

Bridging Global Frameworks and Local Realities: Towards Localizing the City Essentials Approach in Pakistan's Urban Planning Systems

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Cities across the Global South are increasingly exposed to compound and cascading risks ranging from climate-induced disasters to governance, infrastructure, and institutional failures. Global frameworks such as the UNDRR Making Cities Resilient 2030 (MCR2030) Campaign, the City Resilience Index (CRI), UN-Habitat's City Resilience Profiling Tool (CRPT), and the ISO 37123 Indicators for Resilient Cities have collectively redefined resilience as a governance-driven, system-wide process. However, their translation into the planning and institutional realities of developing countries remains partial and fragmented. This paper bridges these global frameworks with local contexts through a comparative synthesis that identifies areas of convergence such as governance, preparedness, and coordination and divergence in adaptability, innovation, and modularity. Focusing on Pakistan as a representative case, the study examines how the City Essentials Approach under MCR2030 can be embedded within national and local urban planning systems to operationalize resilience. Findings from the comparative review reveal that frameworks like MCR2030 and LGSAT align with Pakistan's disaster management architecture (NDMA-PDMA), while data-intensive tools such as CRI and ISO 37123 remain constrained by limited institutional capacity. The paper proposes the City Essentials Localization Pathway (CELP) as a conceptual bridge to integrate global principles into local governance, enabling performance-based resilience assessment, policy coherence, and data-driven decision-making within Pakistan's urban systems.

Keywords: Urban Resilience, City Essentials Approach, UNDRR, Institutional Capacity, Urban Governance, Pakistan



Introduction:

Urban resilience has emerged as a cornerstone of sustainable development, particularly in countries where cities are under increasing pressure from rapid population growth, climate variability, and infrastructure deficits. By 2050, nearly 68 percent of the global population is expected to live in urban areas [1], intensifying demands on governance and service delivery systems [2][3]. The concept extends beyond disaster management it reflects a city's capacity to anticipate, absorb, adapt, and recover from shocks and stresses while maintaining essential functions [4].

Globally, frameworks such as the Sendai Framework for Disaster Risk Reduction (2015–2030) and the UNDRR's Making Cities Resilient (MCR) Campaign have provided structured approaches for integrating resilience into planning and governance systems [5][6]. However, in many developing countries, including Pakistan, resilience remains fragmented within sectoral policies rather than being operationalized through coordinated urban planning [7][8]. The absence of diagnostic tools to evaluate institutional readiness further constrains efforts to align global frameworks with local realities [4][8].

Pakistan's major cities Lahore, Karachi, Islamabad, and Faisalabad are simultaneously facing hydro-meteorological and socio-institutional challenges such as recurrent floods, heat stress, poor air quality, and ecosystem degradation [9][10]. Although national commitments exist under the National Disaster Management Plan (NDMP 2012–2022) and Pakistan Vision 2025, these policies have yet to translate into effective city-level resilience mechanisms [11][12]. Urban development remains largely reactive rather than preventive, reflecting weak institutional coordination and limited policy coherence across planning authorities [7][13].

This paper conceptually bridges global urban resilience frameworks with Pakistan's urban governance and planning systems using secondary data from established global models. It emphasizes that while frameworks such as MCR2030, CRI, CRPT, and ISO 37123 provide structured guidance, their principles remain insufficiently localized within Pakistan's institutional context. Therefore, there is a pressing need to localize global urban resilience frameworks so they can align with Pakistan's fragmented governance systems, limited data capacities, and planning institutions. Doing so enables a context-sensitive interpretation of resilience that bridges global principles with local urban realities. The study addresses this gap through a comparative synthesis of global frameworks, identifying points of convergence and divergence, and proposes the City Essentials Localization Pathway (CELP) as a conceptual foundation for embedding resilience into Pakistan's planning systems.

Evolution of Global Urban Resilience Frameworks:

The evolution of urban resilience frameworks reflects a transition from disaster-specific management toward an integrated, governance-based approach to risk reduction. Early global efforts, exemplified by the Hyogo Framework for Action (2005–2015), focused mainly on assessing hazards and strengthening emergency response capacities [5]. Its successor, the Sendai Framework for Disaster Risk Reduction (2015–2030), advanced this orientation by emphasizing institutional capacity, inclusive governance, and investment in preventive and adaptive measures [14].

This conceptual progression redefines resilience as a continuous process of urban governance one that requires anticipation, adaptation, and transformation across physical, social, and institutional systems [4][15]. It provides the foundation for subsequent frameworks such as MCR2030, CRI, CRPT, and ISO 37123 that translate these principles into measurable, system-wide indicators suited for comparative assessment and localization.

Major Global Frameworks:

Several global frameworks have advanced the operationalization of urban resilience through varying emphases on governance, systems integration, and performance measurement.

The UNDRR Making Cities Resilient 2030 (MCR2030) Campaign provides a structured pathway for cities through the Ten Essentials for Making Cities Resilient, offering a comprehensive checklist for assessing governance, planning, finance, and community preparedness [6]. It guides cities from awareness to implementation and monitoring, promoting institutional coordination and stakeholder engagement.

The City Resilience Framework (CRF), developed by ARUP in partnership with the Rockefeller Foundation, identifies four interlinked dimensions health and well-being, economy and society, infrastructure and environment, and leadership and strategy highlighting systems thinking, inclusivity, and inter-dependencies as cornerstones of urban resilience [16].

The UN-Habitat City Resilience Profiling Tool (CRPT) applies a spatial-systems lens, assessing institutional, environmental, and social interconnections through data-driven diagnostics and GIS-based indicators [17]. Likewise, the OECD Resilient Cities Framework (2018) promotes policy coherence, fiscal accountability, and multi-level coordination to embed resilience into sustainable urban competitiveness [18].

Complementing these, ISO 37123: Indicators for Resilient Cities (2018) establishes standardized performance metrics across infrastructure, environment, health, and governance sectors, providing a basis for benchmarking and comparability. However, it is frequently critiqued for its quantitative bias and limited contextual flexibility in low-data settings [19].

Collectively, these frameworks reinforce the view that urban resilience is an evolving governance process requiring institutional maturity, financial commitment, and continuous evaluation [20][21]. Yet, their implementation in the Global South remains constrained by fragmented institutions, overlapping mandates, and data scarcity, which hinder effective localization [8].

Comparative Limitations:

Despite their conceptual sophistication, most global frameworks underrepresent adaptive attributes such as modularity, agility, creativity, and innovation qualities vital for cities facing uncertainty and rapid transformation [4][20]. In developing contexts like Pakistan, institutional rigidity and fragmented governance further restrict the operationalization of these adaptive traits [8].

Frameworks such as the Local Government Self-Assessment Tool (LGSAT) and ISO 37123 offer structural comprehensiveness but often overlook softer, cross-sectoral dimensions learning, inclusiveness, and adaptability needed for integrated governance [22][23][17]. This limits their ability to function across multiple governance levels, particularly where institutional maturity is still evolving [19][7]

Global resilience efforts have therefore progressed from conceptual models toward operational toolkits such as MCR2030 and its Ten Essentials for Making Cities Resilient, which translate principles into measurable indicators for governance, finance, and infrastructure [6]. Although this study does not apply these tools empirically, their conceptual logic linking governance, risk assessment, and resource mobilization forms the analytical basis for understanding how global frameworks can be localized. This understanding underpins the City Essentials Localization Pathway (CELP) proposed in this study as a mechanism for contextual adaptation.

Problem Statement:

Localized governance mechanisms remain limited and fragmented. In Pakistan, resilience principles are acknowledged in policy instruments such as the National Disaster Management Plan [12] and Pakistan Vision 2025, yet these commitments lack effective mechanisms for implementation and monitoring [24]. This disconnect between policy formulation and institutional practice has resulted in cities like Lahore continuing to rely on reactive planning approaches rather than proactive, resilience-oriented strategies [13][9].

While global frameworks such as MCR2030, City Resilience Index (CRI), City Resilience Profiling Tool (CRPT), LGSAT, and ISO 37123 provide structured guidance, they often overlook adaptive and systemic dimensions—such as innovation, modularity, and agility that are essential for application in rapidly urbanizing and institutionally complex contexts.

The absence of integrated diagnostic mechanisms and cross-sectoral coordination tools has therefore constrained the operationalization of resilience within Pakistan's urban governance framework, underscoring the need for a contextualized approach that aligns global principles with local realities.

Research Aim:

This study aims to develop a conceptual framework the City Essentials Localization Pathway (CELP) to bridge global urban resilience frameworks with Pakistan's governance and planning systems. The CELP synthesizes the conceptual logic of UNDRR's MCR2030, ARUP's City Resilience Index (CRI), UN-Habitat's City Resilience Profiling Tool (CRPT), ISO 37123 Indicators, and the Local Government Self-Assessment Tool (LGSAT), aligning them with national and sub-national planning instruments such as the [12], Pakistan Vision 2025, Punjab Spatial Strategy, and Lahore Master Plan 2050.

To achieve the stated aim, this study pursues the following specific objectives:

Research Objectives:

To review and analyze major global urban resilience frameworks.

To identify convergence, divergence, and omission among global frameworks.

To examine the alignment of global frameworks with Pakistan's policy and planning instruments.

To develop the City Essentials Localization Pathway (CELP) as a conceptual model that integrates global resilience principles with local governance systems.

Methodology:

Stage I: Framework Identification and Review:

The methodological design of this study follows a comparative and synthesis-oriented qualitative approach, aimed at developing a localized conceptual model for urban resilience. This approach integrates documentary analysis, comparative mapping, and thematic analysis to bridge the conceptual gap between global resilience frameworks and Pakistan's urban governance systems.

The first stage involved the identification and systematic review of major global urban resilience frameworks and tools that have shaped international discourse on urban resilience. These include: UNDRR Making Cities Resilient [25] Campaign and its Ten Essentials for Making Cities Resilient [25]; ARUP City Resilience Index (CRI), developed with the Rockefeller Foundation [16]; UNISDR Local Government Self-Assessment Tool (LGSAT) [22]; and UN-Habitat City Resilience Profiling Tool (CRPT) [17], ISO 37123 collectively called global frameworks.

Each framework was examined for its underlying principles, conceptual structure, implementation mechanisms, and relevance to urban governance systems. The review focused on how resilience is defined, operationalized, and evaluated across spatial, institutional, and policy contexts. Particular attention was given to how governance, finance, infrastructure, and community engagement are integrated within each framework.

This stage established the analytical foundation for identifying both universal resilience attributes including robustness, redundancy, adaptability, and inclusiveness and context-specific institutional pathways for their operationalization [15]. The insights generated informed the subsequent stages of comparative mapping and thematic coding that underpin the development of the City Essentials Localization Pathway (CELP).

To ensure contextual relevance, the study also reviewed Pakistan's national and sub-national planning and policy instruments, Pakistan Vision 2025, [26], and the Lahore Master

Plan 2050 which collectively outline the national agenda for risk reduction, climate adaptation, and sustainable urban development [11][26].

The subsequent stages comparative mapping, thematic and contextual synthesis are discussed in Sections 6.2 and 6.3, forming the foundation for developing the City Essentials Localization Pathway (CELP) framework.

Stage II: Comparative Mapping and Thematic Categorization:

A comparative analytical mapping approach was applied to align and cross-reference the thematic structures, domains, and performance-based attributes of the selected resilience frameworks. This process aimed to identify areas of conceptual convergence, divergence, and complementarity among global frameworks, forming the basis for contextual localization in Pakistan.

The comparative synthesis table consolidates global urban resilience frameworks by examining their structural composition, key thematic domains, and resilience attributes. The analysis identifies how each framework emphasizes specific attributes such as governance, preparedness, inclusiveness, and coordination while under-representing others like modularity, agility, and innovation.

Through systematic comparative analysis, the frameworks were reviewed to extract recurring resilience attributes and implementation logic [27]. This process also examined the relative strengths, observed gaps, and the degree of convergence or divergence between global frameworks and local urban governance contexts.

The resulting table presents a structured representation of how global frameworks conceptualize resilience ranging from governance-focused assessment (e.g., LGSAT) to data-driven profiling (e.g., CRPT) and performance benchmarking (e.g., ISO 37123). Overall, the comparative synthesis indicates that while most global frameworks emphasize robustness, coordination, and redundancy, they tend to underrepresent innovation, integration, and digital adaptability attributes increasingly vital for rapidly urbanizing and climate-stressed contexts such as Pakistan.

By combining comparative mapping with thematic categorization, this stage ensured that the localization process was grounded in both conceptual alignment and analytical rigor, establishing the foundation for Stage III: Localization and Synthesis, where the extracted attributes were contextualized within Pakistan's policy and governance systems to develop the City Essentials Localization Pathway (CELP).

Stage III: Localization and Synthesis:

Stage III focused on contextualizing the extracted resilience attributes within Pakistan's governance and planning systems to develop the City Essentials Localization Pathway (CELP).

Key policy and planning instruments the National Disaster Management Plan, Pakistan Vision 2025, Punjab Spatial Strategy, and Lahore Master Plan 2050 were critically reviewed to evaluate the extent to which resilience principles and risk-reduction measures are embedded. A policy framework crosswalk was then constructed to map the structural and thematic components of the City Essentials Approach (CEA) and MCR2030 campaign against the operational domains of Pakistan's key urban institutions, including the Provincial Disaster Management Authority (PDMA), Lahore Development Authority (LDA), and Metropolitan Corporation Lahore (MCL).

This synthesis stage identified institutional overlaps, coordination gaps, and potential entry points for embedding resilience attributes within urban planning and policy processes. The resulting CELP model (illustrated in Figure 2) outlines three sequential layers Framework Integration, Institutional Alignment, and Localization Outcomes providing a conceptual foundation for adapting global frameworks to Pakistan's urban governance landscape.

Table 1. Summary of Methodological Stages

Stage	Focus	Key Activities	Outputs / Outcomes
Stage I	Framework Identification and Review	Comprehensive desk review of global urban resilience frameworks (UNDRR–MCR, City Essentials, CRI, LGSAT, CRPT) and key academic literature.	List of major frameworks and their conceptual pillars (governance, planning, systems integration).
Stage II	Comparative Mapping and Thematic Coding	Development of a comparative matrix analyzing framework structures, thematic domains, and resilience attributes. Coding of overlapping and unique themes.	Identification of conceptual convergence/divergence; extraction of core resilience attributes and implementation mechanisms.
Stage III	Localization and Synthesis	Contextual alignment of framework components with Pakistan’s governance and planning instruments [28]	Development of the City Essentials Localization Pathway (CELP) conceptual model linking global frameworks to local realities.

This stage culminated in the development of a conceptual bridging model called the City Essentials Localization Pathway (CELP), illustrating how international frameworks can inform local resilience planning through institutional alignment and attribute integration. At this stage, research focused on localizing global urban resilience frameworks within Pakistan’s governance and planning landscape and aimed to translate the conceptual findings of the comparative mapping into a practical structure that could guide national and sub-national institutions toward embedding resilience principles in policy and planning processes.

Localization was approached as an adaptive exercise, aligning global frameworks with local institutional capacities, thereby enhancing the contextual relevance and implementability of resilience assessment tools.

Data Sources and Analytical Approach:

This study relied exclusively on secondary data sources, including peer-reviewed academic literature, global resilience framework toolkits, and national policy documents. These materials collectively informed the comparative and synthesis-based methodological design described in this paper.

The comparative literature review served as the primary analytical tool for structuring how global urban resilience frameworks were examined and synthesized. It systematically organized each framework according to its core structure, thematic domains, such as key resilience attributes, implementation approach, and contextual relevance to Pakistan’s urban governance systems.

A qualitative content synthesis and comparative mapping approach was applied to explore inter-framework relationships, conceptual convergence, and contextual divergence. Each framework was analyzed across four analytical dimensions i) Conceptual Focus – whether community-centric, systems-based, or governance-oriented; ii) Resilience Attributes – robustness, adaptability, inclusiveness, redundancy, and coordination capacity; iii) Thematic Domains – governance, infrastructure, environment, social systems, and finance; iv) Implementation Mechanisms – self-assessment, indicator-based evaluation, profiling, or policy integration.

All frameworks and policy instruments were systematically reviewed and thematically categorized to identify recurring patterns, complementarities, and context-specific gaps. Furthermore, the comparative table grouped frameworks across urban systems (Social, Economic, Physical, Natural, Digital), urban subsystems (e.g., Energy, Transport, Health,

Ecosystem, Governance), and performance-based attributes (e.g., Robustness, Redundancy, Agility, Integration, Learning Capacity).

Finally, visual synthesis and mapping techniques were employed to integrate findings from global frameworks and Pakistan's policy context. These analytical steps culminated in the development of the City Essentials Localization Pathway (CELP), which merges global resilience principles with national institutional mechanisms. This design ensures methodological rigor, transparency, and replicability, offering a structured evidence base for localizing international resilience paradigms within Pakistan's urban governance systems.

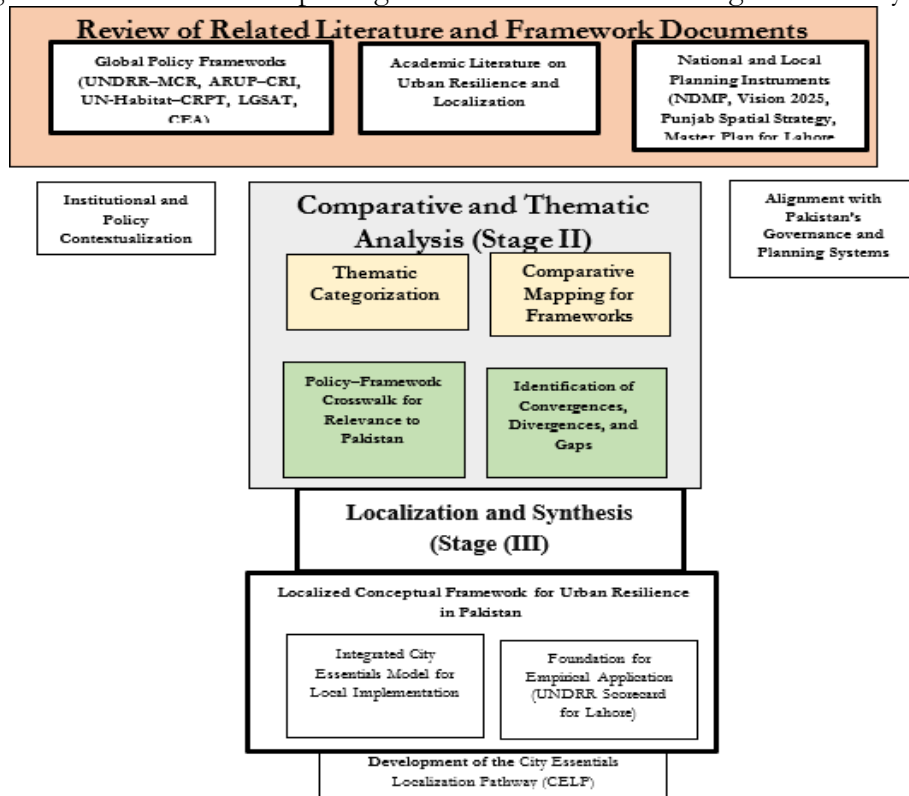


Figure 1. Conceptual Framework of the study illustrating the linkage between data sources, analytical stages, and outputs

Results & Synthesis of Analysis:

The comparative and thematic synthesis revealed that global urban resilience frameworks though diverse in structure and focus share a set of core attributes and institutional drivers fundamental to building urban resilience. However, their operational mechanisms, implementation logic, and contextual adaptability differ substantially, shaping their suitability for localization within Pakistan's governance systems.

Comparative Insights from Global Frameworks (Stage I):

The comparative review highlighted substantial variation in the scope, structure, and analytical depth of major global resilience frameworks. Among these, the UNDRR Making Cities Resilient 2030 [25] framework and the ARUP City Resilience Index (CRI) emerged as the most comprehensive, addressing multiple dimensions of resilience across governance, infrastructure, environment, economy, and social systems. The UN-Habitat City Resilience Profiling Tool (CRPT) similarly demonstrated methodological sophistication through its integration of spatial data, evidence-based assessment, and inter-sectoral linkages that help identify systemic vulnerabilities.

By contrast, the Local Government Self-Assessment Tool (LGSAT) and ISO 37123 Indicators for Resilient Cities provide standardized metrics and procedural clarity but offer limited flexibility for contextual adaptation [23]. Likewise, while the Sendai Framework for

Disaster Risk Reduction (2015–2030) and the UNDRR Disaster Resilience Scorecard for Cities present conceptually robust governance guidance, they remain primarily diagnostic and assessment-oriented, with weaker translation into local implementation.

Table 2 summarizes these comparative insights, illustrating that most frameworks emphasize governance, risk assessment, and preparedness, yet under-represent financial mechanisms, innovation capacity, and digital infrastructure. The CRI and CRPT frameworks prioritize systems thinking and cross-sectoral integration, whereas the LGSAT and ISO frameworks focus on compliance and reporting functions. Collectively, these findings informed the next analytical stage thematic mapping and attribute synthesis which distilled the recurring and missing resilience attributes essential for localization.

To assess the thematic breadth and attribute coverage across frameworks, a comparative literature review table 2 was developed. This table provides a structured comparison of frameworks in relation to their core structures, thematic domains, key resilience attributes, implementation approaches, and localization relevance. Alongside this quantitative synthesis, a qualitative interpretation was undertaken to evaluate each framework's conceptual orientation, thematic emphasis, and institutional applicability in developing contexts.

The synthesis revealed a clear evolution in global resilience thinking from infrastructure-centric models toward governance- and systems-centric approaches. Frameworks such as UNDRR's MCR 2030, ARUP's CRI, and OECD's Resilient Cities Framework have advanced the discourse by embedding governance, data integration, inclusivity, and policy coherence within urban systems. However, their practical application in developing regions remains constrained by fragmented institutional structures, weak data ecosystems, and limited inter-agency coordination [29].

Through comparative mapping and thematic synthesis, six recurring resilience attributes were identified across frameworks: Robustness (Rb), Redundancy (Rd), Adaptability (Ad), Inclusiveness (Inc), Coordination Capacity (Co), and Accountability (Ac). Yet, their degree of representation varies. Most frameworks strongly emphasize robustness, redundancy, and coordination, while attributes such as adaptability, inclusiveness, and accountability receive limited operational attention.

This pattern suggests that technical and infrastructural dimensions of resilience are well represented globally, whereas institutional, adaptive, and learning capacities especially those linked to flexibility, innovation, and social inclusion remain underdeveloped. Hence, the primary challenge lies not only in adopting global frameworks but in translating their principles into operational and institutional realities within developing urban systems such as Pakistan's.

The comparative mapping revealed that while all reviewed frameworks emphasize governance and infrastructure resilience, they differ markedly in depth, complexity, and operational focus. The MCR 2030 and City Essentials Approach (CEA) are institutionally oriented and adaptable, making them highly relevant for localization within Pakistan's decentralized governance structure. In contrast, CRI and CRPT offer strong analytical and spatial rigor but depend on data systems and institutional capacities that are not consistently available at the city level. The LGSAT framework promotes procedural simplicity and community participation, yet lacks comprehensive cross-system integration.

Hence, the City Essentials Approach (CEA) emerges as the most pragmatic bridging mechanism integrating the structural strengths of other frameworks into a coherent and context-sensitive pathway for localization.

Collectively, the patterns identified through the comparative table underline that governance, infrastructure, and preparedness remain the most consistently represented domains, whereas innovation, financing, and digital integration are comparatively underdeveloped. These insights guided the next analytical stage thematic mapping and

attribute synthesis to extract the most transferable and locally applicable resilience attributes for adaptation within Pakistan's urban governance systems.

Thematic mapping and comparative synthesis distilled 18 core performance-based attributes across five urban systems Social, Economic, Physical, Natural, and Digital. The analysis revealed that conventional attributes such as robustness, redundancy, adaptability, and preparedness were most consistently represented across frameworks, particularly within the UNDRR, ARUP, and UN-Habitat models.

Attributes reflecting innovation, modularity, creativity, equity, and agility appeared far less frequently, underscoring a conceptual gap wherein dynamic and context-responsive capacities are often overshadowed by procedural and structural emphases. Frameworks grounded in spatial analytics such as the City Resilience Index (CRI) and City Resilience Profiling Tool (CRPT) demonstrated stronger integration and coordination capacities, while policy-oriented frameworks such as LGSAT and ISO 37123 focused more on governance mechanisms and standardized reporting systems.

Among these, the UNDRR MCR 2030 City Essentials Approach (CEA) proved the most adaptable and governance-driven, emphasizing institutional coordination, community engagement, and policy integration. The CRI, though conceptually rigorous, demands extensive quantitative data and analytical resources, challenging its applicability in developing-country contexts. Similarly, the CRPT introduces a valuable spatial-systems perspective but relies heavily on GIS datasets and technical expertise, constraining its local adoption. Conversely, the LGSAT, while participatory and straightforward, lacks analytical depth and inter-sectoral linkages.

Table 2. Conceptual Comparative Mapping of Global Urban Resilience Frameworks

Framework	Core Structure / Components	Primary Thematic Domains	Key Resilience Attributes Reflected	Implementation Approach	Relevance for Localization (Pakistan Context)	References / Sources
Sendai Framework for Disaster Risk Reduction (SFDRR)	4 Priorities for Action: Understanding disaster risk,(2)Strengthening governance,(3) Investing in resilience,(4) Enhancing preparedness for response and recovery	Governance & Risk Institutions; Knowledge; Resilient Investment; Preparedness & Recovery	Governance, accountability, coordination, preparedness, redundancy, inclusiveness and	Global policy framework emphasizing governance and institutional responsibility	Provides a foundation for national and local DRR strategies; operationalized through NDMA/PDMA mechanisms in Pakistan	[30][31][32]
UNDRR – Making Cities Resilient 2030 (MCR2030): Ten Essentials	0 Essentials (E1–E10): Governance, risk knowledge, finance, planning, ecosystems, institutions, society, infrastructure, preparedness, recovery.	Governance, risk assessment, finance, urban planning, ecosystems, social capacity, infrastructure, response & recovery	Coordination, preparedness, redundancy, accountability, inclusiveness, adaptability	Self-assessment via UNDRR Disaster Resilience Scorecard (Preliminary & Detailed), road-map & monitoring across MCR stages	Highly adaptable; maps to NDMA–PDMA systems; practical gateway for city-level localization (e.g., Lahore)	[25] Global Campaign
ARUP – City Resilience Index (CRI)by Rockefeller Foundation, 2015)	4 Dimensions & 12 Goals	Health & Well-being, Economy & Society, Infrastructure & Environment, Leadership & Strategy	Reflectiveness, Resourcefulness, Flexibility, Inclusiveness	Quantitative scoring based on indicators	Conceptually rich but data-heavy; needs simplification for local application.	Rockefeller Foundation & [16][33][34]
UN-Habitat – City Resilience Profiling Tool (CRPT) (UN-Habitat, 2018).	10 Pillars with urban system indicators	Urban Systems, Infrastructure, Environment, Social Cohesion	Interdependence, Redundancy, Coherence, Equity	GIS-based profiling and spatial analysis	Useful for spatial planners; limited institutional focus.	[35][36][20]
LGSAT – Local Government Self-Assessment Tool (UNISDR, 2012)	Self-assessment questionnaire for local governments	Governance, Planning, Resource Allocation, Communication	Preparedness, Responsiveness, Transparency	Participatory self-assessment	Feasible entry-level tool for district/city planning departments.	[37]

City Scan Tool: Empowering Cities with Data (ECWD) (World Bank, 2017)	Data-based dashboard and analytical toolkit	Data governance, infrastructure, and service delivery	Efficiency, Transparency, Responsiveness	Data-driven analytics for urban diagnostics	Promising for data-rich cities; limited by capacity in developing contexts	[32][38][4]
City Resilience Actions Inventory (CRA) (Resilient Cities Network, 2019)	Repository of global city resilience actions	Multi-sectoral, implementation-oriented	Collaboration, Innovation, Adaptability	Knowledge-sharing and peer benchmarking	Useful for comparative learning; not a standalone assessment tool	[33][39]
ISO 37123 Indicators for Resilient Cities	Standardized performance indicators	Infrastructure, safety, health, and governance	Standardization, Accountability, Efficiency	International benchmarking and certification	High potential for institutional benchmarking; requires adaptation to local data systems.	[23][34][3]

To consolidate the insights from the thematic mapping exercise, a comparative attribute synthesis was developed to determine the extent to which each framework reflects key resilience attributes. Table 3 summarizes the distribution of these attributes identifying which are strongly represented, partially represented, or missing thereby highlighting the conceptual and operational gaps that informed the formulation of a localized resilience framework under the City Essentials Localization Pathway (CELP).

As reflected in Table 3, while governance, infrastructure, and community preparedness are consistently prioritized across frameworks, innovation, modularity, and agility remain underrepresented indicating the need for a contextualized approach that balances structural stability with adaptive capacity.

The analysis reveals strong convergence among global frameworks in emphasizing governance, preparedness, and institutional coordination domains where Pakistan's national and provincial DRR systems already show partial alignment. However, notable divergences persist in the operationalization of innovation, modularity, and community participation.

Frameworks such as MCR 2030 and LGSAT offer feasible entry points for localization, whereas tools like ARUP's CRI and ISO 37123 demand significant data availability, institutional capacity, and cross-agency collaboration. These insights collectively informed the development of the City Essentials Localization Pathway (CELP) proposed in this study.

Stage II: Comparative Mapping and Thematic Coding:

Comparative mapping further confirmed that governance, infrastructure, and preparedness dominate across frameworks, while variation persists in institutional coordination, financing mechanisms, and adaptive learning. This variation underscores the necessity of a hybridized localization model one that maintains global conceptual rigor while remaining pragmatic within the institutional, political, and data realities of cities such as Lahore.

The City Essentials Localization Pathway (CELP) operationalizes six core resilience attributes derived from global frameworks: Robustness (Rb), Adaptability (Ad), Inclusiveness (Inc), Redundancy (Rd), Coordination (Co), and Accountability (Ac). These represent the functional capacities needed to strengthen urban systems across governance, infrastructure, and community dimensions. The thematic synthesis provided the conceptual foundation for linking global frameworks with Pakistan's policy landscape.

This linkage is illustrated in Figure 2, which visualizes the analytical progression from global frameworks through comparative mapping to the development of the CELP model.

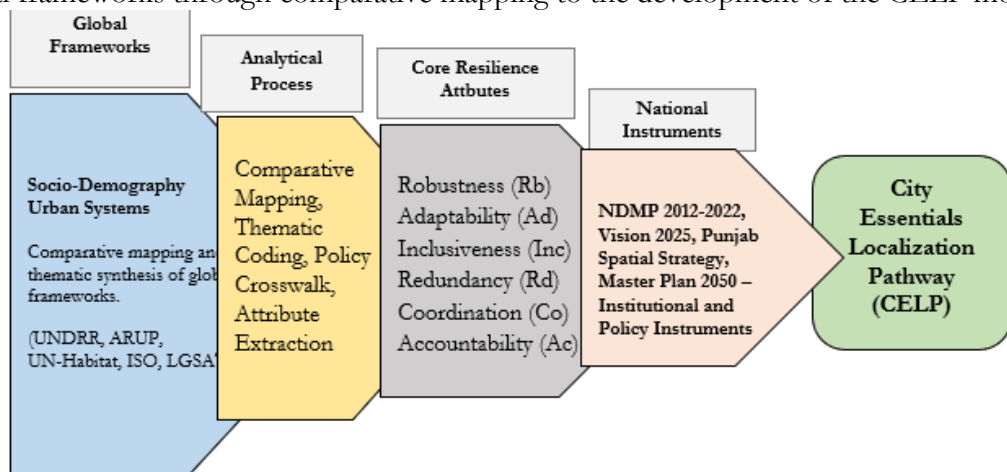


Figure 2. The conceptual model developed by the authors shows the analytical transition from global frameworks and resilience attributes to localized policy instruments through the City Essentials Localization Pathway (CELP).

Table 3. Comparative Attribute Coverage and Observed Gaps across Global Urban Resilience Frameworks; Developed by Authors

Framework	Strongly Covered Attributes	Partially / Missing Attributes	Observed Gaps / Comments	Convergence / Divergence in Local Context (Pakistan)
Sendai Framework for Disaster Risk Reduction (SFDRR)	Governance, Preparedness, Accountability, Coordination	Modularity, Creativity, Innovation	Strong global governance foundation, but weak local adaptability mechanisms.	Converges with NDMA/PDMA frameworks on governance and disaster response structure; diverges in translating global priorities into measurable local resilience indicators and cross-sectoral collaboration.
UNDRR MCR 2030 (Ten Essentials)	Governance, Preparedness, Recovery, Communication, Inclusiveness	Modularity, Creativity, Agility	Focused on institutional integration and local government engagement.	Converges strongly with Pakistan's provincial DRR structures and planning systems (e.g., PDMA, DDMA); diverges in financing, data management, and community-level participation.
City Resilience Framework (ARUP)	Health, Infrastructure, Leadership, Resourcefulness, Inclusiveness	Efficiency, Creativity, Modularity	Broad conceptual coverage; lacks concrete local metrics.	Converges in emphasizing holistic urban systems; diverges due to data intensity and limited local institutional capacity for indicator-based evaluation.
UN-Habitat CRPT	Integration, Redundancy, Coherence, Equity	Modularity, Agility, Flexibility	Technically strong, focuses on spatial profiling.	Converges with Pakistan's spatial planning reforms and GIS tools (e.g., Urban Unit, RUDA); diverges in cross-institutional data sharing and governance coherence.
LGSAT (Local Government Self-Assessment Tool)	Preparedness, Coordination, Awareness, Transparency	Modularity, Efficiency, Agility, Innovation	Participatory but static; limited analytical depth.	Converges with existing local self-assessment culture and NDMA/PDMA review templates; diverges due to weak follow-up mechanisms and absence of digital monitoring.
City Scan Tool (World Bank)	Efficiency, Transparency, Responsiveness	Inclusiveness, Adaptability, Innovation	Data-oriented but resource-heavy.	Converges with emerging smart city data initiatives (PUU, PSCA); diverges where institutional coordination and human capacity are limited.
City Resilience Actions Inventory (CRA)	Collaboration, Innovation, Adaptability	Quantification, Accountability, Institutionalization	Valuable as a global practice repository.	Converges conceptually with peer learning among Pakistani cities; diverges in practical

				application due to a lack of standardized performance tracking.
ISO 37123 Indicators for Resilient Cities	Standardization, Accountability, Efficiency	Creativity, Modularity, Equity	Comprehensive but prescriptive.	Converges with Pakistan's performance-based governance and ISO-certified municipal practices; diverges in affordability and local data availability.
100 Resilient Cities (Rockefeller Foundation)	Inclusiveness, Leadership, Health, Economic Resilience	Agility, Creativity, Flexibility	Transformative, visionary framework, but lacks operationalization.	Converges with Lahore's ongoing city branding and planning reform efforts (e.g., LCWU–RUDA collaboration); diverges in institutional sustainability and continuity beyond pilot phases.

Stage III: Localization and Policy Integration for Pakistan:

Building on the comparative synthesis, Stage III contextualized global resilience attributes—*robustness, adaptability, inclusiveness, redundancy, coordination, and accountability*—within Pakistan's policy and institutional landscape. These attributes were cross-referenced with major planning instruments, including the National Disaster Management Plan [12], Pakistan Vision 2025, the Punjab Spatial Strategy (2018–2040), and the Lahore Master Plan 2050.

The analysis revealed that while policy intent aligns broadly with resilience principles, operational frameworks remain fragmented. Vision 2025 and the NDMP emphasize institutional strengthening and disaster management, but lack measurable resilience indicators. The Punjab Spatial Strategy and Master Plan 2050 promote integrated infrastructure and spatial equity, yet overlook adaptive and performance-based mechanisms.

Some of the systematic weaknesses have been highlighted by [40], such as siloed institutional structures, weak data integration, limited risk-informed budgeting, and the absence of performance tracking. Together, they reveal that resilience in Pakistan is acknowledged in policy but not embedded in practice.

This stage, therefore, established the foundation for developing a localized framework that bridges global resilience logic with national governance instruments. The resulting City Essentials Localization Pathway (CELP) integrates the conceptual insights of global frameworks (UNDRR, ARUP, UN-Habitat, ISO) with the institutional realities of Pakistan's urban systems. It offers a structured roadmap for embedding resilience attributes into planning, budgeting, and monitoring processes transforming resilience from a policy statement into an actionable governance mechanism.

By synthesizing global frameworks with local realities, Stage III provides the conceptual base for applying diagnostic tools such as the UNDRR Disaster Resilience Scorecard, which will serve as an empirical instrument to validate institutional readiness and coordination capacity in subsequent research [29].

Discussion and Policy Implications:

Bridging Frameworks and Local Realities:

In the Pakistani context, resilience attributes surface implicitly across policy documents but lack a cohesive analytical or monitoring framework. For instance, Vision 2025 promotes sustainable and inclusive growth but omits measurable resilience indicators. The National Disaster Management Plan defines institutional responsibilities but not performance metrics, while the Punjab Spatial Strategy (2018–2040) and Lahore Master Plan 2050 reference environmental sustainability without embedding resilience indicators into their evaluation mechanisms [28].

The analysis of Pakistan's urban governance environment reveals five interlinked governance gaps that impede resilience mainstreaming: Siloed institutional structures, where overlapping mandates reduce synergy; Weak data integration, with fragmented and incompatible information systems; Limited risk-informed budgeting, which prioritizes response and recovery over prevention; Lack of standardized performance indicators for tracking resilience progress; Top-down planning, restricting inclusiveness and community ownership.

These systemic weaknesses echo findings from global literature and highlight that governance not infrastructure is the foundation of urban resilience. Consequently, a diagnostic mechanism such as the UNDRR Disaster Resilience Scorecard becomes essential not as an end goal, but as a tool for assessing institutional capacity and preparing the ground for localization.

Development of the City Essentials Localization Pathway (CELP):

To address these gaps, this study developed the City Essentials Localization Pathway (CELP) a conceptual bridge between global frameworks and Pakistan's governance ecosystem.

CELP integrates comparative insights from global frameworks, adapting them into Pakistan's national and provincial planning systems through a multi-stage process. The framework comprises five steps in 4 sequential stages, aligned with both the resilience cycle and national planning hierarchy (Table 4):

Establishing inter-agency mechanisms under PDMA and the Planning & Development Board to strengthen horizontal and vertical coordination to ensure coordination and better governance.

For Risk Data and Diagnostic integration using open data, spatial analytics, and institutional reporting (via PUU, EPA, PMD, and municipal bodies) to create shared risk intelligence.

Embed risk-informed decisions in the City's Development plans, such as Master Plans, zoning regulations, and building codes, through agencies like LDA, RUDA, and WASA.

Linking resilience priorities to budgetary cycles and public investment frameworks, including DRR clauses in PC-I formats for financing and implementation.

Institutionalize adaptive learning through annual resilience reports, performance audits for monitoring, and participatory drills for learning.

Each stage operationalizes the six resilience attributes (Rb, Rd, Ad, Inc, Co, Ac) within existing administrative systems, transforming global resilience principles into actionable, localized practice. CELP, therefore, functions as a hybrid model, bridging international best practices and national institutional realities. It aligns with Sendai Framework Priority 2 ("Strengthening disaster-risk governance") and embodies the principle that resilience must be both globally informed and locally owned.

Policy and Institutional Implications:

The findings affirm that resilience localization in Pakistan requires systemic transformation beyond rhetoric toward integrated, evidence-based governance. Localization is not translation; it is transformation. Effective resilience-building must be embedded within existing governance mechanisms, rather than introduced as an external policy layer. The CELP framework enables this transformation by aligning institutional roles, data systems, and financing mechanisms within a unified governance model. From a policy standpoint, CELP offers a structured pathway for implementing Pakistan's commitments under the [14] and Sustainable Development Goal 11 (Sustainable Cities and Communities). By integrating resilience considerations into planning, budgeting, and institutional coordination, CELP transforms fragmented urban governance into a coherent system capable of anticipating and absorbing shocks.

Table 4. City Essentials Localization Pathway (CELP): A Continuum for Localizing Urban Resilience, illustrating the four progressive stages of the CELP framework, linking awareness, planning, implementation, and learning to build institutional, infrastructural, and societal resilience in Pakistan’s urban governance context

Stages	Activities Along the Continuum	Thematic Areas	Resilience-Oriented Urban Planning Actions	Outcome /Linked Attributes	Impacts
A: CITIES KNOW BETTER	strengthening awareness and understanding of urban vulnerabilities through risk-informed planning and multi-sectoral dialogue.	Urban Risk Knowledge and Early Warning Systems	Develop cross-agency communication systems for sharing hazard, exposure, and infrastructure data. Conduct multi-sectoral training for planners, engineers, and institutions to improve diagnostic and risk literacy.	Enhanced data quality, shared understanding of vulnerabilities, and evidence-based decision-making. (Rb;Rd;Ac)	Promotion of Integrated Institutional and Policy Approaches for Urban Resilience in Pakistan.   The city’s resilience will be improved, and on sustainability pathways to deliver SDGs  Sustainable resilience governance culture institutionalized across city systems.
B: CITIES PLAN BETTER	Enhancing diagnostic and planning capacity through data-driven, climate-informed assessments. Strengthening strategic planning and integration across urban systems.	Spatial Planning & Governance Strengthening strategic planning and integration across urban systems. Integrated Planning & Development	Institutionalize long-term vulnerability assessments using spatial and environmental data (e.g., satellite analysis, OSM). Integrate resilience indicators into Master Plans and zoning regulations. Resilience is mainstreamed within urban policies, land use, and infrastructure planning. To carry out land use planning (study area) and zoning (Master plan 2050) informed by urban heat contributors. Planning for Climate change adaptation and mitigation appears to be further advanced to build resilience against urban heat and heat waves. Integrate findings into Master Plan 2050 and zoning regulations. Mainstream resilience into spatial and sectoral plans. Align local and sectoral plans with resilience goals; ensure risk-sensitive zoning, transport, and green infrastructure.	Resilience Mainstreaming in horizontal and vertical integration of resilience and sustainability development authorities, as well as within city functions. (Ad;Co;Ac)	

	C: CITIES IMPLEMENT BETTER	Increasing access to finance and incentives for resilient urban development. Ensuring climate-responsive and redundant infrastructure. Promoting inclusive participation in risk assessment and implementation.	Financing & Infrastructure	Introduce green awards, resilience-based funding schemes, and incentives for sustainable construction and retrofitting.	Increased private-sector participation and financing for resilient infrastructure. (Ad; Inc; Ac) Reduced system stress and improved service continuity during shocks. (Rb; Rd; Ad) Increased social ownership and equity in resilience outcomes. (Inc; Ac)	
			Infrastructure Resilience	Promote urban farming, permeable surfaces, and natural buffers to strengthen system redundancy. Ensure building orientation supports ventilation and heat reduction.		
			Social Inclusion & Engagement	Engage vulnerable communities in decision-making and monitoring. Institutionalize participatory planning platforms.		
			Integrating climate risk into strategies and plans	Integrate all plans to make a more cohesive plan, which will ensure all the sectors which get affected by climate change, and ensure inclusion by making affected people part of the assessment		
	D: City Adapt and Learn Better	<i>Monitoring, Learning, and Adaptive Governance: Establishing systems for continuous feedback and improvement.</i>	Institutional Learning, Monitoring, and Evaluation	Develop annual <i>City Resilience Reports</i> ; institutionalize post-project evaluation; facilitate public engagement sessions and academic partnerships for resilience research.	Continuous learning loops are integrated into governance. Adaptive planning through iterative review and citizen feedback. (Ad ;Co;Ac)	

Conclusion:

The City Essentials Localization Pathway (CELP) encapsulates this study's core argument, i.e., urban resilience must evolve from conceptual discourse to institutional practice. By merging global resilience frameworks with Pakistan's planning and governance realities, CELP provides both a diagnostic lens and a policy roadmap. It advocates context-driven transformation — building on existing institutions rather than creating new ones. Through CELP, Pakistan's cities can move from reactive recovery toward proactive, adaptive, and accountable urban governance, contributing to a future where resilience is institutionalized, measurable, and locally sustained.

Recommendations and Implementation Strategies:

Based on the CELP framework, the following policy and implementation measures are proposed:

Located under NDMA and the P&D Board, this unit should harmonize efforts of PDMA, LDA, WASA, RUDA, PUU, and municipal bodies to ensure shared action and joint reporting.

To establish a multi-agency platform integrating spatial, environmental, and hazard datasets from different institutions such as PUU, EPA, PMD, and PSCA. To develop a City Risk and data hub that will enable real-time monitoring, transparency, and data-driven decision-making.

This is high time to introduce risk-informed evaluation criteria in Master Plans, land-use zoning, and PC-I project appraisals, ensuring alignment with MCR and City Essentials principles.

Integration of DRR and climate adaptation indicators into Annual Development Plans (ADPs) and fiscal monitoring frameworks, which will promote financial accountability for resilience outcomes.

Conduct annual City Resilience Reports, capacity-building programs, and awareness campaigns, fostering collaboration among academia, civil society, and government agencies.

These measures collectively strengthen institutional coordination, capacity development, data integration, and accountability, demonstrating that resilience is not a product of infrastructure expansion but of governance coherence.

Academic and Practical Contributions:

This research contributes to the academic discourse on resilience localization by demonstrating how comparative synthesis can inform context-specific framework design in developing countries [21]. It also provides a replicable process model for practitioners urban planners, disaster managers, and policymakers to evaluate and strengthen city-level resilience within existing administrative arrangements. The study's multi-stage methodology combining documentary review, thematic coding, and localization presents a scalable framework applicable across South Asian urban systems.

Limitations and Future Research:

This study is grounded in secondary data and qualitative comparison, without direct empirical validation. Future research should apply the UNDRR Disaster Resilience Scorecard through expert consultations, institutional surveys, and field-based assessments in Lahore and other cities. Quantitative integration using composite resilience indices can further enhance analytical rigor. Exploring digital resilience and cross-city transferability will enrich the framework's future application.

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