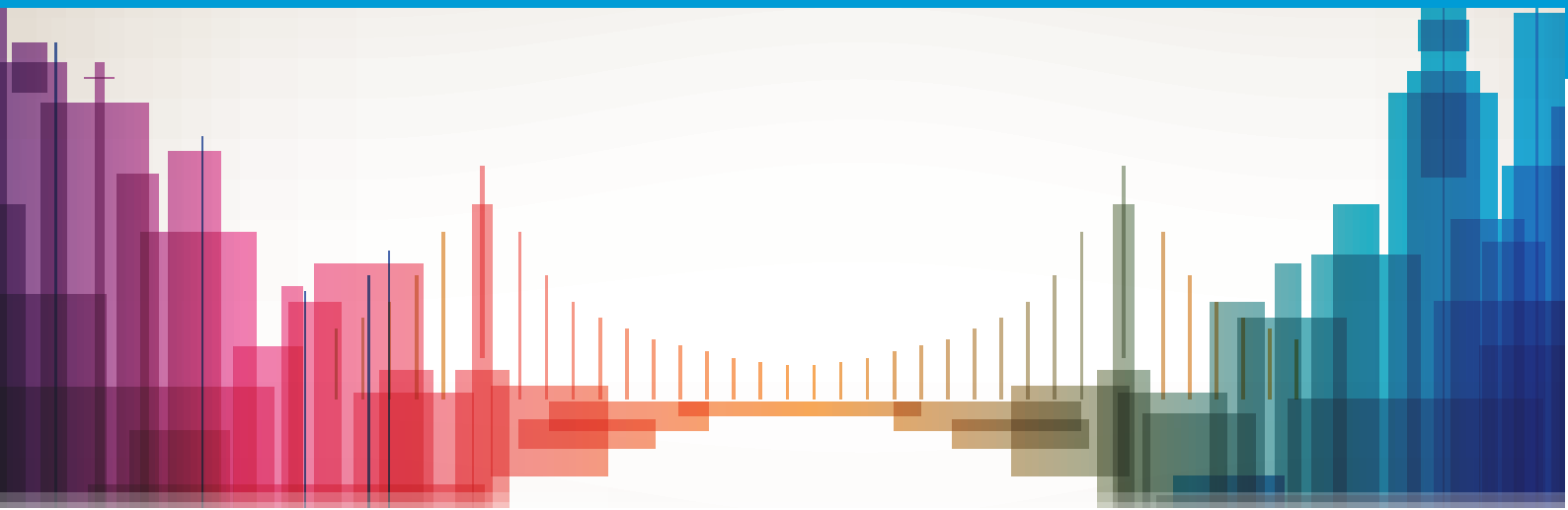


Policy benchmarks for digital transformation of people-centred cities





Policy benchmarks for digital transformation of people-centred cities

Foreword

This publication was developed within the framework of the United for Smart Sustainable Cities (U4SSC) initiative.

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Disclaimer

The opinions expressed in this publication are those of the authors and do not necessarily represent the views of their respective organizations or U4SSC members. In line with the U4SSC principles, this report does not promote the adoption and use of any digital technology. It advocates for policies encouraging responsible use of ICTs that contribute to the economic, environmental, and social sustainability as well as the advancement of the 2030 Agenda for Sustainable Development. The study conducted in this report is based on extensive literature review and voluntary written contributions from stakeholders.

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Contents

1	The need for dynamic policy maturity benchmarking	1
1.1	What is policy benchmarking?	1
1.2	What is a Dynamic Policy Maturity Benchmark model?.....	1
1.3	Why do we need a Dynamic Policy Maturity Benchmark Model?.....	2
1.4	How to use the dynamic policy benchmark?.....	3
1.5	Key performance indicators on digital transformation in people-centric cities	4
2	Introduction of dynamic policy benchmark model	5
2.1	Case in point.....	7
3	Framework to establish acceptable policies and execute policy benchmarks.....	10
3.1	What is a good policy?	10
3.2	The Framework	10
4	Detailed methodology to evaluate policy maturity in people-centric cities.....	12
4.1	People Centric	13
4.2	Institutions and Mechanisms	14
4.3	Digitalization	14
4.4	Society	15
4.5	Sustainability.....	16
4.6	Economy.....	16
5	Conclusion.....	17
APPENDIX I		18
I.1	UN Guidelines for Establishing a Benchmark.....	18
I.2	References of Assessment Criteria	20

List of figures

Figures

Figure 1: Dynamic Policy Interactions	3
Figure 2: Dynamic Policy Benchmark Model	5
Figure 3: Policy Maturity from Level 1 to Level 5	6
Figure 4: Characteristics of Level 1 to Level 5 Policy Maturity Levels.....	7
Figure 5: Scenario of a Dynamic Policy Benchmark on the Impacts of AI Enablement in Digital Smart City Services and Platforms	8
Figure 6: Objectives of Policies and the Maturity Assessment Criteria.....	11
Figure I.1: Methodology of Benchmark Implementation	19

List of abbreviations

Abbreviation	Full Form
AI	Artificial Intelligence
ESG	Environmental, social and governance
ICT	Information and Communications Technology
ITU	International Telecommunication Union
KPI	Key Performance Indicator
GenAI	Generative artificial intelligence
GDP	Gross Domestic Product
SDGs	Sustainable Development Goals
5G	The 5 th Generation Technology Standards for Cellular Networks
SSC	Smart Sustainable Cities
UN	United Nations

Executive Summary

In the era of rapid digital transformation, cities face the challenge of adapting their policy frameworks to harness the benefits of new technologies while ensuring economic, environmental, and social sustainability. The United for Smart Sustainable Cities (U4SSC) initiative has developed the Dynamic Policy Maturity Benchmark Model to address this challenge, focusing on the continuous evolution of policies to meet the needs of people-centred cities.

Digital transformation is reshaping urban landscapes, creating opportunities for enhanced services, efficiency, and sustainability. However, traditional policy frameworks often struggle to keep pace with technological advancements, leading to a gap between policy and practice. The Dynamic Policy Maturity Benchmark Model aims to bridge this gap by providing a structured approach to policy evolution that is responsive to technological changes and societal needs. The model introduces a dynamic benchmarking approach that leverages Key Performance Indicators (KPIs) to measure and adjust policy effectiveness. It defines five levels of policy maturity, from existing to sustainable, each with specific characteristics and requirements. By continuously assessing and updating policies, the model ensures that they remain relevant and effective in the face of rapid technological changes. The Dynamic Policy Maturity Benchmark Model represents a significant advancement in the governance of digital transformation in cities.

By fostering a culture of continuous policy evolution and stakeholder engagement, it ensures that policies remain responsive to the needs of citizens and the environment. This approach not only enhances the sustainability and inclusivity of urban development in accordance with SDG11 but also positions cities to leverage emerging technologies for the greater good.

1 The need for dynamic policy maturity benchmarking

1.1 What is policy benchmarking?

Policy benchmarking plays a crucial role in evaluating a city's existing policy framework in its ability to meet the needs of inhabitants, especially in the context of people-centred cities. The ITU's Benchmark for Fifth Generation Digital Collaborative Regulation,¹ also called the G5 Benchmarks, serves as a national benchmark for inclusive digital transformation across all sectors within a country's economy and society. This benchmark contains indicators that national regulators and policy owners can use to self-assess the strength of their policy framework.

In this context, the city's collaborative ecosystem requires an understanding of how policies impact various domains such as education, health, culture, society, economy, and environment to enable functioning and people-centric digitalization strategies.

Therefore, it is imperative to stress-test policies for their appropriateness and acceptability and their potential to enable positive transformations for human benefits. This iterative process of policy benchmarking should not be seen as a one-time effort but rather as a dynamic, iterative and continuous process that evolves over time to adapt to changing technological, social and environmental needs.

In keeping with the growing urban populations, it is essential that strategies that cater to the needs of inhabitants are based on maturity to policies leveraging fast-paced technological advances. Policy benchmarking provides a mechanism to do so. Dynamic policy benchmarking, as we present in this chapter, enables the continuous evolution of existing policies by gaining maturity and adapting to changing needs, whether technological, social, environmental, or otherwise.

Digital transformation strategies will be using key performance indicators that measure the outcome of digital implementation of technology and infrastructure, as well as their output. These can include the broadband bandwidth for individual users or the number of electric vehicles that can charge on a network station. Dynamic policy maturity benchmarks will be needed to ensure the inclusive, equitable and socially acceptable implementation of these digitalization strategies. They will provide governance guidelines and will require stakeholder engagement in government and the ecosystem to align technology advances with societal agreements.

1.2 What is a Dynamic Policy Maturity Benchmark model?

The concept of a Dynamic Policy Maturity Benchmark model is introduced to ensure sustainable digital transformation in people-centred cities. This model provides an overarching framework and principles to guide the development of policies that support such transformation. Given the

¹ [ITU G5 Benchmark](#)

rapid pace of technological advancements, it is crucial to evaluate the impacts and implications of policies continuously to effectively achieve people-centricity, inclusive equitable lifestyles, and sustainability.

1.3 Why do we need a Dynamic Policy Maturity Benchmark Model?

In the digital century, policy benchmarking needs to be intelligently revised, updated, and timely applied to advance digital technology and services and to achieve the targets contained in Sustainable Development Goal 11. This opens the door for the development of time-sensitive new policy iterations. Therefore, a dynamic mechanism of benchmarking is needed to continuously assess technology evolution and its impact on the community, services, and ecosystem.

There are three pillars of dynamic evaluation and stress-testing of policies in terms of:

- Dynamic KPIs (collection, measurement and display)
- Dynamic Policy (benchmark, update & draft new ones)
- Dynamic Maturity & Sustainable Transformation (leverage, enhancement & update)

In order to ensure the delivery of objectives² (Equity & Human Rights, Inclusion & Participation, Sustainability & Transformation, and Net Zero) of a people-centric sustainable digitalization of cities according to the UN Habitat and New Urban Agenda,³ we are introducing the **Dynamic Policy Maturity Benchmarks Model** (Figure 1).

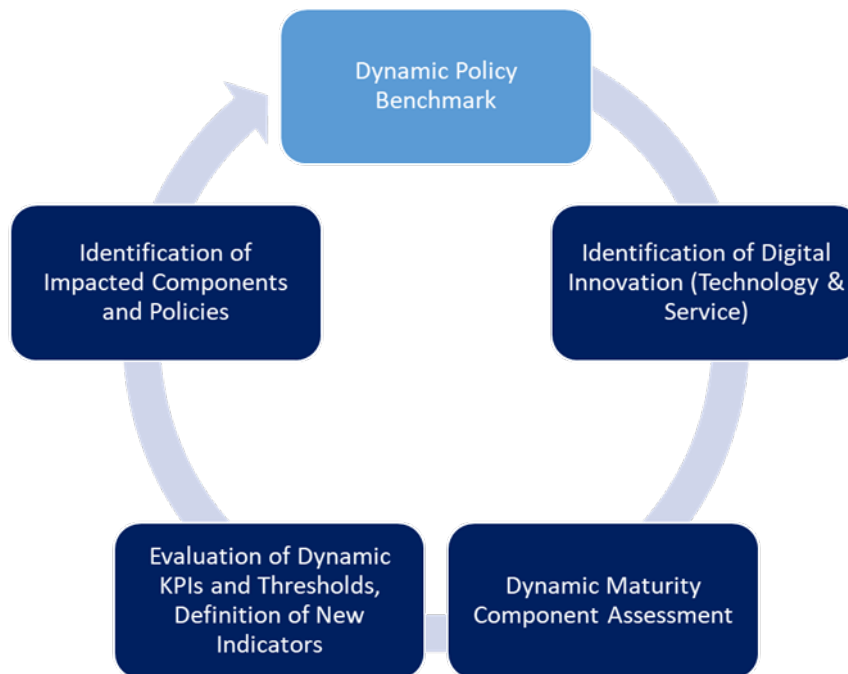
This benchmarking model delivers five distinctive interactive assessment blocks and offers insights on:

- Identification of Digital Innovation (Technologies and/or Services): Interventions and impacts generated by digital innovation
- Dynamic Maturity Component Assessment: Assessment of Digital Maturity of a variety of policy levels and their related components
- Evaluation of Dynamic KPIs and Thresholds: Measurement and update of KPIs thresholds and/or the introduction of new indicators
- Identification of impacted Components and Policies: Introduction of new policies, or update existing ones to mitigate impacted components
- Dynamic Policy Benchmark Cycle: Update & introduction of new KPIs, maturity assessments, and policies enabling a sustainable transformation process

² [UN Habitat Goals and Strategies](#)

³ [New Urban Agenda](#)

Figure 1: Dynamic Policy Interactions



Each block within the model could be digitized separately to be self-dynamic. However, when all blocks are digitized and interconnected within a city/country ecosystem, then they deliver a full dynamic digitalization framework and model.

Any emerging technology or innovation can trigger social, economic, environmental or governance issues. Once this trigger is presented, the technology or innovation will be assessed by applying KPIs that determine if certain thresholds of a given policy have been met or surpassed. These events also influence the maturity of a given policy, which is defined by components of people-centric cities. Depending on the thresholds, if a digital event is outside the defined and aspired maturity level, the policy has to be modified and adjusted. In addition, with growing maturity, KPIs might also be adjusted dynamically to reflect the utilization of the technology or innovation.

1.4 How to use the dynamic policy benchmark?

The Dynamic Policy Benchmark Model (Figure 1) evaluates the influence and impact of the introduction of digital innovation and emerging technologies and services on the digital ecosystem in sustainable cities.

The benchmark ensures seamless alignment between strategy and digitalization impacts. As new technology impacts arise, an assessment is launched to determine whether this technology or digital approach meets cities' people-centric values.

In general, each city can define distinctive digital policy maturity levels that consist, in general of activities and implementation conditions for technology, expectations of benefits and opportunities,

and stakeholder involvement as well as the mitigation of adverse effects. The different maturity levels are measured through thresholds and KPIs. As new technology impacts arise, an assessment is launched whether the technology or digital approach meets or exceeds any of the defined sustainability and people-centric KPI thresholds. The technology and digitalization impact is being evaluated against existing policy maturity levels, the components in this level and/or its influence on urban transformation. If the policy maturity level does not adequately address the technology or innovation implications, policy mechanisms need to be dynamically adjusted.

In certain situations, new policies need to be introduced together. This alignment or synchronization is time-independent to assure that a sustainable and citizen-centric digital transformation is enabled dynamically at any time of the process.

1.5 Key performance indicators on digital transformation in people-centric cities

The Dynamic Policy Benchmark for People-Centered Cities is based on the [U4SSC KPIs for Smart Sustainable Cities](#), which are predicated on the [United Nations Sustainable Development Goals \(SDGs\)](#).

The U4SSC Working Group on “Digital Transformation Assessment of People-Centred Cities” will develop a comprehensive approach to assess the digital transformation of people-centered cities, including creating key performance indicators (KPIs). It will also evaluate the impact of digital transformation on inclusivity and the adoption of emerging technologies.

These KPIs will aim to determine the maturity thresholds of policy levels, dynamic policy benchmarks need to consider expressions and definitions of society, community, sustainability, equity and economy in the thresholds and measures.

2 Introduction of dynamic policy benchmark model

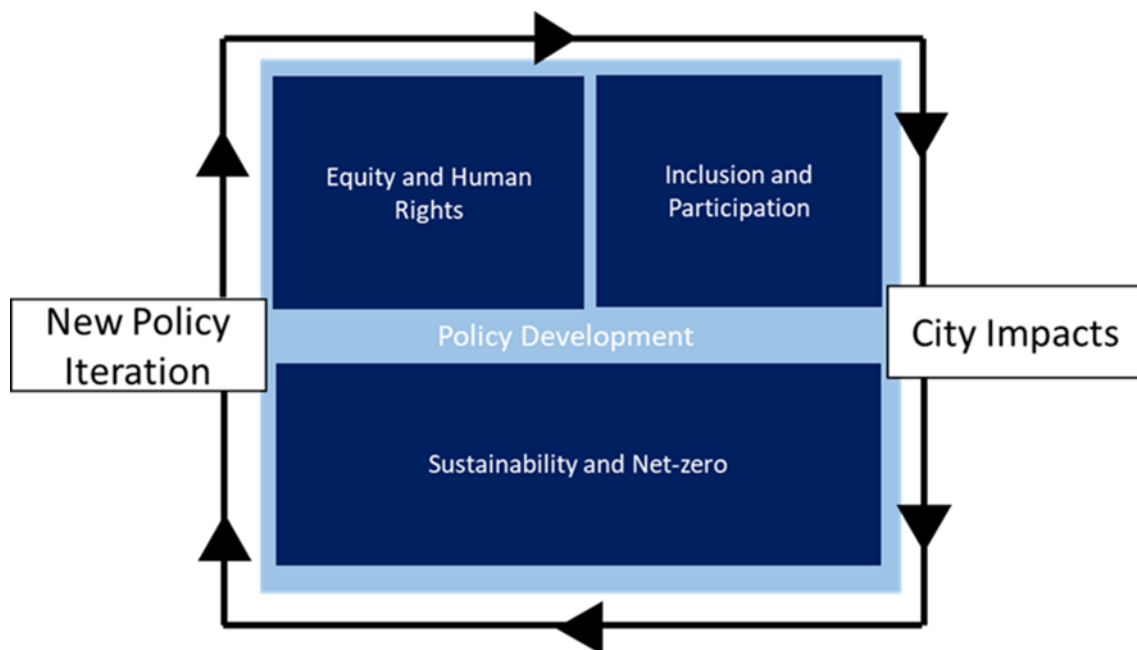
There is immense pressure to develop a people-centred smart city with a multi-stakeholder approach to digital transformation that is realizing sustainable, inclusive and equitable objectives.⁴

Therefore, policy benchmarking needs to evolve intelligently to keep up with technological advancements and changing societal needs. A dynamic mechanism of benchmarking is essential to continuously assess technology evolution and its impact on communities, services, and the ecosystem. This involves dynamic evaluation and stress-testing of policies, dynamic measurement and management of Key Performance Indicators (KPIs), and dynamic enhancement of policy maturity for sustainable transformation. These elements form the foundation of effective policy benchmarking in an ongoing manner.

The following 3 figures describe the dynamic and iterative process of policy benchmarking, maturity, and KPI evaluations for a sustainable transformation to minimize impacts from technologies and services digital innovations (e.g., artificial intelligence, or machine learning).

The introduction of the Dynamic Policy Benchmarks Model (Figure 2) aims to address the objectives of equity, human rights, inclusion, participation, sustainability, and transformation in people-centred sustainable digitalization.

Figure 2: Dynamic Policy Benchmark Model



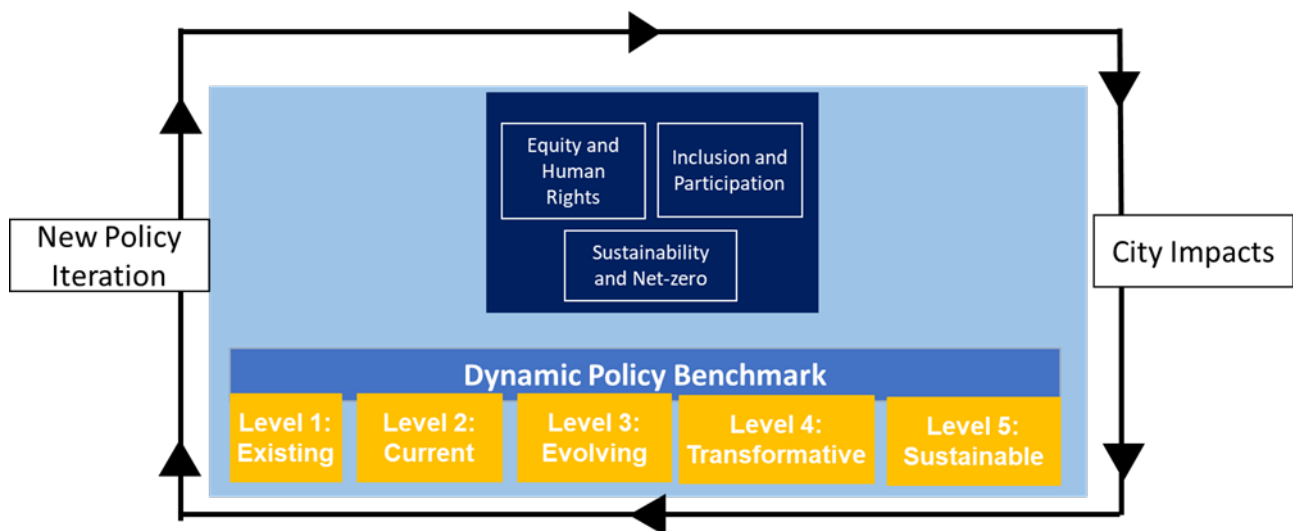
⁴ <https://www.unapcict.org/sites/default/files/2022-04/Academy%20Module%20on%20ICT%20for%20Climate%20Resilient%20Development.pdf>

This model shows the continuous dynamic assessment of policies and their development when new technology is introduced. The framework assesses the city impacts that are defined in different policy levels encompassing Equity and Human Rights, Inclusion and Participation, sustainability, and Net Zero.

Those policies are segmented into different maturity levels based on the reach of purpose, implementation conditions and expected outcomes of technology. The Policy Maturity Levels (Figure 3) show the characteristics of the different levels:

- Level 1: Existing
- Level 2: Current
- Level 3: Evolving
- Level 4: Transformative
- Level 5: Sustainable

Figure 3: Policy Maturity from Level 1 to Level 5



At a minimum, each maturity level should include an assessment of:

- Available KPIs & definition of dynamic governance
- Objectives and outcomes
- Digital sustainable transformation measures
- Structured approaches for updating policies and other related components.

When dynamic changes in digital transformation occur, the policies and maturity level should be assessed iteratively.

The following Figure 4 shows an essential level description and potential outcomes for digital technology implementations in people-centric cities.

Figure 4: Characteristics of Level 1 to Level 5 Policy Maturity Levels

Level 1: Existing	Level 2: Current	Level 3: Evolving	Level 4: Transformative	Level 5: Sustainable
Basic Policy Awareness during the Introduction of: Products/Tech/Services/ /Software/Processes Risk Awareness	Stakeholder Engagement through media outreach or education of video, language, summaries, infographic, social media Policy reporting	Embedded Evaluation of: - Impacts - Previous practices - Patents and Licenses	Informed Digital Practices Policy Updates& Monitoring Introduction & Monitoring of Guidelines	Feedback Loop on Policy, Impacts and Outcomes Service Innovation adheres to Policy Collaboration, Standardization, Integration, Interoperability
Outcome: Awareness of Users, Partners, Ecosystem, Trust and compliance	Outcome: Evidence for Policy Makers, NGOs, Practitioners	Outcome: Iterative Policy Introduction	Outcome: Updated Products, Software, Services, Technology, Partners	Outcome: Evaluation by Citizens and Stakeholders
Iterative And Dynamic Policy Maturity Benchmark				

It is vital to governance structures of the model that with every assessment iteration of city impacts and the necessary policy adjustment is catalogued and registered. For instance, city impacts can be classified as City Impact - Index Number (CI-AI-17724-S-B-C-C), which represents the abbreviation of: City name Impacted from Artificial Intelligence on 17 July 2024 launched Service by the Business/ Organization in the Country registered in the City Name). New policy iteration can be catalogued as New Policy Iteration - Version/Iteration Number (V1.0 / Index Number).

2.1 Case in point

Case in Point: Digital Innovations of a distinctive city trigger a Benchmarking Assessment due to the introduction of AI in digital smart city services and platforms. Figure 5 provides a scenario run down of AI triggering a policy benchmark when the new technology is used to empower smart city services and platforms.

Figure 5: Scenario of a Dynamic Policy Benchmark on the Impacts of AI Enablement in Digital Smart City Services and Platforms

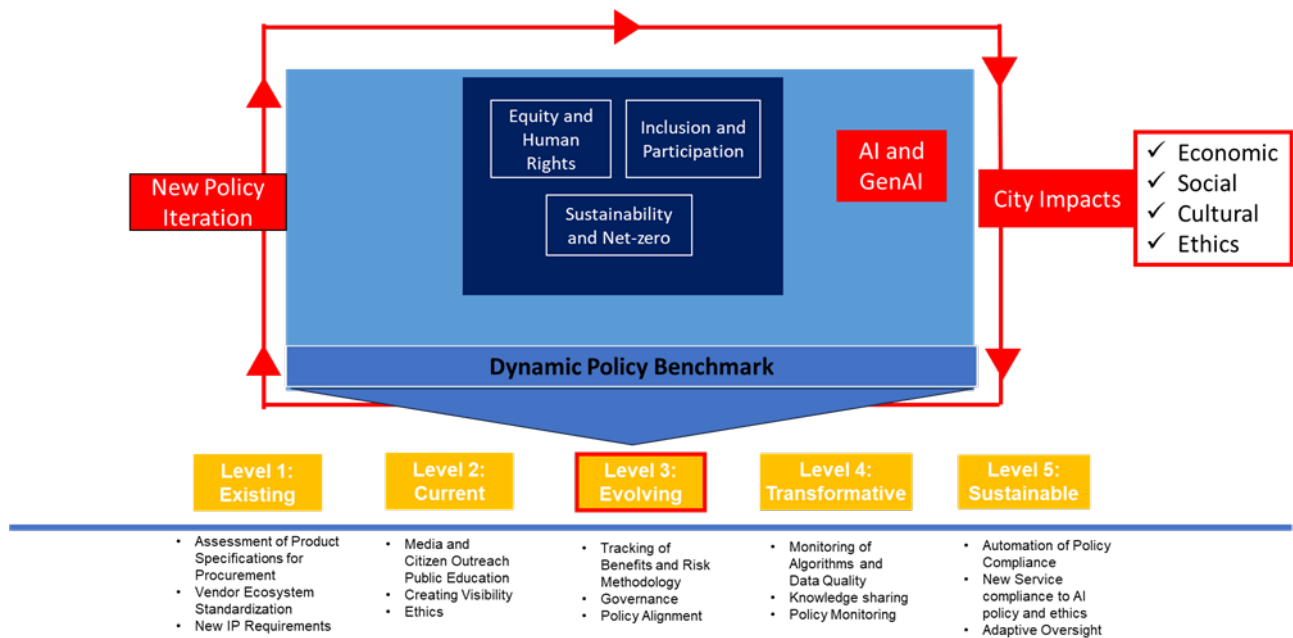


Figure 5 shows that when introducing new digital innovation (e.g., Artificial Intelligence), the Dynamic Policy Benchmark Model realizes that some negative impacts areas detected in Policies Maturity Level 3 (impacts are coloured in RED) such as:

- no policies developed in this regard to-date
- no policies processed
- no patents & no licenses assured
- no professional practices evaluated
- no guidelines updated
- no KPI thresholds updated
- no new measures & KPIs introduced

In this case, the dynamic policy benchmark would trigger an iterative process that would verify if the policy overall can provide the appropriate governance to moderate the city impacts caused by AI. The reassessment of the maturity level allows the city to drive distinctive decisions, readjust the policy to maintain or exceed the maturity level of the policy, or make conscientious decisions of lower maturity levels or high impacts to balance short-term trade-offs to mitigate an environmental disaster or a short-term event. Actions could include the:

- update of policies
- introduction of new policies

- modification of KPI thresholds
- introduction of new measures & indicators
- Inclusion of New Stakeholders in governance bodies

The result: The dynamic policy benchmarking model allows the ability to include the voice of people in the decision of using new technology that enable a sustainable future across the ecosystem in cities.

3 Framework to establish acceptable policies and execute policy benchmarks

3.1 What is a good policy?

The scope of Digital Transformation for People Centered Cities (Working Group 1)⁵ argues that the dependencies between pervasive digital technologies in smart cities become an inherent consideration for policy makers and international businesses and a reality in many areas of citizen life.

"The People-centred smart city approach ensures that information and communication technologies serve to improve people's lives by contributing to improving cities infrastructures and municipal settings such as energy, buildings, traffic, water and sewage, on the basis of integrated development concepts. The concept advocates for a just, inclusive and sustainable transition of cities into smart cities, where technologies are used for and by the people."

Therefore, policies need to include the following **sections and approaches** in order to align the context of policy to people-centric principles. Good policy considers the long-term future (possibility space), minimizes short-term risks (known unknowns), and is adaptable to new information (unknown unknowns). They need to incorporate resilience strategies, institutional mechanisms as well as the depth of digitalization and technology to develop, map and execute policies.

3.2 The Framework

In order to evaluate an acceptable policy based on the societal background and the people centric city roadmap, the policy needs to be assessed and benchmarked⁶ against real time events that are occurring in the city and its entire environment. This is important because this requires transparency generated to a mix of digital technology and human engagement. It also needs to take into account different science methods used to design and evaluate public policies that better reflect human behaviour and decision making in order to be applicable to local or local contexts. Data are important for understanding current impacts of policy against the original objective, the efficiency and efficacy of the use of tools to support policy, as well as the situational awareness and applicability in the city and citizen context.

⁵ Reference to WG 1 Charter

⁶ https://www.oecd.org/en/publications/seven-routes-to-experimentation-in-policymaking_918b6a04-en.html

Policy Benchmarks are following the broad categories (based on significant previous examples of policy assessments from the UN⁷ Habitat as well as the G20 and WEF⁸ co-authored Policy Benchmark for Ethical and Responsible Smart Cities Development):

- People Centricity leading to urban resilience applying digital society factors
- Institutional Mechanism: Public interest, digital governance, participation
- Digitalization: Technology, Data trust and data exchange, sovereignty, infrastructure
- Society: Impacts on Social cohesion, development and quality of life
- Sustainability/ESG: Development of futureproof sustainable strategies and audits that will lead to mitigation and adaptation of climate change related impacts, accomplishing SDGs
- Economy: development of an economy that creating benefits for people and organizations

Those categories need to deliver on the objectives of a people centric sustainable digitalization of cities according to the **UN Habitat and New Urban Agenda**:

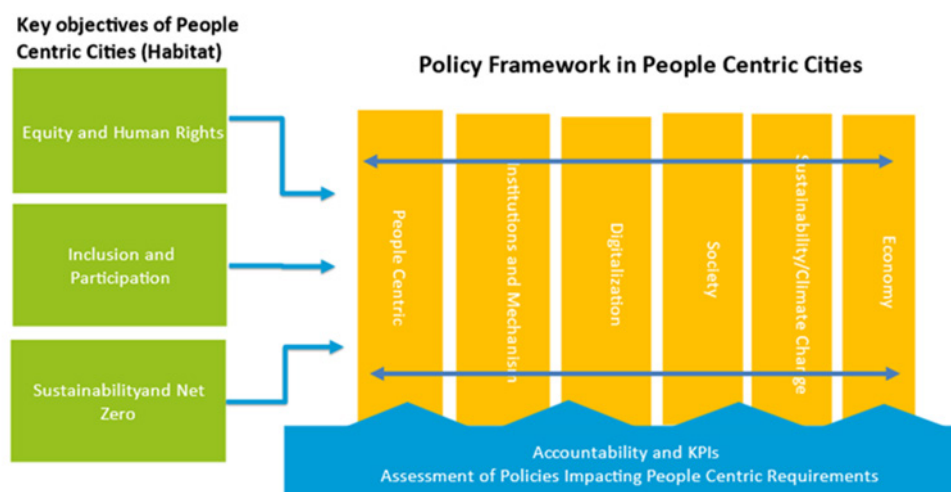
Objective 1: Equity and Human Rights

Objective 2: Inclusion and Participation

Objective 3: Sustainability and Net Zero

The following picture shows the core objectives of people centric cities and the respective assessment criteria that define the maturity levels of policies.

Figure 6: Objectives of Policies and the Maturity Assessment Criteria



⁷ [UN Habitat Sustainability Assessment and Benchmark](#)

⁸ [GlobalSmartCities Alliance](#)

4 Detailed methodology to evaluate policy maturity in people-centric cities

This section presents an in-depth expansion of the previously discussed “Framework”, offering a comprehensive “Assessment Methodology” for benchmarking policies, aimed at realizing the mission of establishing people-centric and sustainable digitalization within smart cities. The proposed methodology serves as a valuable guide for evaluating the essential structure and components of acceptable policies to develop people-centric cities. Nevertheless, leaders should recognize that not everything can be measured.

In the context of people-centric city development, it is critical for cities to map the KPIs used to assess the digital transformation path of their digital smart city strategy with the outcomes of governance based on policies. In other words, the digitalization path in terms of the technology roadmap, infrastructure and services needs to comply with the policies established to ensure a people-centric digitalization outcome. In turn, policy assessments need to be informed by the advancement and requirements of digital technology to create the governance framework for the execution and monitoring of the digitalization roadmap.

The outcome of this benchmarking process will provide a quantifiable evaluation of policy maturity, focusing on the fundamental elements required to achieve the mission's objectives. This assessment creates a baseline of acceptable policies that prioritize the well-being and inclusivity of citizens. It also allows for flexibility by permitting the incorporation of additional elements that align with local context and specific requirements.

The assessment criteria are based on common definitions by the ITU⁹ and other resources that are outlined in the appendix of this document. Those definitions should be selected based on the context of city development, the maturity of the smart city digitalization roadmap and its objectives.

By adopting this assessment methodology, city leaders gain valuable insights into the effectiveness of existing policies and identify areas for improvement. The benchmarked evaluation guides decision-making towards fostering sustainable urban development and reinforces the commitment to people-centred cities. It will leave room for additional elements which will allow cities to continually tailor their policies to the dynamic needs and aspirations of their residents, ensuring that digital transformation efforts remain relevant and impactful for their citizens. In alignment with digitalization roadmaps, **policy criteria** (for references see appendix clause I.2) should include and be rated based on availability and comprehensiveness on the Level of 1 (Existing) to 5 (Sustainable). The criteria listed below serve as a starting point and must be complemented with criteria that reflect regional, national or city-specific context, tradition, customs, practices and policies. City policymakers need to select and establish the criteria based on the most-likely scenarios of their

⁹ https://www.itu.int/en/ITU-T/focusgroups/ssc/Documents/Approved_Deliverables/TR-Definitions.docx

city environment, overpromising or contradictions, overlaps will actually lead to discouragement of applying policy benchmarks altogether.¹⁰

4.1 People Centric

People Centric	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
Protection of Human Rights					
Legal Standards of Human Rights					
Adherence to SDGs					
Policy Enforcement					
Accountability through KPIs					
Citizen Participation					
Non-Discrimination					
Existence of Equity Efforts					
Inclusion Rights					
Empowerment Policies					
Corporate Responsibility					
Access to Education					
Access to the city					
Other					

¹⁰ https://www.un.org/peacebuilding/sites/www.un.org.peacebuilding/files/documents/monitoring_peace_consolidation.pdf

4.2 Institutions and Mechanisms

Institutions and Mechanism	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
Legal Representation of Stakeholders					
Policy Governance					
IT Governance in Government (e-Government)					
Other					

4.3 Digitalization¹¹

Digitalization	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
Data Protection					
Privacy					
Confidentiality of Communications					
Digital Governance					
Connectivity					
Data Literacy					
Digital Skill Development					
Level of Digital Innovation					
Inclusive Investment					
Digital Equity					
Data Ethics					
Cybersecurity					
Open Data					
Data Accessibility / Democratization					
Level of Data Culture					
Digital by Default Rules					

¹¹ <https://www.itu.int/initiatives/green-digital-action-atcop28/wp-content/uploads/sites/4/2023/12/Call-to-Action-Pillar4-Green-standards.pdf> Green Standards references

Digitalization	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
Use of digital twins					
Use of digital simulation					
Availability in Continuous Operations					
Interoperability					
Other					

4.4 Society

Society	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
Social Equity (ESG)					
Social Justice (ESG)					
Availability of Mitigation of Technology Bias					
Accessibility of Resource Distribution					
Accountability					
Fairness					
Transparency					
Standard of Living Protection					
Level of Unemployment					
Available Taxes on Imports					
Corruption rate					
Digital equity					
Cultural Heritage Preservation					
Public Art					
Other					

4.5 Sustainability

Sustainability	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
ESG					
Climate Adaptation					
Climate Mitigation					
Biodiversity and Green Spaces					
Adherence to SDGs					
Circular Economy					
Tracking of Consumption of Citizen					
Environmental Justice in Pricing					
Recycling and Re-use					
Sustainable Buildings					
Green mobility					
Other					

4.6 Economy

Economy	(1) Existing	(2) Current	(3) Evolving	(4) Transformative	(5) Sustainable
National Income					
Average individual income					
Level of Poverty					
Average family numbers					
GDP/Capita					
Tracking of Demographics					
Number of Deaths and cause of deaths					
Adherence to SDGs					
Creative Economy					
Shared economy					
Re-manufacturing					
Other					

5 Conclusion

At a time when digital transformation is reshaping urban landscapes, the Dynamic Policy Maturity Benchmark Model represents a crucial step forward in the governance of smart, sustainable cities. This model addresses the inherent challenge of keeping policy frameworks relevant and effective amidst rapid technological advancements. By adopting a dynamic, iterative approach to policy benchmarking, it ensures that policies evolve continuously to meet the needs of citizens and the environment.

The model's emphasis on leveraging Key Performance Indicators (KPIs) provides a structured mechanism for assessing and adjusting policies, ensuring they remain aligned with the goals of economic, environmental, and social sustainability. The five levels of policy maturity defined within the model offer a clear roadmap for policy evolution, from existing policies to those that are fully sustainable and responsive to the needs of people-centred cities.

The case study involving the introduction of AI in smart city services underscores the model's practical applicability. It demonstrates how dynamic benchmarking can identify gaps in existing policies and trigger iterative adjustments to align with the city's values and objectives. This not only enhances the sustainability and inclusivity of urban development but also positions cities to leverage emerging technologies for the greater good.

In conclusion, the Dynamic Policy Maturity Benchmark Model provides a robust framework for the continuous evolution of policies in the context of digital transformation. By fostering a culture of continuous policy improvement and stakeholder engagement, it ensures that policies remain relevant and effective, ultimately contributing to the development of smart, sustainable cities that prioritize the well-being and inclusivity of their residents.

APPENDIX I

I.1 UN Guidelines for Establishing a Benchmark

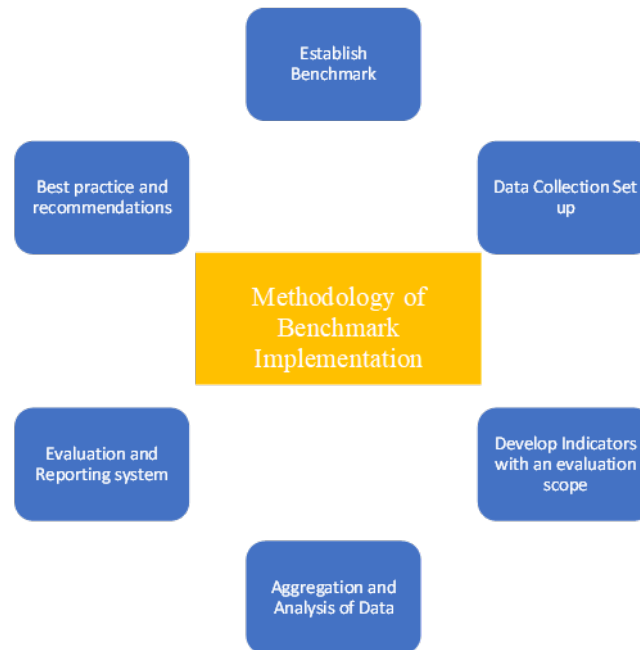
There are multiple approaches for establishing and facilitating policy benchmarks. These allow a transfer of best practices or establish consensus on how adequate a policy is designed to develop people-centric digitalization in smart and sustainable cities. The key implementation guidelines for a policy evaluation should support the main objectives of:

- Avoiding contradictions
- Creating Consensus
- Allowing for measurements and impact analysis
- Allowing for trends in digitalization and future evolution of technology, impacts and scale of adoption such as Metaverse

Existing benchmarking guidelines can be applied and contextualized to build a “stress test” for digitalization in people-centric sustainable cities.

For examples, the UN has published a methodology ([United Nations Practitioners’ Guide to Benchmarking](#)) framework of which can be utilized. In order to prepare for a benchmark, policy leaders in cities need to identify data sources and other statistics and information to make an assessment on capacity of the policy, strategy and conflict analysis. This also includes the potential approach to conducting a benchmark, identifying objectives and core tasks of policy mechanisms, and defining who will be included in the benchmark. How will benchmark conclusions to be utilized, as outlined in the [UN Results based management Handbook](#) ?

Figure I.1: Methodology of Benchmark Implementation



The following steps are listed in the Handbook to support the structure and setup of a benchmarking structure.

- **Establish Benchmarks:** Identify contextual benchmarks and indicators based on direct links to sustainability, digitalization and people-centric cities. These benchmarks need to be related to the city that is developing the policy in a realistic and future-proof way, taking into account social and demographic changes, digitalization advances and technology innovation. It is key to keep focus on the intention of the policy, and the benchmark should not be used to reflect larger aspirations of digital society.
- **Establish a data collections system:** Identify existing and required data sources and build a data collection system that includes structured, as well as unstructured and dynamic data. This data collection needs to observe data protection, as well as digital rights. Use surveys, different existing data sources from ITU, UN, national statistics office, urban offices, open data and other organizations that are relevant to the city. Map quantitative data with qualitative data in utilizing public and private sector sources, as well as crowdsourced people information and participation as well as dynamic data.
- **Attribute Indicators to benchmark:** Identify indicators and KPIs that indicate progress or failure in policy to support people-centric sustainable outcomes. Use more than one indicator. Try to be objective as policy could have a political dimension or a public opinion.
- **Aggregate and analyse data:** Develop a hierarchy of results depending on the statistical methods, classification techniques or qualitative assessment. Also benchmark the data relevance to the policy, to create a full circle of verification.

- **Establish a reporting system:** Either for a specific verification of the policy in terms of its intended purpose, or in the context of a specific outcome. Make it user friendly and understandable. Share and transparently discuss multidimensions of technology, people centricity, inclusion, equity and sustainability/carbon/climate change.
- **Conduct Gap Analysis of Policy Execution:** Develop an “action plan” or reporting process for addressing current gaps identified in the city benchmarking exercise and how to resolve these.
- **Establish a pool of best practices** and listen to public suggestions

Across all the steps, the benchmark development must be assessed in terms of its effectiveness and ability to evaluate policies in the scope of the mission across the objectives and components. The benchmark development has to have the flexibility to be improved and changed. Changes have to be documented.

1.2 References of Assessment Criteria

People Centric	Reference
Protection of Human Rights	Existence of HR related policies and an action plan
Legal Standards of Human Rights	Human rights embedded in law and regulation
Adherence to SDGs	Referral to SDGs, availability of SDG implementation procedures and planning, measurement and visibility
Policy Enforcement	scope and recommendations of policy enforcement
Accountability through KPIs	Clearly identified measurable actions ITU KPI
Citizen Participation	Mechanism of ensure meaningful participation of citizens in decision making
Non-Discrimination	Mechanism to enable fair and unprejudiced treatment of different categories of people.
Existence of Equity Efforts	Allocating resources and opportunities as needed to create equal outcomes for all
Inclusion Rights	Inclusive development of all aspect of sectors and civil life, the practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized
Empowerment Policies	Providing people with agency, skills and capacity to meaningfully participate and contribute in decision making
Corporate Responsibility	Integration of social, environmental and governance considerations
Access to Education	Equitable access to lifelong education and schooling (ITU)
Access to transport and mobility	Availability of mobility options

Institutions and Mechanism	Reference
Legal Representation of Stakeholders	People have a fundamental and inalienable human right to participate in public affairs at every level, including community, local, national, regional and international. (UNSDG Common Minimum Standards for Multistakeholders)
Policy Governance	Inclusive, transparent and interactive empowerment and oversight (UNDP Governance Focus)
IT Governance in Government (e-government)	The direction of IT is governed through the evaluation of the use of IT and the achievement of goals. (ITG4TU IT Governance)

Digitalization	Reference
Data Protection	Protection against unauthorized access to data. (ITU)/ Regulation (EU) 2016/679 (General Data Protection Regulation) https://eur-lex.europa.eu/eli/reg/2016/679/oj
Privacy Rights	The right of individuals to control or influence what information related to them may be collected and stored and by whom and to whom that information may be disclosed (ITU-T X.800; ISO/IEC 27701:2019, ISO/IEC DIS 27701)
Digital Governance	System of evaluation, directing and controlling (ITU + ISO 38500-2015)
Confidentiality of Communications	The content of all means of communication that is not revealed to anyone other than the parties involved. Article 7 of the Charter of Fundamental Rights of the European Union
Digital Inclusion/Connectivity	The equitable, meaningful, and safe access to use, lead, and design of digital technologies, services, and associated opportunities for everyone, everywhere (UN Techenvoy)
Data Literacy	The practices that allow people to access, critically evaluate, and create media/data (ITU)
Digital Skill Development	Availability of programmes to learn and update/advance digital skills and new technology know-how in comparison to the total number of digital professional educational programmes
Level of Digital Innovation	Innovation (Metaverse, digital twin and AI) of associated technologies are exponential, digital, and combinatorial to drive economic and social transformation (UN Digital Economy)

Digitalization	Reference
Inclusive Investment	Inclusive finance strives to enhance access to financial services for both individuals and micro-, small and medium-sized enterprises (UN Inclusive Investment)
Digital Equity for all	Access and meaningful participation in the digital world by older persons (Digital Equity)
Data Ethics	holistic thinking in the design and implementation of technology can mitigate risks such as discrimination, inequality, and loss of agency (UN)
Cybersecurity	The protection of data and systems in networks that are connected to the Internet (ITU)
Availability in continuous operations	The degree to which a system or service remains operational and accessible without interruptions. Availability in continuous operation. It measures the degree to which a system or service remains operational and accessible without interruptions (ITU)
Open Data	Data that can be publicly accessible to all through open standards and protocols or through other means. The use and redistribution of open data can be subject to rules (ITU)
Data Democratization	Access to data without gatekeepers
Level of Data Culture	Digital citizen services
Digital by Default Rules	Digital offerings and Identity
Use of digital twins/Simulation	Digital representation of physical objects (Fraunhofer Definition) A digital representation of an object of interest (ITU-T.Y.4600)
Interoperability	Ability of different systems, organizations and applications working together seamlessly

Society	Reference
Societal Equitable	The fair, just and equitable management of all institutions serving the public directly or by contract; and the fair and equitable distribution of public services, and implementation of public policy; and the commitment to promote fairness, justice and equity in the formation of public policy (United Way)
Social Justice (ESG)	Fundamental rights, employment opportunities, social protections, and constructive social dialogue between governments, employers, and workers. Social Justice

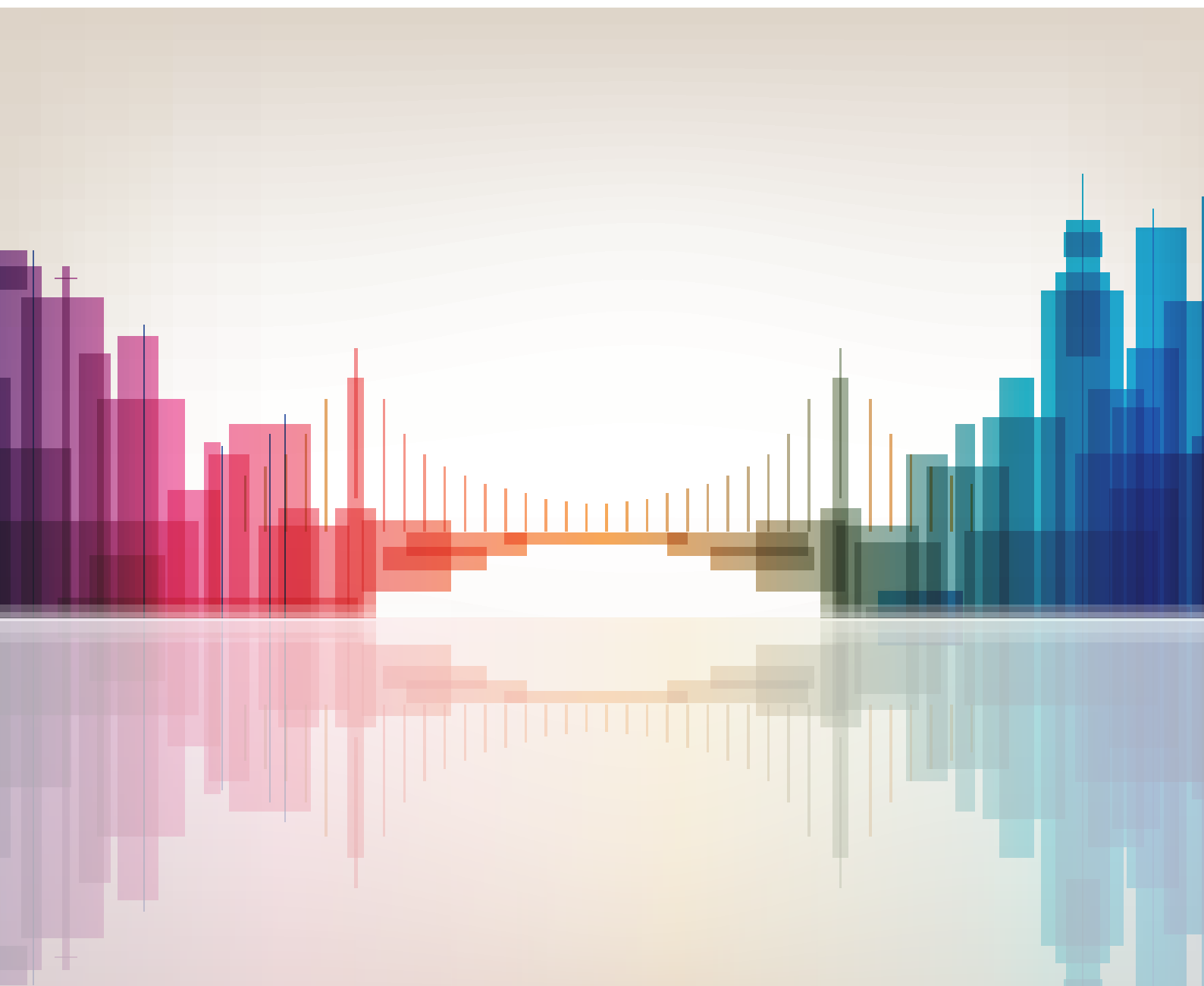
Society	Reference
Availability of Mitigation of Technology Bias	Remove automated judgement (HAAS Berkley Playbook)
Accessibility of Resource Distribution	Just and equitable allocation of resources
Accountability	Refer to the country definition
Fairness	Allowing people to be heard in processes that affect them, ensuring decisions are made without bias and acting consistently with the rules that apply, also referred to as human right or equality (Ombudsperson British Columbia)
Transparency	Refers to a process by which reliable, timely information about existing conditions, decisions and actions relating to the activities of the organization is made accessible, visible and understandable. UNDP .
Standard of Living Protection	Living Standard Dimension of the Human Development Index UNDP
Unemployment	Ratio of unemployed people to the labour force UN
Inclusive Taxes on Imports	Broadening tax base, while avoiding tax avoidance and evasion UN
Corruption rate	Crime committed by officials (public or private) abusing of their role to procure gain for themselves or somebody else Transparency International UN
Digital equity	Broadband distribution and digital empowerment of society
Cultural Heritage Preservation	Measures taken to extend the life of cultural heritage while strengthening transmission of its significant heritage messages and values UNESCO
Public Art	Artistic works that have been specifically realised within/for the public realm Public Art Research Report

Sustainability	Reference
ESG	Environmental, social, and governance (ESG), is a set of aspects, including environmental issues, social issues and corporate governance that can be considered in investing ASDUN .
Climate Adaptation	Adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects OECD .

Sustainability	Reference
Climate Mitigation	Activities to reduce or prevent greenhouse gases, or to enhance carbon sinks that remove them from the atmosphere Worldbank
Biodiversity and Green Spaces	Variety of life on Earth and the natural patterns it forms. UN
Adherence to SDGs	Guidelines for country reporting Global Compact
Circular Economy	Interconnected network of systems that are designed to eliminate waste and pollution, circulate products and materials, and regenerate nature. Metrics on enabling circular economy as well as its outcome Ellen Mac Arthur Foundation Cities
Summer Mortality and Heat Islands	Extreme heat and temperatures contributing to citizen mortality rates Heat and Cold Stress
Environmental Justice in Pricing	Goal of promoting justice and accountability in environmental matters, focusing on the respect, protection and fulfilment of environmental rights, and the promotion of the environmental rule of law. UNDP
Recycling and Re-use	Reduce waste generation through re-use or diverting waste UN
Sustainable Buildings	Decarbonization, sustainable, Net Zero and resource positive buildings. Breakthrough agenda COP28

Economy	Reference
National Income	Total value of the primary incomes receivable within an economy less the total of the primary incomes payable by resident units UN Data
Average individual income	Maximum amount that a household or other unit can consume without reducing its real net worth UN Data
Level of Poverty	Individuals who are employed but nevertheless live in households whose total income is below the poverty line UN Stats
Average family numbers	Based on national statistics/census
GDP/Capita	Based on national statistics
Tracking of Demographics	Census
Non Discrimination	The application of no less favourable treatment to any service or service provider than that accorded to other like services or service providers in similar conditions
Adherence to SDGs	UN SDG Map

Economy	Reference
Creative Economy	Contribution and potential of creative assets to contribute to economic growth and development UN Creative Economy
Shared economy	Economic form in which the economic owners of assets including tangible assets and skills provide services either by transferring the use right of the assets or through independently work using their own assets Sharing Economy definition
Re-manufacturing	Re-use of materials



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