

AI And the Urban Planner: A Comparative Swot Analysis of Western and Eastern Urban Planning Practice

DR./ENP EUGENIO FERRER SANTIAGO

PUP, PCU, NU Manila

Abstract- Rapid advancements in technology provide new functionality to challenge existing paradigms in many industries. AI and urban planning is one such example. This paper uses SWOT analyses to assess AI's challenges and opportunities across ten selected countries. The examination is divided into a Western context (the United States, the United Kingdom, Canada, Australia, and Spain) and an Eastern context (the United Arab Emirates, China, the Philippines, Japan, and Singapore). The author utilized peer-reviewed publications from 2021 to 2025 in data gathering. Applications of AI technologies such as digital twins, generative AI, and geospatial analytics are applied to transport, land use planning, participatory planning, and environmental planning across the cited countries. The author analyzed AI use problems in planning through the ethical perspectives of planning associations' national codes of conduct and planning associations' codes of AI ethics. This examination of planning codes and AI in urban planning is arguably the first paper to question how these codes deal with the control of algorithms and the professional responsibilities of planners. A unique feature of this paper encompasses the environmental, carbon, and water footprint that data centers — which AI relies upon — create. This paper suggests that the identified gaps in technology, planning ethics, environmental governance, social governance frameworks, AI planning, technology, AI ethics codes, and the control of algorithms provide a foundation for planning to address the deficit in planning research, planning ethics, and the existing gaps in AI ethics governance frameworks.

Index Terms- Artificial Intelligence, Urban Planning, SWOT Analysis, Smart Cities, Planning Ethics, Data Centers, Comparative Analysis, Eastern and Western Planning, Professional Conduct Codes

I. INTRODUCTION

Urban planning as a profession developed differently in each nation due to historical context, industrialization, colonial legacies and the development of welfare state lines that were often manifest by national philosophies of modernity.

Now, a new disruptive force — artificial intelligence (AI) — is being added to these historically well-established planning traditions and it raises an important question: will AI have a homogenizing effect on planning practice, or will it reinforce existing national differences? This article examines that question through a comparative SWOT analysis, situated within each state's planning history and institutional capacity, governance culture, and professional ethics framework. Since 2017, due largely to a significant increase after 2023, the scholarly literature on AI in urban planning has expanded dramatically. Sanchez et al. (2022) noted that American planners were anticipating significant impacts of AI on transportation and land use even before Son et al. (2023) presented systematic evidence on the opportunities and risks of algorithmic planning for sustainable urban development. More recently, Sameer et al. (2025) facilitates a clear upward trend in AI-driven urban infrastructure research, with more publications appearing significantly in the years of 2024 and 2025. But the scope of regional differences is uneven, formed partly by institutional preparedness, legal structures, data infrastructure and professional practices. This lack of uniformity is exactly why a comparative analysis has value.

1.1 Country-by-Country Planning Backgrounds

United States. Urban planning in the United States is rooted in the Progressive Era reform movements of the late 19th century, with the 1909 Plan of Chicago representing a landmark effort at comprehensive city design. The profession formalized through the American Institute of Planners, which later became the American Planning Association (APA), and evolved through master planning, zoning reform, federal highway programs, and the environmental movement. Today, U.S. planning is highly decentralized, with significant power vested at the

local government level. Sanchez et al. (2022) found that American planners already regard AI — particularly in transportation, housing, and land use modeling — as a significant imminent force, though adoption remains uneven across jurisdictions.

Canada. Canadian urban planning developed under British colonial planning traditions and was institutionalized through provincial legislation rather than federal mandate. The Canadian Institute of Planners (CIP), founded in 1919, guides professional standards through its Code of Professional Conduct, and Canadian planning has historically emphasized community participation, environmental protection, and housing equity. Canadian cities such as Toronto and Vancouver have piloted smart city technologies, though the Sidewalk Toronto controversy revealed the depth of public concern about data governance and corporate involvement in urban AI (Bibri et al., 2023).

Australia. Australian planning traces its roots to British colonial settlement patterns, with post-World War II suburbanization creating planning challenges that persist today. The Planning Institute of Australia (PIA), which updated its Code of Professional Conduct in November 2023, governs professional practice. Australian cities — particularly Melbourne and Sydney — have been early adopters of urban analytics and Geographic Information Systems (GIS)-based planning tools. He and Chen (2024), in their systematic review, noted that Australia has contributed to emerging AI planning research, particularly in applications related to climate resilience, coastal management, and housing affordability modeling.

Spain. Spain's urban planning tradition is deeply influenced by its Baroque urban form, the modernist urban extension plans (*ensanches*) of the 19th century, and post-Franco democratic decentralization. Spanish planning has evolved through autonomous community frameworks that give regional governments substantial land use authority. The Asociación Española de Técnicos Urbanistas (AETU) represents multidisciplinary planners, and Spanish planners operating internationally are also bound by the European Council of Spatial Planners (ECTP-CEU) Charter, which establishes a code of

professional ethics and conduct harmonized across European Union (EU) member states. Smart city initiatives have been developed in Barcelona, which pioneered the Superblock model and sensor-based traffic management, and has been cited as an international example of AI-informed urban governance (Son et al., 2023).

United Kingdom. The UK's urban planning system has one of the longest formal histories globally, originating in the Town and Country Planning Act of 1947. The Royal Town Planning Institute (RTPI), which launched an updated Code of Professional Conduct on 1 February 2023 based on five core principles — honesty and integrity, professional competence, independent professional judgement, professional practice and duties, and professional behavior and respect — oversees professional standards. Cugurullo et al. (2024) highlighted the UK's role in theorizing AI urbanism, with cities like London and Manchester at the forefront of experimenting with predictive analytics for infrastructure and housing delivery.

United Arab Emirates. The UAE represents one of the most ambitious cases of state-directed AI integration into urban governance. Dubai's Smart Dubai 2030 agenda and Abu Dhabi's urban planning frameworks embed AI deeply into service delivery, mobility, and land management (Wheatley, 2024). Professional ethics in UAE urban planning is governed by the Emirates Planning Association (EPA), established in 2020 by Ministerial Decision No. 121, which is mandated to develop and spread high-standard professional ethical principles, conduct, and practices among planning practitioners. The EPA's top-down governance model enables rapid deployment of AI tools, though accountability and civil liberties concerns remain documented in the AI urbanism literature (Cugurullo et al., 2024).

China. China's urban planning system has undergone radical transformation since the market reforms of the 1980s, evolving from a Soviet-influenced blueprint system to a market-complementary planning framework. The Urban Planning Society of China (UPSC), founded in 1956, serves as the primary national academic and professional organization for urban planning. Its articles of association, while

emphasizing the promotion of planning standards and protecting planners' rights, operate within a framework aligned with the Communist Party of China's governance objectives, which shapes the nature and limits of professional autonomy. Bibri et al. (2023) noted that China has leveraged AI for land use monitoring, urban simulation, and traffic optimization at a scale unmatched elsewhere, though algorithmic governance raises ethical concerns for international planning scholars.

Philippines. The professional practice of environmental planning in the Philippines is regulated by Republic Act No. 10587, the Environmental Planning Act of 2013, which defines the scope of practice, establishes the Professional Regulatory Board of Environmental Planning under the Professional Regulation Commission, and mandates that the Board adopt and promulgate a Code of Ethics and Code of Technical Standards. Environmental planning under RA 10587 encompasses urban and regional planning, city planning, town and country planning, and human settlements planning. The Philippine Institute of Environmental Planners (PIEP), as the sole Accredited Professional Organization (APO), is mandatory for all registered and licensed environmental planners under RA 10587. The University of the Philippines (UP) Center for Integrative and Development Studies (2025) noted that comprehensive AI planning policy frameworks in the Philippines remain underdeveloped, pointing to institutional gaps despite early smart city initiatives at the local level.

Japan. Japan's planning tradition is rooted in the City Planning Act of 1919, which established the legal basis for land readjustment and building control, and was subsequently superseded by the City Planning Law of 1968 — the current foundational statute governing urban planning in Japan (Ministry of Land, Infrastructure, Transport and Tourism; APA Urban Planning System in Japan). The City Planning Institute of Japan (CPIJ), established in 1951, promotes academic and professional standards for urban planning, and Japan's broader public service ethics are codified in the National Public Service Ethics Act. Japan's Society 5.0 national strategy frames AI as a core pillar of future urban governance,

emphasizing human-centered smart cities that integrate digital technology with physical infrastructure to address aging demographics and disaster resilience (Peng et al., 2024).

Singapore. Singapore represents perhaps the most complete integration of AI into urban governance among the countries reviewed. Its Virtual Singapore platform (a city-scale digital twin) and the Urban Redevelopment Authority (URA) represent a unified planning system enabled by dense, clean data. The Singapore Institute of Planners (SIP), through its Singapore Institute of Certified Planners (SICP) certification program, requires all certified planners to uphold SIP's Code of Ethics covering overall responsibility to the public, clients and employers, the profession and colleagues, and professional conduct. Chan and Chye (2023), cited in Sameer et al. (2025), documented how Singapore's smart city initiatives have materially reshaped urban planning strategies.

II. METHODOLOGY: COMPARATIVE SWOT FRAMEWORK

This article employs a comparative SWOT (Strengths, Weaknesses, Opportunities, Threats) framework as its primary analytical methodology. Originally developed for organizational strategy analysis, SWOT frameworks have been adapted in public policy, planning, and comparative governance research to assess the internal capacities and external environmental factors that shape institutional performance and potential (Son et al., 2023; Sameer et al., 2025). The comparative dimension is aligned to the West-East axis that allows systematic drawing of cultural, institutional, and governance differences/similarities. This axis is not viewed as binary opposition – both contexts are diverse internally – but as a tool for structuring similarities and differences in the adoption of AI planning. Each of the SWOT quadrants is filled with developed/ detailed evidence from a review of the available peer-reviewed publications for the period 2021-2025 from journals like Sustainable Cities and Society, Journal of the American Planning Association, International Journal of Urban Sciences, Urban Planning (Cogitatio), Land (MDPI), Buildings (MDPI), and AI & Society.

The analysis proceeds in three analytical steps. First, each country's planning context is characterized using historical and institutional descriptors drawn from the literature. Second, AI adoption dimensions — including tools used, governance models, regulatory environments, and equity concerns — are identified for each country. Third, these dimensions are aggregated into a cross-national SWOT matrix distinguishing Western and Eastern clusters. This approach follows the logic of comparative case synthesis employed by Bibri et al. (2023) and He and Chen (2024), who similarly structured cross-national reviews of AI planning without pretending to statistical generalizability, focusing instead on theoretical and practical insights emergent from

pattern comparison. Only sources with verifiable DOIs or institutional links published within the five-year window of 2021–2025 are cited. The professional ethics analysis in Table 3 draws exclusively on the actual published codes of conduct and ethics of each country's national or recognized planning professional body. The SWOT matrix is presented as Table 1a and 1b; AI applications by country in Table 2; and the comparative ethics and AI analysis in Table 3.

III. RESULTS AND DISCUSSION

3.1 SWOT Analysis: Western Countries (US, Canada, Australia, Spain, UK)

Table 1a. SWOT Analysis — Western Urban Planning Context (AI Adoption)

Dimension	Key Attributes & Evidence	Representative Countries
STRENGTHS	Strong professional regulatory bodies (APA/AICP, CIP, PIA, RTPI, AETU/ECTP-CEU) with established and recently updated codes of ethics; robust open-data infrastructure and digital governance traditions; mature university-planning school ecosystems producing AI planning research; significant public funding for smart city pilots; culture of community participation compatible with AI-aided engagement tools.	US (APA/AICP), Canada (CIP), UK (RTPI 2023 Code), Australia (PIA 2023 Code), Spain (AETU/ECTP-CEU Charter)
WEAKNESSES	Decentralized governance creates uneven AI adoption between large and small municipalities; legacy planning systems resist technological disruption; skill gaps in AI literacy among practicing planners; public skepticism toward data collection, particularly after high-profile smart city controversies; budget constraints in smaller municipalities limit tool access; ethics codes not yet updated with AI-specific provisions in most jurisdictions.	US (local variance), Canada (Sidewalk Toronto fallout), Australia (rural-urban divide), UK (procurement complexity), Spain (regional fragmentation)
OPPORTUNITIES	AI tools can democratize participation through multilingual engagement platforms; machine learning can improve affordable housing identification; predictive analytics can optimize infrastructure investment; natural language processing (NLP) can streamline plan-making and regulatory review; digital twins offer scenario planning at reduced cost; professional institutes (RTPI, PIA) are actively developing AI ethics guidance.	US, UK, Australia (housing AI), Spain (Barcelona Superblock modeling), Canada (participatory platforms)
THREATS	Algorithmic bias can entrench racial and socioeconomic exclusion; lack of AI-specific planning legislation creates accountability gaps; corporate control of urban data	All five Western contexts; particularly acute in US and UK

	infrastructure poses sovereignty risks; data center energy demands create environmental contradictions in sustainability-oriented planning; displacement of planner judgment by automation undermines professional agency.	
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3.2 SWOT Analysis: Eastern Countries (UAE, China, Philippines, Japan, Singapore)

Table 1b. SWOT Analysis — Eastern Urban Planning Context (AI Adoption)

Dimension	Key Attributes & Evidence	Representative Countries
STRENGTHS	Centralized governance enables rapid, large-scale AI deployment; significant national investment in smart city infrastructure; high-density urban forms generate rich spatial data; state-directed innovation ecosystems align artificial intelligence research and development (AI R&D) with planning objectives; Singapore's Virtual Singapore digital twin and UAE's Smart Dubai are global benchmarks.	Singapore (URA/SIP Code), UAE (EPA 2020), China (UPSC), Japan (Society 5.0 / CPIJ)
WEAKNESSES	Limited public participation and civil society engagement in AI governance; in lower-income contexts (Philippines), capacity and digital infrastructure constraints restrict AI adoption; over-reliance on proprietary platforms with limited transparency; algorithmic surveillance risks undermine civil liberties; professional bodies in some countries are nascent (EPA founded 2020); Philippines ethics codes not yet AI-adapted.	Philippines (capacity gaps, RA 10587 Code not AI-specific), China (UPSC within Party-state), UAE (EPA lacks AI guidance), Japan (CPIJ still adapting)
OPPORTUNITIES	AI can address rapid urbanization challenges at scale; emerging economies can leapfrog legacy systems; disaster risk reduction AI (particularly in Philippines and Japan) addresses urgent national needs; Association of Southeast Asian Nations (ASEAN) digital frameworks create cooperative AI planning opportunities; Japan's Society 5.0 model offers human-centered AI urbanism as an exportable framework.	Philippines (disaster risk AI), Japan (aging city resilience), Singapore (land efficiency AI), China (large-scale GIS modeling)
THREATS	Governance opacity in AI systems raises ethical and human rights concerns; data sovereignty risks where foreign technology firms control critical urban AI infrastructure; environmental costs of AI data centers conflicting with sustainability commitments; in the Philippines, informal sector and low-income populations remain largely excluded from AI planning	China and UAE (civil liberties), Philippines (equity exclusion), all five (environmental data center costs)

benefits; surveillance technology normalization.

3.3 AI Applications in Urban Planning: A Cross-National Overview

Across both Western and Eastern contexts, AI tools are being applied across a consistent set of urban planning domains, though with different emphases and governance arrangements. Table 2 synthesizes current applications across all ten countries reviewed.

Table 2. AI Applications in Urban Planning by Country

Country	Land Use & Zoning	Transportation	Environmental Planning	Participatory Planning	Key AI Tools
USA	Zoning reform modeling, housing demand prediction	Traffic optimization, transit demand modeling	Climate vulnerability mapping, air quality prediction	NLP-based public comment analysis	machine learning (ML), GIS analytics, NLP, predictive analytics
Canada	Growth scenario modeling, heritage identification	Autonomous vehicle integration planning	Wildfire risk modeling, flood mapping	Digital engagement platforms	GIS-AI, digital twins, satellite imagery
Australia	Informal settlement detection, coastal modeling	Freight and logistics AI optimization	Bushfire and drought scenario planning	AI-assisted community surveys	Computer vision, ML, remote sensing
Spain	Superblock land use optimization (Barcelona)	Traffic sensor AI (Barcelona city-wide)	Urban heat island monitoring	Smart citizen data platforms	Internet of Things (IoT)-AI integration, sensor analytics
UK	Housing need prediction, development control AI	Congestion modeling, autonomous vehicle corridors	Net zero scenario modeling	Generative AI for plan summaries	Predictive analytics, digital twins, NLP
UAE	Real-time urban monitoring (Dubai City Brain)	Autonomous taxi fleet routing	Desert urban heat mitigation AI	AI citizen service portals	City Brain platform, IoT, ML
China	Large-scale GIS land monitoring, informal settlement mapping	City-scale traffic AI management	Air quality modeling (PM2.5 prediction)	Limited; state-directed engagement	Deep learning, satellite imagery, convolutional neural networks (CNN)
Philippines	Comprehensive Land Use Plan	Flood-affected transport routing	Typhoon risk modeling, sea-	Nascent; participatory	GIS, early ML applications, open

	(CLUP) digital support tools (limited coverage)		level rise mapping	GIS pilots	data
Japan	Compact city AI support, depopulation-driven land reuse	Autonomous and disaster-resilient transport planning	Earthquake and tsunami AI risk modeling	Society 5.0 civic engagement platforms	Digital twins, ML, IoT, simulation models
Singapore	Virtual Singapore 3D digital twin for land use	Real-time multimodal transport AI	Urban heat and green cover optimization	AI-assisted public consultation tools	Digital twin, GIS-AI, predictive analytics

The applications in Table 2 draw on the systematic review evidence of Sanchez et al. (2022), Son et al. (2023), He and Chen (2024), and Peng et al. (2024). Transportation and land use remain the dominant AI planning domains globally. Environmental planning applications are growing in importance in all countries, reflecting the intersection of climate urgency with AI's predictive capabilities. Participatory planning using AI — arguably the most complex dimension — is furthest advanced in Western contexts, where public consultation requirements are legally mandated, but nascent AI tools for engagement are emerging in Singapore and Japan as well.

3.4 AI, Planning Ethics, and Professional Codes of Conduct

The integration of AI into urban planning practice raises profound ethical questions that professional bodies across the world are now grappling with. Unlike the previous version of this analysis, which focused solely on the AICP Code, the following table presents a comparative review of the actual published codes of ethics and professional conduct of each country's designated planning professional body, and maps specific AI governance concerns against each code's provisions. This provides a more equitable and internationally representative basis for ethical analysis.

Table 3. Comparative AI Ethics in Urban Planning — National Planning Bodies' Codes and AI Implications

Country	Professional Body & Code	Relevant Ethics Provisions	AI-Specific Challenge	Gap / Risk if Unaddressed
USA	American Institute of Certified Planners (AICP) Code of Ethics and Professional Conduct (adopted Nov. 2021, effective Jan. 2022). American Planning Association (APA).	Section A.2.a: timely, accurate, accessible public information. Section B.1: serve the public interest. Emphasis on transparency, accountability, and professional competence. 2024 APA AI Ethics Guidance supplements the Code.	AI tools generating plausible but inaccurate planning outputs violate accuracy duties. Algorithmic bias in zoning or housing tools contradicts public interest mandates. Planners must verify all AI outputs before official use.	No AI-specific enforceable Code provisions yet; reliance on general accuracy and public interest clauses. Risk of liability diffusion when AI errors harm communities.
Canada	Canadian	Section 1: Planner's	AI recommendations in	CIP Code predates AI

	Institute of Planners (CIP) Code of Professional Conduct (last amended 2016; 2023 Professional Standards Board reaffirmation). Supplemented by provincial associations (e.g., Planning Institute of British Columbia [PIBC]).	Responsibility to the Public Interest — respect diversity, needs, values. Section 2.1: Provide independent professional opinion; perform only within areas of professional competence. Section 2.2: Undertake planning services with diligence.	areas beyond a planner's verified competence breach Section 2.1. Failure to disclose AI tool limitations to the public violates public interest duties. Privacy governance gaps in AI data collection not yet explicitly addressed.	era; no AI-specific provisions. Professional competence standard must be reinterpreted for algorithmic literacy. Risk of digital divide in participatory AI tools excluding marginalized groups.
Australia	Planning Institute of Australia (PIA) Code of Professional Conduct (updated November 2023, v5.1). Covers all PIA membership grades.	Core Principles: Competency, Due Care and Diligence; Independence and Integrity; Respect for Aboriginal and Torres Strait Islander peoples' rights including free, prior and informed consent. Commitment to highest ethical and professional standards to maintain integrity of planning decisions.	AI tools trained without representative Indigenous community data violate the code's free, prior and informed consent provisions. Due care and diligence requires critical evaluation of AI outputs, not passive reliance. No AI-specific disclosure requirements currently codified.	Most current of the ten codes reviewed, but still general in AI application. Risk of AI-perpetuated disadvantage for First Nations communities in land and planning decisions.
Spain	Asociación Española de Técnicos Urbanistas (AETU). European Council of Spatial Planners (ECTP-CEU) Founding Charter (1995) — Annex C Professional Code of Ethics — governs all EU member planning associations including Spain.	ECTP-CEU Charter Annex C: Professional Town Planners shall conduct themselves to uphold the reputation of the profession. Criteria of professional competence and conduct must be observed by all member planners. ECTP-CEU sets standards of conduct and education harmonized across EU member states.	Barcelona's Superblock AI platform and smart city sensor networks create privacy and surveillance issues not directly addressed in the 1995 Charter. European General Data Protection Regulation (GDPR) compliance intersects with planner conduct obligations when AI tools process citizen data. Independent professional judgement must be maintained	ECTP-CEU Charter is outdated relative to contemporary AI capabilities. Spain benefits from EU-level AI Act (2024) governance context, but planning-specific AI ethics guidance remains underdeveloped. Professional AI literacy varies significantly across autonomous communities.

			even when AI analysis is compelling.	
UK	Royal Town Planning Institute (RTPI) Code of Professional Conduct (effective 1 February 2023). Five Core Principles: (1) Honesty and Integrity; (2) Professional Competence; (3) Independent Professional Judgement; (4) Professional Practice and Duties; (5) Professional Behaviour and Respect.	Updated 2023 Code requires: members to base professional advice on appropriate evidence and without improper manipulation; apply reasonable standards of skill, knowledge and care; maintain independent professional judgement free from improper influence; act with honesty and integrity in all activities.	The requirement for evidence-based advice is directly challenged when AI provides probabilistic outputs without clear uncertainty ranges. Independent professional judgement (Principle 3) is at risk when planners defer to AI algorithms without critical evaluation. Privacy and data security responsibilities arise from AI-enabled citizen monitoring in planning processes.	2023 RTPI Code is the most recently revised among Western codes reviewed, but remains AI-neutral in language. UK Government AI Strategy (2021) and Responsible AI guidelines provide supplementary context. RTPI has issued AI ethics discussion resources but not yet binding Code amendments specific to AI.
UAE	Emirates Planning Association (EPA), established 2020 by Ministerial Decision No. 121. Mandated to develop and spread high standard professional ethical principles, conduct and practices. Newest formal planning body among the ten countries reviewed.	EPA mandate includes promotion of sustainable and people-centric urban development; professional development and training; ethical principles and conduct. UAE National AI Strategy 2031 provides a government-level AI ethics framework within which EPA operates.	EPA's ethics mandate is still being operationalized; no publicly available AI-specific code provisions as of 2025. Dubai's City Brain and Smart Dubai 2030 create AI deployment realities that outpace formal ethics guidance. Tension between state-directed AI governance and planners' independent professional conduct obligations.	Youngest formal planning body in this study; professional ethics infrastructure still maturing. UAE's highly centralized AI governance model reduces space for planners' independent ethical pushback. Civil liberties dimensions of urban AI surveillance are not directly addressed by EPA mandate.
China	Urban Planning Society of China (UPSC), founded	UPSC Articles: promote planning standards, protect	Professional autonomy and independent judgement — central to	Fundamental structural tension between professional

	<p>1956. Articles of Association define conduct objectives within the framework of the Communist Party of China. Registered urban planner examination and practice regulated by Ministry of Natural Resources.</p>	<p>planners' rights and interests, disseminate scientific knowledge. Conduct within Party-state framework. Registered urban planners subject to government-set professional standards. 'New Generation Artificial Intelligence Development Plan' (2017) and subsequent AI regulations provide the governance context.</p>	<p>Western planning ethics codes — are not explicitly protected in UPSC's institutional framework. Large-scale AI surveillance and social credit system data overlap with planning datasets. The absence of an independent ethics enforcement mechanism limits accountability for AI-related planning errors.</p>	<p>independence (which underpins ethical accountability) and Party-state governance framework. AI ethics in Chinese urban planning is primarily a state policy domain, not a professional self-regulatory one. International comparison reveals a significant gap in planner-led ethical deliberation.</p>
Philippines	<p>Philippine Institute of Environmental Planners (PIEP) — sole Accredited Professional Organization under RA 10587 (Environmental Planning Act 2013). Professional Regulatory Board of Environmental Planning (under the Professional Regulation Commission [PRC]) promulgates Code of Ethics and Code of Technical Standards.</p>	<p>RA 10587 mandates: Code of Ethics requiring planners to uphold integrity, competence, and accountability; Code of Technical Standards; Code of Good Governance. Violations of the Code of Ethics are grounds for revocation or suspension of registration. Continuing Professional Development is required.</p>	<p>RA 10587 Code of Ethics and Technical Standards were promulgated before AI was a practical planning tool; no AI-specific provisions exist. Informal settlements and data gaps mean AI planning tools may systematically exclude or misrepresent the urban poor, violating integrity and accountability duties. Digital literacy among PIEP members is uneven.</p>	<p>Rapidly changing AI planning landscape not yet reflected in regulatory framework. Risk of AI tools being adopted uncritically due to capacity gaps. Disaster risk and informal settlement contexts present both high-stakes AI use cases and high exclusion risks. PIEP has an opportunity to lead AI ethics standards for Global South planning contexts.</p>
Japan	<p>City Planning Institute of Japan (CPIJ), est. 1951. Urban and Regional Planning Review (URPR) — peer-</p>	<p>CPIJ promotes improvement of urban and regional planning quality and raising the social status of planners. National Public Service Ethics</p>	<p>CPIJ lacks a standalone enforceable code of professional ethics comparable to AICP, RTPI, or PIA. Government planner conduct governed by</p>	<p>Institutional gap: no single enforceable planning ethics code covers all Japanese planners. AI adoption for aging city management and</p>

	reviewed journal with ethics guidelines. Japan's National Public Service Ethics Act and Code govern planners in government service. Society 5.0 framework provides national AI ethics context.	Act prohibits conflicts of interest and mandates fair execution of duty. Society 5.0 policy framework emphasizes human-centered AI: technology in service of human dignity and social wellbeing, not efficiency alone.	public service ethics rules, but private sector planners have less formal accountability structure. Society 5.0's human-centered AI ethos aligns with planning ethics values but requires translation into enforceable planning standards.	disaster response creates high-stakes scenarios where ethical lapses could have serious consequences. Society 5.0 provides progressive AI ethics framing but implementation in planning practice requires stronger professional governance infrastructure.
Singapore	Singapore Institute of Planners (SIP) — Code of Ethics for Singapore Institute of Certified Planners (SICP). Published on SIP website. Covers responsibilities to public, clients, employers, profession, and colleagues.	SIP Code: planners shall aim to ensure planning work is conducted openly and all relevant information is accurately and clearly disclosed; maintain objectivity, integrity, and freedom from conflicts of interest; not knowingly misrepresent facts; not discriminate on grounds of race, gender, religion, disability; contribute to improvement of the profession through new knowledge and techniques.	SIP Code's provisions on openness, disclosure, and non-misrepresentation directly apply to AI tool outputs used in planning decisions. Singapore's Virtual Singapore digital twin creates significant data privacy responsibilities not yet explicitly addressed in the current SIP Code. The non-discrimination provision must be applied to audit AI model outputs for bias.	SIP Code is functional but general; Singapore's advanced AI planning environment has arguably outpaced the Code's specific guidance. Given Singapore's global leadership in smart city AI, SIP is well-positioned to develop the world's first AI-specific urban planning ethics supplement. The combination of high AI capacity and a clear ethics mandate creates a unique opportunity.

The comparative analysis in Table 3 reveals three critical cross-cutting observations. First, no planning professional body among the ten reviewed has yet enacted enforceable AI-specific provisions within its code of ethics or professional conduct. All existing codes rely on general principles — accuracy, competence, public interest, independence — that have AI-relevant implications but were not drafted with algorithmic governance in mind. Second, there is a significant institutional disparity: Western codes (particularly RTPI 2023 and PIA 2023) are more recently updated and more systematically enforced, while some Eastern bodies (notably the EPA and,

structurally, UPSC) operate in governance environments that constrain professional independence. Third, the Philippines and Japan present the largest structural gaps: the former due to capacity and framework currency limitations, the latter due to the absence of a single enforceable professional ethics code covering all planners. Sanchez et al. (2024) made a similar finding for the U.S. context, noting that ethical AI implementation in planning requires transparency, inclusive data sets, public engagement, and robust ethical guidelines — elements that no current code yet mandates in AI-specific terms.

IV. AI DATA CENTERS AND THE ENVIRONMENTAL PARADOX IN URBAN PLANNING

One of the most important — and often neglected — tensions in AI-driven sustainable urban planning concerns is environmental damage: simply put, digital infrastructure requires energy. Urban planners who embrace AI as a means of creating climate-resilient, low-carbon cities also need to grapple with the carbon and water footprints of the data center infrastructure that enables AI. The evidence from recent studies is both significant and grim. In 2024, the electricity generation attributed to global data centers could have emitted around 182 million metric tons of CO₂ and consumed 560 billion liters of water (de Vries-Gao, 2026), according to estimates from the International Energy Agency (IEA). In the U.S., data centers consumed over 4% of total electricity from September 2023 to August 2024, with over half of that electricity (56%) coming from fossil fuels and producing over 105 million metric tons of CO₂ equivalent — accounting for 2.18% of all United States emissions (Guidi et al., 2024). The carbon intensity of data centers in the United States was 48 percent greater than the national average, a stunning fact considering these facilities cluster in areas where clean energy is far from representing the preponderance of grid power. The environmental risks are expected to rise sharply. Data centers are projected to use a total of 415 terawatt-hours (TWh) worldwide in 2024, rising to about 945 TWh by 2030 thanks to AI's computational intensity (Gbenga et al., 2025). Add to the mix that by 2030, the Electric Power Research Institute (EPRI) estimates data centers could consume up to 9 percent of U.S. electricity generation annually. However, even conventional data centers cause an accelerating cycle of energy consumption where cooling infrastructure per se significantly contributes to carbon footprints (Mondal et al., 2023)

What should urban planners and policymakers do with this environmental paradox? Several actionable pathways are evident from the literature. First, renewable energy integration is the quickest path to mitigation. Research by Gbenga et al. (2025) concluded that solar, wind and hydropower — which

have seen an 80% drop in costs since 2010 and a roughly 50% plummet in price over the same period— are this scalable power solution for decarbonizing data centers. Liquid and immersion cooling technologies reduce energy use by 20–30% over conventional air-cooled facilities. Second, a strategy is already inherent in task with AI-driven optimization of energy efficiency in data center: review by Isazadeh et al. suggested (International Journal of Applied Science [IJAS], 2025), that the implementation of digital twin applications and edge AI deployment would enable annual energy savings of between 8–12% in data center operations. Third, frameworks that include green data center standards and reporting requirements should be integrated into smart city policy approaches, requiring technology vendors to urban AI contracts to disclose energy sources, power usage effectiveness (PUE), and water usage effectiveness (WUE).

For urban planners in particular, the ramifications are twofold. As people who play a central role in regulating land use, planners have an interest in data center siting decisions — including zoning controls, proximity to renewable energy corridors, water access assessments and environmental impact requirements. As AI users, planners can also call on their professional bodies to develop procurement standards which prefer or mandate that AI vendors demonstrate credible commitments to sustainability. The AICP's public interest mandate, the PIA's competency and due diligence provisions, the RTP's evidence-based advice requirement, or the SIP's openness and accuracy obligations — each of these ten ethics codes and conduct frameworks is a source of ethical grounding for this advocacy.

V. CONCLUSION

This comparative SWOT analysis has captured both diverse and uneven landscape of AI in urban planning across ten (10) countries representing Western to Eastern contexts. The analysis shows how AI is not a neutral technology deployed uniformly across the planning systems, but in fact adopted through — and influenced by — the national context of institutional, cultural, governance and resource conditions. While Western contexts have strong professional infrastructure, traditions of open data

and mechanisms for ethical accountability, they also come up against the divisions in governance between local level or state level. This context with its discrepancies in capacity anywhere from large to small municipalities that struggle even to maintain adequate information mapping processes within their jurisdictions challenges any serious enforcement of good data practices on a micro-level—combined with legitimate public fears about data sovereignty. Eastern case studies — especially those of Singapore, the UAE and China — expose centralized governance to facilitate rapid, large-scale AI deployments, with potential for impressive planning innovations but sometimes sacrificing transparency, participation and civil liberties. Countries such as the Philippines face a different challenges like capacity constraints and infrastructure shortfalls that threaten to keep them, in the role of beneficiaries, rather than designers of AI-enabled urban futures.

In all contexts, existing professional codes do not adequately address the ethical demands of AI planning, although the RTPI (2023), PIA (2023), and AICP (2022) codes represent the most up-to-date starting points. Most importantly, no code has addressed a. i. in concrete and actionable language. The SIP Code’s provisions on openness, accuracy, and non-discrimination; the CIP’s public interest mandate; and the PIA’s due care and diligence requirements all have direct relevance to AI but need elaboration specific to that technology if they are to be operationally useful in practice by planners. This approach has revealed an aspect of AI urbanism that planning literature has neglected: the environmental impacts that the data infrastructure associated with the delivery of AI has. Advocates of AI for climate resilience that do not consider the data center’s carbon and water footprints are negating, therefore unsustainably framing, the discourse on the smart city. To reconcile this, urban planners must not only be consumers of AI, but must also become AI governance regulators, utilizing the land use control, environmental impact, and public accountability instruments to the infrastructure of the digital universe.

VI. NEXTSTEPS

The urgent step is for the professional planning associations to develop AI in urban planning use and limitation - specific annexes, or amendments, to each country’s existing professional code of ethics and conduct. As this analysis has shown, none of the ten (10) planning bodies explored here have yet adopted enforceable AI-specific provisions. Professional institutes — specifically those who have most recently updated their codes, such as the Royal Town Planning Institute (RTPI) (2023) and the Planning Institute of Australia (PIA) (2023) — are best placed to lead this work. For a model that could be codified in binding code language, the 2024 American Institute of Certified Planners (AICP) AI Ethics Guidance. For the Philippine Institute of Environmental Planners (PIEP) this is an opportunity to create country-relevant AI ethics standards — standards that reflect the realities of people living in informal settlements, disaster risk, and digital capacity gaps — contexts missing from frameworks created in higher-income countries. The adoption of data center environmental standards into smart city and urban AI procurement frameworks is the next important step. Urban planners already have the regulatory tools to require siting conditions, environmental impact analyses, and energy disclosure for data center projects. The following actions are needed to jumpstart these tools: integrate AI infrastructure sustainability factors with comprehensive land use plans (CLUPs), zoning ordinances, and smart city policy documents across all ten jurisdictions reviewed.

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