



Foundations for Future Readiness for Cities

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Why this course?

We are living in a time characterized by change; from our rapidly warming climate, to growing urbanization, as well as demographic shifts, to global pandemics and conflicts. Municipalities are at the center of this change and are facing a growing number of complex challenges.

To prepare for and adapt to an increasingly uncertain future, new tools and approaches can help municipalities be prepared for and support a sense of readiness for the changing future.

Who is this course for?

This course has been designed for a broad range of municipal officials, ranging from policymakers and planners to political leadership and mayors. It offers a space for municipal changemakers to reflect on what it takes to be more future-ready. It can also be of interest to those working alongside local authorities and on local transformation.

What is this course about?

This course introduces some of the key topics that will shape municipalities in the coming decades. The intention of this course is to boost the future readiness of municipalities to shape thriving and prosperous places.

Across series of modules, you will gain a broad understanding of a range of topics; from the green transition, and smarter and inclusive cities, to approaches to managing complex problems and mobilizing municipal resources, funding and financing.

The course provides a range of opportunities to learn; from video summaries and bite-sized content to interactive quizzes and activities to help you to apply these new learnings to your own context.

See
introduction
video to the
course here



This booklet is based on the same online open access course available below on SparkBlue in following languages:

English



Armenian



Azerbaijan



Georgian



Romanian



Russian



Ukrainian



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by Tina S. Stoum

Design

Natan Aquino

Contact Information

Tina S. Stoum, Regional Project Manager,
tina.stoum@undp.org

Disclaimer

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Foundations for Future Readiness



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Overview of course

Module 1

Welcome to the course

Module 2

Drivers of Change: the need for new approaches to local economic development

Module 3

Understanding the Green and Just Transition

Module 4

Understanding Smarter and Inclusive Cities

Module 5

Managing Complex Challenges

Module 6

Innovation in the Public Sector

Module 7

Mobilizing Funding and Resources

Module 8

Pursuing Future Readiness, today

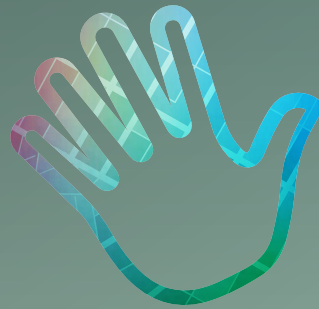


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Module 1

WELCOME



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Module 1

WELCOME

1.1 Welcome to the course

Our municipalities are shaped by a range of factors, both on a global and local scale. To create municipalities that allow people, businesses, and the planet to thrive, it is important to develop a new foundation of concepts, skills and approaches that can help us adapt to our changing future.

Through these series of bite-sized modules, you will be introduced to some of the key trends and concepts that will continue to shape municipalities in the decades to come. Each module will help you understand the key aspects of the topic and introduce new approaches and showcase leading examples. Throughout this course, we encourage you to apply these new concepts and approaches to your own municipal context.

Our learning objectives are:

The WHY

Understand the need for new approaches to urban and local development to navigate 21st Century challenges.

The WHAT

Be introduced to key concepts and approaches to support a new generation of municipal development.

The HOW

Understand how key approaches and concepts can apply to your local context.

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.

Alfred Eugene Toffler

Writer, Futurist, Businessman
(1928-2016)

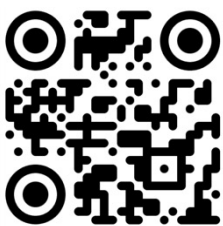


Image of sustainable & thriving places generated through Midjourney

1.2 What is the M4EG and the Urban Learning Center?

This Future Readiness Course was developed as part of the Urban Learning Center (ULC) of the Mayors for Economic Growth (M4EG), an initiative launched by the EU in 2017, and since 2021 co-implemented and designed with UNDP.

M4EG Website



See a brief introduction video of the M4EG here:



Learn more about the Urban Learning Center in this short video:



Landing page for the Urban Learning Center:



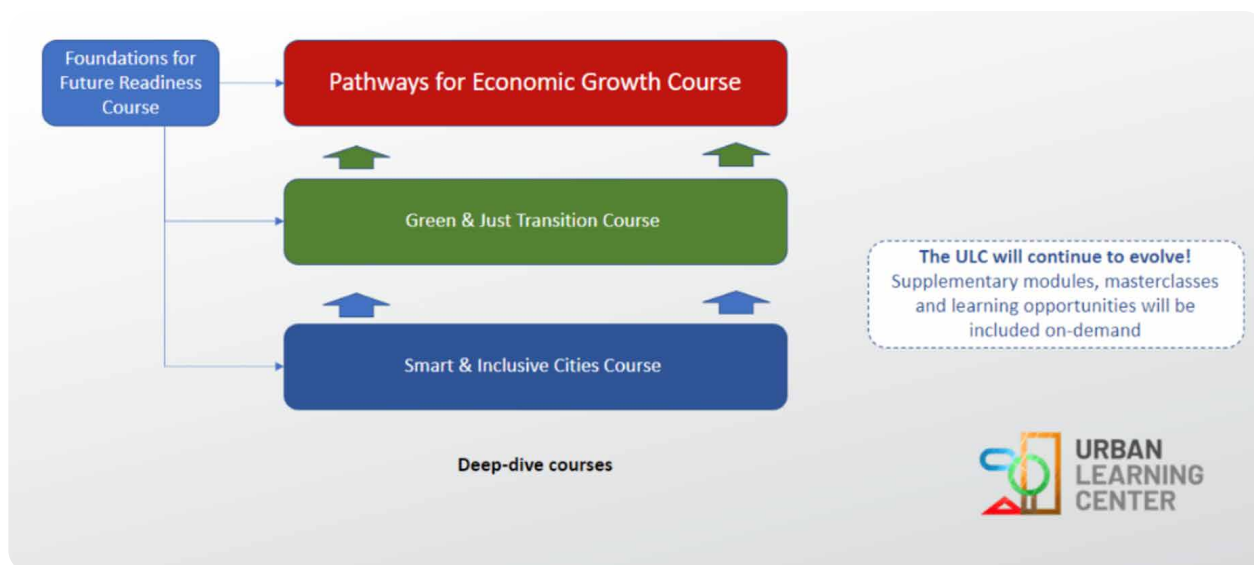
“The M4EG intends to be a demonstration project of what new trajectories of growth within planetary boundaries may look like in the Eastern Partnership countries, and how additional financing can be mobilized at the local government level.”

1.3 What we’ll cover in this course

To support the future readiness of municipalities to adapt to the increasing pace of change over the coming decades, this course will provide you with a succinct overview of some key topics that will shape the coming years.

Each module in this course will introduce a key topic that, together, form new foundation for municipal planning, and can support you and your municipality to get the most out of the ULC’s deep dive courses, including the Pathways for Economic Growth (P4EG), a new generation of local economic development planning.

How does this course fit in to the ULC?



The modules in this course are organized into two main sections:

Concepts for change

These modules introduce some of the key concepts that are shaping municipalities in the coming decades.

Module 2 – Drivers of Change: The need for new approaches to local economic development

Module 3 – Understanding green and just transition, including the EU's Green Deal

Module 4 – Understanding smart and inclusive cities

Approaches for future readiness

These modules will introduce approaches that can support municipalities to adapt to a complex and changing future.

Module 5 – Managing complex challenges

Module 6 – Innovation in the public sector

Module 7 – Accessing funding and resources

Module 8 – Pursuing future readiness, today

1.4 How will this course be delivered?

This is an introductory course in bite-sized modules. You can flexibly follow the modules in this course to suit your learning needs.

Each module can be accessed ‘on-demand’ for you to learn at your own pace, both individually, and as a team of colleagues in your municipality. We strongly encourage municipal team co-learning!

The entire course takes about 4-5 hours to finish. If you take this course online, you will be given a Certificate of Completion once finalized. Please note that UNDP and our international and local partners can supplement this course materials with hands-on in-person and online workshops upon request. To hear more about this, reach out to your local UNDP contact point, or the coordinators at the Urban Learning Center under the M4EG: eu.m4eg@undp.org

Let's start the learning journey!



Workshop with the municipality team in Călărași, Moldova, under the M4EG program Urban Imaginaries in 2021

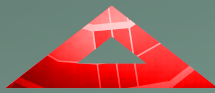


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Module 2

DRIVERS OF CHANGE



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Module 2

DRIVERS OF CHANGE

2.1 Module overview

In this module, you will be introduced to some of the prevailing Drivers of Change that are and will continue to shape our future in the years and decades to come. The module will briefly introduce some tools, frameworks and approaches that can help to navigate complex challenges, and underline the importance of new, holistic approaches to municipal planning for the challenges of the 21st Century.

To kick-start our thinking, take a deep breath and imagine one BIG change from how you currently live your life compared to your grandparents?



The Great Horse Manure Crisis of 1894 in London:

The Times Newspaper predicted: “In 50 years, every street in London will be buried under nine feet of manure.” However, in the following 50 years horses were replaced as a mobility option with the arrival of cars. How could transport continue to be changed in the future?

2.2 The current state

Our changing world

We live in a changing world – complex and interconnected. This pace of change is increasing. Our cities and municipalities of 2050, and even 2030, will look remarkably different than today. With rapid change, it is difficult to keep up with the new opportunities and address the new challenges that they present.

With a recent example: in 2023 we have seen a boom of the use of Artificial Intelligence (AI) and its subset of Machine Learning (ML), which uses algorithms trained on data to produce adaptable models that can perform a variety of complex tasks.

From healthcare to automobiles, agriculture to hospitality, or manufacturing to education, AI is increasingly impacting every industry. This is likely to have a range of positive and negative influences on our existing and future jobs and economic sectors, which are hard to predict.



What can guide us when faced with constant change - the Sustainable Development Goals (SDGs)

The SDGs are a first in human history—a global compact to create a future where nobody is left behind.

The SDGs are universal and hence for all countries, regardless of economic and human development status. Every community has a way to go still to achieve sustainable development, and the path is not evident.

The 17 goals and their 169 targets were adopted by all countries at the United Nations in September 2015. They encompass every aspect of human and planetary wellbeing; a universal call to action to end poverty, to protect Earth and ensure all people enjoy peace and prosperity.



The SDGs come with a deadline - by year 2030. We need all members and actors of our communities to help turn the dial towards a more prosperous future.

The SDGs is the results framework of the 2030 Agenda for Sustainable Development, and stimulates action based on five pillars:

PEOPLE

End poverty and hunger in all forms and ensure dignity and equality.

PLANET

Protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources, and taking urgent action on climate change.

PROSPERITY

Ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social, and technological progress occurs in harmony with nature.

PEACE

Foster peaceful, just, and inclusive societies which are free from fear and violence.

PARTNERSHIP

Implement this Agenda through a solid global partnership.

The five Ps provide an integrated framework for measuring progress. The progress of each P must balance promoting the progress of each of the others.

Although separated into 17 distinct goals, it is crucial to see the SDGs as deeply interlinked and interconnected. A lack of progress on one goal can prevent progress on others. Prosperity for all can only be realized if we take positive action across all pillars in a unified way. Yet, encouragingly, taking positive action can have positive effects on multiple other goals. For example, taking steps to improve gender equality can also improve education, health and well-being, leading to reduced inequalities.

2.3 What are some of the key Drivers of Change that will shape our future?

Achieving these goals is no easy feat. This challenge is compounded by an increasingly rapid pace of change from a diversity of aspects. To manage our municipalities for our future, it is important to understand some of these Drivers of Change.

What are some of the key drivers of change to 2050?

Urbanization



By 2050, 68% of global population will live in cities¹

How can we manage rapid urbanization and create thriving urban places?

Climate Change



Cities are responsible for 70% of global GHG emissions²

How can we be adaptable to climate change while mitigating emissions?

Demographic shifts



Between 2015 and 2050, the proportion of global over 60-year olds will double³

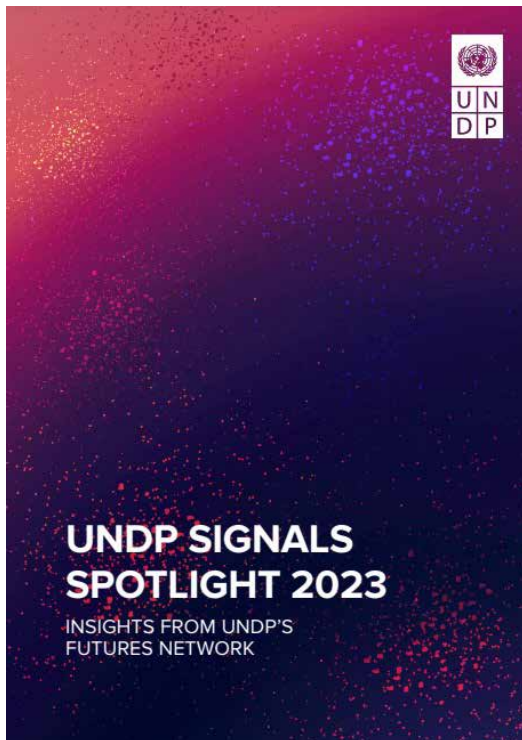
How can we deal with systemic demographic shifts?

Energy



Cities consume close to two-thirds of global energy demand²

How can we generate sustainable and affordable energy for an increasing demand?



You can explore more Drivers of Change at [Arup.com](https://www.arup.com)

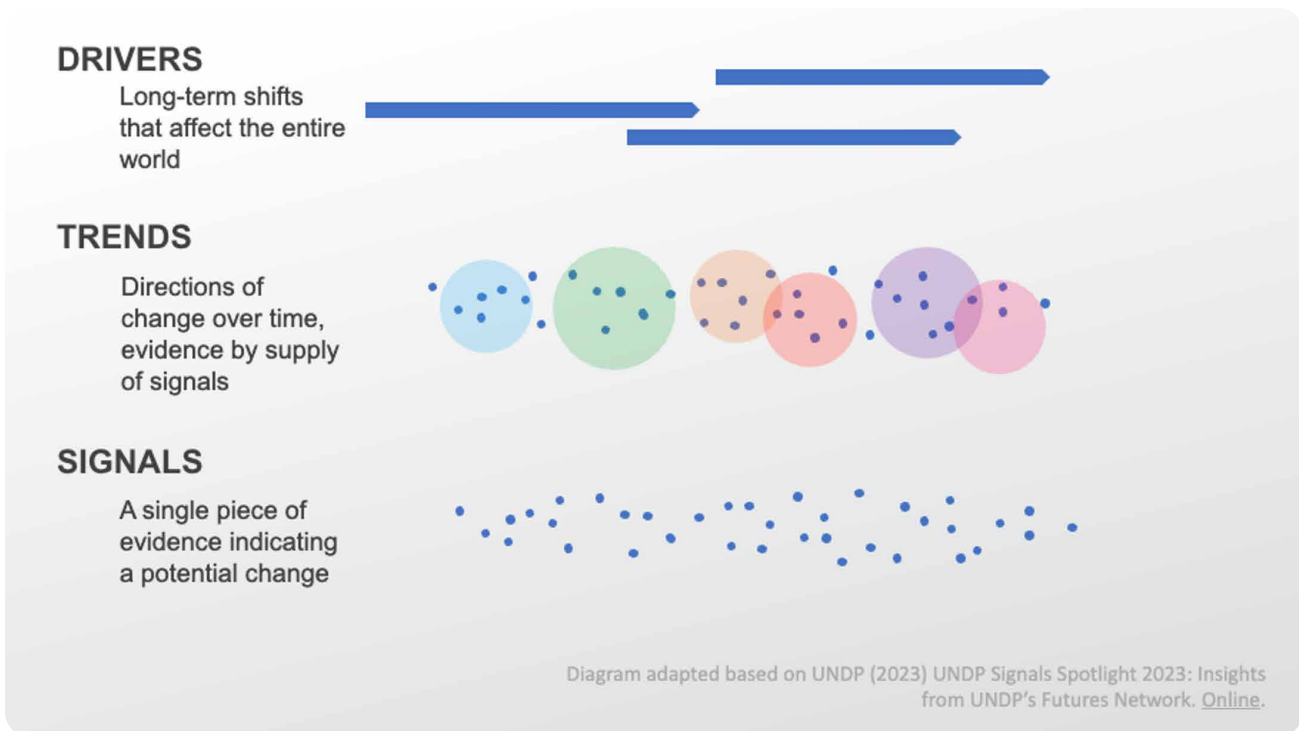


and in the UNDP Signals Spotlight



Understanding the Drivers of Change

Each of these Drivers of Change above will have diverse impacts across our municipalities and globally. The huge scale of such changes can initially be overwhelming to comprehend. Therefore, useful frameworks can help us to break down the scale of this change, analyze past changes, and be better prepared for future changes.



Example Climate emergency

In the summer of 2023, we saw the hottest day on record, and many places are struggling to adapt to what might become a new normal with extreme heat. Amid a climate emergency and increasing concern that global warming will exceed 1.5°C, some governments appear ready to challenge popular preferences or vocal lobbies if that is what it takes to adopt more sustainable policies.

What are trends that speak to this theme of climate emergency?

- 1 Climate shocks, like extreme weather - more intense, more frequent
- 2 Increasing polarization within countries
- 3 Rise in social unrest

What could be some concrete illustrative signals?

- 1 Barbados reinstates its ban on single-use plastics
- 2 Kenya lifts its ban on GMOs to tackle food insecurity
- 3 New tax planned on New Zealand cattle's emissions
- 4 Kazakhstan, Ecuador and Nigeria face protests against cutting fossil fuel subsidies
- 5 US hires 'heat experts' and put in place new measures to protect communities from extreme heat

Could a news heading from 2040 look like this?



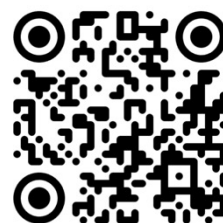
[example taken and slightly modified from the UNDP Signals Report 2023]

2.4 What is the 'STEEP' Framework?

The STEEPV framework is a strategic tool used for scanning the external macro-environmental factors that impact an organization or community. The acronym stands for Social, Technological, Economic, Environmental, Political, and Values. By examining these six dimensions, municipal staff can gain a comprehensive understanding of the external factors that might influence policies, operations, and long-term planning. The social element looks at demographics and cultural attitudes, technological delves into innovation and infrastructure, economic focuses on market conditions and trade, environmental considers natural resources and climate change, political involves governance and regulations, and values explore the underlying beliefs and ethics of the community.

Using STEEPV helps in informed decision-making, risk assessment, and future planning for a more sustainable and responsive municipal strategy.

We can begin to understand the various impacts of these global Drivers of Change through an intuitive framework 'STEEP'. Watch the video below for more on drivers of change and what the STEEPV refers to.



Disclaimer: Please note that STEEPV is just one of valuable foresight tools available to us, you may have used others such as PEST/L and STEEP before, or perhaps 'Horizon 3 Framework' that can complement the STEEPV.

Discussion / Reflection

Discuss with you peers and share your reflection on:

- What are some of the Drivers of Change in your community (e.g. urbanization), and how is/could your municipality be affected directly by these going forward?

2.5 The need for new approaches

Conventional approaches in municipal planning often have focused on a given dimension in isolation. In other words, economic plans have tended to exclusively look at economic sectors, while environmental plans exclusively look at nature, etc.

While these approaches have been able to support advances in each area, they tend to overlook the complete picture. In reality, the challenges that municipalities face do not act in isolation. Useful questions to ask ourselves:

- How can we set new visions, missions or ‘north starts’ for a better future that works across thematic areas and disciplines?
- How can we empower communities and co-create with them in the development process?
- How can we size the opportunities of a low-carbon or net-zero economy?
- How can we boost innovation and competitiveness?
- How can we learn and best use the digital transition to “smarten” our cities?
- How can we promote diverse and equal opportunities?
- How can we solve complex and interconnected problems that affect multiple sectors?

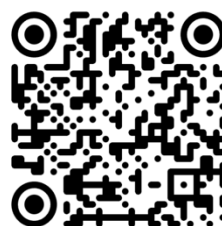
These common challenges currently faced by municipalities cannot simply be addressed by a single focus or technological or financial fixes alone. Instead, they require an adaptive, cross-cutting, and multi-dimensional approach to effectively manage them.

2.6 Inspiration: Tallinn’s participatory planning process for strategy development

Tallinn, the capital city of Estonia, has implemented an innovative approach to developing its strategic plans through participatory planning. This process engages citizens, local organizations, and businesses to work collaboratively with the city government in setting priorities and identifying actions to address critical challenges facing the city.

Pursuing active engagement reflects the priorities and aspirations of the community, with a focus on sustainability, social cohesion, and economic prosperity. It includes ambitious goals, such as reducing greenhouse gas emissions by 40% by 2030 and creating 20,000 new jobs in the city.

By leveraging the knowledge and expertise of a wide range of stakeholders, the city was able to develop plans that are more responsive to the needs and aspirations of its citizens, which has received positive effects and feedback from residents.



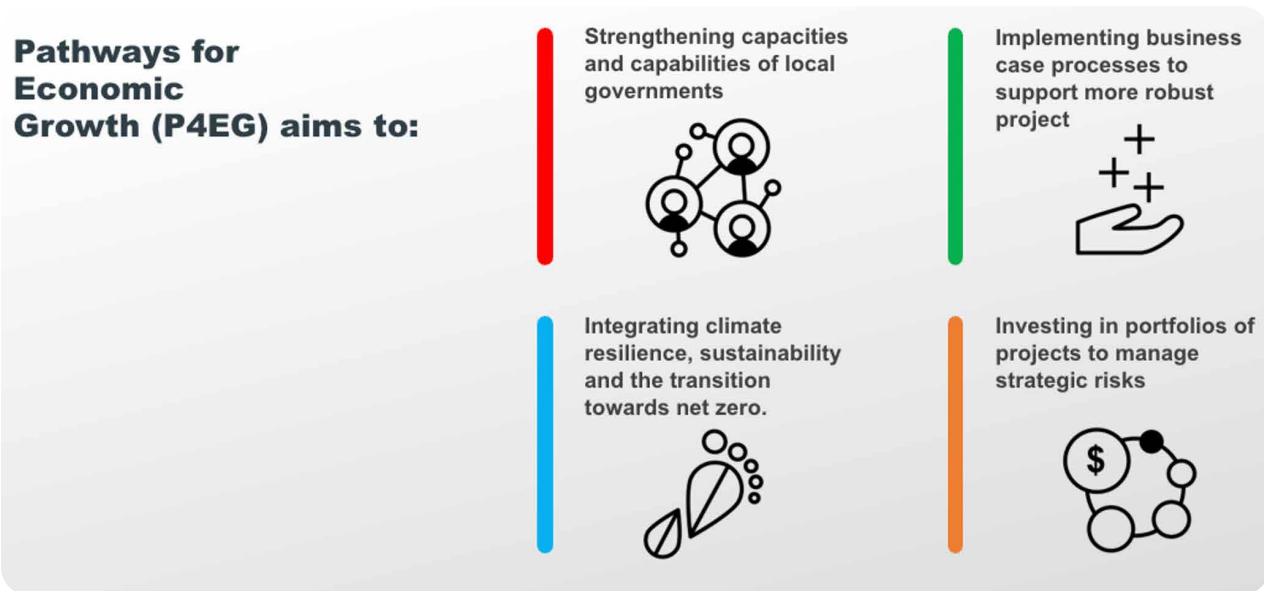
You can see Tallinn’s 2035 Strategic Plan [here](#)



and you can read more about participatory planning in Tallinn [here](#)

2.7 A new generation of economic planning - Pathways for Economic Growth (P4EG)

The Mayors for Economic Growth (M4EG) initiative developed a new generation of economic planning that can help municipalities navigate the complexities of the 21st Century, and create thriving places:



The Pathways for Economic Growth builds upon the success and challenges of the first generation of Local Economic Development Plan (LEDP) under the M4EG (2017-2020) and aims at enhancing inclusive economic growth and job creation by supporting local authorities in the Eastern Partnership (EaP) countries to design and implement a Pathway for Economic Growth (P4EG) through:

- **Strengthening capacities and capabilities of local governments** through the process of developing the Pathways for Economic Growth;
 - **Implementing business case processes to support more robust projects:** disciplined business analysis and transparent decision-making based on strong business cases must take precedence over effort to replicate what has been done elsewhere;
 - **Integrating climate resilience, sustainability and effective transitions** towards net zero and circular economy targets at the core of the P4EG, drawing directly on the European Green Deal objectives and strategic positions, in particular aligning with European Missions of most relevance for cities (Climate Adaptation and Climate-neutral and Smart Cities); and
 - **Investing in mission portfolios of projects** encompassing several actions to test, learn and manage strategic risks. These can be related to improvements in buildings and infrastructure, energy system transitions to zero-carbon, low-/no-carbon mobility shifts (especially related to commercial transport and urban logistics), and deployment of urban greening interventions, with explicit and visible articulation of benefits to citizens and the community, including all co-benefits such as improved public health.
- A mission portfolio is here different from a standard understanding of a grouping of projects. The mission portfolio promotes testing several interventions to address a strategic risk for the municipality (such as de-population, energy transition, over-reliance on a single economic sector, among others). Hence it promotes testing interlinked proof of concepts before any further scaling and investments.**

You can learn more about the Pathways for Economic Growth (P4EG) in a stand-alone course under the ULC.

If we want growth today to be more innovation-driven, more inclusive and more sustainable, then we need a more active state, not a less active one. Yet we still hear the dogma that we should just fix market failure by focusing on science and infrastructure, and to “level the playing field.”

Mariana Mazzucato
 Writer, Futurist, Businessman

If you are interested in how we can reframe the direction of economic growth through mission-based approaches, we recommend the by now well-known book *Mission Economy: A Moonshot Guide to Changing Capitalism* by Professor Mariana Mazzucato. Here you can see her related Ted Talk: "What is Economic Value and Who Creates it?"



2.8 Piloting a new wave of economic planning in Baghdati, Georgia

The municipality of Baghdati, Georgia is a frontrunner in testing the new Pathways for Economic Growth (P4EG) approach. At the end of 2022, the municipality of Baghdati, together with UNDP, Arup and Climate-KIC, piloted the methodology. This new P4EG approach enabled the municipality to bring holistic thinking, going beyond business-as-usual to combine economic opportunities, vibrant communities, and innovative approaches – core to the M4EG identity.

The process included a series of workshops and engagements to integrate climate resilience, and sustainability into the key priorities and practical actions moving to support the municipality's development. Culminating in a practical strategy document, the P4EG process has identified a practical set of actions that Baghdati can pursue to support local people, economy and environment to thrive.



Watch the video to find out more on Local Economic Development Plans in action, Baghdati, Georgia.

2.9 Workshop activity

In a group, explore the Drivers of Change. You can use the Drivers of Change presented in this module, or for a detailed list of Drivers of Change, you can access Arup's Drivers of Change [here](#).



Discuss the following questions:

- 1** How have these Drivers of Change already shaped your municipality over the past decade? Which have influenced the most significant change?
- 2** Which Drivers of Change will have the greatest impact on your municipality over the coming decades? Why?
- 3** How might new approaches to municipal planning that go beyond businesses-as-usual help your municipality to adapt to a changing future?

2.10 Test your understanding

Question 1: How can understanding the Drivers of Change help municipalities?

(Select all that apply)

- A. To anticipate and plan for future change.
- B. To predict the future with certainty.
- C. To understand some of the leading causes of change over the next decades.
- D. To analyze a problem in the past.

Question 2: How can the 'STEEPV' framework support municipalities?

(Select one)

- A. Provides a quantitative measurement tool to develop key performance indicators.
- B. Predicts with certainty the changes and impacts that will take place over the next decades.
- C. Helps to understand the impacts of large-scale change supporting municipalities to analyze past changes and predict future changes.
- D. All the above.

Question 3: Why is it important to adopt new, holistic approaches to municipal development?

(Select all that apply)

- A. To go beyond a simplistic single-sector approach.
- B. To understand and address complex municipal challenges.
- C. To reduce collaboration in municipal planning.
- D. To ignore new opportunities.

Check your answers in the end section of this document.



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Module 3

GREEN AND JUST TRANSITION



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Module 3

GREEN AND JUST TRANSITION

3.1 Module overview

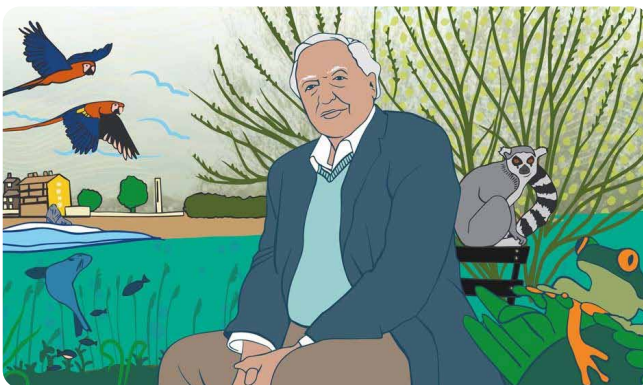
This module outlines what a 'Green & Just Transition' implies in practice for cities, towns or regions.

The module also highlights how European cities are using the European Union's (EU) Green Deal as an opportunity to accelerate their multistakeholder collaboration and rapid decarbonization alongside sustaining economic growth.

Lastly, the module introduces the framework of a Transition Map that outlines the steps necessary for achieving the green and just transition.

We moved from being a part of nature to being apart from nature.

Sir David Attenborough
A Life on Our Planet



Attenborough's career as a broadcaster, natural historian, author, and environmental advocate spans over seven decades. In 2022, the UN Environment Programme granted him the Champions of the Earth Lifetime Achievement Award for his dedication to research, documentation, and advocacy for the protection of nature and its restoration. In 2023, Attenborough is 97 years old. See the **video below** to hear more about his journey.



3.2 What is a Green and Just Transition and what could cities and towns do to achieve it?

The 'green transition' refers to a large-scale shift that many cities, businesses, and individuals are making from traditional, fossil fuel-dependent practices to more sustainable, environmentally-friendly ones. This transition is often driven by a desire to reduce greenhouse gas emissions and mitigate climate change, but it also brings many other benefits like improved air quality and potential cost savings in the long term.

A 'green transition' aims to improve the prosperity, well-being and health of citizens and future generations by providing multiple benefits:



As seen in the illustration above, for municipalities this could entail among other things:

1 Energy

Transitioning to renewable sources of energy like solar, wind or hydroelectric power. This might involve installing solar panels on municipal buildings, purchasing electricity from renewable providers, and encouraging residents to adopt renewable energy technology and practices.

2 Transportation

Encouraging more sustainable transportation practices. This might mean improving public transportation, developing infrastructure for cycling and walking, and transitioning to electric vehicles for municipal fleets. For change to happen, the municipality often needs to lead the way as an example.

3 Waste Management

Implementing better waste management practices. This could involve expanding recycling programs, setting up composting initiatives, or even rethinking how waste is collected and processed. And maybe there are new uses of 'trash' that we have not thought of yet, e.g. as building materials, road fillings etc.?

4 Building practices

Adopting greener building practices. This could mean constructing new municipal buildings to be more energy-efficient, retrofitting existing buildings with better insulation or energy-saving appliances, or creating guidelines for green building practices in the community. Did you know that the cement industry is responsible for about 8% of planet-warming carbon dioxide emissions — far more than global carbon emissions from aviation?

5 Education and Awareness

Promoting education and awareness about sustainability among residents (and visitors!). This might involve hosting workshops on energy-saving techniques, creating information campaigns about recycling, supporting and giving visibility to local champions, or involving schools and other educational institutions in environmental initiatives.

Putting the 'Just' in Green Transition

It is important to understand that the green transition is not just about the environment—it's also about people. A 'just transition' ensures that the shift towards a sustainable future is fair and equitable, leaving no one behind. As we shift our economy to less dependency on fossil fuels, a Just and Green Transition should also aspire to:

1

Diversify low-carbon investments across key economic sectors – to decouple growth and resource use

2

Ensure Greenhouse Gas (GHG) emission reduction also raises Gross Domestic Product (GDP) to ensure new jobs creation

3

Ensure new jobs are decent – with guaranteed living wages, workplace safety protections, and health benefits

4

Prioritise and support regions or communities where economy is highly fossil fuels-dependent

5

Ensure economic goals are aligned with poverty eradication, social inclusion and equity i.e., no one left behind

6

Help planning processes become transparent – with active participation of a broad range of stakeholders

7

Help minimise fear, opposition, and inter-community and inter-generational conflicts

8

Help monitor & learn from the hard-to-measure social impacts (or co-benefits) of economic growth

Here are some key aspects that you may consider in your municipality for a just transition:

1 Job Transition

Many jobs in traditional industries like oil, gas, and coal may not exist in a green economy. A just transition provides training and education for these workers to shift into new jobs in renewable energy, energy efficiency, or other growing sectors.

2 Energy Affordability

While renewable energy is becoming cheaper, the initial costs can still be a barrier for many people, especially those made vulnerable. A just transition includes policies to make green energy affordable for everyone, such as subsidies for solar panels or energy-efficient appliances.

3 Community Involvement

Communities should be involved in decisions about the green transition. This includes local planning decisions, such as where wind farms or solar parks should be located, and bigger policy decisions, such as how funding for the transition should be spent.

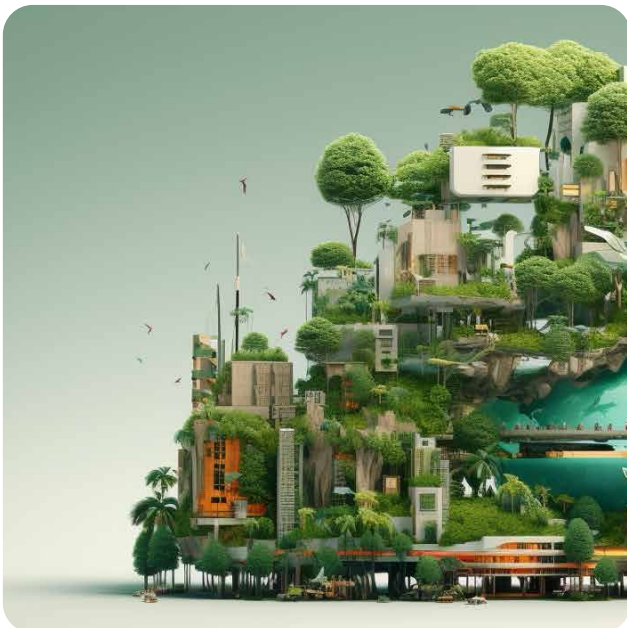
4 Equity

Some communities, particularly marginalized or low-income ones, have been disproportionately affected by environmental problems. A just transition prioritizes these communities for investment and support, helping to address and ideally heal historical inequities.

5 Health and Quality of Life

The green transition is not just about mitigating climate change—it's also about creating healthier, more livable communities. This could mean cleaner air from less pollution, more green spaces, or better public transportation.

In summary, a just transition is about ensuring that the green transition benefits everyone—not just those who can afford it. It is about creating a future where everyone has access to clean energy, good jobs, and a healthy environment.



The green transition isn't just about one big change—it's about lots of small changes that add up. Every action taken towards sustainability, no matter how small, helps to reduce our environmental footprint and make our communities healthier and more resilient.

Reflection

Prosperity without growth?

While economic growth - typically referring to an increase in the Gross Domestic Product (GDP) of a country or a region - can bring many benefits, it is not always evenly distributed in our societies. Some people may see a significant increase in their living standards, while others may see very little improvement or even experience worsening conditions. Therefore it is crucial to consider not just economic growth, but also how the benefits of that growth are shared across society.

We also know that relentless pursuit of economic growth can sometimes lead to negative consequences such as environmental degradation and increased social inequality. That is why the conversation often extends beyond pure economic growth to sustainable and inclusive growth, which considers environmental sustainability and social equity.

Today, there are more and more voices across demographics and expertise that is saying we can have prosperous and thriving societies without the relentless pursuit of 'the economy is growing'.



Illustration by Till Lauer, The New Yorker

“We have an economy that needs to grow, whether or not it makes us thrive. We need an economy that makes us thrive, whether or not it grows.”

Kate Raworth

What do you think - can we have prosperity without growth?

Read the two articles below and provide your reflections on the topic.



The New Yorker
by John Cassidy



Intelligence2 by
Yosola Olorunshola

Inspiration

Viladecans, Spain

How to tackle energy poverty?

- 'Energy poverty' is when households or individuals are not able to access or pay for essential energy products or services (e.g., a secure supply of electricity or heating).
- For the town of Viladecans near Barcelona in Spain, the municipality realized that many residents would face barriers of high costs, and hence needed more help if the municipality was to achieve its low-carbon targets.
- From 2014-2020, the town's VILAWATT project established a public-private-citizen partnership (PPCP) as a hub for knowledge, tools and operations aimed at stimulating the economy.
- The PPCP is an arrangement between public authorities and private partners to deliver infrastructure or services under a long-term contract. It may include public organizations, utilities, private companies, community groups, and research institutes.
- The PPCP led to 60 residential energy retrofits in low-income areas with 60% expected reduction in household energy consumption; the rollout of smart meters and sensors to monitor consumption; public campaigns to increase visibility; public awareness and education on energy efficiency, reaching over 150 households.

More information about this project can be found in the short [video below](#)



EU's Green Deal



Launched in 2020, the European Green Deal is one of the main examples of policies that are driving the Green and Just Transition. It covers 8 key policy areas:

<p>1</p> <p>Climate action Making the EU climate neutral by 2050 and reducing GHG emissions by 55% below 1990 levels by 2030</p>	<p>2</p> <p>Clean Energy Affordable and secure energy generation with renewable sources and energy efficiency</p>	<p>3</p> <p>Sustainable Industry Mobilising industry for a clean and circular economy & production</p>	<p>4</p> <p>Building and Renovating A cleaner construction sector for energy- and resource-efficiency</p>
<p>5</p> <p>Sustainable Mobility Promoting and accelerating the shift to low-carbon and smart mobility</p>	<p>6</p> <p>From Farm to Fork Designing a fair, healthy and environmentally-friendly food system</p>	<p>7</p> <p>Protecting Biodiversity Preserving and restoring fragile ecosystems and biodiversity</p>	<p>8</p> <p>Eliminating Pollution Measures to cut pollution rapidly and efficiently for a toxic-free environment</p>

Having looked at the Green and Just Transition, what does it mean in practice for cities and towns?

As hubs of economic growth, cities and towns can lead the design and implementation of Green and Just Transition actions and policies – through existing stakeholder networks, industrial and innovation ecosystems, as well as project ideas for emissions-intensive and socially-relevant sectors.

Local Authorities are at the forefront of tackling systemic risks and uncertainties due to the pandemic, war, energy crisis, and climate emergency. EU Cities are currently localizing the Green Deal agenda to better plan their response to and recovery from current and future climate-induced crisis events.



Local Green Deals are tailor-made action plans to accelerate and scale up a city or town’s green transition and sustainable development – by building on and joining up existing strategies, policies, market and financial incentives, and empowering businesses and civil society.



Innovation Missions: EU Cities are also enabling a green transition process through their Climate City Missions, focused on timebound decarbonization strategies, finance, multi-sector actions and implementation focused on net-zero GHG reduction by 2030.



The following videos illustrate how two cities are developing and implementing ambitious green & just transition Missions with their local stakeholders:



La Louviere
(Belgium)



Valencia
(Spain)

3.3 Introduction to the Transition Map

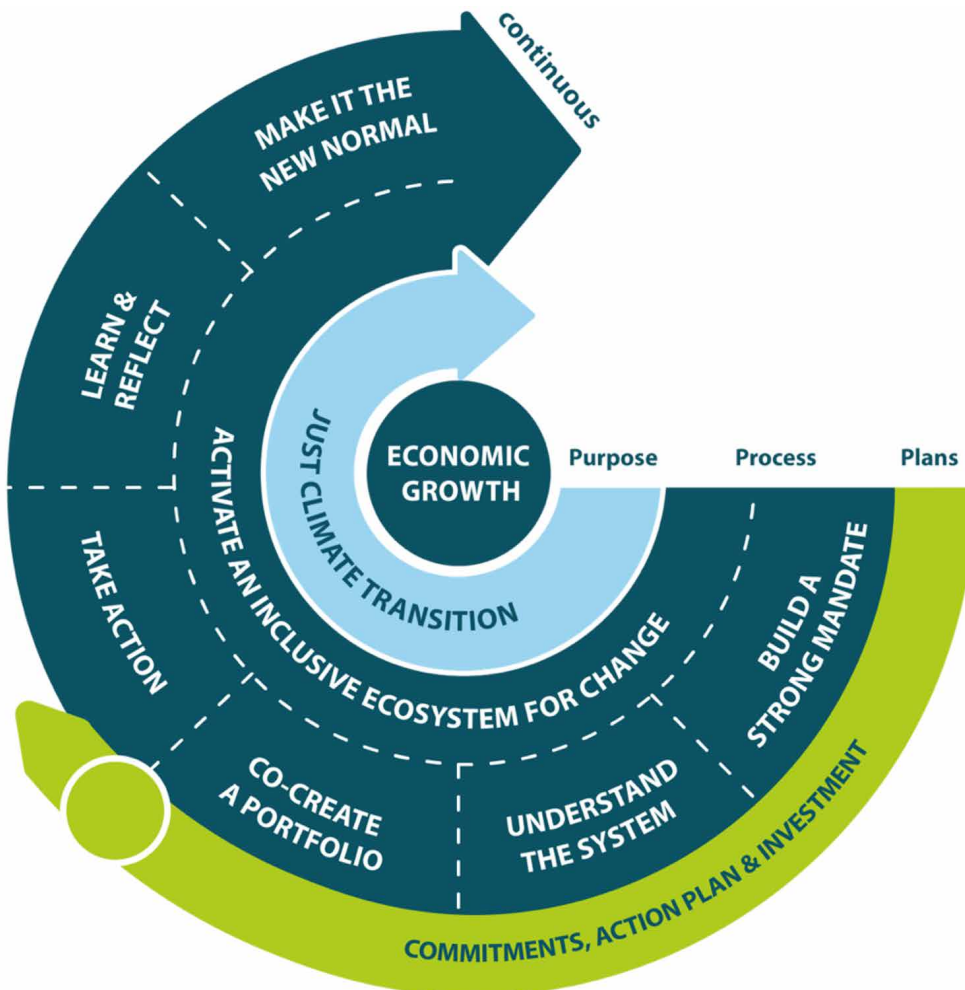
Watch the **video below** for the introduction to the concept of a Transition Map.



The Transition Map is a step-by-step approach with 7 phases to guide a municipality's journey towards a Green and Just Transition.

The Transition Map has been developed by the NetZeroCities initiative, implementing the EU's Climate Cities Mission. It is used for supporting 112 European municipalities manage their transition towards achieving climate-neutrality by 2030.

The phases of this Transition Map are elaborated below:



1 ACTIVATE AN INCLUSIVE ECOSYSTEM FOR THE TRANSITION

- Identify additional stakeholders across all relevant sectors and reflect the diversity of the population, including age and gender. The ecosystem should include non-traditional voices alongside the departments/personnel already close to the planning process.

- Co-creating a shared vision and understanding of what the transition means for the city or town helps build wider consensus as well as to mobilize support, advocacy, and co-leadership.

2 BUILD A STRONG MANDATE WITHIN CITY/TOWN GOVERNMENT

- Create a Transition Team: Create (or strengthen) an internal team in the city government or municipality, with strong relationships at a senior strategic level and at an operational level across key departments (e.g., finance and economic development teams).

- A Transition Team made up of local actors (from the public, private, academia and civil society) makes it possible to connect strategic objectives, resources, and capacities to activate the transition.

- Collaboration across political parties, and with other cities or administrative levels (regional, national governments) can be essential to legitimize the transition locally with stakeholders including residents.

3 UNDERSTAND THE SYSTEM

- Data inventory: Work with all actors in the ecosystem to aggregate information and data. This is essential to create a shared overview of the scale and scope of transition, in terms of all the necessary actions and investments.

- Start from where the city/town is at present: A comprehensive analysis of the city's current gaps for achieving the transition – based on current ambitions and policies (local/regional/national), as well as sector-wise barriers, missing connections, and successes.

4 CO-CREATE A PORTFOLIO FOR TRANSFORMATIVE CHANGE

- Connect individual actions: Connect isolated solutions, department siloes and uncoordinated roadmaps, to assemble a set of coherent actions/projects to strengthen the connections between multiple actors and sectors.

- Estimate co-benefits and impact: Actions for economic growth can also generate significant co-benefits for citizens in related areas, such as health, waste, pollution, resource management or social inclusion.

- Consider all Drivers of Change (technology; governance, policy, and regulation; finance; participation and social innovation; capability building) that can help address identified gaps and barriers.

- Consider your portfolio as a de-risk instrument for your city or town's future investments. What does the municipality need to learn about and test today to be more competitive and thriving in the future?

5 TAKE ACTION

- Innovative governance: Capability building in the city government might be necessary to adapt expertise and administrative structures to the design, financial and operational needs of the portfolio.
- Local governments, utilities, large corporate organizations, Small & Medium sized Enterprises (SMEs), households, residents and community groups all play an essential role in implementing the portfolio.
- The Transition Team should be empowered to coordinate implementation across different organizations and groups; specifically, to prioritize diversity, inclusion and social justice.

6 LEARN & REFLECT TO DYNAMICALLY MANAGE THE PORTFOLIO

- A Learning Organization: Create a culture in which pivoting needs and challenges in an evolving context can be signaled early and responded to in an agile manner.
- Peer-to-peer learning not only enables knowledge transfer and dissemination, but also builds mutual trust in the local ecosystem. This creates a safe environment to deliberate upon barriers and failures.
- A reflexive approach to test, learn, iterate, adapt helps build confidence in the direction and progress towards impacts, and ensures real-time and actionable insights are captured to better inform decision-making of the municipality and local actors.

7 MAKE IT THE NEW NORMAL

- A Monitoring and Learning (MEL) practice will support the monitoring, reporting and communication of the progress made. It helps capture and codify the implemented measures – to embed transition within local context, organizational structures, teams, and processes.
- Mainstream what good looks like: Embed new, good procedures that speed up inclusive decision making, improved multi-actor collaboration and effective implementation.
- Formalize new rules and standards: For practices to be largely adopted by cities or towns, the most efficient processes and standards will need to be agreed upon for these to permeate local institutions. Use relationships with stakeholders like other cities, regional or national networks to help formalize these new practices.

3.4 Inspiration: Mannheim, Germany

Localizing the Green Deal for city-wide transformation



Context

With a population of 310,000 inhabitants, the city was once an industrial center. Over the past decades, the city has managed its transition to an economic, cultural and sustainability hub in the region – by focusing on economic strengths, skills development, quality of life, retail trade or real estate market. The municipality created a city-led multi-stakeholder Platform “iDEAL” that is implementing the Green & Just Transition in the form of:

- **Local:** Adopting the EU Green Deal ambition of reaching climate-neutrality at the city and community-levels with a goal of 2030 (against the 2050 target for the EU).
- **Green:** Achieving sustainable development and protection of climate, nature and environment that affects the daily lives of citizens and the economy.
- **Deal:** Commitments to implementing specific solutions shared by all stakeholders to collectively contribute to the transition.

Aim: To overcome isolated actions by all departments to transform the entire socio-economic model and deliver sustainability policy, along with a focus on SMEs and civil society actors.



The iDEAL initiative has adopted **eight fields of action for a socially just transition**, based on the EU Green Deal objectives:

- Tackling climate goals with the commitment of becoming climate-neutral by 2030.
- Expanding and deploying renewable energy (solar and wind power) to provide an affordable and secure supply.
- Boosting a sustainable economy – Industry, commerce, trade and services that also protect nature and the climate (e.g., design/manufacture of reusable products).
- Mobility that is climate-friendly – Intelligent mobility for better access, health and well-being for all citizens.
- Building for the future – using fewer raw materials and energy as possible, while ensuring sustainable houses and apartments remain affordable.
- Providing healthy fresh and environmental-friendly food, from the farm to the table – while focusing on the entire food system for sustainability.
- Bringing natural diversity to life – Nature is protected and provides diverse flora and fauna; offers space for relaxation in the middle of the city that everyone can enjoy.
- Protecting the environment worth living in – Reducing environmental pollution for clear water in the Rhine River and lakes, healthy soil and fresh air in the city.

Source: iDEAL/City of Mannheim

The following are the key learnings from this case study:



- **Political will:** Local Green Deal (LGD) initiative is supported by the City Mayor and the Deputy Mayor for Environment and Climate, a working group with all Heads of Departments and deputy mayors' offices and an expert advisory panel.

- **Funding:** Mainly from Municipality's core budget; aimed at pooling blended finance; contribution of national and EU-funds; business modelling support to local stakeholders to access private capital.

- **Governance:** LGD established a core team overseeing the implementation, supported by eight Local Green Deal managers for each of the eight action areas. They coordinate with district-level managers – such as social NGOs and volunteers.

- **Knowledge-sharing and innovation:** City partnerships have been established with 17 businesses, industry organizations and service providers, and the largest municipal housing association.

- **Socially-just transition:** The city's action has focused on and contributed to building a strong culture of sustainable activism, behavior change and effective participation among its citizens and local communities.

3.5 Test your learning

Question 1 - Which of the following objectives is not a part of The EU Green Deal?

(Select one)

- A. Climate action
- B. Clean energy
- C. From farm to fork
- D. Thriving oceans
- E. Sustainable industry
- F. Protecting biodiversity

Question 2 - Which of these is a step towards a green and just transition for your city or town?

- A. Building a transition team
- B. Supporting an inclusive ecosystem
- C. Learn and reflect from implementation
- D. Understand the system
- E. Build a strong mandate within government
- F. All of the above

Question 3 - What is the target year established for achieving climate-neutrality (net-zero carbon emissions) by the EU Green Deal?

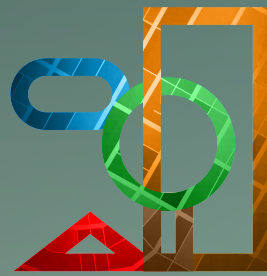
(Select one)

- A. 2030
- B. 2050
- C. 2070
- D. 2100
- E. 2130

Check your answers in the end section of this document.



**Foundations for
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COURSE MATERIALS



Module 4

UNDERSTANDING SMARTER AND INCLUSIVE CITIES



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Module 4

UNDERSTANDING SMARTER AND INCLUSIVE CITIES

4.1 Module overview

This module is focused on smarter and more inclusive cities. It presents an overview of the topic, explains the challenges of urban growth and contextualizes the emergence of the 'smart city' concept.

This module also presents the contribution of cities to the Sustainable Development Goals (SDGs) and explores opportunities and challenges for urban growth and ways to build and manage smarter and inclusive cities.

As a participant, you will get an understanding of the main themes of smarter cities, their characteristics and the importance of governance for developing smarter and more inclusive cities.

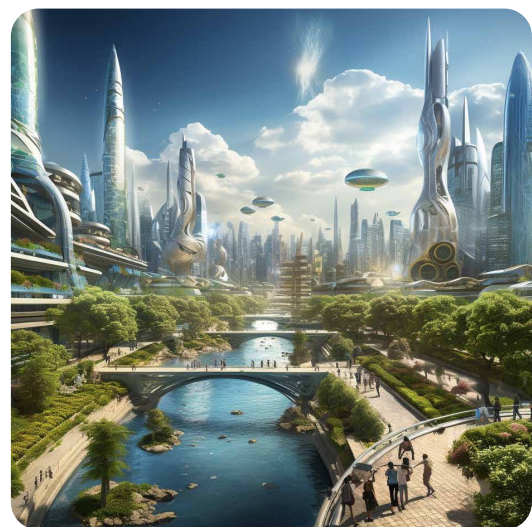
Can we collectively imagine a future urban landscape like the one below?

Where technological advances and data-driven solutions together with the renewable energy transition shape healthy, inclusive and sustainable places? Would you want to live here? And what are risks we will face along the way?

A 'smart city' is a place where its leaders have committed to use technology to transform and improve urban life by increasing local government efficiency and enabling new forms of civic engagement.

Susan Crawford

Harvard Law School Professor and previously special assistant to President Obama for science, technology, and innovation policy



Midjourney AI generated "smart, green, inclusive city"

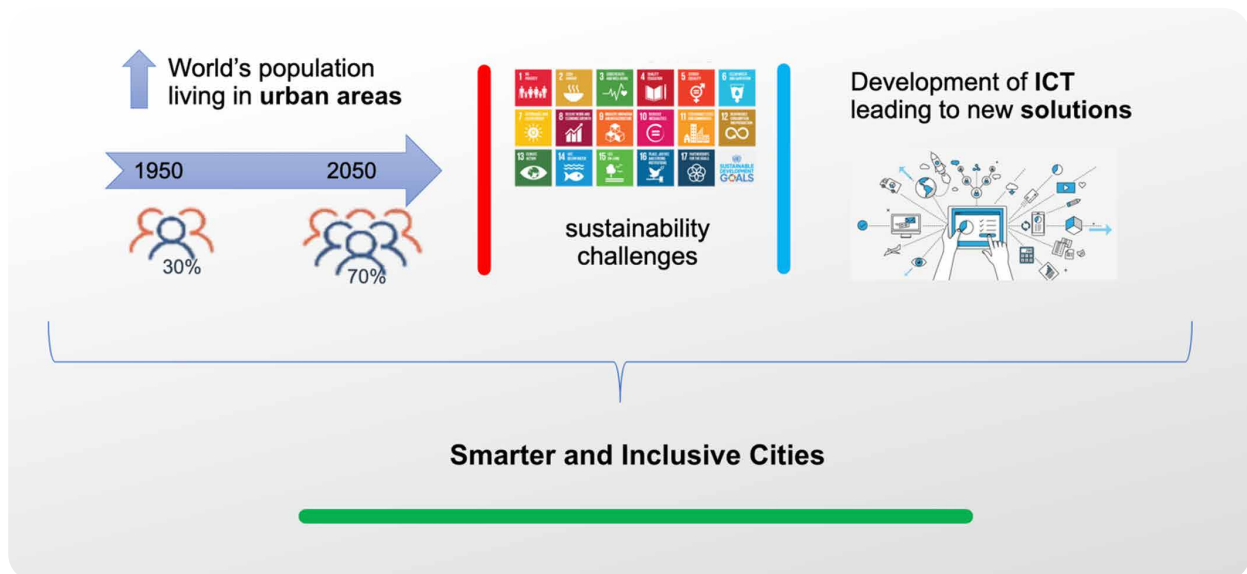
4.2 Understanding the challenge and the context

Why the need for "smarter" towns and cities?

• The world's population living in urban areas is increasing. In 1950, 30% of the population was living in urban areas and this percentage is expected to reach 68% by 2050. Cities remain a platform of potential opportunity, prosperity, and wellbeing for residents – and continue to play a central role in improving lives and livelihoods, being often the closest administrative actor to individuals and businesses.

• The development of Information Communication Technologies (ICT) has fueled the creation of solutions that are used as means to mitigate these challenges, giving rise to new approaches that respond both to the need for sustainable development as well as the challenges and opportunities of urbanization and digitalization. Under this context, concepts such as the 'Smart City' have gained growing attention.

• Urban areas are vibrant spaces and offer tremendous opportunities for economic development and employment. However, rapid urbanization generates challenges such as congestion, urban pollution, human health issues, and deficit in natural resources. 80% of the world's GDP is generated in cities and urban citizens earn on average three times the income of their rural counterparts. Cities have a concentration of universities and are critical venues for research and innovation, political activism and cultural exchange.



What is meant by "smarter" cities?

The "smart city" concept has roots in several disciplines and ideas that have evolved over time, making it difficult to point to one specific origin. However, the idea in its current form started to take shape in the late 20th and early 21st centuries as the world began to grapple with rapid urbanization and advances in information and communication technology.

Truly smart cities recognize the ambiguity of lives and livelihoods, and they are driven by outcomes beyond the implementation of "solutions." They are defined by their residents' talents, relationships, and sense of ownership—not by the technology that is deployed there.

The focus on "smart" has become synonymous with urban uses of technology, particularly advanced and emerging technologies. However, technology such as artificial intelligence, high-speed internet, big data etc. is but means to more prosperous and thriving places. Hence, we choose in this module to refer to "smarter" cities where people - residents are more than end-users of the technology or services.

Even though there is not a universally agreed-upon definition for a 'smart city,' we can establish a general understanding based on common characteristics and goals shared by smart cities around the world. Here's a simple explanation:

Truly smart cities recognize the ambiguity of lives and livelihoods, and they are driven by outcomes beyond the implementation of "solutions." They are defined by their residents' talents, relationships, and sense of ownership—not by the technology that is deployed there.

UNDP, MIT Review

"We need smarter cities not "smart" cities" 2022

A "Smarter City" is essentially a city that uses technology and data to improve the quality of life for its citizens, enhance sustainability, and streamline urban services.



Midjourney AI generated "smart, green, inclusive city"

In a smarter city, data is collected from devices and sensors embedded throughout the city, everything from traffic lights and waste management systems to air quality monitors and energy meters.

This data is then used to manage resources efficiently and effectively. For example, a smart city might use sensors to monitor traffic and adjust signal timings in real time, reducing congestion and improving air quality. Or it might have intelligent streetlights that dim when no one is around, saving energy.

But it's not just about using technology for efficiency. A smarter city also focuses on the "inclusive" aspect.

This means ensuring that **these technological advances and data-driven solutions benefit all citizens and do not exclude any group** based on their income, age, ability, or digital literacy. It also includes creating opportunities for citizens to engage with the city and contribute to decision-making processes.

In essence, a smarter city integrates information and communication technology with various aspects of city operations to enhance the quality, performance, and interactivity of urban services, optimize resources, and connect and engage more closely with its residents.

4.3 How is smarter and inclusive cities contributing to sustainable development?

The ultimate goal for cities and municipalities should be to increase the quality of life of their inhabitants and to ensure prosperity for all. This ambition has a distinct alignment with a variety of SDGs.

The achievement of the SDGs depends on the ability of local and regional governments to promote integrated, inclusive, and sustainable development.



The SDG most related to the local level is the SDG 11 “Sustainable Cities and Communities: Make cities and human settlement inclusive, safe, resilient and sustainable”. However, each of the 17 SDGs are relevant to cities. For instance, cities and towns are critical actors in the implementation of:

- SDG 6 calls for the “availability and sustainable management of water and sanitation for all”
- SDG 2 aims to end hunger and achieve food security
- SDG 3 focuses on “ensuring healthy lives and promoting wellbeing for all at all ages”
- SDG 5 focuses on "gender equality and empowering women and girls"
- SDG 10 focuses on "reducing inequalities". Cities authorities can issue policies that prohibit discrimination, protect wages and promote social inclusion through education and social programs
- SDG 13 focuses on the fight against climate change

With the multitude of challenges at stake and the need to achieve the Sustainable Development Goals (SDGs), the concept of smarter and inclusive cities is becoming increasingly vital. These cities, characterized by their intelligent use of technology, data-driven decision-making, and commitment to inclusivity, hold immense potential to address the complex issues that our societies face today and prepare us for the uncertainties of the future.



Brief concrete examples of "smarter" city

Below are some concrete examples of how a small city can become "smarter":

1 Smart Public Transportation

Implementing a GPS-based tracking system for public buses or trams can provide real-time data to both transportation officials and the public. Commuters can use this information to know exactly when the next bus will arrive, reducing wait times and making public transport more appealing.

2 Intelligent Waste Management

Sensors can be installed in public waste bins around the city to monitor the level of garbage. When the bin is full, the system can automatically alert waste management services to empty it. This way, the city can optimize collection routes and schedules, reduce operational costs, and keep the city cleaner.

3 Digital Citizen Engagement Platforms

Cities can create online platforms or mobile apps where citizens can report problems (like potholes or broken street lights), access information, make suggestions, and even participate in local decision-making processes. This can increase transparency, foster a sense of community, and make municipal services more responsive.

4 Smart Water Management

By using smart meters and sensors to monitor water usage and leaks in real-time, cities can conserve water more effectively. Residents can be provided with information on their water consumption habits, and the city can use the data to manage water supplies, reduce wastage, and address leaks or issues quickly.

5 E-Governance Services

Digitizing services like paying taxes, applying for permits, or accessing records can make these processes more efficient and user-friendly. They can also reduce corruption by minimizing direct interaction between citizens and officials. In addition, they allow for services to be provided remotely, benefiting those who may have mobility or transportation issues.

Remember, a smart city is not just about implementing technology—it is about using technology to make city living better, more efficient, and more inclusive.

As was noted in the Green & Just Transition module earlier, even smaller hacks and steps count! Starting small and focusing on solutions that address the city's specific needs can be a good strategy.

4.4 What are smarter and inclusive cities?

Watch the [video below](#) for an explanation on what is meant by smarter and inclusive cities.



4.5 Projects (implemented) in smarter and inclusive cities

As the previous video highlights, there are many action areas and potential initiatives for the development of smarter and inclusive cities. The FinEst Centre for Smart Cities in Tallinn (Estonia) is helping to pilot a range of these projects.

GREEN TWINS	FUTURE MOBILITY	MICROGRIDS	DIGIAUDIT	RESTO	WELL-BEING
					
Tallinn and Helsinki	Rae County and Tallinn	Lääne-Harju County and Tartu	Tartu and Tallinn	Võru	Narva

You can find out more about these projects [here](#)



Tallinn, Estonia, is world recognized as an e-governance frontrunner

NetZero Cities

Across Europe, a diversity of pilot projects is being implemented to test and explore these concepts. In particular, the NetZeroCities (platform/mission) is supporting cities to pilot initiatives including those that embrace smarter and inclusive ideas.



Quick examples of initiatives in relatively smaller cities

Here are a few examples of smaller cities and towns around the world that have effectively utilized technology to become "smarter":

- 1 Aarhus, Denmark:** Aarhus is one of the leading smart cities in Denmark. They've invested in a smart grid infrastructure and a district heating system using waste heat from local power stations. They also have a digital platform for citizen engagement and smart solutions for traffic management
- 2 Hollands Kroon, Netherlands:** Despite being a rural municipality, Hollands Kroon has embraced digital transformation. They've implemented a digital-first strategy for all services, and employees work flexibly from different locations. They've also used technology to facilitate citizen participation in local decision-making.
- 3 Peachtree Corners, Georgia, USA:** This small city in the US has created a 5G-enabled autonomous vehicle test track, showcasing its commitment to innovation. It's also invested in smart city technologies like intelligent traffic solutions, IoT sensor networks for infrastructure management, and smart LED streetlights.
- 4 Jun, Spain:** This small town near Granada in Spain has been dubbed the "Twitter Town". It's Mayor, encouraged all residents to join Twitter to communicate with the local government and report issues. This has led to more efficient public services and increased resident engagement.
- 5 Machynlleth, Wales, UK:** In many rural areas, internet connectivity is a major challenge. This town in Wales teamed up with local volunteers to lay down their fiber cables, ensuring high-speed internet access for residents. This community-driven initiative shows how rural areas can overcome infrastructure challenges with a bit of innovation and teamwork.
- 6 Goulburn, Australia:** Recognizing the abundant sunshine they receive, this town established a community-owned solar farm, allowing residents to invest in and benefit from renewable energy, reducing their electricity bills and the community's carbon footprint.
- 7 Ayyankottai, India:** This rural community in southern part of the country uses soil moisture sensors to determine when the crops need water. The sensors help optimize irrigation, ensuring water is not wasted and that crops get the right amount at the right time. Such systems can be particularly beneficial in regions facing water scarcity.

These examples demonstrate that size is not a barrier to becoming a smarter city. Even smaller towns and cities can effectively leverage technology to improve the quality of life for their residents, improve service delivery, and promote sustainable practices.



Aarhus in Denmark, with a focus on smart and green tourism

4.6 What are the drivers and barriers related to smart and inclusive cities?

There are various drivers and barriers playing an important role in the development of smarter and inclusive cities, and they span across various themes, including:

SOCIAL: citizen participation, digital literacy, inclusivity, social responsibility, cultural diversity

ECONOMIC: management of resources, funding and investment, sectoral synergies

ENVIRONMENTAL: resources consumption, environmental standards and policies

URBAN INFRASTRUCTURE: technological infrastructure, data analytic capacity, interoperability

GOVERNANCE: stakeholder engagement and coordination, partnerships, collaboration

Smarter cities are driven by numerous factors, but they also face several challenges. Understanding these drivers and barriers can help city administrators strategize effectively as they plan their smart city initiatives. The below are but a selection of some of the drivers and barriers, you may think of others in your specific town or city.

Drivers for Smarter Cities

Across Europe, a diversity of pilot projects is being implemented to test and explore these concepts. In particular, the NetZeroCities (platform/mission) is supporting cities to pilot initiatives including those that embrace smarter and inclusive ideas.

- 1 Urbanization:** Rapid urbanization and population growth in cities increase the demand for efficient and sustainable urban services. Smart city technologies can help meet these demands.
- 2 Technological Advancements:** The rise of IoT, big data, artificial intelligence, and other advanced technologies offers powerful tools to enhance city management, services, and quality of life.
- 3 Environmental Concerns:** With the increasing importance of sustainable development and climate resilience, smart technologies can help reduce a city's environmental footprint and improve resilience to climate impacts.
- 4 Citizen Expectations:** Citizens increasingly expect efficient, user-friendly services that can be accessed digitally. Smart city technologies can help meet these expectations.
- 5 Economic Growth:** Smart city initiatives can stimulate economic growth, attract investment, and create jobs in technology and related sectors.

Barriers to Smarter Cities

- 1 Funding:** Implementing smart city technologies can require significant upfront investment, which can be a challenge, especially for smaller cities or those in developing countries.
- 2 Technology Infrastructure:** Cities need robust and reliable digital infrastructure, such as broadband networks and data centers, to support smart city technologies. This can be a barrier where such infrastructure is lacking.
- 3 Data Privacy and Security:** As smart cities rely heavily on data, protecting that data and maintaining citizens' privacy is a major challenge. Cities need to ensure robust cybersecurity measures are in place.
- 4 Technology Adoption and Digital Divide:** Not all citizens may have access to the necessary technology or digital literacy to use smart city services, creating a risk of exacerbating inequalities.
- 5 Interoperability:** Different technologies and systems need to be able to work together seamlessly. The lack of standards and interoperability can hinder smart city initiatives.
- 6 Political Will and Governance:** The successful implementation of smart city projects requires strong political commitment and effective governance structures. Where these are lacking, smart city initiatives may struggle.

In overcoming these barriers, cities can draw lessons from others who have faced similar challenges. Collaboration, public-private partnerships, engaging citizens in the process, and focusing on inclusivity and equity can all contribute to the successful implementation of smart city initiatives.

To sum up - Cities play an important role in the pursuit of sustainable development

- The transition to smarter and inclusive cities is one of the pathways towards achieving the SDGs.
- Making cities and towns smarter and inclusive is a continuous process closely linked to improving the quality of life, protecting natural resources, and pursuing socio-economic development.
- Smarter sustainable and inclusive/people-centred ways are about using digital solutions for the benefit of their inhabitants and businesses in a sustainable way.



Tallinn, Estonia, Shutterstock

4.7 Test your learning

Question 1 - Which of the following is the best description for smarter and inclusive cities?

(Select one)

- A. A smarter and inclusive use emerging technologies to improve the provision of public services.
- B. Smarter cities protect the environment and promote initiatives that favor equity, diversity, and consensus.
- C. Smarter cities invests in innovation to promote economic growth, using emerging technologies and open data for decision-making.
- D. Smarter cities go beyond the use of digital technologies. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.

Question 2 - What does "people-centered" mean for a smart and inclusive city?

(Select one)

- A. Focusing solely on technological advancements without considering the impact on the residents.
- B. Prioritizing the needs and well-being of citizens when planning, designing, and implementing technology and infrastructure.
- C. Placing emphasis on economic growth for social development.
- D. Implementing strict regulations to promote equality and inclusive /people-centred approach.

Check your answers in the end section of this document.



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**Foundations for
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COURSE MATERIALS



Module 5

MANAGING COMPLEX CHALLENGES



ARUP



**TAL
TECH**

Module 5

MANAGING COMPLEX CHALLENGES

5.1 Module overview

The past modules in this course have focused on highlighting concepts of change, introducing some key concepts that will shape the coming decades in profound ways.

The following modules will focus on approaches for future readiness; presenting a variety of practical methods that can help municipalities to thrive into the future.

In this module, we will explore complex challenges in further detail, unpacking what features of complex challenges make them so difficult to manage. This module will introduce systems thinking perspective, from exploring how to identify the features of a system, to underscoring why thinking in systems can help to more effectively manage complex challenges.

5.2 Thinking in systems

As we have seen across the previous modules, creating thriving places to live, work and belong is not a simple task or a 'quick fix'. On a regular basis, municipalities face many connected and 'stubborn' challenges, such as:



How we provide affordable housing for our residents?



How can we create diverse and equitable employment opportunities for all?



How can we develop a sustainable and efficient transport system?



How can we stimulate an innovative and competitive economy?

Creating thriving places to live, work and belong is not a simple task. On a regular basis, municipalities face many challenges, such as:



How we provide affordable housing for our residents?



How can we create diverse and equitable employment opportunities for all?



How can we develop a sustainable and efficient transport system?



How can we stimulate an innovative and competitive economy?

Why are municipal challenges often so difficult to address?

We can identify a couple of factors that lead these common and complex challenges to be difficult to address:

- The underlying causes of the challenge are not always clear and immediately visible,
- They are adaptable, meaning they are unpredictable and can change with time.

Addressing complex challenges is difficult because we cannot always see the underlying causes.

Just like with a tree, what we can observe above the surface does not tell the whole story; the leaves and branches that we can see are connected to a complex web of roots beneath the surface.

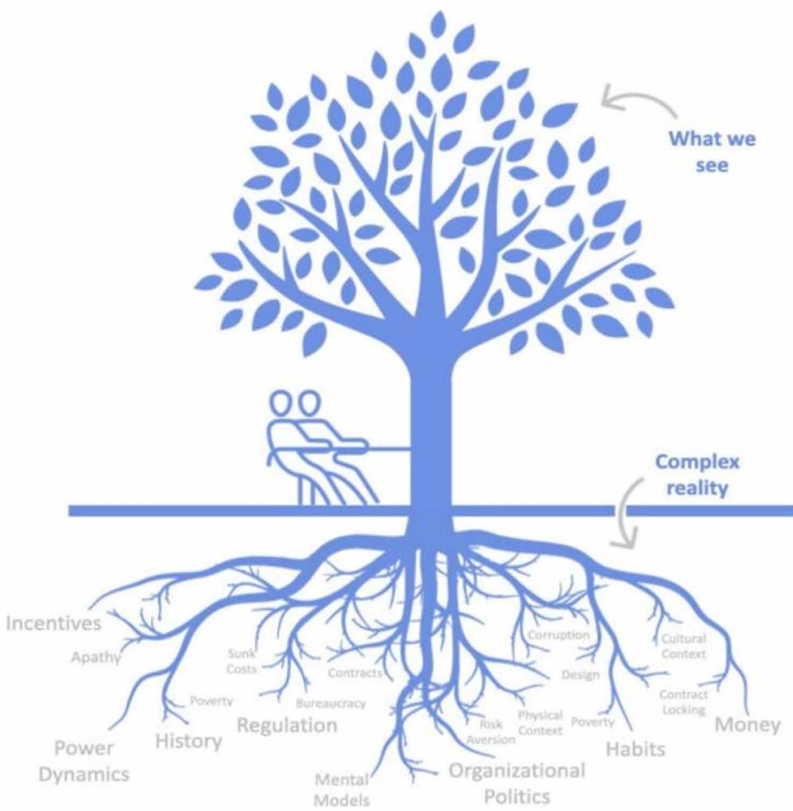


Diagram from Systems Innovation Network



In much the same way, what we can observe in municipalities, -for example, transport networks, schools, businesses, and communities- and their related challenges, are connected to and shaped by a complex reality below the surface –such as habits, incentives, culture, and money, among others.

Adaptive and changing

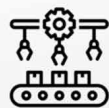
Not all challenges are made equal. Some challenges can be seen as relatively simple, requiring a quick fix, like fixing a flat tire, while other challenges are much more complex, or even represent a crisis. Hence not all problems are 'born equal' and it is helpful to categorize them along these four categories:



Flat tire

Involves few components and actors

Change is a 'quick fix'



Car assembly

Involves many components and experts assisted in a specific order

Change is planned and managed



Traffic jam

Involves many different actors with conflicting interests and goals

Change is emergent

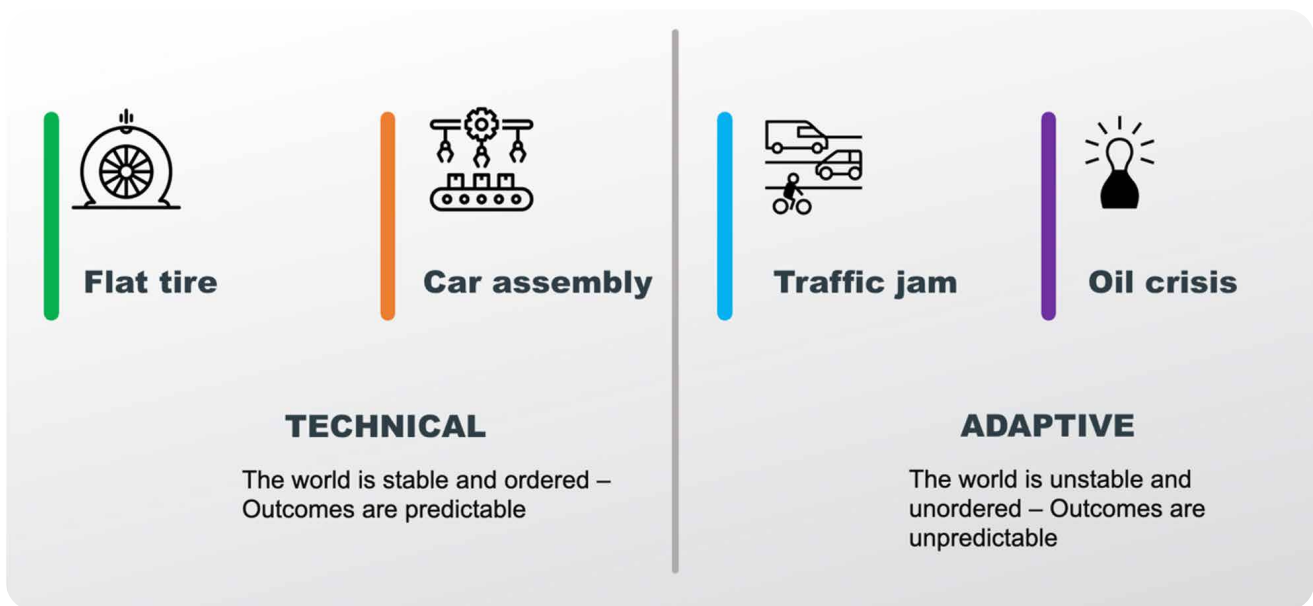


Oil crisis

Abrupt events or escalating conflicts producing chaos, instability or immediate threat.

Change is disruptive

We can see two overarching types of challenges



Technical challenges

Stem from a view that the world is stable and ordered, and that outcomes are predictable.

These often occur when:

- The nature of the challenge is mechanical,
- The challenge can be broken into smaller issues,
- Can be resolved using available knowledge and expertise,
- Can usually be solved by (technical) experts or an authority.

However, not all challenges can be as simply characterized by these considerations.

Adaptive challenges

Come from a view that the world is unstable and unordered, and that outcomes are unpredictable. These often occur when:

- The nature of the challenge is behavioral (cultural, social, political),
- Knowledge about the challenge is partial and provisional,
- There are no precedents, and experimentation is required,
- It requires solving problems across silos and sectors.

It is important to understand that these different types of challenges require different approaches. Complex challenges are adaptive and are often more difficult to develop solutions for. As the underlying features of the challenge are different, we cannot solve a complex and adaptive challenge through technical fixes.

Yet, it is important to acknowledge that not everything within a system is adaptive and complex. Certain problems can be classified as technical challenges. To understand which approach is best suited for a particular challenge, we need to classify the types of challenges we are facing – be they technical or adaptive and complex.

Notwithstanding, some events can be very difficult to predict and effectively plan for their sprawling impacts, where cause and effect can be unclear -often termed 'chaotic'. Such events, like the covid-19 pandemic and the invasion of Ukraine, have brought these dynamics into sharp focus. In these instances, it is important to take an adaptive approach.

To address these complex challenges, we need a different way of approaching these challenges.

To be able to influence a complex problem, it is important to understand the connected whole, rather than individual parts. In other words, to think in systems.



Image: things in life do not always go according to plan. How would you have addressed this new 'pathway', how would you have avoided it?

What is systems thinking?

“Systems thinking is a way of seeing and talking about the reality that helps us better understand and work with systems to influence the quality of our lives” D. Kim (2016). Systems thinking provides us with some useful questions, tools and approaches to explore the world around us and uncover its features.

By gaining a deeper understanding of systems, we can become more aware of the underlying factors that might be creating a certain challenge, and we are better able to influence systems to provide the desired outcomes more effectively.

- We live in systems like our cities.
- We have natural systems, like trees and ecosystems.
- We have built our own systems to help us to achieve a particular purpose like moving things around via transport networks.
- Organizations like businesses and governments are examples of systems.
- You as an individual can be understood as a system that is biologically and psychologically complex and that adapts over time, including your past and current selves.

Importantly, without the interconnections, we just have a collection of parts, not a system.

A system can be understood as: “a set of things interconnected in such a way that they produce their own pattern of behavior over time”

Meadows, 2008



A municipality as a system

Cities and municipalities are common examples of systems. Municipalities are made up of a diverse arrangement of people, cultures, buildings, businesses, roads and public institutions, all interacting and interconnected. In fact, a city or municipality can be seen as a system of systems.

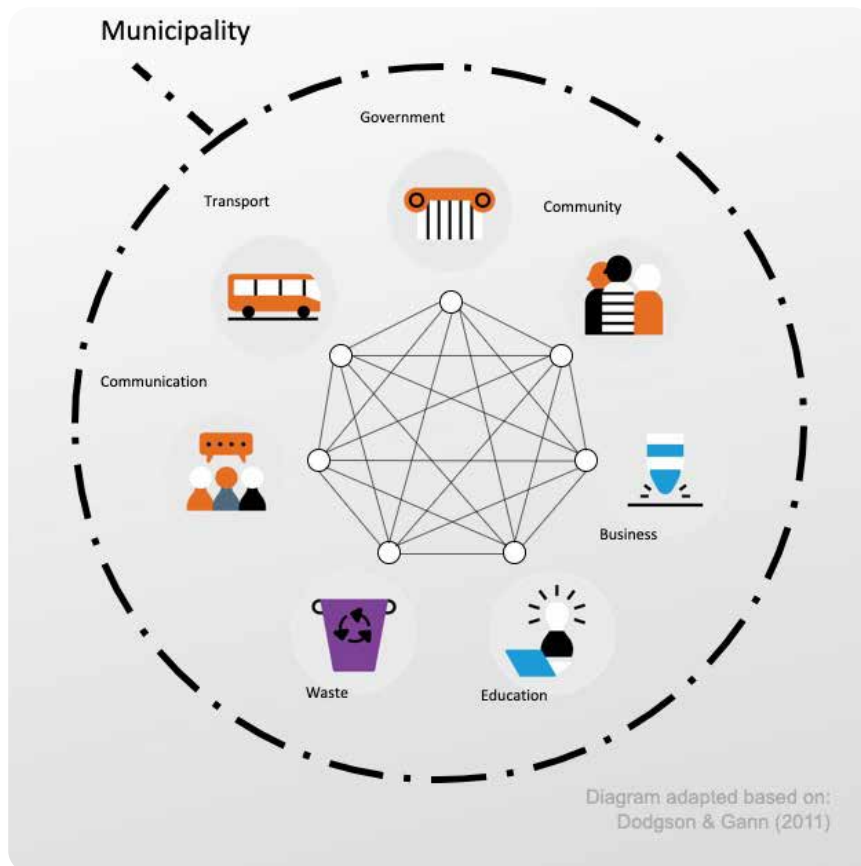
Within municipalities, we have communities, businesses, waste management, transport, education, and many others. Each of these constituent parts could also be seen as a system themselves. However, within a municipality, all these systems interact with one another.

It's no wonder why municipalities can face extremely complex challenges. It's also why understanding systems further can help us to navigate these complex challenges.

The value of thinking in systems

By adopting a mindset of systems thinking to solve complex challenges in our municipalities, we can:

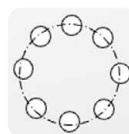
- Focus on the underlying causes of complex challenges, rather than the symptoms.
- Find the most suitable places to intervene which have the greatest potential to create long-term change.
- Apply an adaptive mindset to allow us to respond and reshape actions to the evolving and unpredictable (emergent) nature of complex challenges over the long-term.



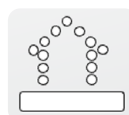
5.3 Key concepts of a system

It may be easy to spot a system when we see one. But what is more difficult is to understand what features make systems distinctive. Understanding what makes a system a system, can help us to understand why complex challenges occur and are difficult to address.

Four key concepts can help us understand the nature of systems (**Systems Innovation Network**) and systems can be seen as:



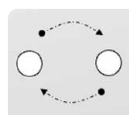
A connected whole with a distinct purpose



More than the sum of their parts



Connected and interdependent



Non-linear and adaptive



Diagram adapted based on Systems Innovation Network (2021) Systems Thinking – Four Key Concepts.

Systems are: A connected whole with a distinct purpose

We are often good at breaking things down into smaller parts to make them seem more manageable. However, by only focusing on the individual parts of the system, we miss understanding the whole. Therefore, when solving complex challenges, it is important to not just think about a collection of individual parts, but rather see the connected whole with a distinct purpose.

When viewing the connected whole, we also need to appreciate that some interactions between elements may present delayed impacts. For example, economic activity has presented a difficult link to environmental issues – such as climate change. Notably, carbon emissions of industry have taken decades to accumulate to a degree to cause catastrophic climate change. As the link impact has a distinct delay, many have historically considered these elements unrelated.

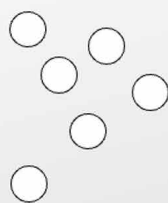
How does this occur in a municipality?

When we examine a municipality, we don't just see it as a collection of buildings. Nor as a matrix of roads. Nor is it a group of businesses.

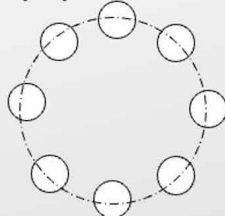
We see a municipality as the whole connection of people, businesses, places, culture, and history - all intrinsically connected. Only when we try to see the connected whole can we understand the full nature of a challenge. In this way, solutions to complex challenges must understand the broad connection of the place.

Solving complex challenges encourage us to:

Move away from thinking about a collection of individual parts...



... to the **connected whole with a distinct purpose**



For example, in a municipality:

It's just its buildings. Nor is it just its roads. Nor is it just its businesses.

We see a municipality as the whole connection of people, businesses, places, culture, and history.



Diagram adapted based on Systems Innovation Network (2021) *Systems Thinking* – Four Key Concepts

Systems are: Connected and interdependent

Systems are not just a collection of disconnected 'things', but interdependent on one another. If we make a change to one part of a system, we are likely to affect another part of the system, whether that is directly or indirectly.

This can be particularly challenging, as developing a solution to one problem could easily lead to new and larger problems later, or somewhere else in the system. Therefore, understanding the relationships between parts of the system is key to ensuring we can shape long term positive impact and minimize any unintended outcomes.

To address complex challenges, we should move away from thinking about disconnected elements, to thinking about a connected and interdependent network.

How does this occur in a municipality?

For example, pursuing economic growth through intensive industry could lead to higher levels of pollution and environmental damage, which, in turn, could cause unintended health impacts to residents.

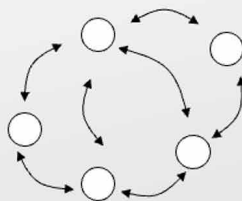
It is important not to see the economy and the environment as separate and disconnected. Only by viewing these elements as connected can we solve the complex challenges faced by climate change.

Solving complex challenges encourage us to:

Move away from thinking about disconnected elements...



...to a connected and interdependent network.



For example, in municipalities:

Generating pollution through intensive economic activity...

...can cause negative impacts for both people and the environment.



Diagram adapted based on Systems Innovation Network (2021) Systems Thinking – Four Key Concepts

Systems are: More than the sums of their parts

The interdependencies and interactions within different parts of the system can own patterns of behaviour that can emerge over time and produce patterns and impacts that are more than the sum of its parts – a characteristic often referred to as ‘emergence’. We can see this easily in nature, when a collection of ants forms an ant colony, or a flock of birds navigate in impressive formations usually without any central coordination.

Therefore, to solve complex challenges in our municipalities, we should move away from reducing challenges down to just their constituent parts, to view systems and their emergent behaviors as more than the sum of their parts.

Systems are: Non-linear & adaptive

As systems are made up of many connections and interdependencies, changes cannot easily be traced as a linear straight line of cause and effect. In a system, 1+1 may not always result in 2. Changes to part of the system can have multiple other impacts on various other parts of the system that themselves can influence the original change. Therefore, complex challenges demonstrate these non-linear, behaviors which can make them difficult to predict.

Therefore, when addressing complex challenges, we should move away from thinking in a linear sequence of impacts (from a technical challenge perspective), to understanding a series of non-linear feedback loops (to an adaptive challenge perspective).

Through this type of approach, we test and observe the effects of actions, those that are both anticipated and unanticipated, rather than thinking we know the correct answer from the beginning. By taking an evolving and iterative approach, we can adapt and adjust the responses to navigate this new understanding of what might produce positive and/or negative outcomes in the systems.

How does this occur in a municipality?

For example, we can spot many elements that make up a municipality, from people, vehicles, even bricks. However, when these elements are brought together, we can observe new patterns:

- People come together to create culture,
- Vehicles come together to create traffic,
- Bricks come together to make a building.

It's clear that when we are dealing with complex problems, it is essential for us to understand these new patterns of behaviors, as they will ultimately shape the solutions.

Solving complex challenges encourage us to:

Move away from linear sequence of impacts...



...To a series of feedback loops.



Diagram adapted based on Systems Innovation Network (2021) Systems Thinking – Four Key Concepts.

5.4 Managing complex challenges - through a PORTFOLIO approach

In the video below, you'll delve deeper into the practical application of systems thinking. By exploring real-life examples and hands-on scenarios, you'll gain a comprehensive understanding of how the concept of systems thinking takes shape in various contexts:



5.5 Inspiration: Leuven's systems innovation

The Belgian city of Leuven is an inspiring example of how a municipality can use principles and approaches of systems thinking to support its transition towards a green and just future.



Since 2013, the city has taken a pioneering approach to developing action for a thriving future, exemplified by establishing Leuven2030, a non-profit organization to deliver on the city's net zero commitments. Over the course of the following decade, Leuven's pioneering spirit has not diminished.

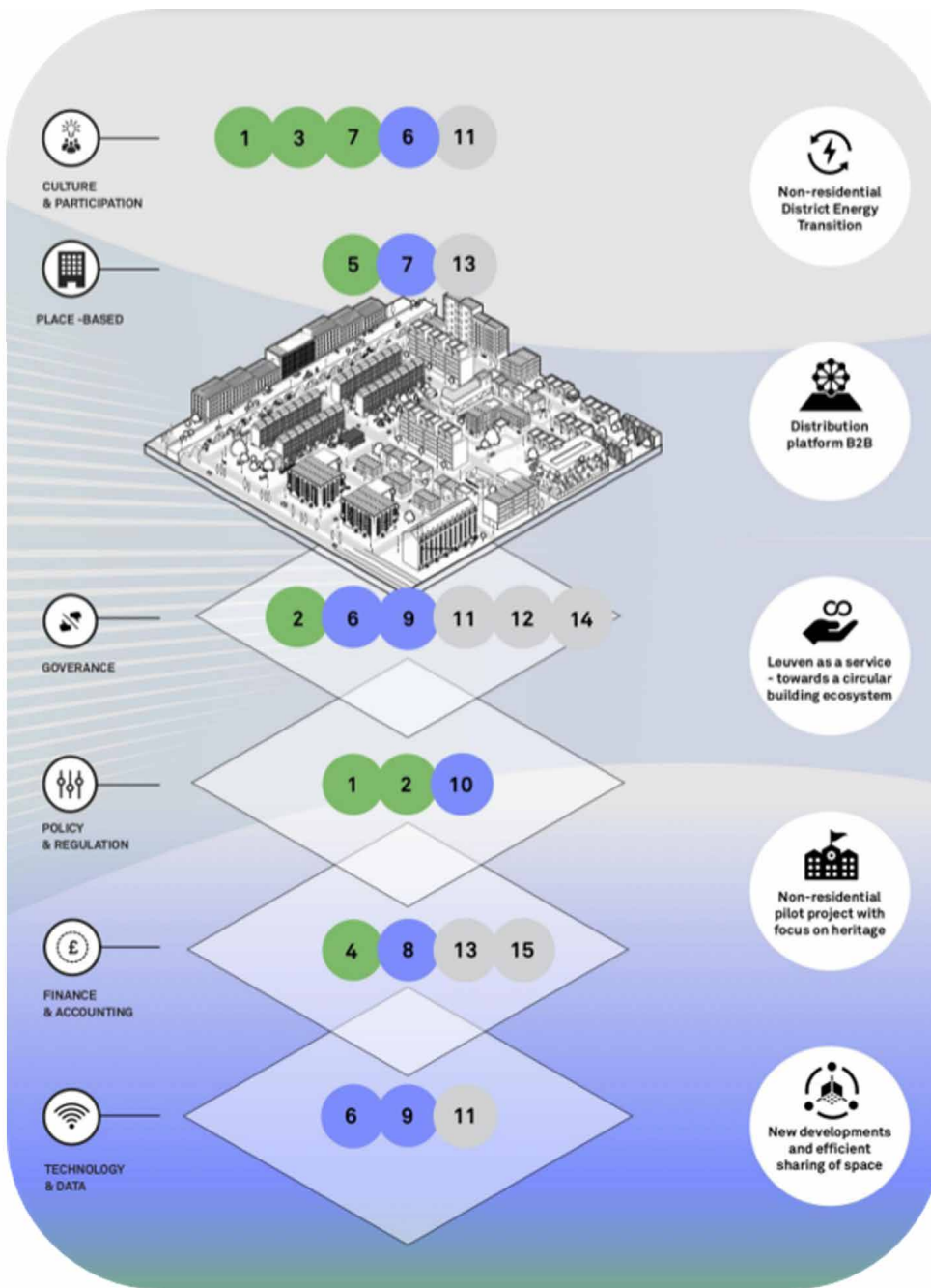
To complement and build on the existing momentum, as part of the EIT Climate-KIC's Health, Clean Cities Deep Demonstration, the city of Leuven, together with a range of partners including Dark Matter Labs, Leuven2030, and Bankers without Boundaries, among others, a systems approach was taken to develop a portfolio of actions and experiments to support the realization of the city's ambitions, such as delivering inclusive action, building resilience, and creating new opportunities for all.



Read more about:
"Leuven Engagement and Activation Overview"



Watch a **short video** on the City of Leuven's approach to co-creating a climate-neutral future. The City of Leuven, co-creating a climate-neutral future:



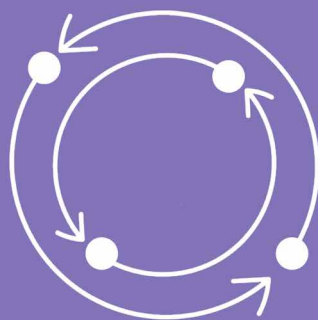
EIT Climate-KIC 'Healthy Clean Cities' Deep Demonstration/Leuven 2030. Source: Dark Matter Labs, Climate-KIC, et al.

5.6 A Workshop activity #1: Applying systems thinking in your municipality

Let's apply what we've learned to a challenge of your municipality!

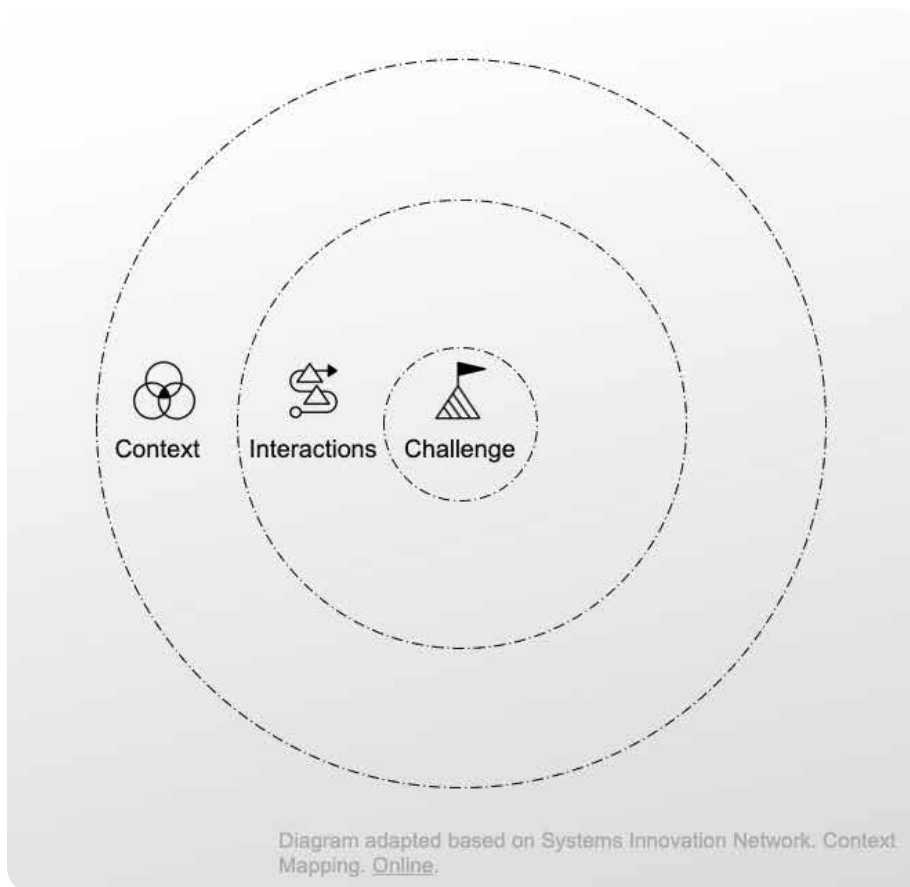
If you are taking this course as part of a workshop format you can test your system thinking in your designated working group. Or if you would like to do it by yourself, you can access the activity instructions and templates below.

Context
Mapping
Canvas



Access the "Context Mapping Canvas" [here](#)

How to: Context mapping



1 Draw your boundary

Start by defining the boundary of this experience –Be it the boundary of your city, a neighborhood, region, etc.

2 Identify a challenge

Now, identifying a challenge that can be observed in the municipality

3 Map the interconnections

Next, look deeper by mapping out the underlying factors that directly influence, and are influenced by, the challenge.

What are the primary causes of the challenge?

What main impacts does the challenge create?

4 Map the context

To go further, go beyond the immediate factors that create the context of this challenge .

What broader set of factors influence the causes of the challenge? How are they connected?

And just like that, you've mapped a system!

5 Taking your Context Map, you can reflect on some additional questions:

What new connections and relationships did this reveal?

What additional factors should be considered when addressing this challenge?

5.7 B Workshop activity #2 - Fictional Town of Kilinau

If you are taking the course as part of a workshop, the below is one alternative group activity where you can test your system 'lens' in discussion with colleagues.

Case Study: Depopulation in the (fictive) Town of Kilinau

Background: Kilinau was once a bustling town during the Soviet era, strategically located near valuable mineral resources. The town thrived primarily due to its Soviet-established industries, including a metal processing plant and a chemical factory. At its zenith, Kilinau boasted a population of 50,000, with the industries being the primary employers.

Present Day: Three decades post the Soviet era, Kilinau paints a different picture. The population has dwindled to 15,000. The metal processing plant is now defunct due to outdated technology, and the chemical factory operates at a mere 20% capacity because of reduced demand and environmental concerns.



Fictional town of Kilinau
generated by Midjourney

FEEDBACK LOOPS

As more people moved away from Kilinau in search of better opportunities, the local businesses, which relied on the workers as their primary customers, started to shut down. This led to even fewer job opportunities, reinforcing the cycle of depopulation.

ECONOMIC SYSTEM

With the major industries operating below capacity, auxiliary businesses like transport, local vendors, and service providers suffered. A once-thriving economic ecosystem was now fragmented.

SOCIAL SYSTEM

Kilinau's cultural festivals, which once celebrated its industrial achievements and drew in crowds from neighboring regions, faded in prominence. The local school, which once had over 1,000 students, now struggles to keep its doors open with just 150 students.

INFRASTRUCTURE SYSTEM

Large sections of the town's housing are now abandoned. Public transport, once efficient, now operates sporadically, and maintaining infrastructures like water and electricity for a shrinking population has become cost-inefficient.

EXTERNAL INFLUENCES

Globalization made it harder for Kilinau's traditional industries to compete on the world stage. National policies focused on boosting tech hubs in major cities, sidelining towns like Kilinau.

LONG-TERM EFFECTS

Many young adults from Kilinau, having studied in bigger cities, choose not to return. The town's population is aging, and there's a tangible loss of cultural and historical traditions unique to Kilinau.

COMPOUNDING FACTORS

The environmental degradation caused by the chemical factory led to health issues among older residents, discouraging younger families from settling in Kilinau. The town also witnessed a brain drain, with its most educated and skilled workers moving to urban centers or abroad.

Group Work Questions

- 1** Feedback Loops: Identify and discuss at least two feedback loops in the Kilinau scenario, one reinforcing and one balancing. How have these loops shaped the current state of the town?
- 2** Interconnected Systems: Based on the case study, how have changes in one system (e.g., economic) impacted other systems (e.g., social or infrastructure) in Kilinau? Provide specific examples.
- 3** Intervention and Leverage Points: If you were tasked with revitalizing Kilinau, where would you identify leverage points in the town's system? What interventions might lead to sustainable, positive change for the town's future?

By engaging with these questions, you can dissect the complexities of the case, see the interconnectedness of various elements, and apply systems thinking to develop holistic solutions.

5.7 Test your learning

Question 1 - What is a system?

(Select one)

- A. A collection of separate parts with no relation to one another.
- B. A chaotic arrangement of many individual elements that interact closely with one another.
- C. A set of elements or parts interconnected in such a way that they produce their own pattern of behavior over time.

Question 2 – How can thinking in systems help municipalities to address complex problems?

(Select all that apply)

- A. Help to focus on the underlying causes of complex challenges, rather than the symptoms.
- B. Find the most suitable places to intervene which have the greatest potential to create long-term change.
- C. Solves all challenges in a municipality at the same time.
- D. Focus on only one small cause of a challenge.

Question 3 – What are four key characteristics of systems?

(Select all that apply)

- A. A connected whole with a distinct purpose
- B. More than the sum of their parts
- C. Connected and inter-dependent
- D. Non-linear
- E. Small and simple
- F. Disconnected and reducible
- G. A collection of separate parts

Check your answers in the end section of this document.



**URBAN
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**Foundations for
Future Readiness
for Cities**

COURSE MATERIALS



Module 6

INNOVATION IN THE PUBLIC SECTOR



ARUP



**TAL
TECH**

Module 6

INNOVATION IN THE PUBLIC SECTOR

6.1 Module overview

This module outlines what public sector innovation implies in practice for cities, towns or regions when faced with complex challenges. The module introduces ways of thinking about local governance systems – through their various drivers and elements, and how cities and towns could operationalize transformational pathways. Lastly, the module introduces the example of how the City of Valencia in Spain is using a systems approach to innovate its governance mechanisms, and to accelerate its ambitious climate-neutrality mission.

6.2 What is the need for Innovation in the Public Sector?

Our public governance systems were not developed to deal with 21st-century challenges. Instead, public governance was developed to respond to the needs of the industrial era.

Industrial principles they were built upon are fast becoming outdated. Processes and the functions of municipal governments, as well as the institutional setups around them, were mostly erected during the post-World War II era.

In the video below you will learn more about:

- 1 What is the need to transform current governance models? and
- 2 What do we mean by governance?



Why the urgency to innovate governance systems?

Municipalities were not established to cater for transformations but to provide stability: local-level rules and hierarchies of responsibilities and duties. Now, cities and towns urgently need to transform themselves and organize collective action in ways that bring them to climate neutrality, economic development, and socially-just transition. There is a lot to do to reform our existing governance structures and approaches at all levels (see also references included at the end of this module).

🌍🏭🌱 Climate change, pollution, and biodiversity loss are problems rooted in several natural and human systems and are also connected with the economic and financial systems. Our approach to change often neglects these interdependencies of causes and so it is unfit for purpose.

🏛️🗳️🗺️ Traditional power dynamics and the way they are institutionalized, as well as the behaviors and values that drive actions also affect how to tackle complex challenges. Notably, systems of governance should bring decision-makers closer to those that are served.

🏡🔧🔄 Cities cannot rely only on the type of innovation ecosystems that help them introduce the newest technologies; they also need to strive for public and multi-actor governance that can bring about a systemic renewal that transforms society



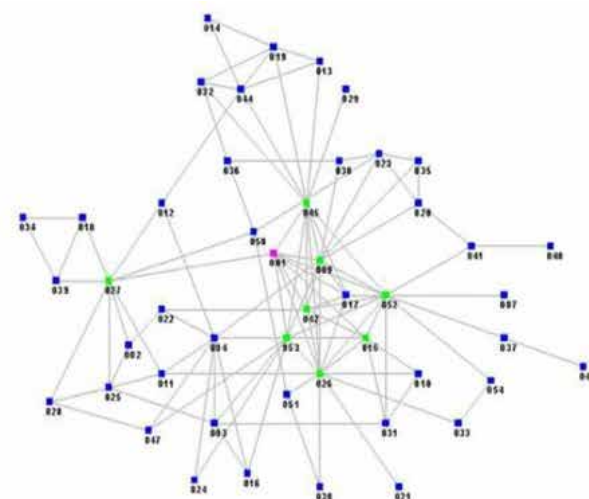
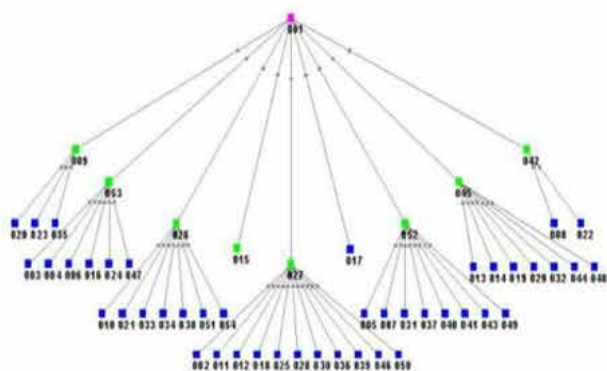
Source: Unsplash / ClementeCorona

What is the need to transform existing governance models?

Transformations within a complex system bring significant uncertainty of actions and impact: the need to be able to work with new approaches to public management. There is a necessity to work with but also go beyond – Markets, Managers, Metrics.

Boundaries and roles between those governing and those governed are blurred and constantly changing – therefore the need for new ways of working and organizing within the public sector.

Governance innovation can be seen as an alternative to Business as Usual, one that acknowledges the systems behind the visible problems, and uses interconnectedness to its advantage to accelerate envisioned change.



The illustration above depicts the transition from hierarchical and static organizations to more dynamic and horizontal leadership and decision-making. Source: Krebs, V., orgnet.com

Reflection exercise

Please reflect on the following questions:

- 1 How is your municipality embracing innovation in how you are working and delivering services to the community?
- 2 Is there a need in your municipality to change processes or organizational structure to serve the local community better?

6.3 What do we mean by ‘governance’ and what are the pathways towards changing the current model?

Let's start with a working definition for our shared understanding:

"Governance is an established collection of mechanisms (principles, processes, structures) that enable how public officials or civil servants organize, work and learn together – to understand and build a better future for their city or town."

Understanding Governance systems through its parts

PRINCIPLES

A set of guidelines, boundaries or norms that define the rules and purposes of the mandate of the municipality. They are consciously and unconsciously derived from broad societal values.

STRUCTURES

Structures are the units of actions and workflows of the city or town. They are a way to institutionalise the guiding principles and internally organise duties and responsibilities.

PROCESSES

Processes are the functions, solutions or measures that make the principles explicit, and generate impact. Processes exist to bring the principles into real-world practice.

6.4 What are the ways in which cities or towns could begin influencing each of three areas to shift the current governance system?

Cities or towns can work towards shifting Governance Principles by focusing on:

Agency

- Municipal devolution and city-to-city peer networks support & enable creative problem-solving; They enhance city’s agency and power – to overcome admin., legal and regulatory barriers, and potential resistance to change.
- Transparent, deliberative decision-making processes result in outputs that are co-created and executed together with the wider ecosystem.

Equity & ownership

- The municipality prioritizes public value (commons), with mechanisms put in place for collective decision making and shared institutions.

- Innovation fosters emergence of local solutions; Secondary benefit of this approach is that democracy is strengthened by community participation.

Leadership

- Leadership is distributed, collaborative and directed towards long-term goals and ambitious missions.
- Build public sector capabilities, enabling governance to deliver innovative policies that respond to systemic risks.
- Enable public servants to be comfortable with experimentation and new ways of collaborating and strategic learning.



Agency > Empowered

- Municipal devolution and city-to-city peer networks support & enable creative problem-solving; They enhance city’s agency and power – to overcome admin., legal and regulatory barriers, and potential resistance to change.
- Transparent, deliberative decision-making processes result in outputs that are co-created and executed together with the wider ecosystem.

Equity & ownership > Commons-led

- The city or town prioritises public value (commons), with mechanisms put in place for collective decision making and shared institutions.
- Innovation fosters emergence of local solutions; Secondary benefit of this approach is that democracy is strengthened by community participation.

Leadership > Mission-driven

- Leadership is distributed, collaborative and directed towards long-term goals and ambitious missions.
- Build public sector capabilities, enabling governance to deliver innovative policies that responds to systemic risks.
- Enable public servants becoming comfortable with experimentation and new ways of collaborating and strategic learning.

Cities or towns can work towards shifting Governance Structures by focusing on:

Decision making

- Citizens are seen as a valuable source of innovation and are actively encouraged to participate in the policy design and decision-making process.
- They are supported with opportunities and the tools to engage with the government and become a key partner for the city as it experiments with transformative governance and policies.

Goals/Targets

- Municipality prioritizes social/environmental goals through intangible public benefits like resilience, wellbeing, equity, and human development.
- Governing structures are highly networked and cross-sectoral, organized around pathways to impact instead of being isolated.
- Programs, projects, and initiatives that produce higher intangible values and social impacts prioritized over rigid targets.

Operations

- Decision-making and accountability through learning in the municipality and in relation to external actors like NGOs, communities, citizens, and the private sector.
- Participatory, collaborative consensus-building methods that extend to the city's administrative, budgeting, and operational procedures, which are networked and are able to avoid departmental competition.
- Shared resources with the private sector and civil society, enabling cross-pollination between different services and agencies.



Decision making > Inclusive

- Citizens are seen as a valuable source of innovation and are actively encouraged to participate in the policy design and decision-making process.

- They are supported with opportunities and the tools to engage with government and become a key partner for the city as it experiments with transformative governance and policies.

Goals/Targets > Pathways-driven

- City or town prioritizes social/environmental goals through intangible public benefits like resilience, wellbeing, equity, human development.

- Governing structures are highly networked and cross-sectoral, organized around pathways to impact than siloed.

- Programmes, projects and initiatives that produce higher intangible values and social impacts prioritized over rigid targets.

Operations > Networked

- Decision-making and accountability through learning in the municipality and in relation to external actors like NGOs, communities, citizens, the private sector.

- Participatory, collaborative consensus-building methods that extend to the city’s administrative, budgeting and operational procedures, which are networked and are able to avoid departmental competition.

- Shared resources with private sector and civil society, enabling cross-pollination between different services and agencies.

Cities or towns can work towards shifting Governance Processes by focusing on:

Policymaking

- The city or town experiments and iterates with instruments to foster long-term policy processes and legal/regulatory innovations.
- Enable continuity of economic growth and green transition across succeeding administrations.

Design and implementation

- The city or town aims to develop processes that allow for imagination, experimentation and learning from transformative initiatives.
- Budgeting, procurement and planning processes are adaptive and capable of responding quickly to both national, regional, and local challenges, allowing for quick and transparent adoption of actionable insights.

Service delivery

- The role of citizens shifts from consumers to stakeholders in service creation and delivery.
- Communities are central to policy design or project preparation, collaborating with local government, NGOs, and other private sector stakeholders to maximize social benefits that are co-delivered.



Policy making > Experimental

- The city or town experiments and iterates with instruments to foster long-term policy processes and legal/regulatory innovations
- Enable continuity of economic growth and green transition across succeeding administrations.

Design and implementation > Adaptive

- The city or town aims to develop processes that allow for imagination, experimentation and learning from transformative initiatives.
- Budgeting, procurement and planning processes that are adaptive and capable of responding quickly to both national, regional and local challenges, allowing for quick and transparent adoption of actionable insights.

Service delivery > Enabling

- The role of citizens shifts from consumers to stakeholders in service creation and delivery.
- Communities are central to policy design or project preparation, collaborating with local government, NGOs and other private sector stakeholders to maximise social benefits that are co-delivered.

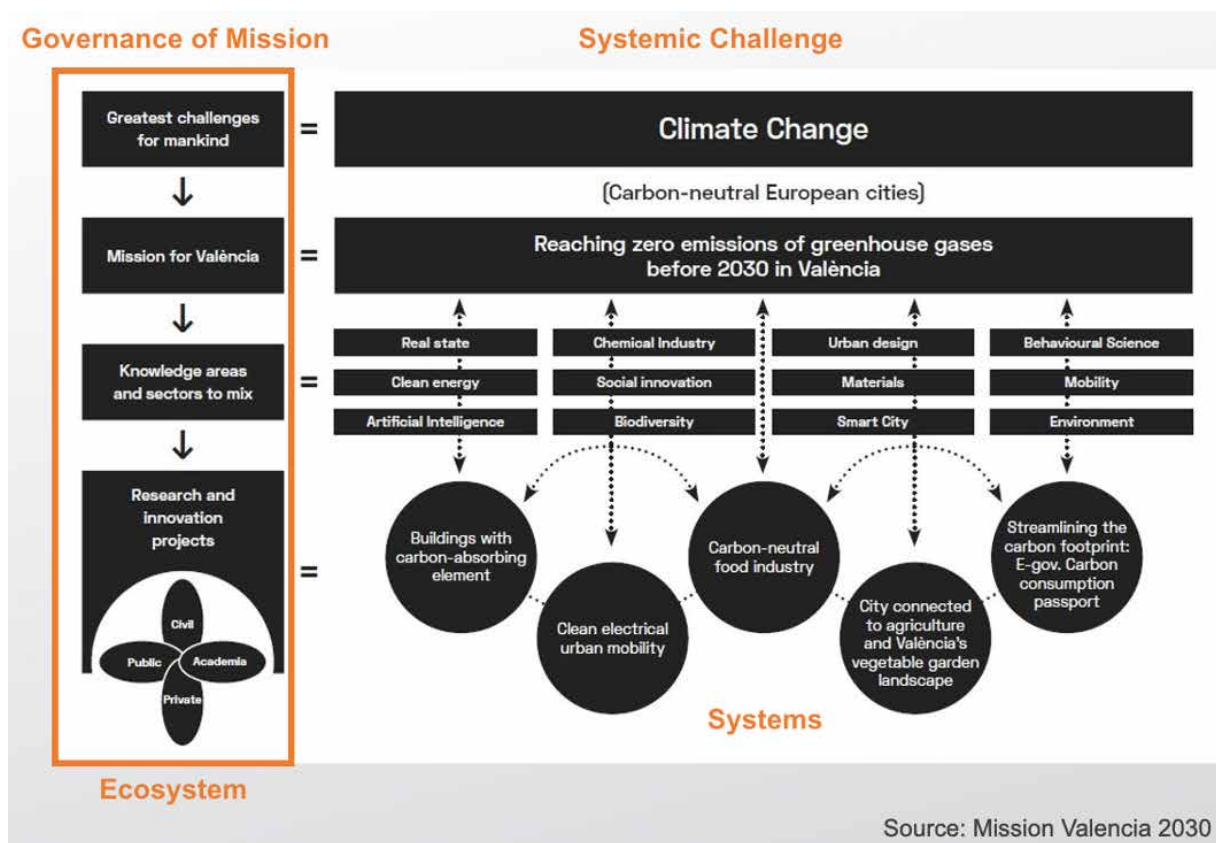
6.5 Inspirational case-study: Governance of ambitious city-wide Missions 2030 in Valencia, Spain

Context: Valencia is the third largest city, committed to delivering an inclusive Mission to tackle the climate-neutrality challenge, based on diversity and with the involvement of everyone in the local ecosystem.

City mobilizes the 4 groups of the local ecosystem:

- **Private sector:** large companies, SMEs, freelancers, start-ups, business accelerators, incubators, etc.
- **Public sector:** different levels of government and their instrumental institutions.
- **Universities:** research centers and associated technological institutes.
- **Civil society:** with the support of social movements, non-profit, organizations, associations, foundations, professional associations, etc.

Missions Valencia 2030 aims to accelerate research and innovation projects with clearly defined Mission impact from any sector, activity, discipline, technology and source of knowledge, mixing disciplines in a bottom-up perspective and by multiple pathways.



Valencia's ways of governing and organizing a constellation of multi-stakeholder projects

To support the core Mission objective and timeline (climate-neutrality by 2030), 4 Visions were mapped with SDGs and agreed on:

Healthy City: Health equity; longevity and ageing; healthy habits and child obesity.

Sustainable City: Waste and consumption reduction, clean energy.

Shared City: Reducing inequalities, loneliness, and urban commons.

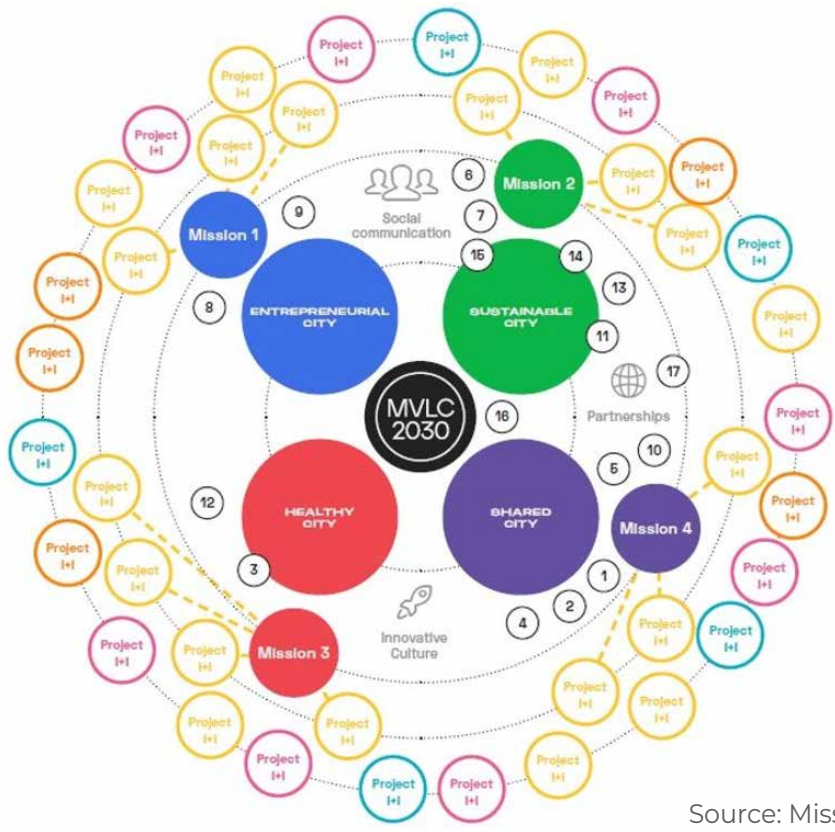
Entrepreneurial City: Resilience, digitalization, productive ecosystem.

Classification of innovation projects based on the leadership and coordination of four groups of the city's ecosystem.

Organizations that join Missions Valencia 2030 take the lead on innovation projects that demonstrably advance the City's goals and are recognized as Missions Ambassadors.

Governance: The governance system of Missions is organized around each mission with a social assembly made up of people and organizations. These assemblies carry out the involvement of citizens and play a key role in the governance and accountability of the Missions secretariat.

Public engagement: Missions 2030 has launched several social media campaigns to recruit ambassador organizations and aim at attracting wider engagement and support from the entire innovation ecosystem.



Source: Mission Valencia 2030

6.6 Test your learning

Question 1 - Which of the following are components of a city or town's governance system?

(Select one)

- A. Structures
- B. Processes
- C. Principles
- D. All of the above

Question 2 - Which of these conditions make innovation in public sector necessary?

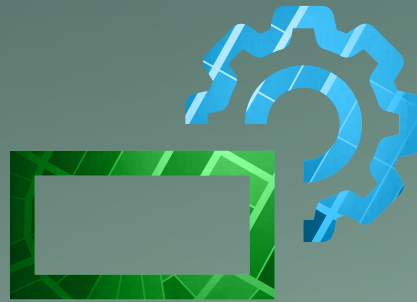
(Select one)

- A. Complex nature of challenges
- B. Rigid administrative set ups
- C. Linear processes
- D. Need to experiment in uncertain conditions
- E. Enabling learning and agile decision-making
- F. All of the above

Check your answers in the end section of this document.



**Foundations for
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COURSE MATERIALS



Module 7

MOBILISING FUNDING AND RESOURCES



ARUP



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Module 7

MOBILISING FUNDING AND RESOURCES

7.1 Module overview

Through this module, we will reflect on the existing and new possible ways to mobilize funding and resources for your municipality and introduce a suit of approaches. Following on from this, we will introduce green finance as a growing and important area of financing. The module will describe the trends and the landscape of green finance and highlight a range of instruments.

7.2 How can municipalities mobilize funding and resources?

Municipalities often face challenges in accessing funding and mobilizing resources. Globally, municipalities play a very important role in the delivery of important public services and meeting the Sustainable Development Goals (SDGs). However, such activities come at an expense. Across municipalities, accessing sufficient resources and funding is a persistent and growing challenge.

Faced with these pressures, a common question that municipalities face is: How can we effectively mobilize resources and funding?

What roles can municipalities play in mobilizing resources?

There are some key roles that municipalities can play to help to mobilize resources and funding:

REORIENTATE EXISTING RESOURCES

Municipalities can make the most of existing resources by reorientating.

ENHANCE MUNICIPAL REVENUES

Municipalities can increase their revenues through from both tax and non-tax sources, as well as receive revenue from Central Government sources.

ACCESS TO BORROWING AND INVESTMENT

In appropriate situations, municipalities can support access to borrowing and investment in projects.

Which instruments are available to mobilize resources and funding?

There are a variety of potential instruments that can support access to resources and funding. Such instruments cover more conventional instruments for local government finance, such as grants and income distribution, commonly from Central Government through distribution grants.

However, a range of alternative instruments can support the mobilization of resources such as developing municipal enterprises to generate increased municipal revenues, as well as blended finance.

This thematic paper on "The Challenge of Local Government Financing in Developing Countries" by UN Habitat (2015) provides a useful overview of the range of instruments that are available to municipalities when mobilizing resources and reflects on some associated challenges.



These instruments include:

- **Partnerships**

- **Taxation**

- **Municipal enterprises**

(for profit purposes)

- **Levies and charges**

(such as user charges and fees, including water and sewerage, electricity, parking, garbage collection, urban transportation, kindergartens, museums and sport facilities. Or user fees to cover the public costs of registration and monitoring of a wide range of activities including business establishment, real estate titling and registration, and driving permits)

- **Grants**

- **Debt**

- **Municipal bonds**

(debt securities, which are loans that investors make to local governments, and are used to fund public projects)

- **Loans**

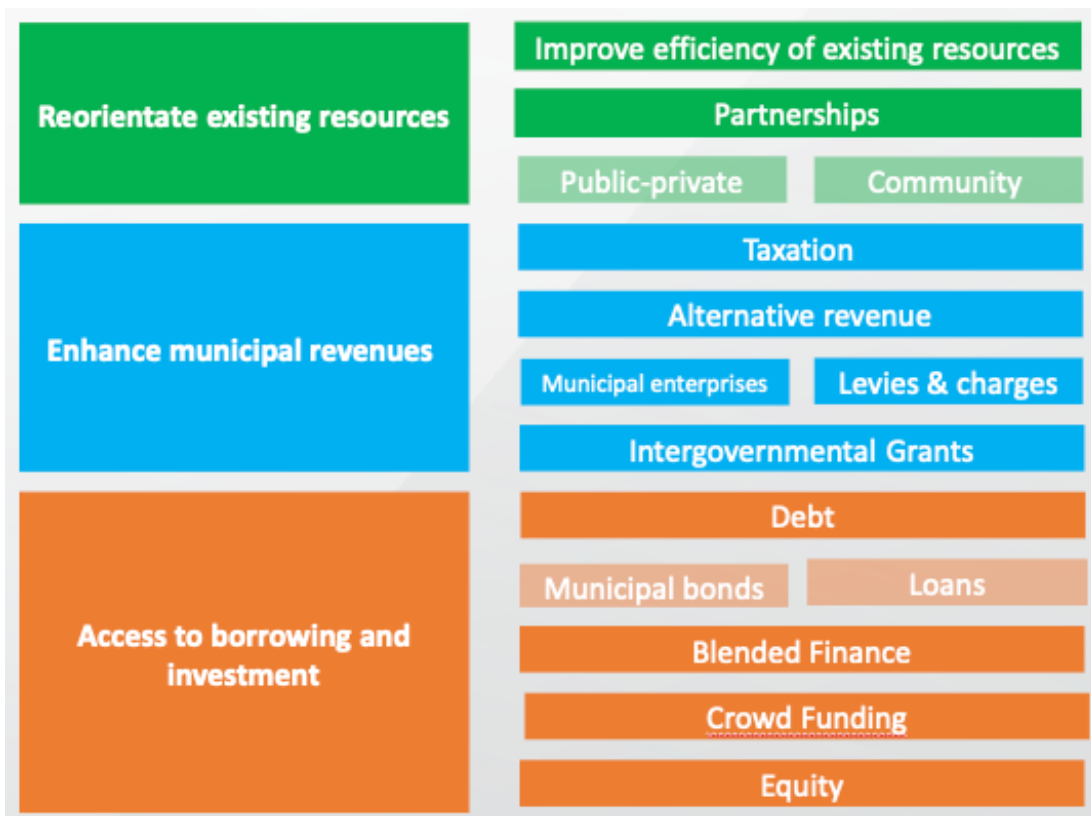
- **Blended finance**

(which usually combines public or donor funds with private capital to incentivize and reduce risks of private investments in social and environmental projects)

- **Equity**

(a method of raising capital by selling shares (a percentage of ownership) of the company to investors)

What is more, the ultimate availability of each instrument for a given municipality is dependent on the specific local and national context which influences the level of local autonomy with regards to such instruments. With this in mind, it is important to explore which instruments are most appropriate for the local context of your municipality.



There are many opportunities a municipality can take in creating a greater commercial mindset to generate additional revenue, such as providing services like water and waste. By building on opportunities to develop innovative revenue-generating approaches, additional resources could be captured to better deliver municipal services and projects.

A spotlight on: Municipal enterprises

A municipal enterprise is a company that is owned and run by a municipality. It can provide an opportunity to raise additional revenue and can provide for the needs of the local community. This could include service provision, such as water or waste organizations.

How can it help to mobilize resources?

- An enterprising mindset can help to identify new sources of revenue.
- Any profits generated would be captured by the municipality. However, it is important to note that so too would any losses.

Example: Hackney Light and Power providing clean and renewable energy.

To help deliver on its goal of becoming net-zero carbon by 2040, the London Borough of Hackney has set up Hackney Light and Power an enterprise that is owned and run by the municipality. The enterprise aims to create revenue by generating decentralized solar energy from rooftops around the London borough of Hackney. Surpluses of the enterprise fund the first borough-wide thermal efficiency housing programme in London, which aims to reduce energy demand and fuel poverty by insulating homes at zero cost to the household. Hackney Light and Power also plan to roll out electric vehicle charging points across the borough and supply renewable energy to the national grid.



Read more about the Hackney Light and Power [here](#)



Photo by Samuel Regan-Asante on Unsplash

A spotlight on: Blended finance

Blended finance is an approach to financing projects that allows different types of capital to invest alongside one another, such as blending public or donor grant funding with private or commercial investment capital. Through blended finance, the goal is to increase the size of capital that is directed towards investments that benefit people and the planet. The public funds can serve the role of lowering the risks of losses of private investments or making the projects financially more viable or sustainable.

How can it help to mobilize resources?

- Blended finance aims to increase the amount of capital raised for municipal projects.
- The approach blends different types (public, impact, commercial) of capital to invest alongside each other and pursue their mutual development outcomes.

Example: The AGR13 Fund de-risking finance for sustainable land use

The AGR13 Fund, launched in 2020, was initiated through a partnership between UNEP and Rabobank, IDH and FMO.

The fund aims to de-risk finance for sustainable land use, with prioritised projects that contribute to sustainable agricultural production or prevent deforestation and enhance reforestation while improving livelihoods. The fund's main goal is to mobilize over \$1 billion of loans by de-risking finance from financial institutions and other key parties in food and agriculture value chains by providing guarantees to loans, which act as insurance for the lender. If the borrower is unable to repay the debt, the lender still gets part of the money back.



Figure from: OECD (2020) Blended Finance Principles Guidance. Online



Read more about the AGR13 fund **here**



You can read more about blended finance **here**

A spotlight on: Crowdfunding

This is a relatively new and novel approach to raising funds for projects, that enables the sourcing of funding from a crowd of stakeholders, ranging from local groups to international collaborators, such as diaspora. It often involves an online platform to facilitate the mechanism. Municipalities can have a variety of roles to support crowdfunding.

How can it help to mobilize resources?

- Pools resources of different stakeholders.
- Raises funds for specific projects or ideas.
- Can support citizen cooperation and engagement.



Read more about the Ghent crowdfunding platform [here](#)



You can learn more about municipal crowdfunding [here](#)



UNDP offers training and related information on crowdfunding under its **Alternative Finance Lab**, please see [here](#) for more information or contact your UNDP focal point directly.

Example: Ghent crowdfunding platform combatting climate adaptation through urban greening:

In 2015, the city of Ghent developed and launched a crowdfunding platform that allows residents to share their ideas and raise the necessary funds to realize them. People who provide financial backing to a project are known as ‘supporters’. The donated amount per idea is viewed as an indicator of community support; only the projects with sufficient community support will become financially viable. This is known as quadratic funding where modest individual contributions are combined with larger matching sums from sponsors or contributors. With quadratic funding, each donor's contribution is matched by the total amount generated.

For example, two projects addressing climate adaptation have been successfully realized with support of the crowdfunding.gent platform; one project encouraging urban farming and the other realizing edible streets.



Photo of Ghent by Dim Hou on Unsplash

7.3 An Introduction to Green Finance



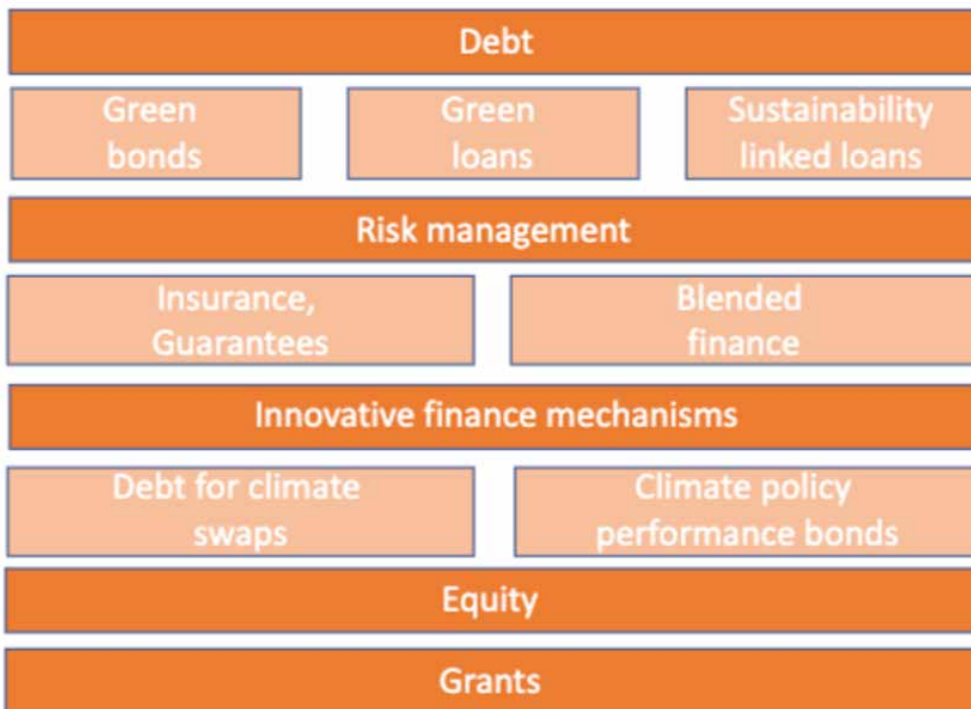
Watch the **video** for an introduction to Green Finance

What is Green Finance?

The G20 Green Finance Study Group (2016) defines green finance as “financing of investments that provide environmental benefits in the broader context of environmentally sustainable development and [...] also involves efforts to internalize environmental externalities and adjust risk perceptions in order to boost environmentally friendly investments and reduce environmentally harmful ones [...]”. There are many links between ‘green finance’ and other similar terms, such as low-carbon, climate and sustainable finance.

Green Finance Instruments

Similar to the approaches outlined in section 1, there is a growing range of Green Finance instruments. There is a great opportunity for municipalities to understand which Green Finance instruments can best suit their given context.



Adapted from Arup (2021) Green Finance Ecosystem

The Green Finance Landscape

There is a growing pool of resources and commitments towards Green Finance. For example:

European Bank for Reconstruction and Development (EBRD)

• Has strong commitments to supporting the green transition and recorded over half of the total financing to Green economy investment in 2021.



• EBRD's flagship Green Cities programme has mobilized more than €5 billion to address environmental degradation.



• The programme has established Green City Action Plans (GCAP) designed to identify and shape investable projects, programmes, and policy actions tailored to address the most significant environmental issues facing cities.

European Investment Bank (EIB)



Established Climate and Environmental Ambitions including:
• Increase dedicated share 'green' of investments to 50% by 2025.
• Align all financing activities with Paris Agreement by the end of 2020.



Smart Cities Marketplace brings together urban actors to support the green, digital and just transition in cities, with a focus on small and mid-sized municipalities.

The World Bank



Has established 2025 Targets to Step Up Climate Action, including:
• Systemically increase direct financing.
• Boost support for adaptation (USD\$50 billion over Five Years for Climate Adaptation and Resilience).

Many of these financial institutions provide loans, equity financing, and guarantees, as well as grants as technical assistance or incentives for green projects and businesses.

Municipalities have a diversity of potential instruments to support the mobilization of resources and funding; From the conventional like grants, to the more innovative such as crowdfunding. Green finance presents a large and growing opportunity for finance that could support municipalities to mobilize resources to fund the transition to green and equitable places.

7.4 Workshop activity

Kindly discuss the questions below:

- 1** What obstacles does your municipality face in mobilizing funding and resources?
- 2** Which instruments are most relevant for your municipality?
- 3** How might your municipality utilize growing opportunities in Green Finance to mobilize resources?

7.5 Test your learning

Question 1 - Which approaches can support municipalities to mobilize finances and resources?

(Select all that apply)

- A. Reorientate existing resources.
- B. Enhance municipal revenues.
- C. Access to borrowing and investment.
- D. Upgrade your municipal transport fleet.
- E. Spend municipal budget unsustainability.

Question 2 - How can crowdfunding help to mobilize resources?

(Select one)

- A. Hands out money to a group of individuals.
- B. Pools resources of different stakeholders to raise funds for a specific project.
- C. Redistributes funding from Central Government.

Check your answers in the end section of this document.

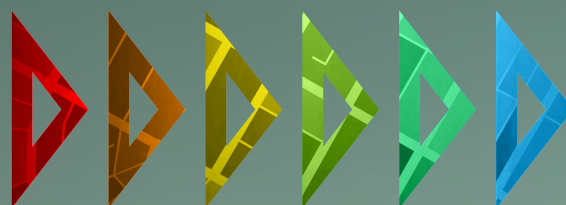


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Module 8

PURSUIING FUTURE READINESS



ARUP



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TECH**

Module 8

PURSUING FUTURE READINESS

8.1 Module overview

This module encourages municipalities to embrace change, pioneer structural transformations, and learn from innovative approaches implemented by other cities. By doing so, they can develop their own Pathways for Economic Growth and create a sustainable future for their communities.

8.2 Pioneering approaches for future readiness

Creating thriving municipalities for the 21st Century is an ongoing task. What we know today will be distorted by unknown future events that are impossible to predict, and other amplifying risks.

The actions that we take today will influence generations to come. Therefore, we must ensure that we move forward embracing adaptability and flexibility to navigate this complex future.

However, we often struggle to take meaningful actions and decisions that lay beyond our immediate future, like the next political term, or municipal budget. New approaches must break away from a short-term mindset and support structural change to support long-term considerations and change like climate change and digitalization.

Taking a long-term mindset, however, cannot discourage taking action now

There is a growing movement of municipalities that are embracing these new approaches and pioneering this structural change to support action from parts of the municipal system, from public sector, to residents, businesses and universities.

No two solutions can be the same, but throughout this course, we can see that this pioneering change is not a thing of tomorrow.

Explore the inspiration from this course below:



Tallin, Estonia –
participatory
planning process



Ghent, Belgium - Ghent
crowdfunding platform
realising climate change
adaptation through
urban greening



Leuven, Belgium –
a systems approach
to green innovation



Hackney Light
and Power, UK -
providing clean
and renewable
energy.



Baghdati, Georgia –
piloting a new approach
to economic planning

Follow your interest and explore
more innovative examples:



Urbact good
practice
collection



La Louviere, Belgium -
Climate neutral by 2030
through Cities Mission



NetZeroCities
Knowledge Base
case studies



Viladecans, Spain
-Innovative local pub-
lic-private-citizen part-
nership for energy
governance



Urban Innovative
Actions project
library



Valencia, Spain –
2030 climate
mission

An approach for a thriving future - Pathways for Economic Growth (P4EG) & other coming courses

Throughout this course, we have been introduced to a range of concepts that will shape the decades to come, as well as explored some key approaches to help municipalities to navigate this change. Diverse and interconnected, these modules have introduced a new foundation for your municipality to develop impactful, investable, and adaptable pathways for economic growth.

While these modules have been presented separately, in reality, these concepts and approaches are deeply connected and integrated into one another. Ultimately, we need approaches that allow us to take this holistic approach; to foster learning, resilience, and structural capabilities.

To support municipalities to develop their own pathway, we have developed a comprehensive course for the Urban Learning Center to explore and explain the approach of the P4EG. Additionally, we have also developed deep-dive courses on Green and Just Transition, and Smarter and Inclusive Cities.



You can learn more about the P4EG and deep-dive courses at the Urban Learning Center.

8.3 Workshop activity

If you are taking this course as a part of a workshop, explore in a group the various case study inspiration provided in this module and discuss the following questions:

- 1** Which approaches adapted by other municipalities resonate with your context?
- 2** What barriers and drivers might your municipality face if taking a comparable approach?
- 3** How might the approaches be adapted to succeed in your municipal context/?

8.4 Test your learning

Question 1 - How can municipalities effectively balance short-term needs with long-term considerations, such as climate change and digitalization, to ensure sustainable economic growth and community development?

(Select one)

- A. By focusing solely on immediate economic gains and disregarding long-term challenges.
- B. By completely ignoring short-term needs in favor of a rigid long-term strategy.
- C. By prioritizing short-term needs exclusively and delaying any long-term planning.
- D. By adopting flexible strategies that integrate both short-term needs and long-term considerations.

Question 2 - What are the key elements of a holistic approach that municipalities can adopt to foster learning, resilience, and structural capabilities while embracing adaptability and flexibility for an uncertain future?

(Select one)

- A. Isolating different aspects of municipal development and addressing them separately.
- B. Relying solely on top-down decision-making without involving local stakeholders.
- C. Integrating learning, adaptability, and flexibility across various sectors and involving stakeholders.
- D. Implementing rigid and unchanging plans that resist adaptation.

Question 3 - How can municipalities leverage the concepts and approaches introduced in this course, such as the P4EG framework, Green and Just Transition, and Smarter and Inclusive Cities, to create unique and impactful pathways for economic growth tailored to their specific communities?

(Select one)

- A. By copying exactly the approaches of other successful cities without any modifications.
- B. By disregarding the concepts and relying solely on traditional economic growth models.
- C. By applying a cookie-cutter approach that does not consider local needs and conditions.
- D. By adapting and customizing these concepts to align with their community's characteristics and goals.

Check your answers in the end section of this document.

8.5 Thank you for taking this course!

We hope that you have enhanced your own understanding and enriched the learning experience for your municipality, laying a foundation for its future readiness.

Please do reach out to us for any further questions and feedback on the course.

This is an open access course - feel free to share!



QUIZ ANSWERS

Module 2

- Question 1: A, B and C
- Question 2: C
- Question 3: A and B

Module 3

- Question 1: D
- Question 2: B

Module 4

- Question 1: D
- Question 2: F
- Question 3: B

Module 5

- Question 1: C
- Question 2: A and B
- Question 3: A, B, C, D and F

Module 6

- Question 1: D
- Question 2: F

Module 7

- Question 1: A, B and C
- Question 2: B

Module 8

- Question 1: B
- Question 2: C
- Question 3: D



Additional resources and references

MODULE 3: GREEN & JUST TRANSITION

Additional resources

- European Union Green Deal
- EU Green & Just Transition
- UNDP Report on why a just transition is central to delivering the Paris Agreement and Sustainable Development Goals
- More information on the Viladecans and VILLAWATT case-study on implementing a socially-just energy transition
- About Local Green Deals
- NetZeroCities Climate Transition Map (online interactive version)
- Mannheim's Local Green Deal initiative (iDEAL)
- Report on Valencia's Mission process and commitments
- Valencia's Mission website in English
- Report on Mission-oriented research & innovation in the EU: A problem-solving approach to fuel innovation-led growth
- Mission-Oriented Innovation Network (MOIN) Casebook
- Mission-oriented Research & Innovation case-study: The German Energy Transition
- Mission-oriented Research & Innovation case-study: The Norwegian Electric Vehicle initiative

MODULE 4: SMARTER & INCLUSIVE CITIES

Additional Resources

- UNDP's Handbook on Smart Urban Innovations
- Can Smart Cities Be Inclusive?
- We need smarter cities, not "smart cities"
- FinEst Centre Blog
- Global Policy Road-map for Successful, Ethical, Smart Cities

References

- United Nations. (2018) 'World urbanisation prospects: The 2018 revision'. United Nations
- World Bank (2023) Urban Development Overview
- Estevez, E., Lopes, N. V., & Janowski, T. (2016). Smart Sustainable Cities - Reconnaissance Study
- The Sustainable Development UN Agenda 2030
- UNDP. Singapore Global Centre
- European Commission
- FinEst Centre for Smart Cities
- NetZeroCities
- Azambuja, L. S. (2021). Drivers and Barriers for the development of Smart Sustainable Cities: In 14th International Conference on Theory and Practice of Electronic Governance. ICEGOV 2021-. ACM.

MODULE 5: MANAGING COMPLEX CHALLENGES

Additional resources

- Read more about the basis of systems thinking - Kim. D.H. (2016) 'Introduction to systems thinking'. Pegasus Communications, Inc.
- Watch this introductory video about the context of systems change <https://youtu.be/LPYfh72LBsY>
- UNDP resources on applying a portfolio approach to complex challenges: System Change: A Guidebook for Adopting a Portfolio Approach (2022)
- Portfolio approach in Eurasia
- Learn more about systems mapping at Kumu's Systems Mapping Guide

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- Dodgson, M. & Gann. D.M. (2011) 'Technological Innovation and Complex Systems in Cities' Journal of Urban Technology. Vol.18(3).
- Kim. D.H. (2016) 'Introduction to systems thinking'. Pegasus Communications, Inc.
- Systems Innovation Network (2023)
- UK Government Office for Science (2023) 'An introductory systems thinking toolkit for civil servants'.
- UNESCAP (N.d.) 'Introduction to Systems Thinking Principles and Analytical Tools'.
- Systems Innovation Network (2021) Systems Thinking – Four Key Concepts.
- Gina Lucarelli 'What does success look like for UNDP's Accelerator Labs?'

MODULE 6: INNOVATION IN THE PUBLIC SECTOR

Additional resources

- Humble governance approach by Demos Helsinki and related article
- Report on Valencia's Mission process and commitments; Valencia's Mission website in English
- Mission-Oriented Innovation Network (MOIN) Casebook
- Smart Cities Marketplace Report on Systemic Changes in Governance.
- Equipping local governments for realising climate-neutral and smart cities

MODULE 7: MOBILISING FUNDING AND RESOURCES

Additional resources

- Read more about the opportunities to mobilize resources in municipalities in UN Habitat (2015) 'The Challenge of Local Government Financing in Developing Countries'. UNHabitat, Nairobi
- Explore Green Finance opportunities via - Covenant of Mayors – Europe (N.d.) 'Financing opportunities'
- Learn more with a UN CC:Learn course 'Climate Policy and Public Finance'
- Learning more with a UN CC:Learn course 'Finding the money – Financing Climate Action'
- Discover net zero finance with the NetZeroCities Finance Guidance Tool
- Local and Regional Governments' Access to EU Innovative Development Financing: Mechanisms and Opportunities
- UNDP's Sustainable Finance Hub Knowledge Bank provides SDG finance examples and materials

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- Arup et al. (2022) 'Making the Case for Public Realm Investment' The Towns Fund. Online
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- G20 (2016) 'Green Finance Synthesis Report.' G20 Green Finance Study Group Online
- Local Government Association. (2017) 'Enterprising Councils. Supporting Councils' income generation activity'. Online
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- OECD (2020) Blended Finance Principles Guidance. Online
- Passeri, F. (2019) 'A guide to crowdfunding for local authorities'. URBACT. Online
- UN Habitat (2015) 'The Challenge of Local Government Financing in Developing Countries'. UNHabitat, Nairobi. Online
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- EBRD Green Finance in 2021. Online
- EBRD Green Cities Doubles in Size. Online
- UNEP Inquiry (2016) 'Definitions and Concepts: Background Note' Online