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FINANCE CENTER FOR
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BRIDGE FOR CITIES 4.0

**Belt & Road Initiative:
Connecting Cities through
the New Industrial Revolution**

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EURO CITIES

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RETHINKING CITY-TO-CITY PARTNERSHIPS UNDER THE 4th INDUSTRIAL REVOLUTION

Organized by United Nations Industrial Development Organization and Finance Center for South-South Cooperation

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INTRODUCTION

For the past decade more than half of the world's population has lived in cities, thus making urban centres the dominant habitat for humankind. This shift has tremendous implications not only for the current and future challenges of human development but also for the solutions that will be proposed and implemented towards more sustainable development (UN, 2012).

The shift towards an "urbanized" world is not simply a demographic phenomenon but a transformative one, amplified by the concurrent transformation of every aspect of life incurred by new technologies. The latter includes the transformation of sectors like energy and food production, the manufacturing industry and water and material cycles.

Cities themselves, both as administration/governance structures and ecosystems of stakeholders, have seized the opportunity to respond to these challenges. Starting many decades ago, via city twinnings and the creation of the first networks of cities, local governments have increasingly been involved in tackling global development challenges. This trend has gained fresh momentum after 2015 and especially after the UN Habitat III conference and the adoption of the 2030 Development Agenda and the 17 Sustainable Development Goals.

For the delivery of this positive agenda and the urbanization dynamic, cities are considered as pivotal nodes and platforms, containing and mobilizing human agents, ideas, spaces and solutions. Cities can work on all three priorities of sustainable human development – social, economic and environmental – and offer opportunities for direct connections among different stakeholders and the creation of ecosystems, for example under the notion of triple and quadruple helixes.

In the last years, city-to-city partnerships have been one of the tools used to materialize this agenda. By "city-to-city partnerships" we mean something substantially bigger than city twinnings and mere cultural exchanges; we are talking about direct cooperation between local governments and their respective stakeholders for the creation and implementation of joint projects and investments; joint academic activities; working together for sustainable development; creating joint opportunities and benefits from Industry 4.0 and the new technologies; and, of course, cultural and education programmes and exchanges.

This issue paper, presented in the framework of the "BRIDGE for cities 4.0" conference organized by UNIDO[1], presents and explains in greater depth these ideas and suggests a framework for the creation of more successful city-to-city partnerships. In the examples provided, these ideas are exhibited in practice.

THE RISING IMPORTANCE OF CITIES AND SUSTAINABLE URBANIZATION[2]

For the first time in history, more than half the world's people are urban. While the urban population is projected to grow by 1.5 billion people, the world's rural population is expected to remain largely static until 2030. At that time, 60 percent of the global population will live in cities. Over 90 percent of that urban growth is expected to occur in the cities and towns of the developing world, mostly in Africa and Asia (UNDP, 2016).

The urbanization of the global population is fundamentally changing the economy and the environment, as well as society as a whole. Urban centres currently cover only a small part of the world's land surface - 0.51 percent of the total land area - but account for 82 percent of the global GDP, produce more than 70 percent of the world's greenhouse gas (GHG) emissions and use 80 percent of the world's energy (World Bank, 2019).

Rapid urban growth poses significant environmental and societal challenges. However, cities are also viewed as engines of growth and innovation, often attracting large shares of R&D investment and an innovative service sector. Rapid urbanization, taking place mainly in the developing world in addition to the vast experiences of the already urbanized developed world, offers a unique framework for tackling common challenges such as reducing greenhouse gas emissions, ensuring effective use of resources, and guaranteeing citizens' health and well-being. Therefore, sustainable urbanization has become a central component to the cooperation between the global North and South in recent years (UEC, 2017).

While there are challenges to be addressed, there are also opportunities to be seized in making the world more

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1   https://www.unido.org/4th-bridge-cities-event

2   Throughout this paper, the terms "city" and "local government/local authority" are used in a seemingly interchanging way. Although it is difficult to provide exact definitions, the two terms have different meanings:

   • By "local government" or "local authority" we mean the core public institution consisting of its political and administrative layers;

   • By "city" we mean a wider ecosystem, the city as a geographical term that includes its political institutions, citizens, public and private organisations, etc. In the frame of international relationships, city-to-city cooperation refers to partnerships where many stakeholders have an active role, but the overall partnership is led or made legitimate via the involvement and political commitment of the local authority.

sustainable, inclusive and equitable with regard to urbanization. Urban residents in well-planned cities enjoy better access to employment opportunities, health care, education, and public services compared to their rural counterparts. Well-managed urban areas have lower per capita energy, climate and ecosystem footprints and lower costs per person for infrastructure and basic services. In addition, the concentration of resources, ideas and energy in urban areas makes for fertile ground for the creativity and technological innovation needed to solve many of the developmental challenges the world faces today (UNDP, 2016).

As a result, cities have become a central component in the global development system. The 2016 Habitat III Conference introduced the New Urban Agenda, which aims to define a global approach to urbanization for the next 20 years (UN Habitat, 2019). The challenges and opportunities for cities are clearly featured in the 2030 Agenda for Sustainable Development as, Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable (UN, 2019a). In fact, inclusive and sustainable development in cities is critical to achieving the 2030 Agenda, as an estimated 65 percent of the SDGs may not be fully achieved without the involvement of urban and local actors (SDSN, 2016).

Exchange of knowledge, technologies and experiences regarding sustainable city services and infrastructures will offer enormous prospects for addressing the issues related to urban planning, the environment, health, water, transport, ICT, hazards, and resilience and disaster risk reduction as well as significantly improve the well-being of citizens.

To tap the full potential of cooperation and deliver tangible results, greater concerted actions among cities, industries, innovative SMEs, academic institutions and civil society actors are needed, a pattern that is visible both in the decision-making sphere (e.g. triple/quadruple helix – see page 5) and the economic sphere (e.g. delivery of public services through public-private partnerships).

SUSTAINABLE URBANIZATION: CHALLENGES AND PRIORITIES

Cities around the world are confronted with many challenges, such as poor environmental, air, and water quality, traffic congestion, lack of basic services and infrastructure, inadequate supply of food, energy and resources, migration flows, crime, poverty and inequality and poor management and governance. Often, local governments have little if any control over these issues. Each region of the world is experiencing a different moment in its urbanization history and has different priority urban challenges to overcome in order to achieve balanced and sustainable development.

Europe

1. Migration
2. Climate change
3. Demographic change
4. Environment resource management
5. Economic development

North America

1. Climate change
2. Environmental resource management
3. Social inclusion
4. Mobility
5. Key infrastructure resilience

South America

1. Economic development
2. Climate change
3. Urban planning
4. Environment resource management
5. Mobility

Middle East and North Africa

1. Water
2. Environment resource management
3. Institution - Governance
4. Safety and Security
5. Migration

Sub-Saharan Africa

1. Water
2. Economic development
3. Innovation and entrepreneurship
4. Safety and security
5. Environmental resource management

Asia

1. Urban planning
2. Mobility
3. Environment resource management
4. Climate change
5. Water

Oceania

1. Climate change
2. Environmental resource management
3. Economic development
4. Ecological preservation
5. Key infrastructure resilience

Figure 1: Regional urban challenges (Source: WEF, 2018)

Two challenges that emerge as common around the world are environmental management and economic development. Climate change effects and finite and degraded environmental resources put a stress on cities, especially the ones in which growth is rapid and not manageable by the local government. Economic development, especially after the financial crisis of 2008 and the realization of the interdependence of different economies, is seen as both a priority and a challenge by cities across the world. As a theme it is also intertwined with the transformation of the economy and the delivery of public services under new business models.

The combination of these two priorities can be found in the theme of sustainable and inclusive industrial and economic development.

THE ROLE OF TECHNOLOGY: INDUSTRY 4.0, INNOVATION AND SUSTAINABLE URBAN-INDUSTRIAL DEVELOPMENT

These challenges, faced to varying degrees by cities all over the world, directly impact cities' ability to provide services and maintain quality of life for their citizens. As the most decisive factor contributing to the growth of cities, industrialization exacerbates these issues by increasing air and water pollution, waste and the depletion of finite resources and GHG emissions, and often resulting in an increased wealth gap, urban migration and poverty.

In fact, following the electrification of industry during the Second Industrial Revolution, cities expanded; distances decreased as the result of the introduction of automobiles and factories increased in both size and number, resulting in congestion, pollution, and overall environmental degradation. The rapid urbanization which accompanies industrialization not only increases the stress on resources but also on infrastructure and public goods and services. Industrialization increases the net wealth and connectivity of urban areas, but simultaneously provides the challenges of ensuring fair distribution of that wealth as well as improvements in social services and conditions and prevention of environmental degradation.

While industrialization contributed to an overall improvement in living standards for those countries who developed organically, urbanization and industrialization in developing countries has often been unbalanced, and as a result, made countries and cities more unequal and worsened environmental degradation and resource depletion. While these challenges remain present with traditional industrial development, the increased role played by technology and technological advancement presents an opportunity to maintain levels of industrialization while reducing the harmful side effects. The introduction of computers, automation, data processing and analysis and the internet allowed for streamlined industrial processes and provided the option for remote working, reducing the stress on cities. These developments also vastly improved labour and resource efficiency, contributing to a reduction in resource waste and an increase in overall productivity. As technology continues to advance, it will only increase the number of solutions for the challenges of industrialization and urbanization and provide increased options for the introduction and implementation of sustainable development projects.

The Fourth Industrial Revolution and the smart technologies that come along with it, also known as Industry 4.0, provide several avenues through which to address the issues of industrialization and urbanization, avenues discussed at the plenaries of the "BRIDGE for Cities 4.0" event:

- Industry 4.0 enables the development of "smart cities" which make cities inclusive, more sustainable, and improve the quality of urban livelihoods. It has the potential to help rapidly urbanizing cities, particularly in the developing world, to grow sustainably and to reduce the harmful effects of industrialization. Against this backdrop, innovation hubs can act as incubators for clean technologies, renewable resources, and provide solutions to the infrastructure and services stresses placed on cities by urbanization and industrialization.

- Industry 4.0 solutions can help cities transition towards a circular model of economy, reducing their carbon footprint through the use of their shared services, infrastructures, and resource supply and recycling systems. In order for Industry 4.0 solutions to be effectively implemented in cities, in both developed and developing countries, those cities must establish close and integrated partnerships with both public and private entities and institutions. Public institutions should involve citizens in order to identify problems, with the private sector proposing solutions.

- Industry 4.0 technologies have the potential to reduce emissions and environmental and resource degradation, improve food, water, and energy security, and increase the overall resilience of cities to climate change and disasters. E-mobility technologies, for example, will reduce harmful emissions and air pollution, creating at the same time new jobs in innovative factories and firms.

THE ROLE OF DIFFERENT STAKEHOLDERS

The importance of international organizations

International organizations work for the maintenance of international peace and stability, be this economic, social or political, and they act in the interest of the international community.

In addition, they play an increasingly prevalent role in the definition of, and agreement on, more effective international rules and regulations for inclusive and sustainable development.

The United Nations and the European Union are two examples of a global and a regional international organization respectively, which share the objective of inclusive and sustainable development, and work for its achievement through the encouragement and creation of city-to-city partnerships, among others means.

The United Nations, both centrally and through its agencies and offices, supports and works towards multilateral networks and forums that contribute to meeting all SDGs and especially SDG 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development (UN, 2019b).

During the 2016 UN Habitat III Conference in Quito, the European Union put forward three commitments to help meet the New Urban Agenda's global objectives: (i) Deliver the New Urban Agenda through the Urban Agenda for the EU, (ii) Develop a global, harmonized definition of cities and (iii) Foster cooperation between cities in the field of sustainable urban development. In particular for the third commitment, the European Union promises to "… encourage cities across the world to link up with one or more partner cities to develop and implement local action plans and projects on common priorities – access to water, transport systems, health or housing. Business partners should be closely associated in the drafting and implementation of these action plans" (EC, 2016).

As the UN agency devoted to the implementation of SDG 9 "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation", UNIDO plays a unique role in the process of integrating Industry 4.0 with cities. In fact, UNIDO is well placed to create opportunities for knowledge and technology transfers and to support policies aimed at implementing clean industrial solutions, taking full advantage of the South-South and Triangular modalities of cooperation. On the other hand, UNIDO supports developing countries in absorbing Industry 4.0 technologies, so as to capitalize on sustainable energy aspects for rapid inclusive and sustainable development and the potential for "leapfrogging"[3]. In these countries, UNIDO provides transformative support, such as training, education, and encouragement and facilitation of entrepreneurship, demonstrates and transfers climate technology, and increases awareness of Industry 4.0, promoting the necessary systems for concrete implementation.

In broader terms, UNIDO can help countries – notably in the developing world – in incorporating Industry 4.0 in cities by facilitating partnerships. Partnerships provide avenues for city leaders and industries to share their challenges and successes, learn from one another, and ultimately develop shared solutions and increase their respective capacities, in addition to facilitating funding and the sharing of technical expertise.

Secondly, UNIDO assists developing countries on a technical level. The organization works with cities and local governments to develop their investment priorities, enact necessary capacity building, and provide training and education to local businesses and broader populations in order to prepare them for these new technologies, in addition to acting as a mechanism for knowledge and technology exchange.

Concrete examples of UNIDO's action in cities (Annex 1)

Energy Efficiency and Low-Carbon Transport in Malaysia:

- The objective is to introduce and increase the widespread use of electric vehicles in order to reduce carbon emissions and increase green technology usage

- The project works on both a policy level, developing regulatory frameworks and increasing capacities, and a technical level, designing and installing EV infrastructure and encouraging local EV manufacturing

Sustainable Cities Management Initiative for Senegal:

- This initiative works to aid in the development of sustainability-focused urban planning strategies and to integrate climate risks and responses into city infrastructure

- In Senegal, this project hopes to increase cities' resilience to climate events and introduce green technologies and renewable energy projects to Diamniadio eco-industrial city and the Greater Dakar area

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3 I.e.: "The phenomenon of a community or country, usually impoverished and in the Global South, departing from the more traditional path of technological growth and instead advancing from a less developed society straight to the newest and most innovative means of communication, business, or agriculture" (Ulman, 2017)

Strategic Platform to Promote Sustainable Energy Technology Innovation, Industrial Development, and Entrepreneurship in Barbados

- Many developing countries lack private sustainable energy enterprises capable of providing products and services long-term, resulting in unstable markets, limited job opportunities, and high reliance on fossil fuels
- This platform aims to strengthen these industries in Barbados through coherent policy and incentive frameworks as well as increased investment in and promotion of sustainable technology companies

Sustainable Cities: Integrated Approach Pilot in India:

- Another project under 'Sustainable Cities', the pilot project in India hopes to lessen the negative effects of rapid urbanization through sustainable urban planning strategies
- This project combines the introduction of sustainable city planning and the development of renewable energy solutions with a partnership component in order to raise awareness of green technologies and promote the 'Sustainable Cities' program

Energy Efficient and Low-Carbon Transport in South Africa:

- The goal of this project is to promote the widespread use of EVs and non-motorized transport (NMT) in order to reduce emissions, congestion and environmental pollution
- In addition to updating policies and regulations and installing EV infrastructure, this project contains an awareness raising and knowledge sharing component, to introduce the ideas of sustainable transport to other cities across South Africa

Integrated Adoption of New Energy Vehicles in China

- The objective of the project is to facilitate and scale up the integrated development of New Energy Vehicles (NEVs) and Renewable Energy (RE) in China.
- This project has four components: policies and programmes, institutional capacity building, piloting technical measures, and aware raising, and engages in actions such as technology demonstration and exchange and promotion of NEV technology among manufacturers, suppliers, and consumers

Finally, at the broadest level, UNIDO plays a key role in promoting new norms and standards related to the development and use of sustainable and integrated technologies and in undertaking any supporting research necessary to back up the implementation and success of Industry 4.0 technologies and solutions at the city level.

Against this backdrop, and bearing in mind the specific interconnectedness of urbanization and industrialization, UNIDO has developed the "BRIDGE for Cities" initiative, which aims to provide local governments and urban stakeholders with a platform to discuss and share experiences useful for the achievement of the SDGs and the New Urban Agenda, in the spirit of city diplomacy.

City diplomacy

City diplomacy is a booming phenomenon, studied and brought into practice by cities all over the world. Starting with the 'twin' and 'sister' cities, followed by the creation of regional and international networks (like EUROCITIES and UCLG) and then resulting in the participation of cities in international governance networks and organizations, cities increasingly influence the policy-making process and have become an alternative channel of diplomacy regarding issues such as climate action, economic development and social affairs.

It is hard and rather artificial to try and distinguish the various categories of city diplomacy. However, six dimensions can be identified (van der Pluijm R. et al, 2007):

1. Security
2. Development
3. Economy
4. Culture
5. Networks – Cooperative dimension[4]
6. Representation - Representative dimension[5]

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4 Usually, international cooperation is considered a means to achieve higher goals such as economic development. However, in the case of the (informal) city diplomacy, becoming organised in any level from regional to global is a diplomatic goal in itself.
5 The representative dimension encompasses all those activities that aim at representing the city at international organisations, and even more, aim at helping cities to participate in the international organisations' activities and influence their decision-making.

Networks of cities

One category to focus on is the network - or cooperative - dimension of city diplomacy, as cooperation is not perceived as an aim per se but rather a means to achieve better results in the other five dimensions. Networking can take place at the national level, with the formation of regional or national associations of municipalities, but also at the international level, either through bilateral (twinning) or multilateral (city networks) arrangements.

As an example, cities have been key players in the partnership between China and the EU for many years now. Indicatively, the delegation of the European Union to China has kept track of more than 700 twinnings between Chinese and European cities from 1979 to 2012 (EEAS, 2013).

Multilateral cooperation between cities is a more recent phenomenon that has gained significant traction with the formation of many regional (EUROCITIES, Merco-Cities, CityNet) and global (UCLG, Metropolis, C40, ICLEI) networks.

All these forms of cooperation aim both at protecting cities' interests at the decision-making bodies in their respective regions and at sharing information and good practices on various urban topics.

The positive impact that the cooperative dimension, both declined in the bilateral and in the multilateral arrangement, is reflected in the different sessions of the "BRIDGE for Cities 4.0" event. The case city sessions – building upon shared challenges and existing cooperation frameworks – are a means to provide a platform to strengthen twinnings; while more open settings, such as the Mayors Roundtable, are meant to be an occasion to bring to the table different voices and point of view, in a multilateral arrangement.

Working with city stakeholders

Within cities, the "triple helix" model of university, industry and local government relations has become one of the most popular innovation and cooperation models. The helix is used as an image to illustrate a complex network of relationships in which business, academia and local government fulfil their traditional functions and collaborate dynamically at the same time. It is not just about working together on an ad hoc or project basis: the cooperation is supposed to be more institutional, structured and strategic. And at times, they 'take the role of the other' by adopting new, non-traditional roles; for example, companies become educators, the university becomes more entrepreneurial and the local government plays the role of business facilitator.

More recently, the term "quadruple helix" has come into use, the fourth helix being civil society and the media, whereby the end-user (which may be the citizen, the consumer, the patient, etc., depending on the situation) enters the equation and becomes directly involved in the process.
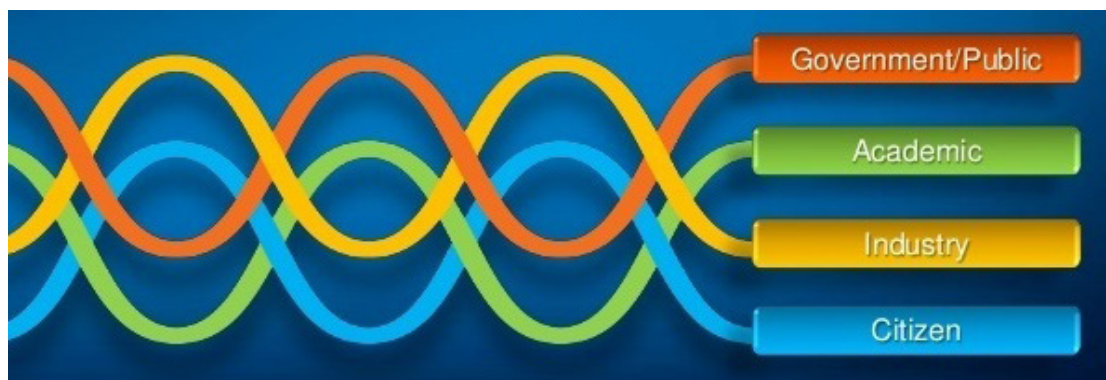

Figure 2: Quadruple helix model participants (Source: Sheridan C. et al, 2013)

When it comes to city-to-city partnerships, the use of a triple/quadruple helix model can make an important difference given the challenges, time and resources needed before successful joint projects can be created. Evidence from the work that the URBAN-EU-CHINA project did with European and Chinese cities suggests that the single most important factor for success in city-to-city cooperation is the existence of a small group of dedicated persons or organizations that will persist in bringing results regardless of the challenges and obstacles. This group usually consists of a combination of stakeholders with complementary strengths that may consist of the city administration, local businesses, academia, or a group that represents the whole helix.

While peer-to-peer relationships remain the norm in cooperation between cities (local government talking with local government, universities talking with universities), a triple/quadruple helix model adds many positive qualities to the cooperation process:

- Better definition of objectives and opportunities: Working with different stakeholders brings a variety of ideas and approaches to the table. It also allows for the enrichment of cooperation opportunities as more areas of cooperation can be discussed and explored. The possibility for successful cooperation is thus increased. Furthermore, each side can better adapt the cooperation offer or demand to its needs or capacities. For example, a city can seek investment in new technologies while offering know-how in tourism;

- Flexibility for the stakeholders: In a triple/quadruple helix model the different organizations play overlapping roles. This way, a degree of joint representation can be created. For example, it is not necessary for a local government to participate in all delegations and visits if the local university or chamber can represent the interests of the whole city ecosystem. Flexibility in participation and use of resources by all partners is a direct result of working in a helix;

- Sustainability of the cooperation: One of the usual challenges in city-to-city partnerships is the lengthy discussions and exchanges that are necessary before a new project or activity can be agreed upon and initiated. Involvement of different stakeholders, who bring different ideas and objectives to the table, can help facilitate the whole process. Even if at any given time only a few of the ideas for joint activities move forward, the whole partnership helix benefits. In addition, these shared achievements create a feeling of accomplishment and can keep all stakeholders at the table, even if the current projects do not directly benefit them. Additionally, applying this multi-tiered approach is extremely beneficial when it comes to high-level dialogue in policy and agenda settings. When discussing themes that touch upon each city's challenges – as is the case of circular economy, e-mobility and innovative hubs during the "BRIDGE for Cities 4.0" event – bringing to the table the experiences and points of view of local and central governments, academia and business sectors provides a detailed and multifaceted perspective on these challenges. Similarly, the crucial role of the business sector cannot be neglected and stands at the core of the business roundtable at the event.

In general, as cities nowadays are complex organisms that have to face a myriad of (often juxtaposed) exigencies, it is of crucial importance to tackle urban development issues while considering the big picture. Using the quadruple helix model helps find solutions to these challenges in a comprehensive and cooperative manner.

THE IMPORTANCE OF CITY-TO-CITY PARTNERSHIPS: BELT AND ROAD CITIES WORKING TOGETHER

During the last two decades of the twentieth century, cities have become active participants in international relations as never before, mainly through extensive programmes of twin/sister cities and the formation of networks of cities. There are three main factors driving this phenomenon. Firstly, urbanization is a growing trend in all developing countries, matching in some respects the rapid development of urban areas which characterized the first industrial revolution in the global North. Secondly, globalization has led to a clearer recognition of the determining position of cities in a world which is both interdependent and committed to sharing finite quantities of natural resources. And third, city governments have taken initiatives to assert their place in the world and to develop international links which will contribute to their future economic and social well-being (UN Habitat, 2001).

Direct links between cities saw unprecedented growth in the 1950s and 1960s, when the aftermath of the Second World War and the tense but changing world's balance of power called for peace, reconciliation and diplomacy through educational and cultural linkages. In today's economic climate there is a growing need for cities to expand sister city partnerships in order to leverage local economic development (Cities Today, 2014).

With the marked trends towards democratization and decentralization of the 1980s and 1990s, the scope for concrete cooperation between local authorities on practical issues of mutual interest expanded considerably. Moreover, cities were increasingly responding to their role in combating the root causes of poverty by fostering sustainable economic and social development as the political entities closest to the needs of their communities. These advances at the local level coincided with growing recognition in the international community that the process of urbanization, particularly with the movement of populations towards the cities in developing countries, raised major issues of governance – as well as of economic, social and environmental policy – which called for new approaches to capacity-building at the local level (UN Habitat, 2001).

The challenges cities face when working together

EUROCITIES, the network of major European cities, has worked for more than thirty years to network with and facilitate the exchange between European cities, to promote the urban agenda to international organizations and to facilitate the exchange of knowledge and good practices between cities in general. Work done in the forums and working groups of EUROCITIES suggests that meaningful city-to-city partnerships, beyond the topic of cultural exchanges or the common need to influence international organizations or agendas (e.g. the European Union or the climate action agenda respectively), are hard to establish and difficult to maintain.

Some of the challenges involved are more generic and are reported by most stakeholders; others are more specific and can be found when special conditions are met. Some refer to the strategic and design phases; others to the operational and implementation ones. In the end, they all need to be acknowledged and taken care of for a partnership of good quality to be established.

EUROCITIES' URBAN-EU-CHINA project has documented the city-to-city partnership efforts between European and Chinese cities and presented them in a systematic way. This has helped, on one hand, cities that already work in Europe-China cooperation for sustainable urbanization to achieve more and better results. On the other hand, it has helped cities that want to create new, or expand existing, city-to-city partnerships to do so in a systematic and efficient way (UEC, 2017). A comprehensive list of challenges that cities face when working to establish partnerships has been compiled by the project using European and Chinese cities as its starting point (UEC, 2018):

- Language barriers;

- Business culture and practices gap;

- More often than not there are incomparable structural contexts/situations (e.g. city size, development dynamics, demographic changes);

- Differences in political systems, power and administration structures, decision-making and endorsement processes;

- Differences in time management and design and implementation timelines;

- Long distance between partnering cities requiring costly and time-consuming travel;

- Lack of staff and resources dedicated to long-term international cooperation, especially when benefits are not tangible or do not come quickly;

- Frequent criticism from the local press for the resources invested in international activities instead of addressing local needs;

- The need to be always up-to-date about (political, economic, social, regulatory) changes and developments;

- It is very difficult to follow or be aware of changes in key staff/personnel that may result in unexpected shut-downs of communication channels or stalled implementation of projects;

- Political cycles (both for elected and appointed officials) may create periods of inactivity or indifference to international relations;

- Difficulty in identifying proper joint projects;

- City-to-city partnerships are slow in bringing the first, concrete results. In this frame, it is difficult to handle expectations, limited resources and/or pressure from stakeholders;

- Some cities wait for their counterpart to take all the initiative or bring all the ideas and expertise. Or one of the counterparts feels that there is an uneven or unbalanced flow of knowledge or resources;

- Lack of reliable partners or lack of direct contact with the counterpart city, all communication is made through third-parties, for example a consultancy or a national agency;

- Lack of adequate or suitable organizations/institutions that can work for and represent a city's interests in the other city's country;

- Local governments cannot always communicate, work with or understand and represent the objectives of all their local triple/quadruple helix stakeholders;

- Differences in the size, priorities, working rationale, result measurement, and/or the capital structure of companies that work with/for cities in the two countries;

- Difficulties involving cities from one country in state-funded projects of the other country and vice versa;

- Lack of reliable, jointly created platforms that facilitate bilateral exchanges.

A strategy for successful partnerships

Successful partnerships between cities come as the result of a structured and well-defined approach. The URBAN-EU-CHINA project looked at the steps taken by the most successful city-to-city partnerships between Europe and China. By using questionnaires and interviews with city practitioners, a pattern of cooperation emerged and a simple flow of four steps that increases the probability of successful city-to-city cooperation was identified (UEC, 2018).

"Prepare to go out"

↓

"Find the partner"

↓

"Make it happen"

↓

"Build on it"

Figure 3: Overview of cooperation between cities (Source: UEC, 2018)

Table 1: The overview of cooperation between cities explained

Step of cooperation	What?	Where?	Key role of the city
Prepare to go out	A city designs its strategy and decides that it needs to create international partnerships to reach its objectives. In parallel, the local government establishes or participates in local partnerships with stakeholders, ideally in the form of a triple or quadruple helix. The local government (politicians) and the local ecosystem (helix) commit to the objectives.	Mainly local actions	Planner/ Convenor
Find the partner	The city, either the local government or an ecosystem, selects and creates an international partnership with a city and its ecosystem abroad. For the partnership to move forward, joint objectives and action plans of activities must be compiled and agreed upon.	Mainly international actions	Facilitator
Make it happen	The activities and projects agreed upon are implemented and their results are monitored and evaluated. The partner-cities and stakeholders re-visit the initial objectives and action plans and new targets for their cooperation are set.	Both local and international actions	Enabler
Build on it	Both cities try to take advantage of the results of their international projects and activities, either by scaling up or by replicating.	Mainly local actions	Facilitator

In this overview, a vital factor of success lies with the ability of cities to make smart decisions when selecting counterpart cities that they want to cooperate with to develop new activities and projects. The URBAN-EU-CHINA project has proposed a set of selection criteria that cities or stakeholders that belong to those cities' ecosystems can

use to determine a well matching city to work with. Equivalently, the set of criteria can be used as a roadmap of steps that cities (or organizations and entities) need to take when they embark on city-to-city partnerships.
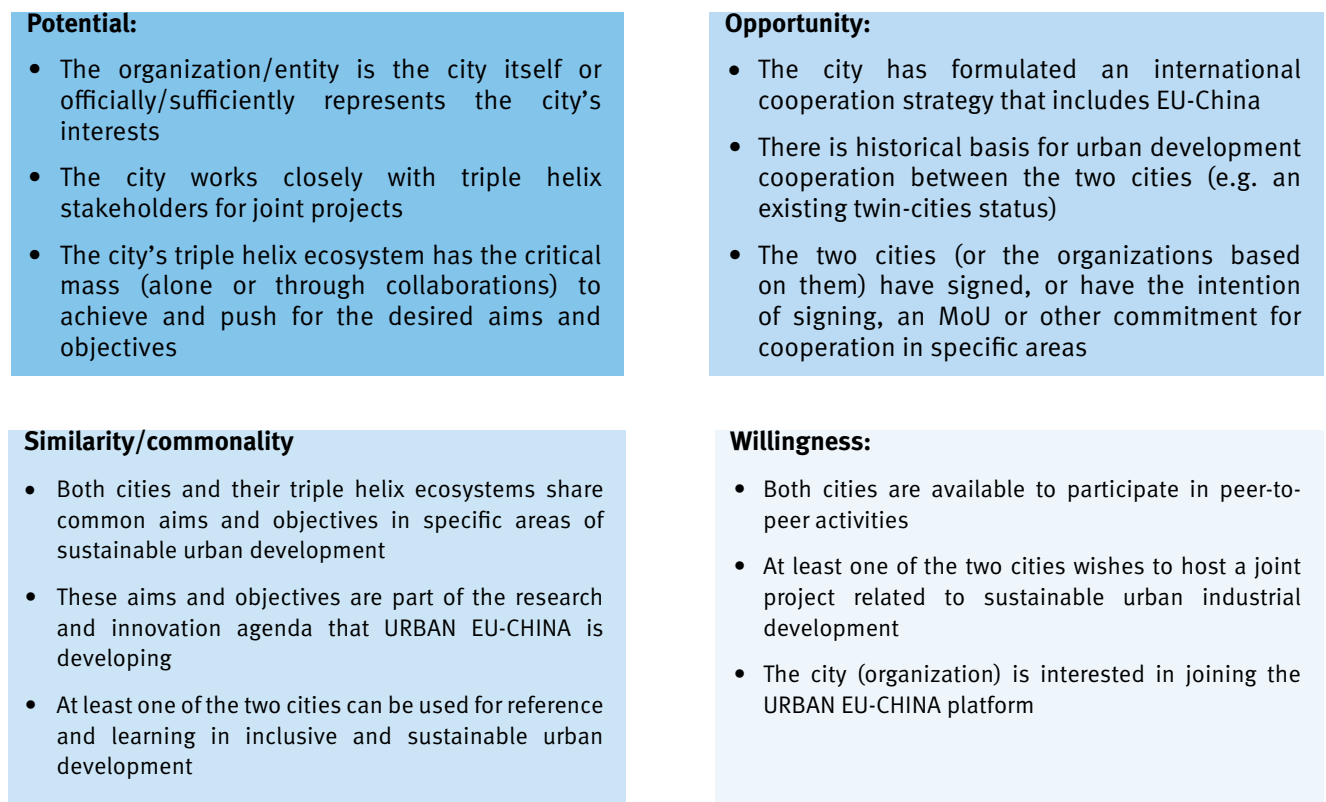
Potential:
- The organization/entity is the city itself or officially/sufficiently represents the city's interests
- The city works closely with triple helix stakeholders for joint projects
- The city's triple helix ecosystem has the critical mass (alone or through collaborations) to achieve and push for the desired aims and objectives

Opportunity:
- The city has formulated an international cooperation strategy that includes EU-China
- There is historical basis for urban development cooperation between the two cities (e.g. an existing twin-cities status)
- The two cities (or the organizations based on them) have signed, or have the intention of signing, an MoU or other commitment for cooperation in specific areas

Similarity/commonality
- Both cities and their triple helix ecosystems share common aims and objectives in specific areas of sustainable urban development
- These aims and objectives are part of the research and innovation agenda that URBAN EU-CHINA is developing
- At least one of the two cities can be used for reference and learning in inclusive and sustainable urban development

Willingness:
- Both cities are available to participate in peer-to-peer activities
- At least one of the two cities wishes to host a joint project related to sustainable urban industrial development
- The city (organization) is interested in joining the URBAN EU-CHINA platform

Figure 4: How can we select the city to work with? (Source: UEC, 2019)

Different cities can select different sets of selection criteria if it more closely correlates to their context and way of working. Many cities indicate that, at the phase of initial discussions, they weigh heavily the complementarity of interests for areas of joint work to pick a partner city and start exploring possible collaboration. Finally, often the selection of a partner city comes as a result or an update of an existing and well-functioning partnership between peer stakeholders of the cities' ecosystems, e.g. a long-standing university-to-university collaboration.

The elephant in the room, when it comes to the selection process and criteria, is the role national governments can play in city-to-city cooperation. It is common for cities to start working together as a result of official visits (e.g. at the level of heads of state) or of bilateral discussions for collaboration at the state level that are eventually realized via twinning of cities, joint university programmes, or systematic industrial cooperation.

Starting from the overview of cooperation and considering all the challenges that cities face, a more detailed cooperation narrative can be proposed, a path that cities should follow to build sustainable, efficient and beneficial city-to-city partnerships (UEC, 2019).
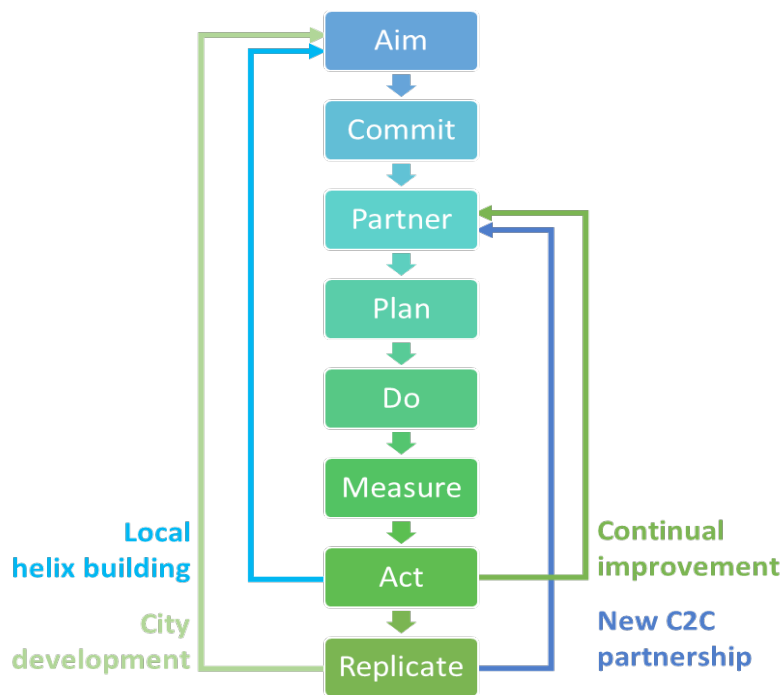
Figure 5: A detailed cooperation narrative between for city-to-city partnerships (Source: UEC, 2019)

At the top level the cooperation narrative consists of eight components:

1. Aim: What is the aim of our international partnerships? Which challenges do we want to address and what opportunities do we see? What local partners and stakeholders will participate?
2. Commit: How are we going to meet the aim and objectives we set? What resources can, and are, we going to use? What is the role and contribution of each involved stakeholder? Do we have the necessary political and/or high-level commitments?
3. Partner: How can we identify suitable and matching counterparts? How can we initiate discussions and reach a strategic agreement?
4. Plan: What are the appropriate plans and roadmaps to reach the objectives agreed? How do we keep all relevant stakeholders involved?
5. Do: How do we implement the plans and deliver the desired objectives and targets?
6. Measure: Is this a successful partnership? Are the joint activities delivering to the involved cities?
7. Act: How can we adjust our partnership and action plans in order to meet the targets – previous, updated or new?
8. Replicate: What are the elements that can be replicated in other city-to-city partnerships? How do we mainstream these results to promote the wider objectives of the city?

Moreover, four different closed loops – or work paths – can be identified to help cities organize their work and the expected outputs in relation to different kinds of city objectives:

1. New city-to-city cooperation: The first loop relates to a city that aspires to establish new city-to-city cooperation. It presupposes a constant and well-defined city strategy, collaboration with the local ecosystem and the capacity to extract the successful elements of a previous partnership and replicate them in a new one;
2. Continual improvement: The second loop relates to the recurrent improvement of an existing partnership in order to make it more efficient or include more areas of work. It also presupposes a constant and well-defined city strategy and collaboration with the local ecosystem;
3. Local helix building: The third loop relates to the creation (and/or enhancement) of a functional and effective local triple/quadruple helix in a city that works with the local government to deliver activities and projects in the context of city-to-city cooperation;
4. City development: The fourth loop includes all eight components of the city-to-city cooperation narrative and follows the "quality management" approach of how a city uses international partnerships and projects to meet its wider targets and objectives.

Using European and Chinese cities as its starting point, the URBAN-EU-CHINA project gathered examples of how cities have built meaningful, successful and lasting international partnerships that can contribute to their sustainable development using the cooperation narrative. An overview on successful examples and ongoing projects can be found in the Annexes.

"BRIDGE for Cities" as a platform to build city-to-city partnerships

Against this backdrop, one of the main goals of the "BRIDGE for Cities" initiative is to build new or strengthen already existing city-to-city partnerships. Introduced for the third edition of the event, the case city feature is a now staple of the initiative. During the event, case cities will be matched on the basis of the theme of the event and, most importantly, on common shared challenges.

Specifically, in matching cities to each other, not only through North-North partnerships but also South-South and Triangular modalities of cooperation are pursued. Thus the exchange of knowledge, technology and expertise among the selected cities, focusing on a clearly defined set of issues and showcasing innovative solutions and approaches will be facilitated.

When referring to the eight steps of the cooperation narrative described above, collaboration between cities under the "BRIDGE for Cities" framework can be placed at different stages. Cities can be matched on the basis of already existing cooperation frameworks (e.g. sister city agreements, as in the case of Phnom Penh and Shenzhen) that did not yield enough benefits and which therefore require re-planning and implementation, or UNIDO can help cities aim for partnerships that have potential for concrete follow-ups.

Conclusions – final remarks

Sustainable urban development has been included in the global objectives for the next decades under the framework of the 2030 Agenda for Sustainable Development, partially because of the fact that more than half of the global population lives in cities and partially because many of the major challenges that humankind faces will be tackled (or lost) in cities.

Cities are recognized as the level of governance closest to the citizens, in an era where citizen participation, multilevel governance and local action are considered key factors for sustainable development at all levels from the urban to the global (EUROCITIES, 2018). Sustainable development makes sense only if we follow a model of conscious social, environmental and economic development, all at the same time.
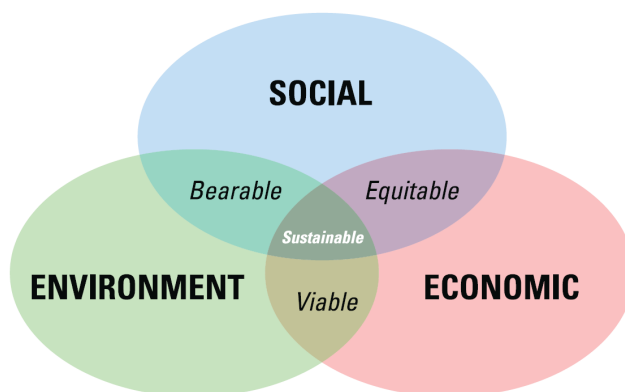

Figure 6: Sustainable Development Model (Source: UN Habitat, 2015)

In the multilevel governance approach, stakeholders and organizations from different levels can work together to propose solutions, facilitate the exchange of knowledge and exhibit good practices. "BRIDGE for Cities" serves as a perfect example of this approach; in this case for the promotion of sustainable industrial development and cooperation.

This issue paper has focused on how cities around the world can design and implement city-to-city partnerships, direct linkages between two local governments and their local ecosystems that aim for the sustainable development of both cities. Although the importance and role of international organizations and national governments cannot be neglected or underestimated, city-to-city partnerships offer some considerable advantages that cities could capitalize on:

- Better understanding of the challenges and proposed solutions between governments of the same level;
- More flexibility in designing and implementing tailor-made or small-scale projects and investments;
- Better connection to citizens and local stakeholders;

There are many challenges in building meaningful, productive and effective city-to-city partnerships. This issue paper has provided suggestions for how to build partnerships in a systematic way and overcome these challenges. Many examples and references available in the forthcoming Annexes, with a focus on sustainable industrial development, can further inspire and help cities to look at international cooperation and partnerships as an indispensable tool for their sustainable development.

ANNEX 1

Malaysia: Energy Efficiency and Low-Carbon Transport; Project 120309

Energy Efficiency and Low-Carbon Transport in Malaysia:

- The objective is to introduce and increase the widespread use of electric vehicles in order to reduce carbon emissions and increase green technology usage

- The project works on both a policy level, developing regulatory frameworks and increasing capacities, and a technical level, designing and installing EV infrastructure and encouraging local EV manufacturing

In order to assist cities with the move to e-mobility, UNIDO has implemented several projects designed to encourage and accelerate the use of electric vehicles (EVs) and implement the necessary infrastructure to support their usage. One such project is currently underway in Malaysia, specifically in the cities of Melaka, Kuala Lumpur, Putrajaya, and Cyberjaya. The Malaysian automotive industry is one of the most developed in the ASEAN region, and was the 23rd largest automotive manufacturer globally in 2018. However, it has also been the largest GHG emitting sector in Malaysia since 2009.

The objective of this project is to catalyse and accelerate widespread use of electric vehicles (EVs) as part of the energy efficient low-carbon transport and low-carbon cities initiatives of Malaysia and it hopes to contribute to the achievement of Malaysia's goal of having 10% of all vehicles being EVs by 2020. The project has two main components. The first is dedicated to policy development, capacity building, and awareness raising, and aims to develop national policies and regulations which encourage the move towards low-carbon transportation and infrastructure, alongside improving the technical and institutional capacities needed to implement these changes. The second component is the physical development of EV infrastructure, including the design and installation of at least six fast and off-grid charging stations for EVs and the encouragement of local manufacturing of EV components.

Overall the project will have numerous benefits, both environmental, such as reduction of GHG emissions and improvements in air and noise pollution in the implementing cities, and economic, creating jobs and increasing income. It also aims for long-term positive effects on urban planning by encouraging and demonstrating the inclusion of sustainable city infrastructure into planning policies.

Figure 7: Example of PV-based fast charging station for EVs

Senegal (Sustainable Cities Management Initiative for Senegal; Project 150270)

Sustainable Cities Management Initiative for Senegal:

- This initiative works to aid in the development of sustainability-focused urban planning strategies and to integrate climate risks and responses into city infrastructure

- In Senegal, this project hopes to increase cities' resilience to climate events and introduce green technologies and renewable energy projects to Diamniadio eco-industrial city and the Greater Dakar area

With industrialization rapidly increasing urban populations, sustainable city planning has become an important objective for many growing urban centres. These plans can assist local and national governments combat transport and housing crises, integrate climate resilience in infrastructure, and make cities more accessible and liveable overall. Such a plan is a priority under the Government of Senegal's program for accelerating economic growth and reducing urban poverty. Of a population of 11 million people, 57% live in cities, with a quarter of the population residing in the Great Dakar area, numbers which are expected to increase exponentially by 2050. In addition to combating the stress of an ever-growing urban population, the Sustainable Cities Management Initiative for Senegal also aims at promoting renewable energy and other sustainable technology solutions.

As a part of this project, UNIDO is committed to helping Senegal, and more specifically the Greater Dakar area and the coastal city of Saint-Louis, to develop sustainability-focused urban plans and specifically to integrate climate risks and responses into city infrastructure. Due to its location both on the Atlantic Coast and at the mouth of the Senegal River, Saint-Louis is prone to flooding and vulnerable to rising sea levels. By integrating climate risks into urban plans, the city will be able to develop resilient infrastructure moving forward. The second arm of the project focuses on introducing and increasing green technologies and industries in Greater Dakar industrial parks, through strategies such as piloting an integrated waste management system and promoting new recycling enterprises. The Diamniadio eco-industrial city will be the focus of this project, with green waste management and renewable energy projects being piloted in the area.

New cities do not have to start with carbon-intensive, waste-intensive models of city and industrial planning, but instead have the option to start with sustainable, integrated mechanisms and infrastructure. Through this project, UNIDO hopes to promote the further integration of renewable energy, waste management, and sustainable industrial practices throughout the Greater Dakar area and establish methods and programs which can be transplanted to similar locations. Additionally, by implementing these methods early on in a city's development, such as in the case of Diamniadio, this project can cut down on industrial and city-based emissions, reduce urban poverty, and improve overall living conditions in urban areas.

Figure 8: Concept plan for Diamniadio Lake City (eco-industrial city)

Barbados (Strategic platform to promote sustainable energy technology innovation, industrial development and entrepreneurship in Barbados; Project 150123)

> Strategic Platform to Promote Sustainable Energy Technology Innovation, Industrial Development, and Entrepreneurship in Barbados
>
> - Many developing countries lack private sustainable energy enterprises capable of providing products and services long-term, resulting in unstable markets, limited job opportunities, and high reliance on fossil fuels
>
> - This platform aims to strengthen these industries in Barbados through coherent policy and incentive frameworks as well as increased investment in and promotion of sustainable technology companies

In many developing companies, private sustainable energy enterprises lack the ability to provide their products under competitive prices in the domestic markets. As such, these enterprises often operate on an ad-hoc basis, and are ultimately unsustainable for the long-term. They also contribute little to the economy in areas such as domestic value added and job creation. As a small-island developing state, Barbados faces this barrier and many others to the development of a domestic renewable energy industry. At the moment, approximately 90% of the electricity produced in Barbados is generated from imported fossil fuels, which not only contributes to environmental degradation but also negatively affects the domestic economy and raises concerns about energy security. Heavy reliance on fossil fuel imports also makes the economy highly vulnerable to price shocks. Considering this, UNIDO has implemented a project with the goal of reducing GHG emissions and increasing domestic value creation by strengthening the sustainable and renewable energy and climate technology manufacturing and servicing industries in Barbados.

This project takes a two-pronged approach to increasing innovation and industry-level development. First, they are working on enhancing opportunities for businesses in these fields through coherent policy, regulatory and incentive frameworks, and improved public-private coordination. Outputs such as a dialogue platform for the promotion of sustainable energy and climate innovation, entrepreneurship, and industrial development open the domestic markets to the possibilities of sustainable energy technology, and make it easier and less risky for businesses to enter the industry. Secondly, they are aiming to directly increase investment and promotion of sustainable technology companies and enterprises, specifically looking at technology areas with high emissions reduction and value creation potential.

Enhanced innovation and implementation capacities will directly contribute to an overall reduction in harmful industry emissions and decrease Barbados' reliance on imported energy sources and fossil fuels. In addition, it will improve the economy, creating jobs and increasing value added from domestic manufacturing and servicing. Barbados will be able to reduce their GHG emissions and increase their share of green technologies in order to work towards full achievement of the related SDGs, while also securing their economy from price shocks.
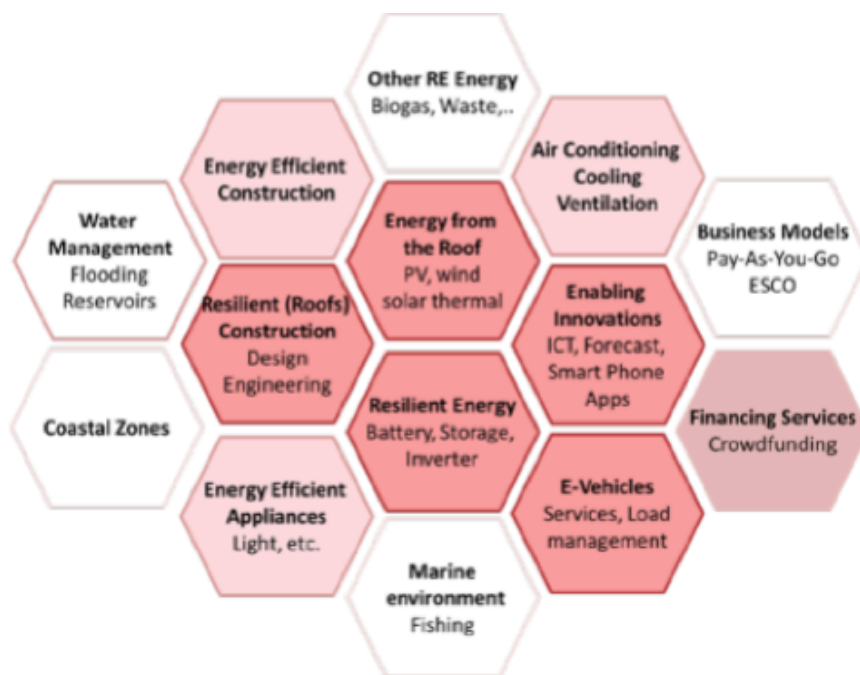

Figure 9: Graphic showing priority technological development sectors for Barbados

India (Sustainable cities, integrated approach pilot in India; Project 150312)

> Sustainable Cities: Integrated Approach Pilot in India:
>
> - Another project under 'Sustainable Cities', the pilot project in India hopes to lessen the negative effects of rapid urbanization through sustainable urban planning strategies
>
> - This project combines the introduction of sustainable city planning and the development of renewable energy solutions with a partnership component in order to raise awareness of green technologies and promote the 'Sustainable Cities' program

As one of the fastest growing populations and fastest growing economies in the world, India faces the challenges of industrialization and urbanization on a massive scale. In an effort to address these challenges, UNIDO is implementing a Sustainable Cities project in five cities: Jaipur, Mysore, Vijayawada, Guntur, and Bhopal. According to the 2011 Population Census, 2774 new towns appeared in the immediate proximity of India's metropolis in the previous decade. This rapid migration overwhelmed infrastructure development, resulting in roads, water and sewage systems, electricity, and other services being unavailable or unreliable in many new urban areas. The necessity of private vehicle ownership in addition to industrial outputs has resulted in many Indian cities topping the WHO rankings on poor air quality. The aim of this project is to integrate sustainability strategies into urban planning and management in order to reduce many of the negative effects of rapid urbanization and improve quality of life, as well as to encourage investment in infrastructure and services.

This project has both a policy and a development and demonstration aspect, with the addition of a specific component dedicated to the development of partnerships for the "Sustainable Cities" programme. The policy component aims to increase the scope and depth of integrated sustainable management policies in city planning in hopes of mitigating future challenges for expanding cities. The development aspect details specific investment projects based on the industry and development situation of each of the project cities, incorporating low-emission and renewable energy technologies as well as innovative waste-to-energy strategies to combat already existing problems and ultimately reduce environmental degradation and GHG emissions. Finally, the partnerships aspect hopes to link both cities within India and Indian cities with external networks in order to promote the "Sustainable Cities" programme and increase awareness of sustainable technology solutions.

The majority of the environmental problems faced by cities result from unplanned development, and therefore can be mitigated through sustainable, renewable energy-based city planning strategies. It is expected that half of India's population will live in urban areas by 2030, and with a projected population of 1.5 billion, it is of the utmost priority to introduce sustainable urban planning strategies into Indian cities sooner rather than later.

Figure 10: Illustration of the proposed integration of 'Sustainable Cities' in India

South Africa (Energy Efficient and Low-Carbon Transport in South Africa; Project 130281)

Energy Efficient and Low-Carbon Transport in South Africa

- The goal of this project is to promote the widespread use of EVs and non-motorized transport (NMT) in order to reduce emissions, congestion and environmental pollution

- In addition to updating policies and regulations and installing EV infrastructure, this project contains an awareness raising and knowledge sharing component, to introduce the ideas of sustainable transport to other cities across South Africa

South Africa is one of the largest and most developed economies in Africa, second only to Nigeria, and has been a member of BRICS since 2011. However, along with this rapid economic growth comes growth in energy consumption and emissions. South Africa is the largest energy consumer in Africa, and dependence on coal has made the country the leading CO_2 emitter on the continent and the 13th largest in the world. The transport sector contributes to 13.1% of the country's GHG emissions, a figure that has risen 33.3% in the decade from 2000 to 2010. The automotive industry is also very important to the economy, accounting for 10% of exports, 30,000 jobs, and 7% of GDP. Given the importance of transportation and its large share of emissions, UNIDO has implemented an Energy Efficient and Low-Carbon Transport project in South Africa.

The project objective is to promote the widespread use of electric vehicles (EVs) and non-motorized transport (NMT) in two cities in South Africa, Durban and Johannesburg, and to facilitate the development of the necessary infrastructure to support low-carbon technology. The project aims to encourage the transition through the improvement of policy and regulatory frameworks, such as introducing tax incentives for low-carbon technology usage and drafting safety guidelines for cyclists, in addition to the direct promotion of environmentally friendly transport technologies and installation of examples of e-mobility infrastructure, including two fast, off-line charging stations. An important component of awareness raising and promotion of green technology is the sharing of experiences from Durban and Johannesburg with nine other South African cities.

Considering the large impact transportation and the automotive sector has on carbon and GHG emissions in South Africa, the promotion of low-carbon and non-motorized transport has the ability to drastically reduce harmful effects and improve air quality in the target cities. Additionally, the inclusion of knowledge and experience sharing within the project objectives facilitates ease of transfer of this project to other locations within South Africa, to further reduce emissions and improve the carbon footprint of the country.
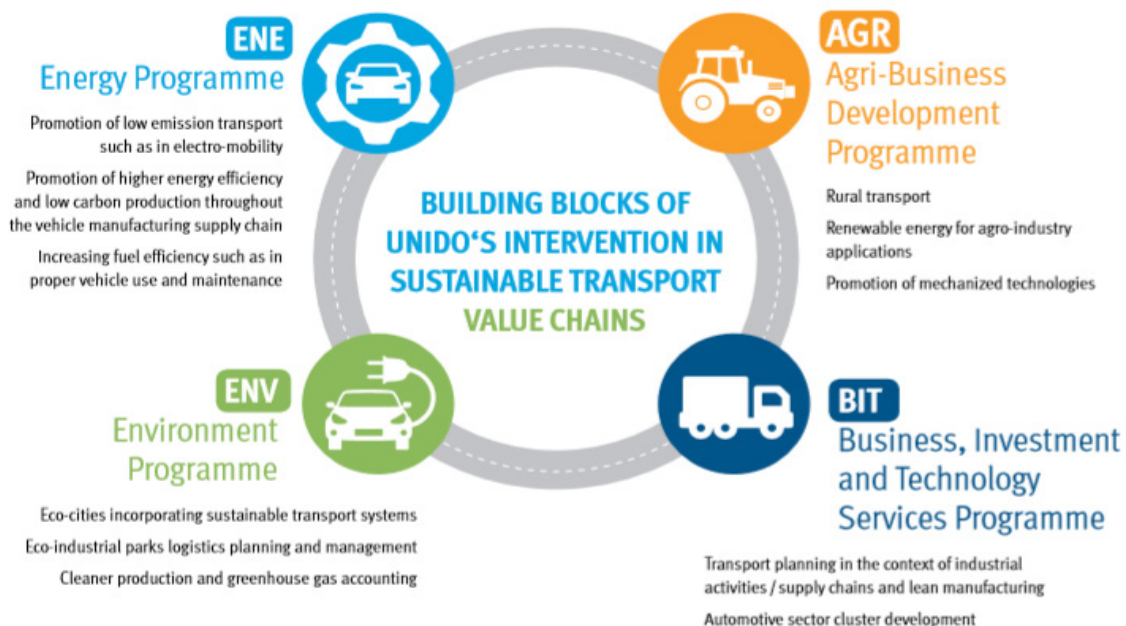

Figure 11: Graphic showing UNIDO's approach to e-mobility promotion

China (Integrated Adoption of New Energy Vehicles; Project 150157)

Integrated Adoption of New Energy Vehicles in China

- The objective of the project is to facilitate and scale up the integrated development of New Energy Vehicles (NEVs) and Renewable Energy (RE) in China.

- This project has four components: policies and programmes, institutional capacity building, piloting technical measures, and aware raising, and engages in actions such as technology demonstration and exchange and promotion of NEV technology among manufacturers, suppliers, and consumers.

The transport sector is one of the largest global contributors to air, water, and environmental pollution and GHG emissions, which is why UNIDO has implemented numerous projects that work to introduce and improve the development and usage of New Energy Vehicles (NEVs), as well as promote the switch the renewable energy resources. China is the largest vehicle sales market in the world, with 150 million cars owned in 2014, a number which has been steadily increasing. With this in mind, China selected NEVs as one of the top ten key development fields in 2015.

In order to cut emissions, UNIDO has collaborated on the 'Integrated Adoption of New Energy Vehicles in China' project, which aims to both facilitate and scale up the integrated development of these vehicles as well as to engage in capacity building and awareness raising. The project is based in two cities, Yancheng and Shanghai, who are each piloting a specific aspect of the project. In Yancheng, the project has introduced 520 smart charging devices for EVs as well as a storage system for EV batteries and 10 mobile charging stations as part of the technology innovation subsection of the program. In Shanghai, the project oversaw the expansion of a business model for car sharing from the pilot group of 800 vehicles to 2,000 vehicles along with the development of the 200 pure electric buses service. In addition to the physical infrastructure development aspects, the project also engaged in capacity building measures, to improve policy-making in regards to NEVs, and facilitated awareness raising amongst manufacturers, suppliers, and consumers.

With such a large population and the corresponding number of car owners, even a slow switch to renewable energy and NEVs would result in a large decrease in GHG emissions and a vast improvement in air, water, and environmental quality.

Figure 12: (Source: https://twitter.com/cbmdcsd/ status/1039469531381555200?lang=en)

ANNEX 2

Aim: Connecting the city development to internationalization

Manchester, UK

In July 2017, leaders from across the public and private sector joined together for the official launch of the Greater Manchester Internationalisation Strategy, a three-year framework for action that aims to take the city-region to the global scale. The strategy identifies eight key priorities which frame the region's ambitions, as well as a number of areas where there is an opportunity to work collectively with the local business community within the target markets identified.

**Figure 13: The Greater Manchester Internationalisation Strategy 2017-2020
(Source: Greater Manchester, 2017)**

Commit: The importance of political commitment

Gothenburg (Sweden) – Shanghai (China)

When it comes to Europe-China city-to-city partnerships, a local government can be seen as an enabler or facilitator. In many cases the city can have a more active role and act as a coordinator. Many business-to-business or university-to-university partnerships could have been possible without the involvement of the city but "sanctioning" a partnership at the highest political level can be a catalyst. For example, while the University of Gothenburg has many MoU's with other universities, its collaboration with the University of Shanghai bloomed after the two cities signed their first MoU, including academic collaboration as an area of work.

Partner: Selecting a first priority

Bradford (Leeds City Region, UK) – Qingdao

According to both cities' experts, signing a city-to-city MoU is always a good start. The MoU should be ad-hoc, based on specific common needs and priorities, and neither too ambitious nor too vague.

The local economic partnerships and the project that they identify can be the starting point. As an example, Bradford City Council (part of Leeds City Region) and the district of Qingdao, where the city's creative industries are centred, signed a MoU regarding cooperation with the Bradford film industry. In 2017, Qingdao was included in the list of UNESCO cities of film.

Plan: Planning the joint activities

Wuhan (China) – Manchester (UK)

In February 2018, the two cities agreed on an Action Plan that defined a set of priorities, activities and the timeline of their execution (see also in Annex: Examples from city-to-city partnerships). The Plan defines seven areas of cooperation between the two cities and the timeline of cooperation for 2018.

To better prepare the Action Plan, the two cities commissioned a joint study to "identify areas for future collaboration between Manchester and Wuhan in the context of the wider collaboration between the Northern Powerhouse and the Middle Reaches of the Yangtze River".

Do: Delivering the partnership's objectives

Changzhou (China) – Essen (Germany)

Some highlights of the cooperation of the two cities include:

- Changzhou Science, Technology and Economy Development Center (CTEDC) which was built in Essen and opened in October 2014 as an important window for international cooperation and business expansion of Changzhou and the wider Yangtze River Delta;

- Both parties are making a joint effort in cultivating talents under "The Dual System". The Sino-German Innovation Park is cooperating with Germany on vocational education regarding "teachers training, school-enterprise cooperation, joint research, and certification system". "Changzhou Sino-German Education and Training Center" and "AHK R&D Center at Changzhou Science and Education Town" have been established;

- Based on the cooperation projects signed during the 2013 EU-China Urbanization Partnership Forum, the deputy mayor of Changzhou and the mayor of Essen signed the Strategic Agreement on Further Deepening Comprehensive Cooperation between Changzhou and Essen at the 2015 EU-China Urbanization Partnership Forum;

- In October 2015, the project introduced in the "Sino-German Innovation Park", the cooperation project between KZA, Germany and China Design Group on new-type urbanization design, was signed in the presence of Chinese premier Li Keqiang and the Chancellor of Germany Angela Merkel.

Measure: An indicative and non-exhaustive list of qualitative and quantitative indicators that have been used by different cities to measure EU-China, city-to-city cooperation

- Number of high-level visits or delegations that were received in our city
- Participation of partner city in key events that take place in our city
- Number (and volume) of direct flights/shipping routes/railroads between the two cities
- Number/volume/value of joint projects
- Volume of FDI to our city
- Volume of investment to the partner city coming from our city
- Volume of trade between the two cities/regions/countries
- Number of companies from our city starting business in the partner city
- Number of companies from the partner city starting business in our city
- Number of foreign visitors and tourists we have attracted to our city
- Number of exchanges between non-commercial organizations (sport, culture, youth, public, education, etc.)
- Joint academic activities (joint programmes/degrees, exchanges of academic staff and students, etc.)
- Number of foreign students we have attracted to our city
- Joint scientific output (number of publications/patents, value of joint research, etc.)
- Quality of the partnership and of its values
- New knowledge acquired through the partnership
- Reputation of our city in the partner city/country
- Volume of publicity that our partnership's activities obtain

Act: Aligning to the current priorities

Gothenburg (Sweden) – Shanghai (China)

A MoU of cooperation between two cities is a high-level written commitment that rarely goes into specific details of activities and implementation. Still, the evolution and alignment of city-to-city partnerships to contemporary conditions is visible in how the MoU between Gothenburg and Shanghai has evolved. The 2013 and 2017 versions of the MoU between the two cities can be found in Annex: Examples from city-to-city partnerships.

Replicate: Success stories and accomplishments in more ways than originally planned

One of the aspects of effective governance is the ability to identify the elements that contributed to the success of an activity or project and use them to replicate this success in similar locations. In the frame of city-to-city cooperation this can be read in at least three different ways:

A city learns from the good examples of other cities and this transfer of knowledge helps to better design and implement future activities;

A city exhibits its good examples and offers knowledge to other cities so that the latter can improve their future activities and projects;

A city identifies the success factors of a good partnership and uses them to create more successful partnerships.

New city-to-city cooperation loop: Learning from previous experiences

UK cities

In 2016, the UK Government's Foresight Future of Cities Project released a report to help UK cities improve on or start with their city-to-city partnerships with Chinese cities. The report built on a literature review as well as interviews with local officials, university representatives, LEPs and regional stakeholder organizations. In total, stakeholders from 11 different UK cities took part and explained their good practices and the challenges of their work with Chinese cities.

Figure 14: (Source: UK Gov, 2016)

Continual improvement loop: Continual improvement in practice

Gothenburg (Sweden) – Shanghai (China)

Figure 14: Mayors of Gothenburg and Shanghai sign the latest MoU between the two cities (Source: Shanghai City Hall)

The two cities are working together based on a MoU that they first signed 16-17 years ago, which is renewed every 3 years. In May 2017, a high-level delegation of Gothenburg visited Shanghai for the signing of the latest MoU.

The political level is involved every three years in the preparation and signing of each update of the MoU with Shanghai. The typical flow of this work is:

(i)   The two cities prepare and sign the updated MoU à

(ii)   Each city prepares an Action Plan à

(iii)   Each city implements the local Action Plan à

(iv)   Results and proposals for new priorities and areas of work are evaluated, and the next version of the MoU is prepared.

Local helix building loop: Evolving the involvement of the local ecosystem

Leeds (UK)

City of Leeds has created different local partnerships when it comes to working with China. In 2013, Leeds created a 'China Task Group' that met to coordinate ahead of visits and relevant events. This led to the creation of the 'Leeds China Business Forum' which works to attract Chinese investment in Leeds and to promote trade with China. Leeds also works with the 'China British Business Council' and a number of local economic or cultural partners, including museums and libraries.

City development loop: Taking advantage of the high-level policies

Foshan (China)

For many years, Germany and China have been cooperating in the area of climate-friendly and sustainable urban development. Against this backdrop, they agreed the Sino-German Urbanisation Partnership in 2015. Part of this partnership is a close exchange with the Industrial City Alliance. Since 2016, the alliance has been supporting the economic growth of nine German and 16 Chinese industrial cities through the use of modern and sustainable industries, by seeking innovative solutions through research and development and promoting industrial services.

Foshan has taken full advantage of this high-level framework to promote a number of objectives:

- The cooperation between Deutsche Messe and GICEC (Guangdong International Convention and Exhibition Center);
- Midea Group's M&A of KUKA Group;
- The cooperation between Robotation Academy in Hannover and GICEC;
- Fraunhofer-Gesellschaft set up an office in Foshan;
- The cooperation between RWTH Aachen University and Shunde Polytechnic.

In addition, in 2014 Foshan and Ingolstadt became twin cities. Ingolstadt holds the headquarters of Audi and Foshan is where the Chinese-German joint venture FAW-VW, which consists of the Chinese First Automobile Works (FAW), VW and Audi, opened its new car plant in September 2013.

In addition to economic cooperation there is also an exchange between Ingolstadt and Foshan in the areas of medicine, science and education. Foshan University and Ingolstadt University of Applied Sciences also signed an MOU.

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