

Article

Building Complete Streets in China: An Assessment of Local Urban Street Design Guidelines

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Abstract

Recognizing the negative consequences of auto-oriented urban transportation, Chinese cities began developing Urban Street Design Guidelines (USDGs) in 2016. The literature on urban transportation design from a decision-making perspective is very limited. As the first systematic evaluation of the pioneering effort by cities in China, this study analyzes local USDG documents and interviews key practitioner stakeholders from ten large cities by adapting a leading policy evaluation tool of urban street design for sustainable transportation based on the Complete Streets Policy Framework. A total of 11 USDGs adopted between 2016 and 2020 were evaluated to represent the wide range of urban contexts in China. The evaluation revealed an average performance of only 30.9% of the total possible score. Despite strong aspirations, local USDGs face significant implementation challenges, lack consideration of disadvantaged communities, and need clarify modal priorities in diverse contexts. Targeted improvements could contribute to more effective and sustainable urban street building and management in China's cities. As an ex-ante assessment, this study provides a key reference for the future analyses of the outcomes of local USDGs.

Keywords: Urban Street Design Guidelines; Complete Streets; transportation planning; policy evaluation; China



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1. Introduction

Urban transportation planning often prioritizes automobile mobility, which causes congestion, pollution, accidents and unequal accessibility, threatening urban livability and sustainability [1,2]. The Complete Streets approach advocates safety, comfort, and accessibility for all road users, regardless of age, physical ability, or mode used [3,4]. Complete Streets principles have been translated into concrete policy frameworks to create more inclusive and balanced transportation networks [5], playing a crucial role in coordinating transportation planning efforts, fostering a shared understanding of urban mobility goals among policymakers, planners, and stakeholders [6]. Over 1000 agencies at the local, regional, and state levels in the U.S. have adopted the Complete Streets approach [7].

The Complete Streets concept started in the mid-2000s as a safety-oriented approach to multimodal road infrastructure provision. A complete street is “a road designed to ensure safety for drivers, bicyclists, transit vehicles and their users, and pedestrians of all ages and abilities” [3] (p. 24), with multimodal safety as a priority [8,9]. Typical street design elements include sidewalks, bicycle lanes, bus lanes, pedestrian crossings, curb extensions, median islands, accessible transit stops, etc. [10]. Over time, the Complete Streets concept has evolved into a policy tool promoting not just multimodal mobility, but environmental

and social equity and urban livability goals [11]. Particular emphases include context-sensitive designs aligning with local needs and user preferences [12] and policies designed to correct longstanding inequities in the transportation system [13]. Developed by the National Complete Streets Coalition (NCSC), the Complete Streets Policy Framework (revised in 2018) represents the current best practices for creating a strong policy that can be implemented at any level of governance, widely adopted for translating the Complete Streets concept into actionable policies and design strategies [4].

There have been just a few evaluations of Complete Streets policies [2,7]. Gregg and Hess [14] apply a content analysis approach to local Complete Streets policies across the U.S. They categorize 113 policies into seven types and examine such aspects as the legal status of policy, the exceptions within policy, and the trade-offs among different users/modes. Their analysis identifies major policy shortcomings including weak legal foundation, unclear and varied definitions of complete streets, inadequate guidance on balancing trade-offs between different user groups, and a lack of specific operational guidelines. These weaknesses lead to implementation challenges such as inconsistent enforcement across jurisdictions, difficulties in adapting to diverse contexts, conflicting priorities between modes of transport, and unclear implementation procedure. Bian and Tolford [7] evaluate Louisiana state transportation agency's progress toward the adopted Complete Streets policy goals by reviewing state agency documents and state-funded projects during 2011–2020. Acknowledging progress made after 2010, the study highlights the challenge of shifting agency culture to balance multimodal needs and recommends continued development of design guidance to fit a variety of contexts. Vandegrift and Zanoni [15] conduct perhaps the only quantitative impact evaluation of local Complete Streets policies. Examining local jurisdictions in the states of New Jersey and New York, they find that Complete Streets policy adoption has no effect on home price, indicating no significant amenity value from a municipality-level commitment to Complete Streets. However, it is unclear whether their finding is due to low values that residents attach to street design changes, the high costs of design changes associated with Complete Streets, planners or public works departments that ignore the Complete Streets policy, or the low frequency of road construction projects. Delbosc et al. [16] compare the Australian SmartRoads framework with the Complete Streets approach, both promoting multimodal road transportation. While the SmartRoads framework does not explicitly refer to equity, it offers formal guidance on implementing multimodal level of service planning, including specific procedures such as classifying roads, prioritizing modes, and developing/accessing options for road design and operational improvements.

Most existing studies assess policy quality and implementation by analyzing the contents of policy documents. Adopting the Complete Streets Policy Framework, the Complete Streets Policy Evaluation Tool (CSPET), updated by the National Complete Streets Coalition (NCSC) in 2023, provides a standardized and structured approach for evaluating Complete Streets policies across different jurisdictions, such as those applied by Smart Growth America and the National Complete Streets Coalition [4,13,17].

Drawing on these international experiences, this study turns to the Chinese context, where rapid urbanization and motorization over the past decades have influenced transport planning and design, with infrastructure expansion reinforcing private vehicle dependence [18]. China experienced rapid motorization in recent decades, causing severe traffic and environmental problems [19]. Recognizing the negative impacts of auto-oriented urban development, Chinese cities have begun developing local Urban Street Design Guidelines (USDGs) to promote multimodal and inclusive urban streets [20]. While most local USDGs do not refer to “complete streets” as the goal, they share considerable similarities with the Complete Streets policies in scope, emphasis, and approach. Shanghai adopted

the first USDG in 2016, followed quickly by a number of large cities or urban districts. The local USDGs guide cities in street design, multimodal planning, and pedestrian-friendly development, aligning with the core Complete Streets principles without referencing the term directly. Such USDGs are developed by technical specialists, often modeled after Western Complete Streets policies and design principles [21]. As of 2021, more than two dozen cities in China are known to have adopted USDGs. Little research has been conducted to understand the content, feasibility, and/or impacts of these USDGs or local street design policies generally in China. In general, existing policy and planning studies of Complete Streets or urban street design policies are few in number and mostly limited to the U.S. context. Meanwhile, studies on China's urban transportation planning tend to overlook the mobility of the elderly and the disabled [22]. Employing a systematic policy evaluation framework to analyze the recently emerged local USDGs in China could help address the research gaps.

Adapting the Complete Streets Policy Evaluation Tool (CSPET) to the Chinese context, this study systematically evaluates 11 USDGs from 10 Chinese cities completed between 2016 and 2020 to identify major strengths and weaknesses. Targeted interviews with key policymakers and practitioners involved in developing the USDGs provide further clues of underlying policy dynamics and the potential contributors to identified issues. The results reveal that while local USDGs demonstrate strong commitment and clear vision, they face considerable implementation barriers and lack equity considerations, particularly for underinvested and underserved communities. The study suggests targeted policy improvements, including establishing clearer implementation procedures with interagency coordination, embedding equity considerations into design and funding decisions, and developing measurable performance indicators to monitor progress.

This study contributes to the existing literature in three ways. First, it provides the first systematic policy evaluation of local USDGs in China, offering an institutional lens on how the Complete Streets concept is localized in a non-Western context. Second, it adapts a structured scoring and qualitative assessment framework for future policy evaluation in urban design and transport governance. Third, it advances the global discussion on sustainable street design by bridging policy analysis and implementation practice in its context, thereby enriching comparative research in urban design, transportation planning, and sustainability.

The remainder of this article is structured as follows. Section 2 introduces the adapted evaluation tool. Section 3 outlines the methods used for the USDG assessment and practitioner interviews. The results of the assessment and interviews are presented in Section 4. Section 5 discusses the results, and Section 6 concludes the study with policy suggestions and future research directions.

2. Adapting the CSPET to China

Developed and refined by the National Complete Streets Coalition (NCSC), the Complete Streets Policy Framework (CSPF) provides a comprehensive and structured approach for safe, inclusive, and sustainable streets as part of transportation network and urban space [13]. According to the CSPF, an ideal Complete Streets policy includes the following ten elements:

1. Establishes commitment and vision.
2. Prioritizes underinvested and underserved communities.
3. Applies to all projects and phases.
4. Allows only clear exceptions.
5. Mandates coordination.
6. Adopts excellent design guidance.

7. Requires proactive land-use planning.
8. Measures progress.
9. Sets criteria for choosing projects.
10. Creates a plan for implementation.

The Complete Streets Policy Evaluation Tool (CSPET) operationalizes the CSPF to assess local Complete Streets policies. As the “go-to policy framework” for any community looking to develop or refine its street policies [13], the CSPET assigns weights to the ten CSPF elements and further specifies clearly defined sub-elements and corresponding scoring criteria, enabling the systematic assessment of local policies. Local practitioners and stakeholders can easily identify strengths and areas to improve their Complete Streets policies.

Informed by the existing evaluations of Complete Streets policies, this study adapts the CSPET to the Chinese context for a structural evaluation of the local USDGs in China. First, the modified tool only evaluates policies at a single level of government—China’s local governance structure does not feature the jurisdictional fragmentation often observed within an American metropolitan area [19]. Second, without changing the distribution of potential points across (sub)elements, a scoring criterion (policy requires the priority of pedestrians and bicycles: 1 point) is added to sub-element #3e to reflect the common modal structure in Chinese urban transportation. Third, ‘Complete Streets’ are replaced with ‘USDG’ or similar phrases.

3. Methodology

This study employs a two-stage analysis approach that combines document review and semi-structured interviews to holistically understand local USDGs within the Chinese context. The first stage involves content analysis of the local USDGs and a scoring process to assess how well the guidelines align with the ten elements of the Complete Streets Policy Framework (CSPF). Document review has been widely recognized as a qualitative approach for policy evaluation by revealing policy goals, content, and process in specific policy contexts. In transportation governance, document review has been used to examine project development and delivery processes, offering insight into how agencies translate policy principles into practice [7]. Indeed, two of the most direct and influential applications of this approach can be found in Smart Growth America’s 2023 [13] and 2025 Best Complete Streets Policies reports [17], which apply similar document-based and scoring frameworks to assess institutional performance and policy effectiveness. The present study uses a document review of local USDGs to evaluate the alignment between policy design and broader governance frameworks for sustainable street development. Following the review of local policy documents, the second stage consists of a semi-structured interview analysis, providing a more nuanced understanding of the underlying institutional factors behind local policy strengths and weaknesses.

3.1. Sample USDGs

A list of 32 candidate local design guidelines related to urban streets between 2016 and 2021 is assembled based on Ma, Wei, and Ren [23]. A total of 11 USDGs from 10 cities (see Table 1) enter the research sample by meeting the below criteria: (1) being a detailed urban street design policy instead of a minor component of a city plan/design guideline; (2) issued or endorsed by recognized public authorities such as a local governmental agency; and (3) publicly available. The sample guidelines represent a diverse range of spatial scales, regional background, and administrative levels (including provincial-level cities, provincial capitals, prefecture-level cities and urban districts), although all of them are from large

cities and the majority are on the east coast of China. Table A2 summarizes the detailed sample selection process.

Table 1. Sample USDGs.

District/City	Province	Policy Name	Year
Shanghai (SH)	Shanghai	Shanghai Street Design Guidelines	2016
Nanjing (NJ)	Jiangsu	Nanjing Street Design Guidelines	2017
Kunming (KM)	Yunnan	Kunming Street Design Guidelines	2017
Beijing (BJ)	Beijing	Urban Design Guidelines for Beijing Street Regeneration and Governance	2018
Luohu District, Shenzhen (LH, SZ)	Guangdong	Luohu Complete Streets Design Manual	2018
Guangzhou (GZ)	Guangdong	Guangzhou Complete Street Design Manual	2018
Wuhan (WH)	Hubei	Wuhan Street Planning and Design Guidelines	2019
Foshan (FS)	Guangdong	Foshan Street Design Guidelines	2019
Chengdu (CD)	Sichuan	Chengdu Street Integration Design Guidelines for Building a Park City	2020
Xi'an (XA)	Shaanxi	Xi'an Street Design Guidelines	2020
Fudian District, Shenzhen (FT, SZ)	Guangdong	Shenzhen Futian Street Design Guidelines	2020

Sources: Chengdu Street Integration Design Guidelines for Building a Park City (2019) Available at: http://mpnr.chengdu.gov.cn//ghhrzyj/sjwj/2020-07/07/content_4abd7e9a64dd4deba9d30e8102c18eec.shtml (Accessed: 31 July 2023). Guangzhou Municipal Housing and Urban-Rural Development Committee; Guangzhou Urban Planning & Design Survey Research Institute; Hu, F.; Xu, H.; Lai, Y. *Guangzhou Complete Street Design Manual*; China Architecture & Building Press: Beijing, China, 2018; ISBN 978-7-112-21949-0. Kunming Street Design Guidelines (2017) Kunming Urban Planning & Design Institute Co., Ltd. (Received: 31 July 2023). Foshan Street Design Guidelines (2019) Available at: https://fszrzy.foshan.gov.cn/ywzt/cxgh/phgg/content/post_762668.html (Accessed: 31 July 2023). Nanjing Street Design guidelines (2017) Available at: http://ghj.nanjing.gov.cn/ghbz/cssj/201802/t20180208_875978.html (Accessed: 31 July 2023). Shanghai Planning and Land Resource Administration Bureau; Shanghai Municipal Transportation Commission; Shanghai Urban Planning and Design Research Institute, Eds. *Shanghai Street Design Guidelines*; Tongji University Press: Shanghai, China, 2016; ISBN 978-7-5608-6567-6. Shenzhen Futian District Street Design Guideline (Draft) (2019) Available at: http://www.szft.gov.cn/wlwz/zjzt/content/post_7260712.html (Accessed: 31 July 2023). Shenzhen Luohu District Urban Management Bureau; Shenzhen Urban Transport Planning and Design Institute, Eds. *Shenzhen Luohu District Complete Street Design Manual*; Tongji University Press: Shanghai, China, 2018; ISBN 978-7-5608-8073-0. Urban Design Guidelines for Beijing Street Regeneration and Governance (2018) Available at: http://ghzrzyw.beijing.gov.cn/biaozhunganli/bz/cxgh/202106/t20210623_2419742.html (Accessed: 31 July 2023). Wuhan Street Planning and Design Guidelines (2019) Available at: https://zrzyhgh.wuhan.gov.cn/zwgk_18/zcfgyjd/gtzy/202111/t20211126_1860372.shtml (Accessed: 31 July 2023). Xi'an Street Design Guidelines (2020) Available at: <http://zygh.xa.gov.cn/ywypd/cxghgsbg/ghgsbg/5e240179f99d65775042c415.html> (Accessed: 8 Nov 2023).

3.2. Document Review

While the local USDGs vary in how contents are organized, the sample USDGs share six common thematic components: introduction, general principles, street classification, detailed design guidelines, implementation strategies, and references. The introductory section typically outlines the background, mission, and vision of street planning, whereas the general principles explain the core design philosophy. The street classification section categorizes urban road types based on user needs, with the detailed design guidelines provide specific recommendations for urban streetscapes. Implementation strategies specify how policies should carry out, and the reference section lists relevant laws, regulations, and planning frameworks.

The local USDGs are reviewed in two steps: overview of elements and sub-element scoring. The first step matches the content of local USDGs with each of the ten overarching elements of the CSPF. The second step evaluates the detailed content corresponding to the 32 sub-elements. Local policies are assessed against the modified CSPET criteria in

Table A1. Also noted are qualitative observations capturing nuances in the local USDGs' alignment with the CSPF principles that are not fully reflected by numerical scores.

3.3. Semi-Structured Interviews

Following the document review and scoring, semi-structured interviews of practitioners are conducted. Both individual interviews and focus group discussions are used to capture the interviewees' diverse experiences and perspectives, providing insights into the local motivations, policy challenges, practical constraints, key decision-making factors, and potential areas of improvement. The use of open-ended and non-leading interview questions allow participants to freely express their perspectives without being influenced by the wording of questions.

The selection of interview participants was guided by both strategical relevance as well as feasibility. First, four cities were chosen to include the earliest adopter (Shanghai) and cities with relatively high (Kunming) and medium-to-low (Chengdu and Xi'an) scores in evaluation. Second, interviewees were selected to reflect the diversity in participant roles including urban planners, policymakers, and implementers directly involved in the creation or execution of the sampled USDGs. In the end, a total of eight practitioners possessing first-hand knowledge of USDG formulation and implementation were interviewed. All interviewees are fully informed about the study's objectives and have provided their voluntary consent. To ensure confidentiality, each participant is assigned a pseudonym (e.g., 'Practitioner 1' is referred to as 'P1' throughout the study).

Listed in Table 2, interview questions are designed based on the findings of document review and scoring, focusing especially on elements with high or low scores, such as Elements #1 (commitment and vision), #2 (equity considerations), #6 (design standards) and #10 (implementation planning). An additional question (Q6) examines potential conflicts between national regulations and local USDG principles, investigating whether regulatory frameworks support or constrain the effectiveness of local USDGs.

Table 2. Interview questions.

Background and status of the USDG	Q1. Could you please share the initial intention of the city (district) to develop the USDG? Q2. What departments were involved in the development of the USDG? Q3. Has the USDG been adopted as a local regulation and become legally binding? Q4. What is the status of the implementation of the USDG? Is it used to guide planning/design, management and construction in practice?
Policy learning	Q5. In the process of developing the Guidelines, besides relevant laws, rules and regulations, what other domestic or international knowledge/best practice (e.g., theories, policies or standards) were used as reference? Which reference had the greatest impact on the development of the Guidelines?
Relation to existing regulations and standards	Q6. Did the existing relevant regulations and technical standards help or limit in the development of the Guidelines?
Equity considerations	Q7. Do the Guidelines specify prioritized areas/communities? Q8. Do the Guidelines give specific consideration and emphasis of equity (e.g., 'prioritizing underinvested and underserved communities', 'disadvantaged communities and populations')?
Deficiencies and suggestions	Q9. Are there any plans to update the Guidelines? Q10. If the Guidelines are updated, what improvements would you like to see?

4. Results

4.1. Strengths and Weaknesses

Table 3 provides an overview of the performance scores and average performance percentages (the sample mean points relative to the total available points) of the local

USDGs by element, with further detailed performance by sub-element in Table A3. Overall, all sampled USDGs have a total score below 50 points, with an average performance percentage of 30.9% suggesting substantial room for improvement. While this study focuses primarily on identifying overall policy patterns and structural issues shared across local USDGs, substantial variations across cities do exist, with a high of 49 (Kunming) and low of 9 points (Guangzhou). Nevertheless, there do not seem to be any correlations between scores and size of city / district, level of economic development, or year of completion.

Table 3. Local USDG scores and average performance percentages by element.

City/District	Province	Year	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	Total
Points available			12	9	10	8	8	7	10	13	8	15	100
SH	Shanghai	2016	8	0	2	4	3	5	5	3	1	2	33
NJ	Jiangsu	2017	11	0	5	2	5	5	7	3	0	1	39
KM	Yunnan	2017	9	0	4	4	5	5	7	5	5	5	49
BJ	Beijing	2018	10	0	4	2	3	5	6	5	0	2	37
LH, SZ	Guangdong	2018	10	0	8	2	1	5	2	2	1	3	34
GZ	Guangdong	2019	8	0	0	0	0	1	0	0	0	0	9
WH	Hubei	2019	9	0	2	0	0	1	1	0	0	0	13
FS	Guangdong	2019	12	0	10	2	5	5	1	2	5	1	43
CD	Sichuan	2020	12	0	2	0	1	5	8	0	0	1	29
XA	Shaanxi	2020	7	0	8	0	1	1	1	4	0	1	23
FT, SZ	Guangdong	2020	8	0	8	2	1	5	1	0	0	0	25
Average point			9.5	0.0	4.8	1.6	2.3	3.9	3.5	2.2	1.1	1.5	30.9
Average performance percentage (%)			78.8	0.0	48.2	20.5	28.4	55.8	35.5	16.8	13.6	9.7	30.9

Notes: #1 through #10 refer to the ten elements of the CSPF (see Section 3).

Most sampled local USDGs have clear commitment and vision (Element #1), with an average performance percentage of 78.8%. Local guidelines explicitly include considerations for pedestrians, non-motorized vehicles, and public transit in their street classification and design guidance sections. Local USDGs' strong commitment and clear vision seem related to policy learning. The interviewees generally agree that knowledge shared by international organizations (through direct collaboration sometimes) and notable domestic early adopters (e.g., Shanghai) have a significant impact on their development of street design guidelines. Interviewees (P1, P3, P4, P7, P8) acknowledge that planners now generally recognize streets as spaces for human activity, not just vehicular movement. Additionally, major events, such as the 14th National Games in Xi'an, help create momentum and catalyze policy development.

On the other hand, performance is low for a number of elements related to implementation and vertical equity. Scores on policy exceptions (Element #4), coordination (Element #5), and land-use planning (Element #7) all average 20–30%. More severe deficiencies are found in performance measurement (Element #8), funding prioritization (Element #9a), and implementation planning (Element #10). In particular, the consideration and prioritization of underinvested and underserved communities (Elements #2 and #9b) is completely neglected by all cities.

4.2. Equal Treatment vs. Equity

Without dedicated policy mechanisms, transportation planning tends to favor already well-served urban areas, exacerbating disparities [24]. Our assessment of the local

USDGs suggest that equity is insufficiently addressed, with 10 out of 14 equity-related sub-elements on average scoring below 20%, especially when it comes to underinvested and underserved communities.

A few sampled USDGs—such as those of Beijing, Luohu, Foshan, and Chengdu—explicitly acknowledge equity (#1d). But the majority fail to incorporate equity considerations, particularly regarding funding allocation and accessibility improvement in underprivileged communities. The lack of transparency in policy assessments (#8e, #8f) further indicates a gap in engaging communities in transportation decision-making. According to interviewees (P1, P3, P4, P7), the missing consideration of underinvested and underserved communities arises from an overreliance on uniform policy application, mistakenly equating unified standards with equity. In other words, local USDGs are assuming equal treatment sufficiently addresses equity concerns, without recognizing the distinct history, status, and needs of underprivileged communities.

Interviews with the practitioners further suggest a significant variation in the understanding of equity among those involved in developing local USDGs. Some consider unified guidelines as sufficient, some believe that more general policies such as urban renewal plans are more suitable for addressing equity concerns, yet others argue that specific attention in design and implementation could be paid to inclusivity and equity, but there is no need to state equity as a principle. As a result, the local USDGs focus primarily on equal treatment instead of vertically equitable distribution of resources.

Many disadvantaged groups, such as the poor, the elderly, and the disabled, tend to rely more on active modes and shoulder heavier safety and health burdens, especially in underinvested and underserved communities. For example, decades of underinvestment in infrastructure for active modes contributes to thousands of deaths every year on America's roads [25]. The absence of targeted measures for disadvantaged neighborhoods and populations raises concerns about local USDGs' ability to effectively bridge urban accessibility gaps, which could reinforce instead of reducing socio-economic disparities.

4.3. Feasibility Challenges

A policy's success is ultimately determined by its feasibility, which refers to the practical implement of policy design, provision, and evaluation [26]. Effective transportation policies must include clear procedural guidelines, accountability mechanisms, and interdepartmental coordination [27]. However, the local USDGs face significant barriers in turning policy vision into reality due to the lack of clear procedures and mechanisms ensuring accountability and interagency cooperation.

While the sampled USDGs articulated the benefits of street design policies well (#1c: 100%), the 0% performance in sub-elements related to granting exceptions (4c), time frame of implementation (6b), and performance measures (8d, 8e, and 8f) highlights the lack of clear procedural guidelines for enforcement. Some interviewees (P1, P3, P7, P8) note that in reality the local USDGs function primarily as advisory guidelines—government departments other than the planning agencies, such as transportation and municipal services, engage in the development of local USDGs but not much further into enforcement. The lack of clarity in the guidelines also results in difficulty in interpretation (translating guidelines to practical measures) and inconsistent application, weakening the ability to achieve intended policy outcomes.

Interviews further reveal a lack of mechanisms ensuring interagency coordination. USDGs involve multiple governmental agencies, which differ in responsibility, objective and work style, and often disagree on implementation, causing inconsistencies in policy adherence. In particular, urban planning and transportation departments tend to disagree on street design priorities. Similarly to the tensions documented elsewhere [28], planners advocate for pedestrian-prioritized designs, while transportation officials are used to focus

on traffic efficiency (often guided by existing transportation design standards), leading to disputes over measures like reducing motor vehicle-turning radii at intersections (P1, P2, P8). As a result, some key safety and accessibility guidelines often remain unimplemented.

5. Discussion

The results of this study are consistent with findings from a range of international evaluations of Complete Streets and multimodal transport policies. Gregg and Hess [14] as well as Bian and Tolford [7] point out that persistent implementation gaps, fragmented interdepartmental coordination, and weak accountability mechanisms have continued to undermine the effectiveness of such policies. Delbosc et al. [16] reach similar conclusions, observing that even when design principles are relatively mature, translating them into everyday practice remains highly challenging. Recent Best Complete Streets Policies reports released by Smart Growth America (SGA) and the National Complete Streets Coalition (NCSC) highlight some of the same problems again. The 2025 edition [17] shows that the average score of the top ten local policies in the United States dropped from 89 points in 2023 to 79 points in 2025. According to the report, this decline primarily results from insufficient attention to underinvested communities and the lack of well-defined implementation mechanisms (Framework Elements #2, #9, and #10). In other words, equity and enforcement remain long-standing challenges in the US context. The parallels between these international studies and the findings of this research are striking, reflecting structural tensions between policy aspirations and administrative capacity common to different governance and planning systems.

In both Western and Chinese contexts, the key issue lies not in the shortage of technical expertise but in the absence of institutional mechanisms capable of coordinating agencies, allocating responsibilities, and sustaining long-term policy implementation. From a broader theoretical perspective, these observations reaffirm an essential point: the advancement of sustainable urban transport depends not just on physical and design interventions, but on the integration and coherence of public governance systems.

6. Conclusions

A number of Chinese cities have pioneered the shift from auto-oriented roads to multimodal accessibility by developing Urban Street Design Guidelines consistent with the Complete Streets principles. The technical and policy effectiveness of these guidelines remain largely unknown to the broader planning, transportation, and policy communities, as well as academics. Combining content analysis with practitioner interviews, this study conducts a comprehensive evaluation of 11 local USDGs from large Chinese cities using a modified Complete Streets Policy Evaluation Tool (CSPET).

The evaluation provides critical insights into policy strengths and weaknesses, highlighting the importance of interagency collaboration, measurable implementation procedures, and long-term commitment to people-centered street design. The local USDGs in China share some similar traits with the Complete Streets policies in North America—challenges to implementation and modal prioritization in diverse contexts [7,14,28,29]. This is more pronounced in China, though, as local USDGs focus just on equal treatment and lack the consideration of disadvantaged communities, which reduces the guidelines' ability to address vertical equity in urban transportation and beyond. Methodologically, the adapted application of the US-based CSPET in China offers an example of policy assessment in non-Western contexts.

The findings of this study inform city leaders and policymakers as well as the transportation planners and designers of solutions addressing some critical gaps in current local USDGs. Targeted improvements such as context-specific and enforceable goals, clear implementation procedures with interagency coordination and accountability mechanisms,

as well as a built-in emphasis of vertical equity based on a more comprehensive understanding of equity, could bring about more effective urban street construction and management in China's cities. In addition to learning from state-of-the-art American Complete Streets practices, local USDGs can borrow the Australian SmartRoads framework's more structured methods to context-specific design, i.e., classifying roads and prioritizing modes at the network level [28].

Using document review and practitioner interviews, this study serves as an ex-ante assessment that examines the institutional and procedural dimensions of urban street design governance, aiming at enhancing urban transportation sustainability. While variations in USDG scores among cities are observed, this study focuses on the collective patterns instead of the sources of the variations. It would be desirable for future research to appraise the real-world impacts of local USDGs, potentially by comparing policy outcomes across cities, and linking policy effectiveness with local policy designs.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

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Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Modified Complete Streets Policy Evaluation Tool by Smart Growth America, publicly available at <https://smartgrowthamerica.org/complete-streets-policy-evaluation-tool/> (accessed on 1 August 2023).

Criteria			Points
Element #1—Establishes commitment and vision			12
1a	The policy is clear in intent, stating firmly the jurisdiction's commitment to the USDG, using "shall" or "must" language. This needs to be in the body of the legislation, not the "whereas" statement.	x	3
	<i>The policy states the jurisdiction "may" or "considers" the USDG in their transportation planning and decision-making processes.</i>	or	1
	<i>The policy language is indirect with regard to their intent to apply the USDG, using language such as, "consider the USDG's principles or elements."</i>	or	0
1b	Mentions the need to create a complete, connected network.	x	2
1c	Specifies at least one motivation or benefit of pursuing the goals of USDG.	x	2
1d	Specifies equity as an addition motivation or benefit of pursuing the goals of USDG.	x	1
1e	Specifies modes, with a base of four modes, two of which must be biking or walking.	x	4
	<i>Policy mentions fewer than four modes and/or omits biking or walking.</i>	or	0

Table A1. Cont.

Criteria			Points
Element #2—Prioritizes underinvested and underserved communities			9
2a	The policy establishes an accountable, measurable definition of priority groups or places. This definition may be quantitative (i.e., neighborhoods with X% of the population without access to a vehicle or where the median income is below a certain threshold) or qualitative (i.e., naming specific neighborhoods).	x	4
2b	The policy language requires the jurisdiction to “prioritize” underinvested and underserved communities. This could include neighborhoods with insufficient infrastructure or neighborhoods with a concentration of people who are disproportionately represented in traffic fatalities.	x	5
	<i>Policy states its intent to “benefit” people in the underinvested and underserved communities, as relevant to the jurisdiction.</i>	or	3
	<i>Policy mentions or considers any of the neighborhoods or users above.</i>	or	1
Element #3—Applies to all projects and phases			10
3a	Policy requires all new construction and reconstruction/retrofit projects to account for the needs of all modes of transportation and all users of the road network.	x	4
	<i>Policy considers or mentions these projects as opportunities to apply the policy.</i>	or	1
3b	Policy requires all maintenance projects and ongoing operations, such as resurfacing, repaving, restriping, rehabilitation, or other types of changes to the transportation system to account for the needs of all modes of transportation and all users of the road network.	x	4
	<i>Policy considers or mentions these projects as opportunities to apply the policy.</i>	or	1
3e	Policy specifies the need to provide accommodations for all modes of transportation to continue to use the road safely and efficiently during any construction or repair work that infringes on the right of way and/or sidewalk.	x	2
	Policy requires the priority of pedestrians and bicycles.	or	1
Element #4—Allows only clear exceptions			8
4a	Policy includes one or more of approved exceptions—and no others.	x	4
	<i>Policy includes any other exception, including those that weaken the policy.</i>	or	2
4b	Policy states who is responsible for approving exceptions.	x	2
4c	Policy requires public notice prior to granting an exception in some form. This could entail a public meeting or an online posting with opportunity for comment.	x	2
Element #5—Mandates coordination			8
5a	Policy requires private development projects to comply.	x	5
	<i>Policy mentions or encourages private development projects to follow the USDG.</i>	or	2
5c	Policy specifies a requirement for interagency coordination between various agencies such as public health, housing, planning, engineering, transportation, public works, city council, and/or mayor or executive office.	x	3
	<i>Policy mentions or encourages interagency coordination.</i>	or	1
Element #6—Adopts excellent design guidance			7
6a	Policy directs the adoption of specific, best state-of-the-practice design guidance and/or requires the development/revision of internal design policies and guides.	x	5
	<i>Policy references, but does not formally adopt specific, best state-of-the-practice design guidance.</i>	or	1
6b	Policy sets a specific time frame for implementation	x	2
Element #7—Requires proactive land-use planning			10
	Policy requires new or revised land use policies, plans, zoning ordinances, or other documents to specify how they will support and be supported by the community’s urban street design vision.	x	5
7a	<i>Policy requires new or revised transportation plans and/or design guidance to specify how transportation project will serve current and future land use, such as by defining streets based not just on transportation function but on the surrounding land use.</i>	or	4
	<i>Policy discusses the connection between land use and transportation or includes non-binding recommendation to integrate land use and transportation planning.</i>	or	2
	<i>Policy acknowledges land use as a factor related to transportation planning</i>	or	1
7c	Policy requires the consideration of the community context as a factor in decision-making.	x	3
	<i>Policy mentions community context as a potential factor in decision-making.</i>	or	1
7d	Policy specifies the need to mitigate unintended consequences such as involuntary displacement.	x	2
	<i>Policy acknowledges the possibility of unintended consequences.</i>	or	1

Table A1. Cont.

Criteria		Points
Element #8—Measures progress		13
8a	Policy establishes specific performance measures under multiple categories such as access, economy, environment, safety, and health.	x 3
	<i>Policy mentions measuring performance under multiple categories but does not establish specific measures.</i>	or 1
8b	Policy establishes specific performance measures for the implementation process such as tracking how well the public engagement process reaches underrepresented populations or updates to policies and documents.	x 2
	<i>Mentions measuring the implementation process but does not establish specific measures.</i>	or 1
8c	Policy embeds equity in performance measures by measuring disparities by income/race/vehicle access/language/etc. as relevant to the jurisdiction.	x 3
	<i>Policy mentions embedding equity in performance measures but is not specific about how data will be disaggregated.</i>	or 1
8d	Policy specifies a time frame for recurring collection of performance measures	x 2
8e	Policy requires performance measure to be released publicly.	x 2
8f	Policy assigns responsibility for collecting and publicizing performance measures to a specific individual/agency/committee	x 1
Element #9—Sets criteria for choosing projects		8
9a	Policy establishes specific criteria to encourage funding prioritization for USDG implementation.	x 5
	<i>Policy mentions revising project selection criteria to encourage USDG implementation.</i>	or 1
9b	Policy specifically addresses how equity will be embedded into project selection criteria.	x 3
Element #10—Creates a plan for implementation		15
10a	Policy requires that related procedures, plans, regulations, and other processes be revised within a specific time frame	x 3
	<i>Policy mentions revising procedures, plans, regulations, and other processes.</i>	or 1
10b	Policy requires workshops or other training opportunities for transportation staff. Policy is specific about the timing and/or participants for the training and workshops.	x 3
	<i>Policy mentions workshops or other training opportunities for transportation staff.</i>	or 1
10c	Policy assigns responsibility for implementation to a new or existing committee that includes both internal and external stakeholders that are representative of underinvested and vulnerable communities. Specific about which stakeholders are/will be represented on the committee.	x 3
	<i>Policy assigns oversight of implementation to a specific body that may not include internal and external stakeholders.</i>	or 1
10d	Policy creates a community engagement plan with specific strategies for who, when, and how they will approach public engagement in the project selection, design, and implementation process. Policy specifically addresses how the jurisdiction will overcome barriers to engagement for underrepresented communities.	x 6
	<i>Policy creates a community engagement plan with specific strategies for who, when, and how they will approach public engagement but does not address underrepresented communities.</i>	or 3
	<i>Policy mentions community engagement but does not go into detail about specific strategies.</i>	or 1

Note: This table is adapted from the original Complete Streets Policy Evaluation Tool. As explained in Section 2, this study adapts the CSPET to the Chinese context by (1) keeping the evaluation at the local level and eliminating the state level; (2) adding a scoring criterion (policy requires the priority of pedestrians and bicycles: 1 point) to sub-element #3e without changing the distribution of potential points across (sub)elements; and (3) replacing ‘Complete Streets’ with ‘USDG’ or similar phrases.

Table A2. USDG Sample Selection.

Administrative Rank	Location	USDG Name	Completion Year	Status	Relevant	Detailed	Available	Selected
Province	Yunnan Province	Guidelines for the Planning and Design of Urban Blocks in Yunnan Province	2017	C	-	○	-	○
Province-level city	Shanghai	Shanghai Street Design Guidelines	2016	C	●	●	●	●
	Beijing (Whole region)	Urban Design Guidelines for Beijing Street Regeneration and Governance	2018	C	●	●	●	●
	Beijing (Sub-center)	Urban Design Guidelines of Beijing Sub-center—Guidelines for Street Space Design	2018	C	●	○	-	○
	Beijing (Core area)	Guidelines for Street Design in the Core Area of Beijing	2017	C	●	○	-	○
	Beijing (Core area)	Management Guidelines for the Design of Environmental Improvement and Upgrading of Backstreets and Alleys in Core Area	2017	C	●	○	-	○
	Beijing (Core area)	Technical Guide for the Urban Design of Four Horizontal and Five Vertical Key Urban Streets in the Core Area	2017	U	●	○	-	○
	Beijing (Chaoyang District)	Chaoyang District Street Design Guidelines	2018	U	●	●	○	○
	Beijing (Dongcheng District)	Hundred Streets and Thousand Alleys- Ten Elements of Street Environment Improvement Design Guidelines	2017	U	●	●	○	○
	Beijing (Xicheng District)	Beijing Xicheng District Urban Design Guidelines	2018	U	○	-	-	-
	Beijing (Nanbei Chizi Street)	Planning for the Street Space Upgrading of Nanbei Chizi Street	2017	U	●	●	○	○
Provincial capital city	Nanjing (Whole region)	Najing Urban Street Design Guidelines (Trial)	2017	C	●	●	●	●
	Nanjing (Qinhuai District)	Qinhuai District Urban Street Design Guidelines	2018	C	●	●	○	○
	Wuhan (Whole region)	Wuhan Street Planning and Design Guidelines	2019	C	●	●	●	●
	Wuhan (Guanggu Center City Street)	Wuhan Guanggu Centre City Street Design Guidelines	-	U	-	○	-	○
	Changsha	Changsha City Road Image Improvement Design Guidelines	2016	C	○	-	-	
	Chengdu (Whole region)	Chengdu Street Integration Design Guidelines for Building A Park City	2019	C	●	●	●	●
	Chengdu (City Proper)	Technical guidelines for the Planning and Construction of Distinctive-featured streets in Chengdu City Proper	2018	C	●	○	-	○
	Kunming	Kunming Street Design Guidelines	2017	C	●	●	●	●
	Guangzhou	Guangzhou Street Full-Element Guidelines	2019	C	●	●	●	●

Table A2. Cont.

Administrative Rank	Location		USDG Name	Completion Year	Status	Relevant	Detailed	Available	Selected
Provincial capital city	Xi'an		Xi'an Street Design Guidelines	2020	C	●	●	●	●
	Xiamen		Xiamen Street Design Guidelines	2018	U	●	○	-	○
Sub-provincial level city	Shenzhen (Luohu District)		Luohu Complete Streets Design Manual	2018	C	●	●	●	●
	Shenzhen (Futian District)		Shenzhen Futian Street Design Guide	2020	C	●	●	●	●
	Qingdao		Qingdao Street Design Guidelines	2020	C	●	●	○	○
Prefecture-level city	Suzhou		Suzhou Street Design Guidelines	2020	O	●	○	-	○
	Foshan		Foshan Street Design Guidelines	2019	C	●	●	●	●
	Yuxi		Yuxi City Proper Exquisite Street Design Guidelines	2018	C	●	●	-	○
	Wenzhou		Wenzhou Street Design Guidelines	2018	U	●	○	-	○
	Shaoxing (Shangyu District)		Shangyu District Street Planning and Design Guidelines	2018	U	●	○	-	○
	Zhuzhou		Zhuzhou Street Design Guidelines	2017	C	●	○	-	○
	Baoding		Xiongan Complete Streets Design Guidelines	2020	O	●	●	○	○

Note: ‘●’ indicates that the USDG meets the specified criterion, ‘○’ indicates that the USDG does not meet the specified criterion, and ‘-’ represents the unavailability of data or non-applicability. In the ‘Status’ column, ‘C’ stands for ‘completed’, ‘U’ stands for ‘unverified’, and ‘O’ stands for ‘Ongoing’. Source: the list of street design guidelines comes from [23].

Table A3. Local USDG Scores and Average Performance Percentages by Sub-Element.

City/District	#1					#2		#3			#4			#5		#6		#7			#8						#9		#10				Total Score
Points available	12					9		10			8			8		7		10			13						8		15				100
	1a	1b	1c	1d	1e	2a	2b	3a	3b	3e	4a	4b	4c	5a	5c	6a	6b	7a	7c	7d	8a	8b	8c	8d	8e	8f	9a	9b	10a	10b	10c	10d	
	3	2	2	1	4	4	5	4	4	2	4	2	2	5	3	5	2	5	3	2	3	2	3	2	2	1	5	3	3	3	3	6	
SH	8					0		2			4			3		5		5			3						1		2				33
	0	2	2	0	4	0	0	1	1	0	4	0	0	2	1	5	0	2	3	0	1	2	0	0	0	0	1	0	1	0	0	1	
NJ	11					0		5			2			5		5		7			3						0		1				39
	3	2	2	0	4	0	0	4	1	0	2	0	0	2	3	5	0	4	3	0	3	0	0	0	0	0	0	0	0	0	0	1	
KM	9					0		4			4			5		5		7			5						5		5				49
	1	2	2	0	4	0	0	1	1	2	2	2	0	2	3	5	0	4	3	0	3	2	0	0	0	0	5	0	1	0	1	3	
BJ	10					0		4			2			3		5		6			5						0		2				37
	1	2	2	1	4	0	0	4	0	0	2	0	0	0	3	5	0	4	2	0	3	1	1	0	0	0	0	0	0	0	1	0	1
LH, SZ	10					0		8			2			1		5		2			2						1		3				34
	1	2	2	1	4	0	0	4	4	0	2	0	0	0	1	5	0	2	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0

Table A3. *Cont.*

City/District	#1					#2	#3			#4			#5		#6	#7			#8						#9	#10				Total Score			
GZ	8					0	0			0			0		1	0			0						0	0				9			
	0	2	2	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0						
WH	9					0	2			0			0		1	1			0						0	0				13			
	1	2	2	0	4	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0						
FS	12					0	10			2			5		5	1			2						5	1				43			
	0	2	2	1	4	0	0	4	4	2	2	0	0	2	3	5	0	1	0	0	1	1	0	0	0	0	0						
CD	12					0	2			0			1		5	8			0						0	1				29			
	3	2	2	1	4	0	0	1	1	0	0	0	0	0	1	5	0	5	3	0	0	0	0	0	0	0	0						
XA	7					0	8			0			1		1	1			4						0	1				23			
	1	0	2	0	4	0	0	4	4	0	0	0	0	0	1	1	0	0	1	0	3	1	0	0	0	0	0						
FT, SZ	8					0	8			2			1		5	1			0						0	0				25			
	0	2	2	0	4	0	0	4	4	0	2	0	0	0	1	5	0	1	0	0	0	0	0	0	0	0	0						
Avg. score	1.0	1.8	2.0	0.4	4.0	0.0	0.0	2.5	1.9	0.4	1.5	0.2	0.0	0.7	1.5	3.9	0.0	2.2	1.4	0.0	1.4	0.7	0.1	0.0	0.0	0.0	0.5	0.0	0.5	0.1	0.1	0.7	-
Avg. performance (%)	33.3	90.9	100	36.4	100	0.0	0.0	63.6	47.7	18.2	36.4	9.1	0.0	14.5	51.5	78.2	0.0	43.6	45.5	0.0	45.5	36.4	3.0	0.0	0.0	0.0	10.9	0.0	18.2	3.0	3.0	12.1	

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