article 10(1), which permits the BMA to adapt laws for the local context. Comparative analysis (see Table 3) illustrates examples where this ordinance defines terms such as "warehouse," "concrete," and "theater" more broadly or precisely than the national codes.

- **Exclusive provisions in local ordinances:** Certain terms and requirements exist solely within BMA Ordinance B.E. 2544, such as "public area," "fixed load," and "road alignment" (see Table 4). These have no equivalent in the national-level ministerial regulations.

- **Post-ordinance additions in ministerial regulations:** Newer national codes have introduced additional definitions and requirements absent from older BMA ordinances, such as "net width," "skywalks," and "building alignment" (see Table 5), resulting in misalignment and enforcement difficulties.

Stakeholders across all focus groups consistently identified this fragmentation as a core challenge. Participants reported that compliance efforts are impeded by the need to consult and interpret multiple legal documents, often with conflicting or ambiguous provisions. These difficulties are compounded by inconsistent interpretation practices.

Inconsistency

The provisions on the same subject within BMA Ordinance on Building Control B.E. 2544 (2001) may conflict with or contradict ministerial regulations, because ministerial regulations are more frequently updated and aligned with current technological advancements, resulting in user confusion over which legal instrument should take precedence (see Table 6).

A key issue mentioned most frequently across all stakeholder groups was the inconsistency in legal interpretation and application of Bangkok's building control laws. Focus group data showed that this concern was raised in seven separate comments by Group 1 (professional and academic experts) and the same number by Group 2 (BMA government officials), while Group 3 (private-sector developers) raised it in three comments. While the number of mentions suggests that interpretive inconsistency was a recurring theme, it should be noted that this frequency does not necessarily reflect its real-world priority or severity.

Table 2

Summary of Key Challenges in the Implementation of BMA Ordinance B.E. 2544

Example of comments from focus group interviews			Example of comments from the public discussion	Synthesis of Issues	Primary Challenges
Group 1: Academics and Licensed Professionals	Group 2: Government Officials	Group 3: Private Sector Representatives and Civil Society Groups			
• Legal provisions allow discretionary interpretation by officials • Inconsistent legal interpretations	• Inconsistent legal interpretations	• Inconsistent legal interpretations • Officials' discretion leads to inconsistent decisions	• Many laws lack clarity, often requiring written consultations that yield vague responses or rely on local officers' discretion	• The legal language is text-heavy, complex, and difficult to interpret	(1) Complexity
• Building permit approval processes are time-consuming, and officers cannot verify all details	-	• Local regulations lack completeness or local relevance • Laws are difficult to understand; multiple laws apply to a single building	• Multiple laws are hard to use	• A single law often lacks full or clear information, requiring reference to multiple laws	
• Legal provisions allow discretionary interpretation by officials • Inconsistent legal interpretations	• Inconsistent legal interpretations	• Legal provisions allow discretionary interpretation by officials • Inconsistent legal interpretations	• Many laws are unclear, often requiring official letters for clarification, which sometimes provide vague answers	• The same issue is defined differently across laws	(2) Inconsistency
-	• Some ministerial regulations are derived from BMA Ordinance B.E. 2544, creating legal contradictions	• BMA Ordinance B.E. 2544 may conflict with the Building Control Act	• Definitions and measurement methods vary across laws; terms are fragmented and lack standardization	• Frequent amendments to ministerial regulations create inconsistencies with provisions in the BMA Ordinance B.E. 2544	

Table 2 (Continued)

Example of comments from focus group interviews			Example of comments from the public discussion	Synthesis of Issues	Primary Challenges
Group 1: Academics and Licensed Professionals	Group 2: Government Officials	Group 3: Private Sector Representatives and Civil Society Groups			
• Ordinances are overly complex in many areas	-	-	• Many overlapping laws exist within BMA Ordinance B.E. 2544 • Some content overlaps with other ministerial regulations	• Multiple laws regulate the same issue	(3) Redundancy
• Laws are outdated, while technologies continue to evolve • Current dimension and usage calculations often cause under- or over-requirements	• Laws are outdated, e.g., requiring design calculations based on occupancy numbers, which are inapplicable for buildings with automated systems	• Outdated definitions, unclear legal intent, outdated building types and requirements, and inflexible provisions	• New building types emerge but lack definitions • Parking space rules are unsuitable • Calculation methods vary between laws • Laws cannot adapt to modern needs	• Some provisions do not reflect the economic, social, and urban realities of today's investment context	
-	• Databases are not updated (e.g., old land titles and outdated manuals)	• Databases are outdated, causing unreliability	• Permit officers exceed processing deadlines or misplace designs, burdening developers	• Databases, technology, and inter-agency data connectivity are outdated	(4) Obsolescence
• No process to update land classification when actual conditions change	• District office capacity varies depending on geography and staff resources	-	• Design verification data is difficult to access; online submission would reduce officer workload and clarify requirements	• Knowledge and human resources do not meet the needs of Bangkok's changing context	

Table 3

Legal Definition Comparison Between BMA Ordinance B.E. 2544 and Other Ministerial Regulations Highlighting Regulatory Complexity from Expanded Local Provisions

BMA Ordinance on Building Control B.E. 2544 (2001)		Relevant Ministerial Regulations			Issues
Clause	Content	Edition	Clause	Content	
5	(5) “Warehouse” means a building or any part of a building used for storing goods or items for commercial or industrial purposes, or for the purpose of freight handling operations. This does not include storage rooms.	55	1	“Warehouse” means a building or any part of a building used for storing goods or items for commercial or industrial purposes.	BMA Ordinance B.E. 2544 is stricter or more comprehensive.
5	(8) “Concrete” means a material composed of a mixture of cement, fine aggregates such as sand, coarse aggregates such as stone or gravel, and water. This includes normal strength concrete, high strength concrete, and ultra-high strength concrete.	6	1	“Concrete” means a material composed of a mixture of cement, fine aggregates such as sand, coarse aggregates such as stone or gravel, and water.	
5	(78) “Theater” means a building or any part of a building used as a place for showing movies, stage plays, musical performances, or other entertainment, with the intent to be regularly open to the public, whether admission is charged or not.	55	1	“Theater” means a building or any part of a building used as a place for showing movies, stage plays, musical performances, or other theatrical performances, with the intent to be open to the public, whether admission is charged or not.	

Table 4

Legal Definition Comparison Between BMA Ordinance B.E. 2544 and Other Ministerial Regulations Highlighting Regulatory Complexity from Provisions Unique to the Local Ordinance

BMA Ordinance on Building Control B.E. 2544 (2001)		Relevant Ministerial Regulations			Issues
Clause	Content	Edition	Clause	Content	
5	(37) “Public place” means an area that is open to, or permitted for, public access or use as a thoroughfare, whether or not a fee is charged.	-	-	-	Certain terms and requirements exist solely within BMA Ordinance B.E. 2544.
5	(43) “Dead load” means the weight of the permanent parts of a building, including the weight of non-structural elements that are constructed or permanently installed on various parts of the building.	-	-	-	
5	(44) “Street line” means the boundary of a road or walkway that is designated as a public way.	-	-	-	
5	(48) “Architectural drawing” means a drawing intended for the construction, alteration, demolition, removal, use, or change of use of a building, clearly showing essential details, dimensions, material specifications, and functional use of the various parts of the building, sufficient for implementation.	-	-	-	

Table 5

Legal Definition Comparison Between BMA Ordinance B.E. 2544 and Other Ministerial Regulations Highlighting Regulatory Complexity from Post-Ordinance Additions

BMA Ordinance on Building Control B.E. 2544 (2001)		Relevant Ministerial Regulations			Issues
Clause	Content	Edition	Clause	Content	
-	-	55	1	“Net width” means the width measured from one point to another without any obstruction in between.	Certain terms and requirements introduced in Ministerial Regulation issued after BMA Ordinance B.E. 2544.
-	-	55 (amended by Ministerial Regulation No. 66 B.E. 2559)	1	“Pedestrian walkway between buildings” means a walkway constructed above ground level that connects buildings, used solely to provide convenience and safety for building occupants, and not for any other purpose.	
-	-	55 (amended by Ministerial Regulation No. 68 B.E. 2563)	1	“Building line” means the outermost line of a wall, column, or staircase of a building, excluding open-type external fire escape staircases.	

Table 6

Legal Definition Comparison Between BMA Ordinance B.E. 2544 and Other Ministerial Regulations Highlighting Inconsistency or Conflict

BMA Ordinance on Building Control B.E. 2544 (2001)		Relevant Ministerial Regulations			Issues
Clause	Content	Edition	Clause	Content	
5	(46) "Row house" means a terrace or townhouse used for residential purposes, with open space in front and at the back between the fence or land boundary and each building unit.	55	1	"Row house" means a terrace or townhouse used for residential purposes, with open space in front and at the back between the fence or land boundary and each building unit and having a height not exceeding three stories.	Inconsistent or conflicting.
5	(23) "Public road" means a public way accessible to vehicular traffic.	55	1	"Public road" means a road that is open to or permitted for public access and use as a thoroughfare, whether or not any fee is charged.	
		33	1	"Public road" means a road that is open to or permitted for public access and use as a thoroughfare, whether or not any fee is charged.	

This inconsistency stems from overlapping, fragmented, and sometimes contradictory legal instruments. Many terms and provisions are defined differently across various laws, creating confusion in practical implementation. A particularly problematic area is the variation in how measurements and calculations are specified, for instance, how to determine building height, floor area, or required setbacks. These discrepancies arise from differences in definitions across legal texts, resulting in varied calculations for parameters such as required parking space, which directly impact project cost, design, and land use. BMA officials reported that when faced with legal ambiguities, they rely on textual interpretation supported by documents and evidence. However, for novel or unclear scenarios, decisions often hinge on administrative discretion or are guided by prior court rulings or departmental orders that are not always applicable across contexts. As a result, officials frequently consult multiple agencies to validate their interpretations, yet no unified standard or interpretive framework currently exists.

This concern was reinforced in the large-scale consensus forum, where participants emphasized that the abundance of laws and lack of harmonization lead to delays in project timelines. Several stakeholders noted the difficulty of determining which law to follow when definitions or requirements conflict. Some definitions are stricter or more comprehensive than others, and many are dispersed across legal documents without a clear standard. Participants also pointed out that ministerial regulations are updated more frequently than BMA ordinances, further widening the gap and increasing interpretive uncertainty. These legal inconsistencies often force officials to rely on subjective judgment, resulting in variations across districts and contributing to unequal enforcement of the same regulations.

Redundancy

The provisions in BMA Ordinance on Building Control B.E. 2544 (2001), when compared to the corresponding ministerial regulations, are either identical in wording or carry the same interpretation despite minor textual differences. Although not in direct conflict, these provisions

create redundancy. This overlap largely results from the fact that, during the drafting of BMA Ordinance B.E. 2544, content was adopted directly from existing ministerial regulations. In other cases, ministerial regulations issued after the enactment of the 2001 Ordinance (B.E. 2544) include provisions on the same subject matter as those already stipulated in BMA Ordinance B.E. 2544. Examples of such overlapping legal provisions are presented in Table 7.

This finding aligns with insights from focus group interviews, where participants noted that multiple legal instruments address the same regulatory issues and that BMA Ordinance on Building Control B.E. 2544 (2001) contains several overlapping provisions. This redundancy may have resulted from the intent to ensure comprehensive legal coverage of specific topics. While not all focus groups identified this issue as a major concern, some acknowledged that such duplication complicates legal searches due to the proliferation of regulations. Nevertheless, this issue was reaffirmed during the large group discussion, where some participants stated that BMA Ordinance on Building Control B.E. 2544 (2001) contains provisions that overlap with those found in the relevant ministerial regulations.

Obsolescence

Another prominent issue consistently raised across all focus groups was the obsolescence of current building control regulations. Group 1 referred to outdated provisions in five comments, Group 2 in three comments, and Group 3 in six comments. All participants agreed that Bangkok's building control laws are significantly outdated, particularly in light of the rapid advancement of construction, computational, and automobile technologies. Both professionals and academics noted that even when designs incorporate state-of-the-art safety technologies, practitioners are often required to revert to outdated legal standards, especially those related to life safety.

The obsolescence of the regulatory framework is also apparent in its inability to reflect changing societal needs and functions. For example, government officials pointed out that many regulations still calculate usable space based on human occupancy, a method that becomes increasingly impractical for facilities that now rely

heavily on automation and machinery. Private developers further emphasized that outdated legal definitions hinder the accurate classification of modern building types. A notable case is the “clubhouse,” a recreational facility that lacks a suitable legal category and is therefore regulated as a public building, leading to disproportionate legal obligations, such as excessive restroom requirements that are misaligned with actual usage patterns.

Moreover, participants explained that the prescriptive nature of the regulations, which apply uniformly across all contexts (a “one-size-fits-all” model), fails to reflect the diverse urban fabric of Bangkok. Although the legislative intent may be articulated, enforcement tends to rely strictly on literal interpretations, often at the expense of contextual understanding. Existing regulations also lack flexibility in technical specifications, such as parking provisions. Current laws mandate a fixed ratio of parking spaces per user, resulting in up to one-fourth of a building’s total area being dedicated to parking. This requirement not only inflates construction costs but also imposes additional financial burdens on future occupants or buyers.

In addition, participants raised concerns regarding the outdated information infrastructure and data management systems that underpin building control enforcement. District officials reported that foundational documents such as land title records and procedural manuals are not regularly updated, impeding effective decision-making. The lack of interoperability between databases across agencies also complicates administrative workflows and document processing. Compounding this issue is the limited technical knowledge and human resource capacity to address the evolving demands of Bangkok’s urban development.

These concerns were strongly reaffirmed during the large public forum, where numerous stakeholders emphasized that certain building code provisions are misaligned with the contemporary economic, social, and environmental contexts of the city. This misalignment ultimately affects the financial viability of real estate investments and impedes urban development.

Recommendations for Modernization

Based on stakeholder reflections regarding proposed solutions to the challenges posed by Bangkok’s building control regulations, several recurring recommendations emerged across all groups (see Table 8). Notably, while the frequency of comments suggests the relative prominence of certain issues, the recommendations are presented thematically rather than in order of importance.

Complexity

Stakeholders emphasized the need for a holistic revision of the legal structure to ensure coherence across the entire system. While BMA Building Control Ordinance B.E. 2544 (2001) serves as the primary legal instrument, many additional related regulations exist. Interviewees suggested that the revised framework should align all relevant laws to enhance clarity and usability. Moreover, legal provisions should be categorized according to their purpose. Respondents stressed that legal reform should not focus solely on the current law but also consider future urban development plans and anticipated legislative trends. A recurring recommendation was to incorporate visual aids or graphics into legal texts to facilitate interpretation and illustrate examples or limitations—thereby minimizing subjective interpretation and promoting a shared understanding among users. Additionally, participants proposed the creation of a centralized, authoritative database for building control laws to address difficulties in accessing complete and reliable legal references. A single, consolidated manual covering all relevant laws was suggested as a practical tool for reference and dispute resolution.

Table 7

Legal Definition Comparison Between BMA Ordinance B.E. 2544 and Other Ministerial Regulations Highlighting Redundancy

BMA Ordinance on Building Control B.E. 2544 (2001)		Relevant Ministerial Regulations			Issues
Clause	Content	Edition	Clause	Content	
5	(1) “Gravel” means naturally occurring stones larger than 3 millimeters.	6	1	“Gravel” means naturally occurring stones larger than 3 millimeters.	Identical
5	(9) “Reinforced concrete” means concrete that contains embedded steel reinforcement to enhance its load-bearing capacity.	6	1	“Reinforced concrete” means concrete that contains embedded steel reinforcement to enhance its load-bearing capacity.	
5	(10) “Prestressed concrete” means concrete that contains embedded prestressed steel to create stress units sufficient to counterbalance those induced by loading.	55	1	“Prestressed concrete” means concrete that contains embedded prestressed steel to create stress units sufficient to counterbalance those induced by loading.	
5	(22) “Row house (shophouse)” means a building constructed in a continuous row of two or more units, separated by shared walls and predominantly composed of fire-resistant materials.	55	1	“Row house (shophouse)” means a building constructed in a continuous row of two or more units, separated by shared walls and predominantly composed of fire-resistant materials.	

Table 8*Recommendations for Modernization*

Primary Challenges	Synthesis of Issues	Number of Comments				Proposed Solutions	Number of Comments			
		G1	G2	G3	Total		G1	G2	G3	Total
(1) Complexity	Certain provisions may be incomplete or insufficiently tailored to local contexts, with different buildings often subject to multiple legal instruments.	0	0	4	4	Develop a comprehensive legal handbook consolidating all building-related regulations into a single volume.	0	0	1	1
	Legal language is difficult to understand.	0	0	4	4	Present legal content with visual aids or graphics to explain details clearly.	1	0	0	1
	The building permit approval process is time-consuming for officials, who may be unable to thoroughly verify all regulatory details.	2	0	0	2	Provide clear handbooks, standardized application forms, and checklists for designers and owners to assist in self-verification.	0	4	0	4
						Integrate technologies, e.g., BIM.	4	0	0	4
						Review the building permit process to make it less complex and time-consuming.	3	0	0	3
						Involve third-party inspectors in the permit process.	2	0	0	2
(2) Inconsistency	Differences in legal interpretation.	7	7	3	17	Ensure coherence and consistency in the structure of building control legislation.	3	0	1	4
						Create a central information system to address inconsistencies in legal interpretation.	3	0	0	3
	Area and quantity calculations prescribed by law can result in under- or over-provision in actual building use, particularly due to varied interpretations.	4	2	8	14	Introduce performance-based approaches for specific calculations, such as parking requirements.	2	0	4	6
						Define non-overlapping local ordinance terms clearly.	0	0	1	1

Table 8 (Continued)

Primary Challenges	Synthesis of Issues	Number of Comments				Proposed Solutions	Number of Comments			
		G1	G2	G3	Total		G1	G2	G3	Total
(2) Inconsistency	Legal provisions often allow excessive discretion by government officials.	1	0	5	6	Establish standardized operational guidelines, such as manuals for officials and categorized checklists to support both officials and designers.	1	1	2	4
						Reduce or eliminate reliance on individual discretion by designers and inspectors.	1	0	0	1
	Some ministerial regulations are derived from BMA ordinances, leading to legal contradictions.	0	1	0	1	Amend BMA Ordinance B.E. 2544 with consideration of the city development plan.	2	3	0	5
(3) Redundancy	Many provisions in the BMA ordinance are redundant with relevant ministerial regulations.	1	0	0	1	Develop a checklist identifying which regulations should be revised or repealed.	1	0	0	1
						Consider evolving ordinance formats that are more advanced than current ministerial regulations.	1	0	0	1
(4) Obsolescence	Existing laws are outdated as building standards continue to evolve. Issues include obsolete definitions, unclear legislative intent, outdated building classifications, and rigid, inflexible regulations.	5	3	6	14	Update laws to reflect local conditions and contemporary realities.	3	3	0	6
						Enact laws that accommodate present-day innovations, such as automated parking systems.	5	0	0	5
						Ensure that the BMA Ordinance is flexible enough to suit the city's diverse character.	2	0	0	2
	Databases are not regularly updated and include, for example, old land title documents and district office procedural manuals.	6	2	2	10	Establish a centralized data system for the Bangkok Metropolitan Area.	3	4	1	8
						Introduce technological improvements, such as PDF, CAD, and BIM, particularly for large-scale developers.	0	0	6	6

Table 8 (Continued)

Primary Challenges	Synthesis of Issues	Number of Comments				Proposed Solutions	Number of Comments			
		G1	G2	G3	Total		G1	G2	G3	Total
(4) Obsolescence	The operational capacity of each district office should be determined based on the city's physical characteristics, the specific features of the area under its jurisdiction, and its available personnel.	0	3	0	3	Clearly define delegated responsibilities in accordance with staff capacity and qualifications.	0	3	0	3

Inconsistency

Participants highlighted the need for continuous legal review to determine which provisions require amendment or repeal to ensure consistency and avoid contradictions. In cases where practical implementation challenges arise, stakeholders called for clear procedural guidelines for both public users and government officials. A common issue identified was inconsistent discretionary interpretation by local officials across different districts. Therefore, it was recommended that a standardized legal interpretation guide be developed, accompanied by a detailed checklist organized by category to assist both officials and designers. This would help ensure consistent application of the law and reduce dependence on individual discretion.

Redundancy

As discussed earlier, overlapping provisions in various laws complicate interpretation. To address this, stakeholders recommended regular legal audits to identify provisions that require revision or elimination. This would help modernize the regulatory framework and improve clarity for users.

Obsolescence

Rapid advancements in construction standards and technologies have led to the emergence of new building types and innovative solutions. Accordingly, stakeholders recommended that laws be updated to accommodate these innovations. For example, regulations should be introduced to govern automatic parking systems, ensuring their safety and effective integration. Beyond legal updates, technology should also be adopted in procedural aspects. For instance, applications for building permits in Bangkok currently rely heavily on paper documentation. Participants suggested introducing digital submission formats such as PDF and AutoCAD files as a starting point, eventually integrating Building Information Modeling (BIM) into the system. BIM adoption would help various agencies verify the completeness of submitted information, reduce workload, and enhance interoperability throughout the application process.

In instances where prescriptive regulations are no longer appropriate for certain building types or urban contexts, stakeholders proposed adopting performance-based regulations. Given Bangkok's diverse urban landscape, performance-based provisions could introduce flexibility and adaptability to meet specific project needs. This approach would be particularly beneficial for requirements like calculating stairwell dimensions based on occupancy load or determining the number of parking spaces. Furthermore, participants emphasized the need to modernize land use databases (e.g., land titles and road width records) and improve inter-agency data integration. Equally important is the development of updated technical knowledge and the continuous capacity-building of personnel across all sectors to keep pace with evolving regulations in an increasingly technological era.

DISCUSSION

The preceding analysis identifies four primary challenges inherent in Bangkok's prescriptive-based building regulatory framework and, drawing from the in-depth insights of practitioners and scholars, proposes corresponding pathways for modernization.

- First, complexity stems from fragmented and overly detailed legal texts that require interpretation across multiple documents. This reflects broader concerns raised in the literature, where scholars including McLean (2004) and Shapiro (2016) argue that overly codified systems can hinder usability and compliance. To address this, respondents proposed restructuring the legal framework to improve clarity, particularly for universally applicable categories like safety, supported by visuals or structured guides.

- Second, interpretive inconsistency arises from conflicting definitions and overlapping mandates between BMA Ordinance B.E. 2544 and ministerial regulations. Frequent national-level revisions exacerbate this gap. This mirrors findings from Meacham et al. (2005), who identified inconsistent expectations and enforcement variability as major limitations. The experts thus recommended regular legal reviews, clear interpretive guidelines, and standardized procedures to reduce discretion in enforcement.

- Third, redundancy results from overlapping provisions intended to ensure coverage, leading to multiple laws addressing the same issue. This challenge is consistent with Porter and Linde's (1995) argument that excessive regulation can reduce efficiency and stifle competitiveness. This could be resolved by consolidating regulations and retaining only necessary provisions, thereby streamlining the legal landscape.

- Fourth, obsolescence reflects the inability of outdated rules to accommodate new technologies, urban conditions, and investment realities. This aligns with global experiences documented by Meacham (2010) and Visscher and Meijer (2007), where static regulations failed to keep pace with construction innovation. Stakeholders suggest routine updates, a dedicated oversight body, and greater flexibility, such as incorporating performance-based approaches in some areas.

The findings also emphasize that neither prescriptive nor performance-based regulation is inherently superior. The suitability of each approach depends on contextual factors such as institutional capacity, enforcement capability, and socio-cultural norms. As such, reform efforts should not aim to replace one model with another entirely. Instead, a more pragmatic and effective strategy lies in incrementally refining prescriptive regulations while selectively incorporating performance-based elements. This hybrid system enables stakeholders to balance innovation with safety by selecting approaches suited to specific project needs. This study reinforces Meacham's (2016) assertion that the choice of regulatory model should reflect institutional capacity and local context. A well-designed hybrid model allows regulatory systems to remain context-sensitive, technically robust, and adaptable to both current demands and future challenges.

This study offers both academic and practical contributions. Academically, it identifies and organizes the key challenges of prescriptive-based building regulations into four core categories: complexity, inconsistency, redundancy, and obsolescence. These findings form a foundational analytical framework that can guide future research on regulatory challenges in urban construction governance. This framework is especially valuable for studies in developing

countries, where data on regulatory performance remains limited and fragmented. Practically, the research provides empirical insights that can support policy reform and regulatory improvement efforts in Bangkok. The identified issues and proposed solutions offer a roadmap for modernizing prescriptive-based codes, making them more efficient, coherent, and responsive to current technological, economic, and urban development needs. This evidence-based guidance is particularly relevant for local authorities, planners, and legislators seeking to enhance the effectiveness of building control systems in rapidly urbanizing contexts.

Nevertheless, several limitations should be acknowledged. This study is based primarily on stakeholder interviews that capture perceptions of the challenges and potential solutions related to building control regulations in Bangkok. While the findings provide valuable insight, they reflect only the views of selected groups and have not yet been tested or validated through broader implementation or engagement with other stakeholder groups. Moreover, the research is context-specific, focusing exclusively on the regulatory environment of Bangkok. As such, its applicability to other cities or regions, particularly those with different institutional or socio-economic contexts, may be limited.

CONCLUSION

Rapid advancements in construction technologies have led many countries to shift from prescriptive-based to performance-based regulatory models. However, rather than favoring one model over the other, this study advocates for a hybrid approach that combines the strengths of both. Such an approach is especially suitable for Bangkok and comparable developing urban contexts. Although prescriptive-based regulations present four key challenges: (1) complexity, due to their highly textual, fragmented, and interpretation-dependent nature; (2) inconsistency, stemming from conflicting definitions and overlapping legal instruments; (3) redundancy, where multiple provisions regulate the same issue unnecessarily; and (4) obsolescence, with outdated provisions misaligned with contemporary urban, economic,

and technological realities, the solution lies not in discarding this model but in improving it. This includes simplifying legal structures to enhance clarity and enforceability, conducting regular reviews to resolve contradictions, removing duplicative rules, and continuously updating provisions to remain responsive to evolving needs. At the same time, incorporating performance-based elements can increase regulatory flexibility, foster innovation, and allow for adaptation to diverse project conditions.

For academics, this research contributes a practical framework for analyzing regulatory barriers and paves the way for future research on the hybrid regulatory approach. For authorities, the findings offer concrete pathways for legal modernization, capacity-building, and policy experimentation to support more efficient and future-ready urban development.

Future research is recommended to empirically test proposed reforms, such as visual legal tools, consolidated codes, and hybrid performance standards, through pilot programs or policy trials. Comparative studies in other rapidly urbanizing cities, especially in developing countries, could validate findings and reveal context-specific insights. Assessing municipal agencies' capacity, including personnel, technology, and coordination, will clarify readiness for regulatory change. Research should also examine how diverse stakeholders, such as small developers and local officials, experience regulatory clarity and usability. Studies on the impact of hybrid models should measure outcomes like cost, approval timelines, and safety. Further exploration into harmonizing local and national laws could reduce legal fragmentation. In addition, future studies are encouraged to investigate the relationship between building control regulations and broader planning instruments to better understand the regulatory alignment between building-level codes and urban-scale planning policies. Finally, inclusive engagement strategies and cost-benefit analyses would support more effective and trusted regulatory transitions.

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