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Introduction

The Council of Asian Liberals and Democrats (CALD) was formed in 1993 out of the recognition of leaders of like-minded political parties in Asia of the need for a dynamic forum promoting discussion and exchange of ideas regarding trends and challenges affecting democracy, human rights and the rule of law in the region.

In 2019, CALD launched a Smart City Blueprint Project to assist select local governments under CALD member parties to develop and make recommendations for their smart city design. While smart cities are mostly defined through its technological aspects, recent developments emphasize the quality of government services and citizen welfare. This can make the smart city a political tool for democratic values at the local level at a time when many national governments in Asia are reeling from the effects of populism and authoritarianism.

By reviewing the efforts of other organizations, this document is aimed at helping CALD differentiate the assessment tool that is crucial to is Smart City Blueprint Project from its competition.

A primer on Smart Cities

The World Bank (Vein 2017), Asian Development Bank (Ramamurthy, et al. 2018), and McKinsey (Woetzel, et al. 2018) consider the use of digitalization, information, and communications technology (ICT), cloud technology, big data, artificial intelligence, and the internet of things (IoT) to improve the delivery of services while also improving the quality of life of citizens in what is now coined as the "smart city" strategy. While the smart city concept gained traction with these think-tanks as of late, the core idea can be traced in the 1990s albeit the term itself was not yet coined at that time.

In a meta-analysis by Ingwersen and Serrano-Lopez (2018), the first mention of "smart cities" in publication titles was in 1999. From 1990 to 1998 and from 2008 to 2016, relevant studies focused on sustainability in energy, transportation, and the environment. Then from 2008 to 2016, researches focused on the multidisciplinary nature of smart cities. Meanwhile, Cohen (2015) traces three (3) generations of smart cities: (i) technology-driven, (ii) technology-enabled, city-led, and (iii) citizen co-creation. Deakin and Al Waer (2011) has previously discussed that in the transition to smart cities, the importance of innovations and creative partnerships were lost.

The existing literature points to a perennial problem in smart cities: its definition. In a quick comparison, Cavada et. al. (2014) explain that different agencies define smart cities differently and can thus be categorized based on stakeholders (people, governance, or companies) and themes (ICT, resilience & sustainability, or innovation & business).

Consequently, the definition shapes the metrics of a successful "smart city." Following the literature that has been discussed, this review of literature will look at smart city metrics across 3 different stakeholders: the private sector, governance, and the people-the latter in the purview of climate change and vulnerability. The term "metrics" shall encompass a

wide variety of literature in this paper: from scorecards, norm-building exercises/networks, and events as they provide ways of (re)framing smart cities and how they should be assessed and provide an overview of the "competition" for efforts at large.

I. Smart Cities from the lenses of the private sector

Aspects covered in the to			ool							
			(parallels to the CALD tool)							
	Case	Scope of assessment	City Leadership	City Manageme	Best Practices	Citizen Engagemen	Use of data	ICT Infrastructur	Ecosystems	
	Frame	works from private-	led thir	nk-tanks	;					
1.	Smart cities: Digital solutions for a more livable future by McKinsey & Company	City-wide; Part of a study				۲	۲	۲	۲	
2.	<i>How Smart is your city?</i> By the IBM Institute for Business Value	City-wide; configurable as a bought service		۲		۲	۲	۲	۲	
3.	Building the Smart City: Smart city 2.0 framework by the Deloitte Center for Government Insights	City-wide; Part of a white paper				۲	۲	۲	۲	
4.	Smart City Ranking by ABI Research	City-wide; Part of a study	۲				۲	۲	۲	
		Standards boo	lies							
5.	ISO/TS 37151	Bought service as a standard					۲	۲	۲	
6.	BS ISO 37106:2018 - Sustainable cities and communities by BSI	Bought service as a standard	۲	۲		۲	۲	۲	۲	
7.	P2784 - Guide for the Technology and Process Framework for Planning a Smart City of the IEEE Smart Cities (IEEE.org)	Bought service as a standard					۲	۲	۲	
8.	Smart Cities Technology Roadmap of the ATIS group	Technical recommendations on a per-project basis					۲	۲	۲	
	P	rivate initiatives and	l produ	cts						
9.	Smart City Asia Pacific Awards and Smart Development Index of the International Data Corporation (IDC) Asia/Pacific	Per project-basis; Awarded annually	۲	۲		۲		۲	۲	
10.	Smart City Opportunity Assessment by Miovision	Bought service for projects					۲	۲		

1. Smart cities: Digital solutions for a more livable future



McKinsey Global Institute

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City	City	Best Practices	Citizen	Use of data	ICT	Ecosystems
Leadership	Management		Engagement		Infrastructure	

ORGANIZATIONAL PROFILE

The McKinsey Global Institute is the business and economics research unit of one of, if not the largest management consulting company McKinsey & Company. The company is a leading global consulting firm for business strategy and management.

RATIONALE FOR THEIR TOOL/PRODUCT

As part of the urbanization and technology thrust of the McKinsey Global Institute (MGI), the firm released a toolkit that analyzed various cities across the globe. The think-tank's work is seen to help "business and policy leaders understand the forces transforming the global economy and prepare for the next wave of growth," (McKinsey Global Institute 2018).

SALIENT POINTS OF THE TOOL

The 2018 tool looks at the role of data and technology in improving the quality of life as part of their research paper that aims to advance the need to pursue a smart city initiative. They looked at three (3) layers of smartness on top of traditional physical and social infrastructures: (i) technological base composed of devices and sensors, (ii) smart applications and data analysis, and (iii) adoption and usage by around 50 cities around the globe. Each layer had a scoring mechanism, thereby creating an index per city.

For the layer on smart applications, their tool looked at the impact of in eight (8) domains: security, healthcare, mobility, energy, water, waste, economic development & housing, and engagement & community. Selected indicators were baselined and measurement was arrived to gauge the impact of smart applications, thereby providing a comprehensive look at the impact of smart cities across various aspects.

On the one hand, city leadership and management were not considered in their scoring mechanisms. On the other hand, the whole paper/tool promotes smart governance and is targeted to policymakers.

For further information, please visit:

https://www.mckinsey.com/~/media/mckinsey/industries/capital%20projects%20and%20 infrastructure/our%20insights/smart%20cities%20digital%20solutions%20for%20a%20mo re%20livable%20future/mgi-smart-cities-full-report.ashx



ORGANIZATIONAL PROFILE

IBM is an American multinational information technology (IT) firm. The company has been in the hardware and software markets but has also ventured into (server) hosting and consulting services for technology.

RATIONALE FOR THEIR TOOL/PRODUCT

As part of the IT firm's research initiatives and unbundling of support services from the sale of hardware, IBM founded a unit that, in turn, became the IBM Global Services of today. This department provided consultancy services for technological applications in businesses.

SALIENT POINTS OF THE TOOL

Like the McKinsey tool, the IBM tool (2009) is also part of the research of the think-tank on how the smart city approach contributes to development. It also looks at the traditional infrastructure, herein the core system elements, and how these can be made smarter in three (3) levels: instrumentation, interconnection, and intelligence. The IBM tool assesses these layers across the following domains: city services, (quality of life of) citizens, business, transport, communication, water, and energy.

The tool presupposes a city's vision and strategy and the preparedness for such is not part of their assessment tool. They also sell the service as an assessment that provides a holistic and comprehensive view of the city while being tailor-made to the vision and external factors. While benchmarking is possible as part of the service, the cities are not assessed on how they specifically learn from other cities.

For further information, please visit: <u>https://www.ibm.com/downloads/cas/KLEYQE6Z</u>.

Deloitte Center for Government Insights

3. Building the Smart City: Smart city 2.0 framework

Deloitte



ORGANIZATIONAL PROFILE

Deloitte is a London-based multinational professional services firm. The firm created the Deloitte Center for Government Insights to provide thought leadership in the public sector.

RATIONALE FOR THEIR TOOL/PRODUCT

In 2018, Deloitte started to push for initiatives they consider as Smart City 2.0. Deloitte partners Sen, et. al. (2018) consider connected infrastructure as Smart City 1.0 while the intersection of Data, Digital, and (user) Design as the building blocks of Smart City 2.0 that build upon the former layer. The firm then released a white paper explaining such a framework.

SALIENT POINTS OF THE TOOL

The Deloitte Smart City 2.0 framework looks at four (4) aspects, each with their own components:

- Constituents,
 - o Engagement,
 - o Inclusion,
 - o Transparency, and
 - o Collaboration;
- Domains,
 - o Economy,
 - o Mobility,
 - o Security,
 - o Education,
 - o Living, and
 - o Environment;
- Infrastructure,
 - o Information and communication technology, and
 - Cybersecurity and analytics; and
- Goals
 - o Economic competitiveness,
 - o Sustainability, and
 - o Quality of life.

I. Smart Cities from the lenses of the private sector

For further information, please visit:

https://www2.deloitte.com/content/dam/Deloitte/us/Documents/public-sector/us-fedbuilding-the-smart-city.pdf I. Smart Cities from the lenses of the private sector



ORGANIZATIONAL PROFILE

ABI Research (n.d.) is an American intelligence firm that provides research and consultancy on "transformative technologies that are reshaping industries, economies, and workforces." They claim that their research is data-driven and provides analyses across important markets.

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RATIONALE FOR THEIR TOOL/PRODUCT

ABI Research published a Smart City Ranking on 2Q 2018 to provide benchmarks and hopefully an opportunity for cities to learn from other's best practices.

SALIENT POINTS OF THE TOOL

The Smart City Ranking covers ten (10) megacities: New York, Los Angeles, Paris, London, Dubai, Beijing, Shanghai, Singapore, Tokyo, and Seoul. Each city was then ranked according to metrics in the following:

- Congestion,
- Air quality,
- Gross Domestic Product,
- Crime rates,
- Cost of living,
- Out-of-the-box thinking (innovation), and
- Plans for the deployment of disruptive technologies.

These benchmarks were weighed on their impact on mobility, transportation, energy, education, healthcare, and public services.

While the tool was envisioned by the firm to foster the adoption of best practices, a city's own adoption of best practices is not part of the ranking. And while leadership is part of its metrics, management is not. The ranking is a purchasable product.

For further information, please visit: <u>https://www.abiresearch.com/market-</u>research/product/1028389-smart-city-ranking/

5. ISO/TS 37151:2015(en) Smart community infrastructures



International Organization for Standardization (ISO)

	<u> </u>			С, С,		
City	City	Best Practices	Citizen	Use of data	ICT	Ecosystems
Leadership	Management		Engagement		Infrastructure	
22	22	22	22	۲		

ORGANIZATIONAL PROFILE

The International Organization for Standardization (ISO) is the most renowned standards organization with membership from 164 national standards bodies. The Geneva-based nongovernment organization (NGO) prepares documents that outline requirements, specifications, and guidelines to facilitate international exchange–or standards.

RATIONALE FOR THEIR TOOL/PRODUCT

To facilitate international trade of "community infrastructure products and services and disseminate information about leading-edge technologies to improve sustainability in communities," (ISO 2015) the standards body created technical specification (TS) 37151. The technical specification provides performance metrics and recommendations for its target users: national and local governments, regional organizations, community planners, developers, community infrastructure operators, community infrastructure vendors, and NGOs.

SALIENT POINTS OF THE TOOL

In ISO/TS 37151, ISO considers smart city components in energy, water, transportation, waste, information, and communications technology as important enablers of sustainable development goals (SDGs) and pro-poor growth. For these components, ISO provides metrics for smartness, interoperability, synergy, resilience, safety, and security.

As a technical specification, the tool does not look at city leadership nor management and does not measure a city's efforts to learn from best practices. ISO/TS 37151 must be purchased.

For further information, please visit: <u>https://www.iso.org/obp/ui/#iso:std:iso:ts:37151:ed-1:v1:en</u>

6. BS ISO 37106:2018 - Sustainable cities and communities. Guidance on establishing smart city operating models for sustainable communities



British Standards Institution (BSI)



ORGANIZATIONAL PROFILE

The British Standards Institution (BSI) is the national standards body of the United Kingdom. The UK national standards body also operates in 193 countries and is a member of the International Organization for Standardization (ISO).

RATIONALE FOR THEIR TOOL/PRODUCT

While a non-profit body in the United Kingdom, BSI commissions standards products such as Publicly Available Specifications (PASs). BSI worked with Future Cities Catapult for a Cities Standards Institute and a product of this partnership is PAS 181 - Smart City Framework. To include new learnings and add an international purview on smart cities, BS ISO 37106 was launched as a successor to the now-deprecated PAS 181 (BSI 2018).

SALIENT POINTS OF THE TOOL

BS ISO 37106 is designed for city leaders in both public (city authorities) and private (business executives and community groups) spheres. This standard focuses on service delivery, budget-setting, accountability, and other processes necessary to make cities smart. It also looks at addressing the needs of citizens, physical and digital planning, and addressing emerging challenges.

The tool assesses a city across four (4) key areas: guiding principles, cross-city governance, and delivery processes, benefit-realization strategy, and critical success factors. As such, a city must have both vision and ICT infrastructure, while addressing key bottomlines. However, it does not measure a city's efforts to learn from best practices. BS ISO 37106 is a purchasable product.

For further information, please visit: <u>https://shop.bsigroup.com/upload/Smart_cities/BSI-PAS-181-executive-summary-UK-EN.pdf</u> and <u>https://shop.bsigroup.com/ProductDetail/?pid=0000000030348126</u>

7. P2784 Guide for the Technology and Process Framework for Planning a Smart City



Institute of Electrical and Electronics Engineers (IEEE)



ORGANIZATIONAL PROFILE

The Institute of Electrical and Electronics Engineers (IEEE) is a New York-based professional association for electronic engineering and electrical engineering. IEEE (n.d.) provides its global audience publications, conferences, technology standards, and professional and educational activities related to engineering, computing, and technology information.

RATIONALE FOR THEIR TOOL/PRODUCT

The Communications Society/Standards Development Board of IEEE created guide/standard P2784 for "technologies and the processes for planning the evolution of a smart city," (IEEE n.d.). This project is only one of many other standards activities for Smart Cities by IEEE. The other standards provide technical guidance on the Internet of Things, Smart Networking and Connectivity, Smart Transportation, Smart Homes and Buildings, Smart Technologies, Security, and Learning Technologies (IEEE 2018). Unlike these industry-setting standards, P2784 is a separate project sought to create a planning standard.

SALIENT POINTS OF THE TOOL

The P2784 used to be available in the IEEE Standards store but is yet to be reinstated as their website is going through updates. This section will be updated once P2784 can be found again from the IEEE Standards Store. Nevertheless, the IEEE Smart City initiative is mostly concerned with the technical aspects of a smart city.

For further information, please visit <u>https://standards.ieee.org/project/2784.html</u> and <u>https://smartcities.ieee.org/</u>.



ORGANIZATIONAL PROFILE

The Alliance for Telecommunications Industry Solutions (ATIS) is a standards organization for the information and communication technologies (ICTs) sector. The standards alliance is joined by telecommunication companies and has provided guidelines across different technologies.

RATIONALE FOR THEIR TOOL/PRODUCT

The ATIS group (n.d.) is seeking to target planners and decision-makers to invest in data management and partner with relevant technological firms. Their roadmap is meant to be a data-centric approach to smart cities that targets city leaderships and firms that are ATIS members in an approach they believe can foster dialogue in data sharing.

SALIENT POINTS OF THE TOOL

Their roadmap provides a checklist of technological necessities for data-driven smart cities by looking at how technology enablers affect future and legacy applications. As such, managing the smart city platform requires the management of connected devices and application enablement platforms. They provide technological recommendations on addressing the following: energy, smart buildings, water and wastewater, waste management, education, public safety, healthcare, government services, tourism and economic development, citizen engagement, and transportation. However, the whole roadmap is still technology-driven.

For further information, please visit: <u>https://access.atis.org/apps/group_public/download.php/34053/ATIS-I-0000058.pdf</u>

9. Smart City Asia Pacific Awards and Smart Development Index

International Data Corporation (IDC) Asia/Pacific





ORGANIZATIONAL PROFILE

Founded in 1964, the International Data Corporation (1964) is a US-based "global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets," (IDC n.d.). IDC has 1,100 analysts in over 110 countries in the ICT sector. They serve technology suppliers and IT buyers, assist businesses and IT leaders, and provide advisory in its "IT Executive Programs."

RATIONALE FOR THEIR TOOL/PRODUCT

The Smart City Asia Pacific Awards is part of the Smart Development Index initiative of IDC. The Smart Development Index targets smart city planners and governments.

SALIENT POINTS OF THE TOOL

The Smart City Asia Pacific Awards annually selects government project/s on each of the following areas:

- Administration;
- Civic Engagement;
- Digital Equality and Accessibility;
- Economic Development, Tourism, Arts, Libraries, Culture, Open Spaces;
- Education;
- Public Health and Social Services;
- Public Safety Disaster Response/Emergency Management;
- Public Safety Smart Policing;
- Smart Buildings;
- Smart Water;
- Sustainable Infrastructure;
- Transportation Connected & Autonomous vehicles, public transit, ridehailing/ridesharing;
- Transportation Transport Infrastructure; and
- Urban Planning and Land Use.

For further information, please visit <u>https://www.idc.com/ap/smartcities/about/dev-index/</u> and <u>https://www.idc.com/ap/smartcities/awards-judgement/</u>.

I. Smart Cities from the lenses of the private sector

10. Smart City Opportunity Assessment

Miovision

miovision



ORGANIZATIONAL PROFILE

Miovision is a Canada-based firm that started as a traffic solutions company that expanded into smart city issues.

RATIONALE FOR THEIR TOOL/PRODUCT

They are selling a smart city opportunity assessment product to tie into their traffic-related technological solutions.

SALIENT POINTS OF THE TOOL

The company provides solutions for multimodal detection, traffic studies, signal maintenance, signal communications, traffic operations, and traffic project analysis. While they look at the use of data and existing ICT infrastructure as a company, the other contents of their assessment tool are not publicly available.

For further information, please visit: <u>https://miovision.com/smart-city-assessment/</u>



			Aspects covered in the tool				ool		
				(p	arallels	to the C	CALD to	ol)	1
	Case	Scope of assessment	City Leadership	City Manageme	Best Practices	Citizen Engagemen	Use of data	ICT Infrastructur	Ecosystems
1.	Smart City Guidance Package by the European Innovation Partnership on Smart Cities and Communities of the European Commission	City-wide	۲	۲	۲	۲	۲		
2.	SMART CITY TOOL - Assessment Tool for Smart Cities in bee smart city	Per-project basis	۲				۲	۲	
3.	World City Smart Awards of the Smart City EXPO World Congress	City-wide or per- project basis; Awarded annually		۲		۲	۲	۲	۲
4.	Performance Measurement Framework by CITYKeys	City-wide or per- project basis	۲	۲		۲			
5.	Smart Cities Maturity Self- Assessment tool by UrbanTide	City-wide; assessment bought as a service	۲	۲		۲	۲	۲	۲
6.	City Needs Assessment: Smart Cities, Mobility, Walkability, and Emissions by CITYNET	City-wide; needs assessment only	۲	۲	۲	۲		۲	

1. Smart City Guidance Package

European Innovation Partnership on Smart Cities and Communities of the European Commission (EIP-SCC)





ORGANIZATIONAL PROFILE

The European Innovation Partnership on Smart Cities and Communities (EIP-SCC) is a networking platform initiated by the European Commission. The platform connects cities and service providers and provides guidelines. It also groups projects, documents, members, and discussions into six (6) action clusters: (i) citizen focus, (ii) business models, finance and procurement, (iii) integrated infrastructure and processes, (iv) integrated planning, policy, and regulations, (v) sustainable districts and built environment, and (vi) sustainable urban mobility (EIP-SCC n.d.).

RATIONALE FOR THEIR TOOL/PRODUCT

The Integrated Planning, Policy, and Regulations action cluster of the EIP-SCC created a Smart City Guidance Package (SCGP) for public authorities and non-government actors that plan and manage smart city projects. The tool is also recommended to cities participating in the Covenant of Mayors for Climate and Energy initiative—a network of European mayors.

SALIENT POINTS OF THE TOOL

The tool does not adopt a single, consolidated tool for smart city design (and in turn, assessment). Instead, the package provides various tools and recommendations on how each phase of planning and implementation can be conducted. While the tool helps prepare cities towards adopting a vision and a management plan, and while it underscores citizen engagement and the need to learn from other best practices, the package does not emphasize ICT infrastructure and the ecosystem involved.

For further information, please visit: <u>https://eu-smartcities.eu/sites/eu-smartcities.eu/files/2019-</u> <u>07/Smart%20City%20Guidance%20Package%20LowRes%201v22%20%28002%29_0.pdf</u>



ORGANIZATIONAL PROFILE

The bee smart city is a global networking platform that facilitates the exchange of smart city best practices and solutions. Its knowledge center provides strategies, solutions, insights, and knowledge of events and tenders. They also provide advice to public and private companies for digital transformation. Through the networking element of the platform, bee smart city gets to tag trends in smart city solutions. The platform also ranks each city based on the number of smart city solutions (see: <u>https://www.beesmart.city/ranking</u>).

RATIONALE FOR THEIR TOOL/PRODUCT

In 2015, bee smart city started development on its Smart City Tool (SCTOOL) to provide an assessment on technologies, service delivery and needs adaptation to end-users of smart cities. This tool was piloted in Irunea, Spain.

SALIENT POINTS OF THE TOOL

The tool employed quantitative and qualitative indicators in mobility, energy efficiency, and quality of life and the percentage of implementation of solutions in each sector. In turn, the tool allows for objective and comparable scores (Branchi, SMART CITY TOOL - Assessment Tool for Smart Cities 2015). They also assess the existence and dissemination of a smart city strategy and their existing technology and systems (Branchi, Fernandez-Valdivielso and Matias 2017).

For further information, please visit: <u>https://www.beesmart.city/solutions/smart-city-tool-assessment-tool-for-smart-cities</u> and <u>https://www.mdpi.com/2079-8954/5/1/8/htm</u>

3. World City Smart Awards

Smart City EXPO World Congress





ORGANIZATIONAL PROFILE

Started in 2011, the Smart City EXPO World Congress (SCEWC) is one of, if not the largest event for the smart city initiative. The event was created to feature sustainable initiatives to help address climate change.

RATIONALE FOR THEIR TOOL/PRODUCT

The 2019 run of the event focuses on smart implementation at scale, new governance models, new technologies, and new ways of processing information.

SALIENT POINTS OF THE TOOL

In the 2019 World Smart City Awards (WSCA), each entry (either a city or a project) must be entered under one of the following topics: (i) digital transformation, (ii) urban environment, (iii) mobility, (iv) governance and finance, and (v) inclusive and sharing cities. The entries are then evaluated based on the following:

- Innovation,
- Relevance,
- Impact,
- Scope of implementation,
- Citizen Engagement and Co-Creation,
- Inclusivity,
- Feasibility,
- Replicability,
- Multi-stakeholder collaboration, and
- Soundness.

While the topics are diverse enough to allow for both technological and non-technological approaches to smart cities, a city or a project is not necessarily weighed on both aspects. Learning from best practices is also not accounted for in the awards.

For further information, please visit:

http://www.smartcityexpo.com/documents/11491498/a6b645bb-486f-43c6-8df8ec0540f6c9a4 II. Smart Cities as e-governance 2.0 or as part of new public management



ORGANIZATIONAL PROFILE

The European Commission has two (2) tracks for smart city initiatives: lighthouse projects or large-scale implementation of technologies in cities, and horizontal activities or initiatives that address a specific challenge. The CITYKeys project is under the horizontal activities track meant to "develop and validate, a holistic performance measurement framework for future harmonized and transparent monitoring and comparability of European cities," (CITYKeys n.d.).

RATIONALE FOR THEIR TOOL/PRODUCT

The project itself is meant to develop a performance measurement framework. It compiles various indicators meant to address the triple bottom line of people, planet, and profit. The project has separate indicators for projects and cities allowing for assessment of both smaller initiatives and of cities as a whole.

SALIENT POINTS OF THE TOOL

Below are their city and project indicators:

- 1. People
 - 1.1. Health
 - 1.2. Safety
 - 1.3. Access to other services
 - 1.4. Education
 - 1.5. Diversity and social cohesion (for projects only)
 - 1.6. Quality of housing and the built environment
- 2. Planet
 - 2.1. Energy and (climate change) mitigation
 - 2.2. Materials, water, and land
 - 2.3. Climate resilience
 - 2.4. Pollution and waste
 - 2.5. (Environmental) ecosystem

- 3. Prosperity
 - 3.1. Employment
 - 3.2. Equity
 - 3.3. Green economy
 - 3.4. Economic performance
 - 3.5. Innovation
 - 3.6. Attractiveness and competitiveness
- 4. Governance
 - 4.1. Organization towards contribution to smart cities
 - 4.2. Community involvement
 - 4.3. Multi-level governance
- 5. Propagation (for projects only)
 - 5.1. Replicability and scalability
 - 5.2. Factors of success

II. Smart Cities as e-governance 2.0 or as part of new public management

For further information, please visit:

http://nws.eurocities.eu/MediaShell/media/CITYkeyslistofcityindicators.pdf and http://nws.eurocities.eu/MediaShell/media/CITYkeyslistofprojectindicators.pdf



ORGANIZATIONAL PROFILE

UrbanTide was formed in 2014 by former team members of a smart city demonstrator project for Glasglow, UK. UrbanTide provides a data platform that identifies and maps the Internet of Things (IoT) and Artificial Intelligence (AI) to provide API curation and open data publication (UrbanTide n.d.).

RATIONALE FOR THEIR TOOL/PRODUCT

The Scottish Government and the Scottish Cities Alliance commissioned UrbanTide to create the Smart Cities Maturity Self-Assessment Tool. The tool was designed to help cities find the level of their progress and as such, help them align initiatives towards reaching their desired level of maturity or progress. The tool is compatible with PAS 181.

SALIENT POINTS OF THE TOOL

The tool helps cities assess their status within five (5) levels across three (3) aspects. From least mature to most mature: (1) ad-hoc, (2) opportunistic, (3) purposeful and repeatable, (4) operationalized, and (5) optimized; and the aspects are (1) city management, (2) smart city status and (3) effect on outcomes.

To ascertain a city's level, a city scores its maturity based on (i) strategic intent, (ii) data, (iii) technology, (iv) governance and service delivery, and (v) citizen and business engagement.

For further information, please visit:

https://static1.squarespace.com/static/5527ba84e4b09a3d0e89e14d/t/55aebffce4b0f89 60472ef49/1437515772651/UT_Smart_Model_FINAL.pdf



ORGANIZATIONAL PROFILE

CityNet is an Asia-Pacific based network that was established in 1987 with a Seoul-based secretariat. For 2018-2021, the Makati City Government sits as the First Vice President, Muntinlupa City as Auditor, and the League of Cities of the Philippines as a member of the Executive Committee.

RATIONALE FOR THEIR TOOL/PRODUCT

In 2018, CITYNET worked with Korea Associates Business Consultancy Ltd. (KABC Ltd.) for a study that canvassed opinions of 28 cities and five (5) associate members, and eight interviews with experts from Delhi, Jakarta, Taipei, Kuala Lumpur, Galle, and Hanoi. This survey compiled important indicators for smart cities, with results grouped by city size.

SALIENT POINTS OF THE TOOL

The study itself is not a self-assessment tool. However, it advances citizen-driven, less technological (and more affordable) approaches while encouraging learning from best practices. The study itself provides baseline data but it does not map out an aspiration vision for cities.

For further information, please visit: <u>https://citynet-ap.org/wp-</u> content/uploads/2019/03/CityNet-Infrastructure-Survey_Final_For-Website.pdf

III. Smart Cities for the future: addressing climate change and vulnerability

			Aspects covered in the tool (parallels to the CALD tool)							
	Case	Scope of assessment	City Leadership	City Manageme	Best Practices	Citizen Engagemen	Use of data	ICT Infrastructur	Ecosystems	
1.	Smart City Projects Assessment Matrix: Connecting Challenges and Actions in the Mediterranean Region by the European Investment Bank and the Universidad Politecnica de Madrid	City-wide	۲	۲	۲	۲	۲			
2.	ClimateSMART Cities Assessment Framework by the Ministry of Housing and Urban Affairs, India	City-wide	۲				۲	۲		
3.	<i>Project Screening Tool</i> by Cities Development Initiative for Asia	Per-project basis	۲	۲						

European 1. Smart City Projects Assessment Matrix: Investment **Connecting Challenges and Actions in** Bank the Mediterranean Region Fernandez-Anez, et.al. (European Investment Bank and the Universidad Politecnica de Madrid)





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Citizen Engagement ۲

Use of data ۲

ICT Infrastructure

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ORGANIZATIONAL PROFILE

The European Investment Bank (EIB) is the lending arm of the European Union established in 1958 under the Treaty of Rome to finance the European integration. EIB funded the Assessing Smart City Initiatives for the Mediterranean Region (ASCIMER) project to create "a comprehensive framework that allows public and private stakeholders to make informed decisions about Smart City investment strategies," (EIB 2017).

RATIONALE FOR THEIR TOOL/PRODUCT

The ASCIMER Project envisioned an assessment methodology that weighs the contexts and particularities of a city (context and object) in innovation, integration, and inclusion (Smart City Project or SCP criteria) with quality assessment. This led to the ASCIMER Smart City Projects Assessment Matrix (SC[PAM]). SC[PAM] was developed in partnership with the Transport Research Center of the Universidad Politecnica de Madrid.

SALIENT POINTS OF THE TOOL

SC[PAM] catalogs the city challenges of the Mediterranean region and cities are assessed on their initiatives to address these challenges based on the following dimensions and project areas:

- Smart Governance 1.
 - 1.1. Participation
 - 1.2. Transparency and information access
 - 1.3. Multi-level governance
 - 1.4. Efficiency in municipal management
 - Smart Economy
 - 2.1. Innovation
 - 2.2. Entrepreneurship
 - global 2.3. Local and interconnectedness
 - 2.4. Productivity
 - 2.5. The flexibility of the labor
 - market
- Smart Mobility 3
 - 3.1. Traffic management
 - 3.2. Public transport
 - 3.3. ICT infrastructure

- 3.4. Logistics
- 3.5. Accessibility
- Clean and non-motorized 3.6. options
- 3.7. Multimodality
- Smart Environment 4.1. Network

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5.

- and environmental monitoring
- 4.2. Energy efficiency
- 4.3. Urban planning and urban
- refurbishment
- 4.4. Smart buildings and building renovation
- 4.5. Resources management
- Environmental protection 46 4.7. Awareness and behavioral
- change Smart People

- 5.1. Digital education
- 5.2. Creativity
- 5.3. ICT-enabled work 5.4.
- Community building and urban life management
- 5.5. Inclusive society Smart Living
- 6.1. Tourism

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- 6.2. Culture and leisure
- 6.3. Healthcare
- 6.4. Security
- 6.5. Technological accessibility
- 6.6. Welfare and social inclusion
- 6.7. Public space management

III. Smart Cities for the future: addressing climate change and vulnerability

For further information, please visit: <u>https://institute.eib.org/wp-</u> <u>content/uploads/2018/09/2018_JUT_Smart_City_Projects_Assessment_Matrix_Connectin</u> <u>g_Challenges_and_Actions_in_the_Mediterranean_Region_publish.pdf</u>

2. ClimateSMART Cities Assessment Framework

Ministry of Housing and Urban Affairs, India





ORGANIZATIONAL PROFILE

The Ministry of Housing and Urban Affairs (MoHUA) of the government of India started a Smart Cities Mission to address demographic challenges and its targeted emissions reduction under its Intended Nationally Determined Contribution in 2015 in the Paris Agreement. The Smart Cities Mission covers 100 cities and is reported as a supportive mitigation and adaptive measure.

RATIONALE FOR THEIR TOOL/PRODUCT

MoHUA received support from the German development agency Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) to integrate climate aspects in the Smart Cities Mission. This partnership created the ClimateSMART Cities Assessment Framework.

SALIENT POINTS OF THE TOOL

The framework assesses a city based on the following:

- Energy and green buildings,
- Urban planning, green cover, and biodiversity,
- Waste management,
- Water resource management, and
- Mobility and air.

The tool is better appreciated as a supplementary tool for other smart city initiatives as it does not measure other smart city features.

For further information, please visit:

https://www.smartcitytvm.in/newsevents/climatesmart-cities-assessment-framework/ and https://www.giz.de/en/worldwide/75009.html

III. Smart Cities for the future: addressing climate change and vulnerability



ORGANIZATIONAL PROFILE

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The Cities Development Initiative for Asia (CDIA) is a trust fund ushered by the Asian Development Bank (ADB) and currently implemented by ADB and the Agence Française de Développement (AfD). The trust fund is used to support infrastructure projects that "emphasize poverty reduction, environmental improvement, climate change mitigation or adaptation, and good governance," (CDIA n.d.).

RATIONALE FOR THEIR TOOL/PRODUCT

The Rockefeller Foundation, one of the funders of CDIA, convened a meeting for urban climate change resilience in 2014. One of the working groups from the said meeting developed a tool to ensure, among others, the existence of a resilience strategy or action plan, the improvement of the investment climate, and assess a city's needs and the feasibility of projects.

SALIENT POINTS OF THE TOOL

The tool is a simple checklist based on the following:

- Screen 1: Have climate change adaptation infrastructure investment projects been identified and prioritized?
- Screen 2: Have climate change adaptation infrastructure investment projects been adequately profiled (most especially how much will these investments cost)?
- Screen 3: Have potential sources of financing for your infrastructure priorities been adequately screened and considered for suitability?
- Screen 4: Have municipal finances been reviewed and the ability of municipal government to secure financing for climate-resilient infrastructure investments assessed?

For further information, please visit: <u>https://www.beesmart.city/solutions/smart-city-tool-assessment-tool-for-smart-cities</u> and <u>https://www.mdpi.com/2079-8954/5/1/8/htm</u>

Smart Cities need not be expensive: a note on non-technological technologies

From 26 May to 02 June 2019, the International Academy for Freedom (IAF) of the Friedrich Naumann Foundation conducted a 6-day "Smart Cities and Modern Mobility" seminar. The seminar provided a "first-principles" take on the issue of smart cities. Veering away from the usual approach of showcasing grand projects of cities, the seminar aimed at distilling the relevant foundational principles on smart cities as a complex social phenomenon. These principles were then used as lenses to look at the smart city project progress at Duisburg, the excursion site, and at other cases and examples shared by the participants across the globe.

However, the IAF seminar challenges this preponderance on technology by contemplating the essence of technology: the reduction of transaction costs. Apps like Uber, Grab, and Airbnb reduces the costs of matching excess resources with those that need them. Carcounting sensors reduce the costs to the government who would have spent a lot more in sending volunteers to manually count passing vehicles. The availability of huge data points allows more efficient statistical analyses while cloud technologies reduce the costs of transferring information across systems. Such costs are transaction costs and the reduction leads to greater consumer surplus.

If there is any takeaway that the seminar facilitators hoped to impress, it's that innovations that reduce transaction costs are more important. These innovations do not always have to be technological in nature as policies that reallocate resources to maximize consumer surplus can be considered a "non-technological" technology/innovation. On the one hand, this allows resource-constrained countries to craft or think of such technologies without benchmarking their efforts vis-a-vis those of economically advanced countries. On the other hand, it can be argued that while smart technologies reduce transaction costs, not all innovations that reduce transaction costs can be considered "smart."

The CALD Smart Cities Assessment Tool

The CALD Smart Cities Blueprint Project hopes to assist select local governments under CALD member-parties to develop or improve their smart city blueprint. This will be done in three stages: (1) collect baseline data on select local governments (that may or may not have smart city initiatives); (2) conduct a specialized expert assessment of these local governments' readiness to either start embarking on smart city initiatives, or improve existing initiatives; and (3) convene representatives of these local governments in a regional workshop where they can learn concrete steps in putting their smart city vision into reality.

From 10 to 14 June 2019, around two-dozen delegates from 10 CALD member parties participated in a seminar-workshop in Seoul, South Korea that aimed to introduce the concept and characteristics of a "smart city." In this workshop, a preliminary version of the CALD Smart Cities Assessment tool was prepared.

To refine the said tool, CALD, in cooperation with the Democratic Progressive Party (DPP), the Pingtung County Government, and the Friedrich Naumann Foundation for Freedom (FNF) organized a follow-up seminar in Pingtung County, Taiwan on 23-27 August 2019 and presented the Smart Cities Assessment tool to the participants.

The tool

The CALD Smart Cities Assessment Tool provides a checklist of questions on seven (7) key smart city aspects. The city leaders who are intended to answer the tool score themselves on indicators for each aspect, and thus forming a Likert scale (from 1 or strongly disagree to 5 strongly agree). Because the indicators are aspirational, a lower score signals more opportunities for improvement, while a higher score means that a city is closer to the ideal vision of a smart city. For communities, that are yet to start smart city initiatives or consolidate their different projects into the smart city approach, the tool provides an assessment for their readiness. Meanwhile, communities that already have smart city initiatives will benefit from the tool as a "mid-term" assessment that may also widen their perspectives on the aspects of a smart city.

Below are the key aspects and their indicators:

- 1. City Leadership
 - 1.1. All city stakeholders have a mutual understanding of the smart city concept.
 - 1.2. The City has prepared a smart city strategic plan.
 - 1.3. There is an overall appointed city transformation officer.
 - 1.4. City departments have identified their smart city goals.
- 2. City management
 - 2.1. The City uses indicators and performance measures to set goals and measure progress.
 - 2.2. There is a process in place to capture problems faced by citizens and businesses.
 - 2.3. A progress report of smart city initiatives is available for the media and public.
- 3. Adoption of Best Practice
 - 3.1. The City is an active member of any smart city organizations or associations.
 - 3.2. The City is actively seeking out smart city partnerships with universities, corporations, non-profits, etc.
 - 3.3. The City officials are making visits to explore and verify implementation examples of best practices.
- 4. Citizen Engagement
 - 4.1. The City has a program rewarding internal employees for driving positive citizen engagement.
 - 4.2. The City is maintaining communication with community organizations, leaders and individual citizens.
 - 4.3. The City has identified and is actively protecting communities endangered by the digital divide.
 - 4.4. The City is maintaining and supporting a strong citizen feedback mechanism.
 - 4.5. The City is carrying out programs for people empowerment.
- 5. Data
 - 5.1. The City has public data policies, data ownership rules, and defined rights.

- 5.2. The City has a process to control data systems level of compliance with current regulations.
- 5.3. The City has a process to ensure a high level of data security.
- 5.4. The City has a program introducing data usage competencies to marginalized communities.
- 6. Infrastructure
 - 6.1. There is an up-to-date report on the current communications infrastructure in the municipality.
 - 6.2. There is an up-to-date report on the ICT resources of city stakeholders and city systems.
 - 6.3. There is a city strategy in place to develop and upgrade the ICT infrastructure.
- 7. Ecosystem
 - 7.1. The City has developed a strategy to develop and nurture a Smart City innovation ecosystem.
 - 7.2. The City is regularly reviewing and introducing incentives to smart city innovators and investors.
 - 7.3. The City is actively distributing ecosystem announcements and promoting the ecosystem in media channels.
 - 7.4. The City is actively supporting and engaging in local, national and global Smart City events.

The CALD tool vis-à-vis the other tools

Based on the cases presented above, most tools can be classified based on their focus: either on governance or on the technological aspects of smart cities. Most "tools," from the private sector or from firms that provide a paid product focus on the data, infrastructure and ecosystem components of a smart city. Meanwhile, "tools" from non-profits focus more on leadership and management.

The CALD tool has an obvious advantage in providing assessments in both areas. While there are tools that also approximate this advantage, the CALD tool is unique based on the following:

- 1. It emphasizes the role of adopting best practices from other cities and other actors;
- 2. It originates from stakeholders through a process that involved participating in political parties;
- 3. It is deployable for communities across different levels of smart city implementation (from zero projects to existing implementors); and
- 4. It allows for the co-creation of ideas with other stakeholders that can be involved in the assessment process through its self-explanatory design.

The CALD tool is primarily designed for city-wide cases, unlike other tools that can be used on a per-project/initiative basis. This can be considered as the scope of the tool but also presents an opportunity to craft a tool designed or addresses projects or initiatives. The latter may allow for engagement with cities without overarching plans but have initiatives that align with the overall vision or may serve as a supplementary tool to the city-wide assessment.

Feedback on the tool

Through a world-café format, participants of the Pingtung County, Taiwan seminar were able to provide invaluable feedback on the CALD tool. The feedback session grouped inputs based on (i) the assessment tool (its components and design), (ii) process (of administering the tool and (iii) output (or the expected output from CALD by participating in the project).

- 1. Assessment tool
 - There is a need to clarify the process and evaluation standards.
 - The "best" in "best practices" was found to be relative, and can be a bar set high for some.
 - Some found the need to define people's empowerment.
 - There is a need to clarify data usage competencies and define high-level data security.
 - The infrastructure section only touched on ICT infrastructure but not other forms such as waste management, energy, etc.
 - The acceptance of the ecosystem can be considered.
- 2. Process
 - The participation of stakeholders in the assessment is crucial.
 - It is also important to achieve public support in the process.
- 3. Output
 - A standardized metric was suggested. In this standardization, it was also recommended to clarify the level of the city being assessed as an outcome of the tool while finding concrete steps on how to move to the next level.
 - Policy briefs and other frameworks/data strategies, other than the CALD tool itself, may help cities should they join the project.
 - A repository of information (book or website) that compiles the cases of assessed cities may assist in learning from other practices while helping in tracking the progress of such cities.
 - Knowledge sharing between participating cities is important, e.g. social network on Signal, direct experience transfers, or sister-city partnerships.
 - Linking to experts and the promotion of cities in seminars will foster social capital exchange.
 - Some suggested that the tool be available in the following languages: English, French, Russian, Arabic, and Chinese.

CALD considered the valuable feedback of its members for the development of this tool and future related endeavors.

Other readings on smart cities

- Albanese, Jason. 2018. "What Does It Take to Build a Smart City?" *Inc.* October 10. <u>https://www.inc.com/jason-albanese/what-does-it-take-to-build-a-smart-city.html</u>.
 - Albanese argues that most cities that use data and technology can claim that they are smart. However, he cites four (4) key barriers to become "smarter":
 - Lack of infrastructure to support citywide smart projects,
 - Cities struggle to deploy technology efficiently,
 - Lack of resources to fund smart technology, and
 - Limited alignment or visibility to smart projects across municipalities.
 - In addition to this emphasis on a large-scale ecosystem, he argues for three
 (3) key technologies: 5G networks, transportation infrastructure, and blockchain.
- Anthopoulos, Leonidas G. 2015. "Understanding the Smart City Domain: A Literature Review." In *Transforming City Governments for Successful Smart Cities*, by Manuel Rodríguez-Bolívar. Springer. <u>https://link.springer.com/chapter/10.1007/978-3-319-03167-5_2</u>.
 - Anthopoulos finds that the smart city literature since the 1990s describes the approach based on different cases within urban spaces, e.g. knowledge management, agglomeration of ICTs, ICT infrastructures, etc. Various resources have a common theme of "urban economy, mobility, environment, living, people, and governance." He also finds that the ICT sector uses this approach to create new markets for them.
- Asian Development Bank. 2018. "What makes a city smart?" ADB Perspectives on Smart City. March. <u>https://events.development.asia/system/files/materials/2018/03/201803-adb-</u> perspectives-smart-city.pdf.
 - This material from ADB compiles their initiatives (and in turn, their perspectives) towards a "one ADB smart city approach." Their initiatives are organized based on their implementing unit/group:
 - Technology development includes ICT industrial ecosystem rollout;
 - Governance includes support local government revenue generation and land administration reform;
 - Environment includes a smart, green infrastructure framework;
 - Climate Change and Disaster Response includes resilient urbanization strategies;
 - Urban Sector includes digital land registry;
 - Transport Sector includes technical assistance for e-mobility policy and strategy; and

- South Asia Urban and Water includes smart drinking water management.
- Fitzgerald, Michael. 2016. "Data-driven City Management: A Close Look at Amsterdam's Smart City Initiative." *MIT Sloan Management Review*. May 19. <u>https://sloanreview.mit.edu/case-study/data-driven-city-management/</u>.
 - This article provides a compilation of select smart city initiatives in Amsterdam. Of note are the experiences of the "outside guy," Amsterdam's Chief Technology Officer and "Mr. Inside," the Head of the city's Department of Research, Information, and Statistics. The former works with IoT and ICT providers and finds that there is a huge difference between how technology providers package their vision and the actual execution. He also mentioned the large costs of implementing ICT infrastructure upgrades. Meanwhile, the latter works to find ways on how data can improve the city's delivery of its services and how they launched a publicly-accessible data lab.
- GOV.UK. 2015. "Future of cities: Smart Cities, Citizenship Skills and the Digital Agenda." August 28. <u>https://www.gov.uk/government/publications/future-of-citiessmart-cities-citizenship-skills-and-the-digital-agenda</u>.
 - o This whitepaper is part of the larger Future of Cities research project of the U.K. government to find strategic foresight in their cities and provides a twofold appraisal of smart city implementation. First, educating and capacitating citizens towards the use of technology prepares citizens for the types of work in the future and for co-creation in civic engagement. This can be achieved "through long-term technology innovation strategy and industrial policy," with the use of open data and digital infrastructure. Second, it looks at how ICT should be treated as a "triple-axis issue," where (i) it would be inconceivable for planners to not integrate ICTs, (ii) ICT developers must also consider the citizens, and (iii) citizens must make the most of the opportunity that technology provides to society.
- McKenna, H. Patricia. 2019. "Innovating Metrics for Smarter, Responsive Cities." Data 4 (1): 25. <u>https://www.mdpi.com/2306-5729/4/1/25/htm</u>.
 - The journal article suggests different metrics for smart cities in relation to big data challenges. The paper suggests four (4) groups of variables. First is awareness or the experience of urban elements in public spaces, and improvement of usage of public spaces. Second is learning or the experience of the placement of urban elements and people's interaction with them towards the improvement of everyday interactions. The third is openness in the generation and use of public data, or how transparency allows for new contributions. And lastly, engagement or how spaces in the city contribution to reaching out to people.

- Sterling, Bruce. 2018. "Stop Saying 'Smart Cities'." *The Atlantic.* February 12. https://www.theatlantic.com/technology/archive/2018/02/stupid-cities/553052/.
 - Sterling provides a critical review of the smart city approach, or at least its wide misuse and his argued unfulfilled promises. He finds the idea of a smarty city as an obsession with technology that does not address the more compelling issues of aging populations, decaying infrastructures and climate change. On the one hand, cities strive to create their own applications in a bid to attract more capital. On the other hand, the smart city approach provides data-extractive big tech companies the capacity to transform democracy from participation (in council meetings and labor union rallies) towards point-and-click fixes and surveillance. He, therefore, argues that this approach can be seen as "standard urban practices, with software layered over," a "generational civil war" between old and new companies.
- The Guardian. n.d. "Smart Cities." *The Guardian.* <u>https://www.theguardian.com/cities/smart-cities</u>.
 - This tag archives news and articles on the smart city approach that were published in The Guardian.
- World Bank. 2017. "Innovative Solutions for Cities Webinars." Open Learning Campus. <u>https://olc.worldbank.org/content/innovative-solutions-cities-webinars</u>.
 - The World Bank-led webinars provide further learning for people who wish to learn about different components of a smart city. Topics include employment through innovation, open data ecosystems, crowdsourcing of citizen inputs, financing for slum upgrading, data and analytics for city management, local non-property revenues, co-working spaces, etc.

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