



TRANS-URBAN-EU-CHINA

Transition towards urban sustainability through socially integrative cities in the EU and in China

Deliverable

D5.2 Report on the Living Lab knowledge base

WP 5 Living Labs, exploitation and dissemination

Task 5.1 Living labs



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EXECUTIVE SUMMARY

The TRANS-URBAN-EU-CHINA project will create environmentally friendly, financially viable transition pathways towards socially integrative cities, for urban expansion as well as urban renewal. The transition approaches will be co-created and tested in Chinese Living Labs, and their relevance will be discussed with 60 Reference Cities. A Living Lab (European Network of Living Labs, 2018a) typically fuses real life and experimental research and is enabled by public-private partnerships in which businesses, researchers, authorities, and citizens work together for the creation, validation, and testing of new services, business ideas, and technologies. Innovation occurs in the integration between different disciplines and sectors, with the researchers as participants in the entire process from the definition of goals, through the design, and finally in evaluating the processes and the physical results in operation (Meistad, 2015).

In TRANS-URBAN-EU-CHINA, the Living Labs will serve as innovation hubs for co-creation between project partners and local stakeholders, in particular urban authorities, real estate developers, public service providers and citizens. They will be used to test, evaluate and optimise the real-life performance of the solutions developed in WPs 1-4, to learn, inspire and disseminate project knowledge. Thereafter, this report on the Living Lab Knowledge Base will be input into the online compendium in WP6.

To achieve such objectives, the TRANS-URBAN-EU-CHINA partners co-created a list of success criteria and potential pitfalls for the Living Labs in spring 2018, based on their collective previous experiences in China and Europe. These criteria and related questions were further discussed and elaborated during the TRANS-URBAN-EU-CHINA Urban Living Labs Workshop in Beijing in September 2018. Based on these criteria, four potential Living Labs were identified, each with at least one Chinese partner as main contact: Tianjin (CCUD), Wuhan (CAS), and Jingdezhen and Xiong'an (CAUPD). Based on initial meetings with the corresponding Chinese partners, each Work Package and Task made a preliminary selection of at least one Living Lab with which they would like to cooperate during the TRANS-URBAN-EU-CHINA project period. In addition, each Work Package and Task will work with the Xiong'an Living Lab as an opportunity to inform urban expansion. This information was brought forward to the local authorities and decision makers in each of the potential Living Labs, and the cooperation potential discussed and detailed. Based on these dialogues, a set of recommendations for each Work Package or Task is described in this report.

TRANS-URBAN-EU-CHINA partner meetings in autumn 2019 and spring 2020 will be held in two of the Living Labs, in Jingdezhen and Wuhan, respectively. In cooperation with the local authorities, activities will be scheduled, back-to-back with the partner meeting. The Living Lab activities will gather TRANS-URBAN-EU-CHINA as well as local experts to investigate transformation strategies to make a specific neighbourhood more socially integrative, in cooperation with local citizens, authorities and other stakeholders. In preparation of the Living Lab meetings, the responsible TRANS-URBAN-EU-CHINA partners will perform mapping of local community stakeholders as well as urban decision makers that need to be involved in the living lab, discuss appropriate governance models for interaction and decision-making between TRANS-URBAN-EU-CHINA partners and the local authorities, and set realistic targets for each living lab.

Similar activities will be organised in Tianjin in cooperation with CCUD and local authorities, back-to-back with the annual China-EU Sustainable Development Forum. TRANS-URBAN-EU-CHINA partners may engage in advising the development of the Xiong'an area when appropriate according to the corresponding planning process.

1. METHODOLOGY

This report has been developed based on in-depth desktop studies, outcomes of partner meetings and workshops, and information shared by Chinese and European stakeholders and invited speakers at events. The different methods for data collection and analysis from WPs 1-4 have been used to ensure a solid basis for the report.

Good practice examples of urban living labs, and socially integrative city and neighbourhood developments from Europe and China, i.e. frontrunners of urban sustainability transitions, have been chosen, documented and analysed for mechanisms and measures to support and accelerate urban sustainability transitions and urban transformative capacity. The examples were chosen through review of scientific articles on the subject, reports from earlier and ongoing Living Lab projects and web-searches on Google.com and Baidu.com.

The criteria for living labs developed by the project, and presented in this report, are based on review of existing living labs and information from meetings with stakeholders, project meetings, information shared by invited speakers from China and Europe and workshops. Amongst TRANS-URBAN-EU-CHINA targets are to engage with local stakeholders, and meetings with local authorities and industry in the Chinese cities chosen as hosts for the TRANS-URBAN-EU-CHINA Urban Living Labs, contribute to this target. Based on the goals and strategies of the local stakeholders and the scope of TRANS-URBAN-EU-CHINA, priorities have been and are being identified for each of the host cities, and potential next steps have been discussed.

Participatory research uses a spiral process, and alternates between information gathering, analysis of compiled information, and critical reflection, continuously refining methods, data and interpretation in light of the knowledge developed.

2. SUCCESS CRITERIA FOR LIVING LABS IN EU AND CHINA

2.1 CITIES AS LIVING LABS

What are *Living Labs*, and how are they different from e.g. *Testbeds*? There is no uniform definition of living labs, but a living lab typically turns users, traditionally seen as observed subjects for testing, into contributors to the co-creation and exploration of emerging ideas, breakthrough scenarios and innovative concepts. Tracing the roots of the concept of living laboratories, including an element of public involvement, one finds the expression used in the United States since the early 1990s (Leminen et al., 2017).

According to the European Network of Living Labs (ENoLL), which was founded in 2006, “Living Labs (LLs) are defined as user-centred, open innovation ecosystems based on a systematic user co-creation approach, integrating research and innovation processes in real life communities and settings. LLs are both practice-driven organisations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas where both open innovation and user innovation processes can be studied and subject to experiments and where new solutions are developed. LLs operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. LLs have common elements but multiple different implementations” (European Network of Living Labs, 2018b). An overview by Voytenko and others (2016 p. 46) shows that European living labs for sustainability and low carbon cities display “different goals and ways of working, they are initiated by various actors, and they form different types of partnerships”.

Urban Living Labs can change the way in which people think of urban planning and development. Urban living labs are arenas for innovation and transformation while providing test grounds in a real-world environment. They can play an essential role in developing new urban solutions. They are a place and mode for experiments for multiple stakeholders and on suitable scales. In the JPI Urban Europe Strategic Research and Innovation Agenda (2015 p. 59) an urban living lab is defined as “A forum for innovation, applied to the development of new products, systems, services, and processes in an urban area; employing working methods to integrate people into the entire development process as users and co-creators to explore, examine, experiment, test and evaluate new ideas, scenarios, processes, systems, concepts and creative solutions in complex and everyday contexts”. Similar definitions and scopes have been described by, amongst others (Voytenko et al., 2016; Santonen et al., 2017).

2.2 URBAN LIVING LABS IN EUROPE

Urban living labs have been implemented in cities across Europe, addressing perspectives such as urban governance, water management, e-participation, mobility management and stakeholder involvement, amongst others (JPI URBAN EUROPE, 2017). The European Network of Living Labs (ENoLL), which was founded in 2006, and has since its formation labelled close to 450 living labs in Europe (European Network of Living Labs, 2018c). Of the 73 JPI Urban Europe funded projects funded until October 2018, almost half apply the Urban Living Lab approach (Riegler, 2018). Several of these projects have investigated the urban living labs approach, mapped existing urban living labs and created new insights on what urban living labs are, when they can be applied and how they can be used. Insights from these projects have been transferred into reports, handbooks, games and a prototype inspiration kit for urban lab practitioners (JPI URBAN EUROPE, 2017).

This section presents a selection of Urban Living Labs in Europe that may serve as inspiration for TRANS-URBAN-EU-CHINA. The overview was obtained based on desktop research as well as a workshop on “Urban Living Labs: Testing Grounds for Urban Innovation and Transformation” co-organised with JPI Urban Europe in Beijing on 4 September 2018.

ENoLL (2006-)

Founded in November 2006 under the auspices of the Finnish European Presidency, the European Network of Living Labs (ENoLL) is the international federation of benchmarked Living Labs in Europe and worldwide (European Network of Living Labs, 2018c).

“The European approach to Living Labs was created in the Unit “Collaborative working environments” of the DG INFSO (now DG CONNECT) in close collaboration with an industrial advisory group on Open Innovation (Open Innovation Strategy and Policy group – OISPG) which was founded by Bror Salmelin of DG CONNECT. The original concept was updated to open innovation environments attracting inwards investment, both intellectual and financial one” (European Network of Living Labs, 2018c).

Today, ENoLL has over 150 active Living Labs members worldwide, including active members in 20 out of the 28 EU Member States, as well as activities in six continents. They provide co-creation, user engagement, test and experimentation facilities targeting innovation in many different sectors (European Network of Living Labs, 2018c).

ENoLL has developed a set of evaluation criteria for approval of living labs within its organisation. It is expected that candidates fulfil at least 80% of the required categories. When checking this, evaluators look at the balance of criteria in comparison with the lifecycle phase of the living lab operations (Eschenbächer et al., 2010 p. 36):

- “Evidence of co-created values from research, development and innovation
- Values / Services offered / provided to LL actors
- Measures to involve users
- Reality of usage contexts, where the LL runs its operations
- User-centricity within the entire service process
- Full product lifecycle support – capability and maturity
- LL covers several entities within value chain(s)
- Quality of user-driven innovation methods and tools
- Availability of required technology and/or test beds
- Evidence of expertise gained from the LL operations
- Level of own commitment to open innovation process
- IPR principles supporting capability and openness
- Openness towards new partners and investors
- Business-citizens-government partnerships – strength and maturity
- Organization of LL governance, management and operations
- Business model for LL sustainability
- Interest and capacity to be active in EU innovation system
- International networking experience and capability
- Channels (web, etc.) supporting public visibility and interaction
- People / Positions dedicated to LL management and operations”

URB@Exp (funded by JPI UE, 2014-2017)

The URB@Exp project reviewed experiences with urban labs and new forms of urban governance and city development, and conducted action research in urban labs in five European cities: Antwerp (B), Graz and Leoben (A), Maastricht (NL) and Malmö (S) (JPI URBAN EUROPE, 2016). This information was synthesized in the report *Guidelines for Urban Labs* (Scholl et al., 2017), showcasing a transdisciplinary approach cutting across various disciplines and domains, similar to the cross-cutting perspectives found in many urban labs.

The URB@Exp project identified the following success factors for urban living labs (Scholl et al., 2017 p. 99-100):

- “Allowing and facilitating people to participate: Urban labs allow people to become involved in lab activities via a clear single point of contact. The active management of stakeholder networks is central to running a lab.
- Maintaining a good level of activity/dynamics and moderating discussions across media: This generally requires a community manager working across the board of the lab’s activities.
- Ensuring clarity about who is responsible for which activity: This is crucial especially when responsibilities are shared across multiple people or organizations.
- Communicating within and about urban labs: This is key to their success, yet the capacity needed to ensure both quantity and quality of communication is often underestimated. Communication contributes to and reflects the identity and branding of a lab.
- Aggregating and creating knowledge: Urban labs tend to generate a lot of valuable knowledge about societal dynamics, which needs to be captured and translated in such a way that others within and beyond the lab can use it to their benefit.
- Learning and knowledge exchange: Urban labs require explicit attention for capturing, structuring and feeding key learnings back into the operations of the lab. Within URB@Exp, the Antwerp City lab has worked with a ‘neutral’ knowledge centre (university department) to guide learning.
- Taking care of administration and logistics: Urban labs require quite a bit of practical support, e.g. when organizing events, inviting people, looking for venues, accommodating for different types of activities, etc.
- Providing feedback to civil servants in and around the municipal organization: Urban labs not only communicate with residents and society but also towards the municipal organization. Insights and new ways of working emerging from lab activities need to be fed back into the city administration. This requires the explicit attention of a group of people within the municipal organization, e.g. a team of civil servants brokering insights between lab and municipality. Such a team can grow into a solid support structure for the lab that assists in setting up and implementing experiments and stimulating learning processes”.

SubUrbanLab (funded by JPI UE, 2014-2016)

SubUrbanLab (2016) investigated how suburbs in less esteemed areas can be modernised and socially elevated together with the residents and other stakeholders, in order to turn these suburbs into more attractive, sustainable and economically viable urban areas. The project created six Urban Living Labs in two suburbs in Sweden and Finland (three in Alby, Sweden and three in Peltosaari, Finland) as arenas for co-creation of innovative urban solutions and a method to develop new ways of involving residents and stakeholders in an urban context. The labs included activities to examine how the residents can participate in developing the innovations that are needed, how they respond to new technologies and what is the effect of resident and stakeholder involvement on increasing the social, economic and environmental sustainability.

SubUrbanLab (2016, p. 6-9) identified the following key success factors for urban living labs:

- “Early involvement of the people
- Well-defined goals, context and expectations
- Continuous and clear communication
- Methods adapted to goals and participants
- Participants are active partners from planning and design to developing, implementing and evaluating
- To understand the context of the urban area
- To stand next to each other and look at a common goal: It is important to have clear common expectations and goals for the project among all participants. Be very open with what the involved residents and other stakeholders can influence and what can be done within the time, budget and scope of the project.
- Spend sufficient time to identify and find relevant residents and other stakeholders important for the project. Give extra attention to traditionally passive groups highly affected by the project. It is also important to understand the needs and motivations of participants.
- Listen actively and be open to the opinions of all participants. Take the viewpoints of different stakeholders into account.
- Feedback, transparency and clear and open communication are often very important to keep motivation of participants and to ensure a successful Urban Living Lab.
- Participants should see concrete results that they have been able to influence.
- Involve the residents and other stakeholders as early as possible in the process. A key feature of a successful Urban Living Lab is that the participants are active partners during the whole process – from planning and designing to developing, implementing and evaluating.
- Transparent power structures are significant – clarify the roles of all participating residents and other stakeholders as well as procedures for decision-making.
- Choose and adapt the specific methods for interaction and channels for communication based on the different participants, the area and project goals.
- Choose approaches that create a possibility and atmosphere for all relevant residents and other stakeholders to participate and express their opinion.
- Adapt the level of information, language, and vocabulary to the different involved participants and their expected comprehension of the issue”.

APRILab (funded by JPI UE, 2013-2016)

APRILab (Action oriented planning, regulation and investment dilemmas for innovative urban development in living lab experiences) aimed “to understand and to co-design how municipalities and planning offices deal with the challenges of uncertainty and economic instability in urban development (Riegler, 2013). The project adopted 6 projects in total, in Istanbul, Amsterdam, Helsinki, Copenhagen and Aalborg. It experimented with a community of practice that included housing corporations, municipal officers and private companies to study the economic, legal and design challenges of urban projects” (JPI URBAN EUROPE, 2017).

In order to achieve these goals, four universities and one municipality collaborated to gain more insight into innovation and urban planning. The project was led by the University of Amsterdam (Netherlands), with researchers from Aalto University (Finland), Aalborg University (Denmark) and Yildiz Technical University (Turkey) and the municipality of Amsterdam coordinated a series of European case studies and looked into the dilemmas met by urban planners (Riegler, 2013).

APRILab identified the following success criteria for Urban Living Labs (Voytenko et al., 2016 p. 48):

- “User-centred (i.e. the users/participants have an active role in the planning)
- Part of an urban ecosystem/city
- Supportive of open innovativeness (i.e. knowledge transfer is enabled within and beyond institutional boundaries)
- connected with the real urban environment”

Malmö Innovation Arena (financed by the city of Malmö, the European Regional Development Fund and Vinnova, 2016-2019)

The Malmö Innovation Arena (Lund University, 2016) creates and analyses developer dialogues in Malmö, testing how cities can use dialogue to overcome obstacles to urban innovation and encourage sustainable built environments.

“The Malmö Innovation Arena is a collaborative effort between government, business, the non-profit sector and academia who are working to promote innovations that can contribute to the refurbishment and development of the existing housing stock in Malmö. An important part of the project is the Sustainable City Accelerator - a meeting place where innovators from different sectors may aid in developing new solutions for sustainable urban development in cooperation with the real estate industry” (Lund University, 2016).

Malmö Innovation Arena has a clear triple-helix perspective¹, with the public, private and academic sectors as the main partners. It quickly became apparent that the platform needed to include the third sector² more clearly, as they play an important role in supporting democracy and add an alternative rationality (Scholl et al., 2017).

2.3 URBAN LIVING LABS IN CHINA

Although a newer concept in China than in the West, urban living labs are far from unknown in the country. This section provides a selection of relevant projects in China that were identified through desktop research and contributions from Chinese partner and stakeholders. While none of the projects covers the main Urban Living Lab characteristics identified in European projects, they do provide inspiration for the TRANS-URBAN-EU-CHINA Living Labs.

China Living Lab for Future Housing (China Housing Lab) (2014 - ongoing)

The China Housing Lab was established in 2014 with a mission to practice and promote a living lab innovation approach in the housing industry in China, aiming to improve people’s health and wellbeing (European Network of Living Labs, n.d). The goal of the China Housing Lab is to become a best practice dissemination centre and an innovation centre for the housing industry in China, exploring and showing how to apply the living lab approach in Chinese social, political, economic and cultural environments. The China Housing Lab is based in CITISAH, the China Industry Technology Innovation Strategic Alliance for Housing. CITISAH was founded in 2012 by the Chinese government, and is a national industry technology innovation strategic alliance focusing on housing industry with over 90 member organizations (companies 65%, research/design institutes 23%, universities 12%).

¹ The triple helix model of innovation refers to a set of interactions between academia, industry and governments, to foster economic and social development.

² Third sector organisations are organisations that are neither public sector nor private sector, i.e., voluntary and community organisations, social enterprises and co-operatives.

The China Housing Lab has organized, amongst others (European Network of Living Labs, n.d):

- Pilot projects for health and well-being, applying a living lab approach related to innovation of domestic solutions
- Living Lab tours in 2015 and 2016 in Europe and North America for learning and sharing best practice with peer labs
- Setting up a living lab facility in Beijing that is integrated into an actual real-life canteen buffet, with the goal of studying user behaviour with self-service kitchen solutions
- Planning and implementing the “Ideal Town Living Lab”, installed into an actual 30-floor residential apartment building in Ningbo, with the goal of supporting strategic innovation in future solutions for wellbeing and health
- A joint proposal for starting a state key lab for cooperative innovation for housing

According to the China Living Lab for Future Housing, the most important capabilities and characteristics for a living lab are (European Network of Living Labs, n.d):

- “A user-centred approach for understanding users, identifying user needs, designing innovative solutions and user-based iterative evaluation-redesign
- Focus on the target context of use including users, tasks and environments in generating and validating solutions
- Long-term partnership with users and all other stakeholders for cooperative innovation in real-life contexts”

Beijing City Lab (2013 - ongoing)

The Beijing City Lab (Beijing City Lab, 2018) is a research network, which is mainly dedicated to studying Beijing. Its focus lies on employing interdisciplinary methods to assess urban dynamics, generate new insights for urban planning and governance, and ultimately produce the science of urban areas needed for sustainable urban development. The lab consists of planners, architects, geographers, economists, and policy analysts which gives it a unique research strength.

The core research theme of the Beijing City Lab is the quality of living environments in “New Urbanisation Planning of China”. Their goal is to fully monitor, measure and diagnose the quality of living environments in this fast-paced period of urbanisation in China, and supply references for national decision making.

While lacking the citizen interaction element in order to qualify as an Urban Living Lab, the BCL does include certain elements that are of interest for the TRANS-URBAN-EU-CHINA Living Labs (Beijing City Lab, 2018):

- “The BCL serves as a networking platform for its research fellows and student members.
- Urban researchers are invited to use the working paper series to disseminate their findings about Beijing.
- The BCL's data-sharing scheme provides open research data about Beijing to the wider scientific community”.

MIT China Future City Lab – City Living Lab (2017 - ongoing)

In November 2017, MIT launched the China Future City Lab (MIT-CFC Lab), a new urban research and innovation program (Dizikes, 2017). The CFC Lab aims to advance urban life in China through a wide range of research and entrepreneurship education projects. The CFC Lab is hosted by the Department

of Urban Studies of MIT's School of Architecture and Planning, and is affiliated with the Department's Centre for Real Estate. It also has robust cooperation with the Media Lab, Senseable City Lab, and Sloan School of Management at MIT.

"The China Future City Lab consists of three foundational pillars (MIT-CFC LAB, 2018a):

1. The Lab supports a wide range of basic research projects, investigating aspects of urban and environmental economics and policy, with a special focus on China as well as international comparative studies.
2. The Lab houses a program known as the MIT-Tsinghua Future City Innovation Connector (FCIC), which supports start-up teams applying ideas to China's urban challenges. The FCIC also aims to identify innovative concepts and technologies that could be implemented in China.
3. The China Future City Lab is engaging with Chinese cities that will serve as "living labs" or testing sites where MIT researchers will have a unique opportunity to test and deploy their urban-focused innovations".

The Lab addresses challenges and issues related to urbanisation in China through mobilizing "the vision, research expertise, experience, talent, creativity, and other resources of MIT to identify innovative concepts and develop novel tools, technologies, and solutions that are applicable to the obstacles and opportunities in China's growing cities"(MIT-CFC LAB, 2018a). The Lab will (MIT-CFC LAB, 2018b):

- Use Big Data in the evaluation and visualization of urban issues
- Apply research in real-world policy experiments
- Develop a testing site for urban planning concepts
- Evaluate and visualize urban data
- Develop content for workshops, symposiums, and other activities
- Academically assess urban planning and design issues
- Cooperatively develop pilot urbanisation projects

In its inaugural year, the MIT-Tsinghua Future City Innovation Connector's (FCIC) facilitated useful connections and possible pilot opportunities for each of its start-ups. Seven out of sixteen teams signed agreements with member companies for pilot projects, and planned to launch pilot projects in the cities of Beijing, Guangzhou, Chongqing, Wuhan, Hangzhou, Shanghai and Shenzhen (MIT-CFC LAB, 2018c).

2.4 DIFFERENCES AND SIMILARITIES BETWEEN EUROPEAN AND CHINESE LIVING LABS

Urban Living Labs, although relatively speaking a new phenomenon, are fast becoming a commonplace method and approach to testing potential solutions that can contribute to solving urban development and transformation challenges. Urban Living Lab methods have been applied in Europe for more than a decade, and the idea has spread across the globe. Today, also China has many ULL-like projects running, and the use of ULL's to test solutions will increase in the years to come. From this selection of relevant ULL-projects in Europe and China one can see similarities in the way this approach is applied, but there are also some differences.

Based on the lists of the above-mentioned projects' own success criteria, one can see that core ULL characteristics are active user involvement, being connected to a real-world environment with participation of multiple stakeholders, outward communication and dissemination and choosing the right methods for the different environments. Local anchoring through cooperation with municipal and other relevant authorities are also aspects that several of the projects underline.

One can also see that these examples from China are still more connected to universities and research institutions than in Europe, with a dissemination and data-sharing focus and strong emphasis on stakeholders. When it comes to the way they actually operate, one can see differences from the European examples, most notably that the Chinese ULL's here are organized as research networks that promote ULL approaches, and that they lack the same degree of initial citizen interaction and participation, and co-creation, as their European counterparts. One could argue that this makes them look more like facilitators for developing urban testbeds than urban living labs, but at the same time one has to take into account the societal and cultural differences between China and Europe.

2.5 SUCCESS CRITERIA FOR LIVING LABS

Partner Discussions

During the kick-off meeting of TRANS-URBAN-EU-CHINA in Dresden, in January 2018, a Living Lab workshop was held to establish ground rules and define success criteria and potential pitfalls. Based on the discussions, the goals of the project and its target to engage with local stakeholders on various levels, ground rules for TRANS-URBAN-EU-CHINA's work with Living Labs were agreed upon:

- TRANS-URBAN-EU-CHINA will work with 2 living labs³.
- All Tasks will commit to choose their cases for transformative knowledge within the living labs;
- Within the living labs, each task can work with specific cases which may have different geographic boundaries and different stakeholders involved;
- Developing the Knowledge Base includes collecting examples from elsewhere (good practices & glorious failures) including reference cities;
- NTNU, CCUD and CAUPD⁴ will facilitate that each task can get access to the data, stakeholders and activities they need in order to fulfil their ambitions.

As part of the participatory research approach, during the workshop, the partners were asked to divide in groups of 5-6 people each, and perform the following individual as well as group reflections:

- Individually: Think of a living lab or case study in which you have been involved. Write down 3 things that went well, and 3 things that went poorly. Reflect upon why/how these happened – which conditions needed to be in place for the case/living lab to work well/poorly?
- As a group, each person shares their experiences, the other group members ask questions for clarification or detail.

Based on these discussions, stakeholder participation was identified as a key component of a successful living lab, including the following criteria:

- Local anchoring, identify who should be addressed, and how to address them;
- Strong local government support, with approval and support of local government or municipality. All departments should be involved;
- Public support and engagement, with strong involvement and commitment of the participants and involved stakeholders. This includes engagement of stakeholders in the design and set-up of the living lab and its activities. Ideally TRANS-URBAN-EU-CHINA want stakeholders to be proud to be a good practice example;
- Liaising with a real-estate developer with rich experience in urban transformation;
- Involvement of local university/students;

³ In September 2018 the number of living labs was suggested expanded to 2-4, instead of 2.

⁴ With the selection of Wuhan as a potential third living lab, this obligation is extended to CAS.

- International consultant team, funding by EU and/or involvement in research projects;
- The stakeholder involvement should be structured, and embedded in processes, with a strong coordinator for the living lab;
- Identify PR/communication channels, blogging within community.

One of the approaches identified as contributing to success of living labs by the partners, was to create deep on-site knowledge, understanding local context and stakeholders, using one or more of these methods:

- Interviews, people, fieldwork, meetings;
- Testing and combining methods and approaches from different disciplines;
- Adjusting methods and approaches to local context;
- Trust and credibility built on 2-3 round interviews;
- Good availability of physical documentation: photos, drawings etc.;
- Possibility to experiment and generate new practical knowledge: Involvement in design ideas, scenarios, development/transformation of the site, tangible/visible results;
- A strong architectural or urban environment that characterises the space of the living lab;
- Confirmation of relevance/meaningfulness of the case, accurate preparation and selection;
- Forward-looking, visionary positioning, progressive implementation, hands-on mentality;
- Identifying windows of opportunity;
- Analytical framework, regular reflection/exchange on Living Lab functionality, change and adaptation.

The partners identified these elements as important while engaging with a living lab:

- Who will be the audience (i.e., who does TRANS-URBAN-EU-CHINA want to help)? Chinese governance bodies, or Chinese citizens require a very different approach and scope. So do middle class or upper class citizens, with particular attention for those that are registered in the Hukou (户口);
- Living labs require team work and cooperation, in which the role of the partners needs to be clear. Does TRANS-URBAN-EU-CHINA see a living lab with a strong governance or rather a form of self-governance?
- TRANS-URBAN-EU-CHINA needs to set clear targets and objectives, and a transparent direction;
- TRANS-URBAN-EU-CHINA needs to discuss the geographical scope of an “urban” living lab – to which degree does one engage with rural areas? Does TRANS-URBAN-EU-CHINA select developed or underdeveloped areas? Urban regeneration or urban expansion?
- The aspect of cultural heritage needs to include both physical and intangible (collective memory, lifestyle...) elements. However, physical heritage might be important only for intellectuals or higher classes, while lower class, rural people and those who are not in the Hukou would be more concerned about making a living, education for their child(ren).

The partners also identified a long list of challenges and risks that need to be taken into account when selecting, developing and managing the living labs:

- Partner accessibility to site and stakeholders for interviews and surveys. The language barrier may lead to misunderstandings, lack of trust and difficulty to get real answers. Involved practitioners are not always reliable, hence selection of engaged and reliable participants must be ensured;
- When engaging with the local authorities, not all departments might be involved or convinced about the participants and about the topic, and there might be lack of coordination between

municipal departments due to lack of finances, time, training or personnel resources. There might be political changes during the project;

- The partners might have an overambitious plan, the objective might not be clear, and there might be lack of data to perform the intended scope and work; partners might also experience reduced accessibility to and methods of collecting quantitative, environmental and market data;
- Partners may lack understanding of Chinese or local processes, and the local population might be sceptical to foreign involvement. They might not be interested in being involved in a wider network;
- Partners cannot follow the living lab in real time and they cannot build solid connections to the local ecosystem as they cannot be present locally continuously. It would help to find a long-term scholar that can be hosted by the living lab;
- It takes a long time to establish living labs and there might be slow progress, hence good planning is necessary, also for after the project ends. It is also important to keep in mind the distinction between the objectives of the research project versus the ambitions of the local stakeholders in practice;
- The results of the cooperation might not be visible, or only accessible to a privileged few;
- Transfer of results of the living lab to the right audience will be difficult. The impact of the living lab might be reduced due to an insufficient plan for documenting lessons learned, follow-up, replication, and upscaling. The plan or its execution might be generic, superficial, or not checked/proven.

Urban Living Lab Workshop

An Urban Living Lab workshop with European and Chinese participants, co-organised with JPI Urban Europe in Beijing on 4 September 2018, confirmed the findings of the desktop research and experiences of TRANS-URBAN-EU-CHINA partners. The workshop aimed to create a common understanding of Urban Living Labs as a method and its benefits, as well as requirements and framework conditions to support the operationalisation of an Urban Living Lab approach in the Chinese context, to learn from successful applications of Urban Living Labs and to identify the benefits, aims and benefits of implementing Urban Living Labs in China. The workshop featured keynote speakers from Europe and China who shared their insights from both the European and Chinese perspectives, which informed the discussions.

Potential benefits and limitations of applying Urban Living Labs in Chinese urban areas were concluded by the workshop participants to be:

- Receiving new solutions to challenges;
- Increasing the quality of life;
- Growing mutual understanding among stakeholders;
- Empowering the co-production of knowledge;
- Increasing entrepreneurship growing networks; The conclusions of the discussions were:
- Improving cultural embeddedness, people-centric solutions and place-making, combined with international experiences;
- Adapting to the local characteristics of each city and region, and to whether you work in a city centre or an expansion fringe;
- Balancing collective and individual needs: the messages change according to whom you are talking;
- Promoting real stakeholder interaction, which is desirable, but difficult;
- Avoiding the pitfall that many living lab-like activities only dealing with “recognized” stakeholders and with high-tech solutions;

- Engaging the city authorities to discuss and work with real problems in living labs;
- Balancing the scope of the ULL: the more comprehensive the ULL, the more difficult it will be to run;
- Discussing how to define concrete and useful offerings to the Chinese cities and ULL stakeholders;
- Building capacity in the local administration and authorities;
- Given the large variety among Chinese cities, discussing what is realistic to achieve where.

Potential key roles of /aims for urban living labs were discussed to be: testing environment, incubator, learning environment, translator, initiator, administrator, networker and matchmaker, mediator, advisor provider of infrastructure, convincer, point of contact, agenda setter. In order to select the correct scope for the TRANS-URBAN-EU-CHINA Living Labs, for each city the following elements will need to be determined, with the partners and local authorities:

- What is a lab? Where one experiment with different variables, with an ambition as a point of departure: trying different things. Often these LLs become projects, where all is selected and decided, and not a lab in which aims are left open and being defined by the stakeholders as well. There is a difference in what could be and should be achieved – what can an ULL achieve? Blurring between what types of participatory formats and instigating transitory formats. Has TRANS-URBAN-EU-CHINA discussed a definition that one wants to work with? TRANS-URBAN-EU-CHINA should balance this between what it needs to deliver in the project, and what is realistic to do? TRANS-URBAN-EU-CHINA should select one way of how to approach the cities as LLs, since it will be a mess if one does not coordinate;
- Balancing showing what is possible with understanding the local need. Precondition and localization: TRANS-URBAN-EU-CHINA cannot import needs according to its own understanding. TRANS-URBAN-EU-CHINA should perhaps start by listening to the needs of these cities. How does TRANS-URBAN-EU-CHINA understand needs can be part of a learning process. This also means that there will be an element of learning from experience and other examples, e.g. in Europe. That should be the starting point. TRANS-URBAN-EU-CHINA should listen to what the local people say – it needs to provide something they need, not only to get the data that the project needs. The responsibility becomes to show options, what types of alternatives that exist, to tell people what they could have vs what they want. Things have narrowed down considerably lately, the Chinese partners often have very specific requests, so TRANS-URBAN-EU-CHINA could find out if there are some concrete things, or more open. Regarding listening: perhaps in China more mediation is needed. Perhaps ULLs will not work in the same way. TRANS-URBAN-EU-CHINA needs to think about how it can learn something on one hand, and how one can offer something on the other. What can TRANS-URBAN-EU-CHINA offer?
- Uncertainty about scale and form: new technologies are entering, and uncertainty about how the future cities will be. Experimental field of how new technologies can be accepted. What is the scale and scope: community level? New areas? A learning process: there are a lot of innovations that are going on in China, e.g. sharing economy – so learning should also be one of the aims of these LLs. Also, thinking about transformation: TRANS-URBAN-EU-CHINA needs to think about old neighborhoods, and how they are transformed. Physical space in the city;
- Tianjin (2nd tier city) and Jingdezhen (fourth tier city): Quite different cities. ULL can be useful to reinterpret the purpose or aim behind these projects. Testing and verify new area construction – e.g. in areas where there are already buildings and inhabitants, to ensure better transition;
- Whose needs are TRANS-URBAN-EU-CHINA talking about? The planners, the citizens? Talking

about participation: in Europe this is a goal, to make sure that people participate. In China it is more a tool. TRANS-URBAN-EU-CHINA should perhaps focus on administrators and on real-life. Informative participation or co-creation. Guanxi: the assumed importance of it. Maybe TRANS-URBAN-EU-CHINA is thinking about LL's as something that's easier when there is a more rooted community, compared to a new community such as Xiong'an etc. So if there are no citizens, perhaps the focus should be more on the planners, experts and designers etc. End users can be future citizens but also designers etc. Villages might be easier to work with, because everybody knows what everybody thinks;

- A foresight workshop might give leverage points for the purpose of ULLs. Improve on aspects of life, or on transformation of a whole system – energy, social technical, ecosystem services etc. How to create trust, how to change the administration. Such objectives depend on the scale of transformation. What are the key challenges that are faced?
- Culture as the soul of place-making: an ULL should have an identity, if the identity of these ULLs are known TRANS-URBAN-EU-CHINA can flag this. Culture should be obvious e.g. lifestyle choices, a landmark. This could be an aim of the project. One idea might be to organize a type of exhibition/festival limited in time, e.g. 2 days to a week. This has advantages of coordinating efforts with local governments etc. Perhaps directly in a city in a neighborhood. Also for collecting data.

Furthermore, the depth of the involvement of urban actors was discussed for individual stakeholder groups: from information to participation to consultation to co-creation. Urban actors who might be involved in Urban Living Labs are: knowledge institutes, municipal managers/leaders, civil servants, politicians, local entrepreneurs and business, citizens and grass root organizations, artists, students, start-ups, NGOs and civic organizations. The conclusions were:

- European experiments with Urban Living Labs have shown that these can create a greater sense of belonging and connection to neighbourhoods amongst residents. Urban Living Labs in China might have the potential to improve a sense of belonging to a neighbourhood;
- China Nature Watch is a programme run by an NGO which involves citizens in collecting data on natural environment (ornithology) and thus engage them in a dialogue which informs the government. Data collection by citizens and therefore engaging them in a broader dialogue on urban matters could be one aspect of ULLs in China;
- When talking about replicating/scaling up findings and approaches of Urban Living labs, from EU to China, but also within China, the local context has to be kept in mind. China is very different in many ways (culturally, economically, geographically, demographically, historically, etc.) from Europe which asks for contextualising the knowledge. Besides this obvious diversity, it is important to take into account the diversity among Chinese urban areas and regions;
- There are good examples of local initiatives which started in an experimental manner which have been scaled up by the local government, e.g. Community gardens in Shanghai. These initiatives could be stimulated to be developed into ULLs;
- In general, people might be interested in participating in ULL. However, it is important to keep in mind that this might lead to sensitive competition of ideas between the local residents and the local public administration;
- In order to bring together different urban actors in ULLs, the role of a mediator is important in the Chinese context in order to create a trustful environment. Universities, SMEs or NGOs could take this important role to balance different interests.

Urban Living Labs come in different forms, sizes and actors involved; characteristics which are determined by the existing preconditions. Furthermore, the design and practices of the ULLs are different. So is the organisational structure: "The organizational structure of urban labs can be defined in many

different ways, depending on their specific objectives and missions. The modes in which urban labs function and perform can range from loose organisational structures to rather strict operating procedures and routines. The choices as to how the work of the lab gets done and how responsibilities are shared are largely influenced by the operation model of the lab, which basically describes how value is created” (Scholl et al., 2017 p. 96).

According to the participants, important conditions for TRANS-URBAN-EU-CHINA Living Labs in China to strive for, are:

- Willingness of the ULL to participate and to incorporate transformations process;
- Shared ideas of transition;
- Self-perception (Needs of the ULL should not be defined by us);
- Involve stakeholders from the beginning (Local authorities, Research institutions, Representatives of the public);
- ULL should include processes of Urban Renewal and Urban Expansion.

Learning processes which result from Living Labs are manifold: “Learning enables individuals or groups to respond to changing conditions and new challenges. In urban labs, novel responses are developed and tested, and serve as primary source and focus of learning” (Scholl et al., 2017 p. 134). Possible methods to maximise learning from urban experiments such as ULL in the Chinese context might be: collaboration with academia for a neutral reflection, evaluate on regular basis with the stakeholders involved in the urban living lab, keep a learning diary, tell stories about experiences and share/learn from them, document the pilots and experiments.

Key learning processes were identified which the TRANS-URBAN-EU-CHINA Living Labs should strive to achieve:

- Learning from innovation in real-time, in line with China’s policy for public innovation and entrepreneurship;
- City-university cooperation for social innovation;
- High-frequency interaction to accelerate interaction;
- Curling - different orchestration roles for ULLs in different stages;
- Need for open-minded cities, advocacy to convince city leaders;
- Capacity in small cities and towns needs to be focused, need for capacity building;
- Cooperation with regulatory authorities;
- How to create good funding and cooperation mechanisms for this?

In addition, potentially relevant topics for the TRANS-URBAN-EU-CHINA Living Labs were clarified:

- Social innovation using local resources and international networks;
- People-oriented transition from quantity to quality, from planning and design to service;
- Urban and rural renewal, densification, place-making, spatial quality;
- Use and re-build historical cultural system / intangible heritage;
- AI, big data, internet, internet of things etc. provide a good opportunity for ULL;
- Enabling SMEs and start-up companies as the heart of the urban economy.

In addition to these preliminary lists of success criteria and potential pitfalls identified by the partners, desktop research was performed to identify potentially relevant existing European and Chinese living labs as inspirational examples for TRANS-URBAN-EU-CHINA.

2.6 SUCCESS CRITERIA FOR TRANS-URBAN-EU-CHINA LIVING LABS

Based on the partner discussions, the contributions from the speakers and contributors to the workshops and desktop research, the following criteria are used to identify relevant Living Labs for TRANS-URBAN-EU-CHINA in China:

- Potential for local anchoring, robust contact and existing cooperation between Chinese partners of TRANS-URBAN-EU-CHINA and local authorities and other urban decision makers in the local ecosystem, with broad approval and support of local government or municipality. This will help build trust and increase TRANS-URBAN's chances of getting involved in real-life urban transition projects. Building on existing cooperation will help TRANS-URBAN-EU-CHINA establish the living labs and harvest results during the short project period (3 years). This will also help the project establish a part time local presence in the living lab, and enable concrete cooperation and translation of documents and dialogue.
- Potential for interaction with local community (residents, staff and other end users). Ideally the local authorities or developer has previous experience with community engagement and/or an explicit ambition to involve local community in their ongoing projects;
- A strong architectural or urban environment that characterises the space of the living lab, with good accessibility to the site and stakeholders, and good availability of data, physical documentation (photos, drawings) etcetera.

TRANS-URBAN-EU-CHINA partner meetings in autumn 2019 and spring 2020 will be held in two of the Living Labs, in Jingdezhen and Wuhan, respectively. In cooperation with the local authorities, activities will be scheduled, back-to-back with the partner meeting. The Living Lab activities will gather TRANS-URBAN-EU-CHINA as well as local experts to investigate transformation strategies to make a specific neighbourhood more socially integrative, in cooperation with local citizens, authorities and other stakeholders. In preparation of the Living Lab meetings, the responsible TRANS-URBAN-EU-CHINA partners will perform mapping of local community stakeholders as well as urban decision makers that need to be involved in the living lab, discuss appropriate governance models for interaction and decision-making between TRANS-URBAN-EU-CHINA partners and the local authorities, and set realistic targets for each living lab.

Similar activities will be organised in Tianjin in cooperation with CCUD and local authorities, back-to-back with the annual China-EU Sustainable Development Forum.

TRANS-URBAN-EU-CHINA partners will be engaged in advising the development of the Xiong'an area when appropriate according to the corresponding planning process.

The following chapters describe and discuss each of the four potential TRANS-URBAN-EU-CHINA Living Labs.

Wuhan and Tianjin are highly developed megacities with strong educational institutions, a long history of international relations and ties, and important harbours. Jingdezhen is a smaller city with a strong tradition of cultural heritage, and a growing creative cultural sector that is promoted and emphasized by the municipal authorities. Within these three cities, TRANS-URBAN-EU-CHINA have identified urban regeneration projects as well as potential involvement in urban expansion. The fourth city, Xiong'an, is one of the world's largest urban development projects, with strong commitments by the Chinese central Government. The Xiong'an New Area is planned to be the cleanest and most cutting-edge city in the world, and is most certainly a place where the TRANS-URBAN-EU-CHINA project should be represented and visible.

3. JINGDEZHEN

3.1 ABOUT JINGDEZHEN

General Background

Jingdezhen is a prefecture-level city in north-eastern Jiangxi province, China, with a total estimated population of 1,654,000 in 2016 (City Population, 2018). Presently, Jingdezhen is divided into 1 county, 1 county city, and two districts, and the city centre area is north-east of the Poyang Lake Plain (Wikipedia, 2018b).

Jingdezhen is known as the "Porcelain Capital" because it has been producing pottery for 1,700 years, and the city has a well-documented history that stretches back over 2,000 years. "Jingdezhen's natural resources include kaolin, coal, manganese, and lime, but it is the kaolin that has made the city famous in China and the world. For over a millennium, its unique kaolin has enabled Jingdezhen to make high-quality porcelain" (Wikipedia, 2018b). Jingdezhen's porcelain has been famous in China as well as internationally for being "as thin as paper, as white as jade, as bright as a mirror, and as sound as a bell" (O'Brien, 2017).

Jingdezhen is a considerable destination for tourists in northern Jiangxi Province, and the majority of the city's tourist attractions are linked to the ceramics for which it is famous (Wikipedia, 2018d). Jingdezhen is an important industrial and commercial base in the north-eastern part of Jiangxi, and achieved a GDP of 85 billion RMB in 2016 (HKTDC RESEARCH, 2018).

"The city has convenient water and land communications. The Anhui-Jiangxi railway line passes by the city. Regular air flights link it to major cities throughout the country" (Encyclopaedia Britannica, 2017).

Education

Jingdezhen has three colleges and universities, and is the home of the Jingdezhen Ceramic Institute (JCI), which was established in 1910 and has around 19000 students (Jingdezhen Ceramic Institute, 2018). JCI is well known in Chinese and international academic circles in the field of ceramics, and is the only institute in China that provides advanced ceramics training. The other institutions of higher learning in Jingdezhen are Jingdezhen University and the Jiangxi Ceramics & Art Institute (Wikipedia, 2018c).

3.2 TRANS-URBAN-EU-CHINA INTERACTION WITH JINGDEZHEN EXPERTS & DECISION MAKERS

On 5 September 2018, during the International Advisory Board meeting of TRANS-URBAN-EU-CHINA in the Forbidden City in Beijing, CAUPD and Jingdezhen City signed a cooperation agreement regarding the development of a smart city platform for Jingdezhen with cultural heritage at the core (CLII, 2018).

- Exploring the transformation of new urbanization with "culture + technology";
- Established a cultural city and a scientific and technological innovation city think tank;
- Formulate a characteristic culture city development strategy;
- Promote the implementation of "Digital Jingdezhen".

On 17-18 October 2018, CAUPD, NTNU, PoliTO, representatives of the EU Delegation in Beijing and other urban experts visited Jingdezhen for a 2-day EU-China Living Lab working meeting. Guided by

the local authorities and CAUPD, the delegates visited many of the heritage sites in the city and received valuable information on past and current developments regarding urban transition in the city and its surroundings.

The working meeting with local authorities and international experts, organized by CAUPD, provided key elements for the Jingdezhen Living Lab such as the protection of the city's old streets and old industrial buildings, as well as the air quality, blue sky and surrounding nature with mountains and rivers. Jingdezhen forms part of a global UN innovative city network in which 72 countries participate. The network discusses, amongst others, balanced transition of culture, economy and environment; this fits well with the objectives of TRANS-URBAN-EU-CHINA. In addition, a series of on-site research activities were envisioned, based in the future living lab project office, and regular EU-China meetings and conferences. Jingdezhen was selected for cooperation because of its cultural capital, which fits perfectly to test best practices of EU and China, and to jointly develop new ones.

CAUPD's "Digital City Jingdezhen" project aims to create an urban spatial information platform including the following elements:

- Set up a cultural city index for Jingdezhen;
- Organize a high-level EU-China forum in Jingdezhen;
- Help Jingdezhen to build an urban living lab in the old town, a public playground for a low-carbon, smart city;
- Build a digital Jingdezhen to promote the city and a digital platform for city management and citizen participation and engagement;
- Build a smart neighbourhood/town in Jingdezhen.

The Jingdezhen authorities aim to become a pilot zone for IP, heritage and technology, and embark on a green sustainability path that builds on time-honoured history, with culture involved in the city's strategy, integrating and engaging local industry and entrepreneurship, and showcasing the best and most relevant practices – and jointly developing new ones where required. They are keen to learn, but keep the city locally rooted. As such, Jingdezhen could become a new standard for the rest of China.

Jingdezhen's planned transition is not limited to the heritage sites, it involves the entire city as well as new development areas such as Chang Nan. This includes modern infrastructures, integrated into Jingdezhen's tradition, high quality public space, slow mobility, and sponge city solutions. In particular, the Jingdezhen living lab could contribute with the following elements as a testbed for cooperation:

- How to specify the urban concept, what is the gap between the current situation and the vision? Key Performance Indicators, transition pathways etc.
- How to make use of the existing buildings, with transformation of functions?
- How can the newly planned areas such as Chang Nan relieve some of the burden of the old town, while adding value? How can such areas be expanded without destroying the surrounding ecosystem?⁵
- How to work with the local community, citizens as well as businesses, on transforming the old factories?
- How to work with cultural innovation, and balance international and local cooperation?

The TRANS-URBAN-EU-CHINA Jingdezhen Urban Living Lab and "Digital City Jingdezhen" project are two parallel, but related projects that the CAUPD proposed to Jingdezhen authorities. The "Digital

⁵ This topic is investigated in several H2020-funded projects on nature-based solutions, some of which are already running in cooperation with Chinese cities

City Jingdezhen” project aims to force the urban integrated development and transformation in Jingdezhen, and will build a digital platform including city data for Jingdezhen. TRANS-URBAN-EU-CHINA could use this digital platform as a technical tool for the implantation of the Jingdezhen Urban Living Lab.

3.3 DIALOGUE WITH THE TRANS-URBAN-EU-CHINA PARTNERS

With its heritage sites, existing city centre and expansion areas such as Chang Nan, Jingdezhen offers an opportunity for each Work Package in TRANS-URBAN-EU-CHINA.

Work Package 1, and in particular Tasks 1.3 and 1.4, is interested to work with Jingdezhen as living lab. PoliTo has never worked in this city, but has developed research activities (research projects, PhD thesis) on the development of cultural and creative industry and heritage in China; so does NTNU. Tsinghua University has pre-existing cooperation with Jingdezhen. Starting from that knowledge base TRANS-URBAN-EU-CHINA can imagine activities as consultancies with local government on transition development on the basis of protecting outstanding heritage resources.

Tasks 4.2 could contribute with workshops with local stakeholders to identify priority externalities to be reduced and other sources of information that can help documenting and assessing these externalities as well as existing or planned policies to reduce them. Task 4.3 could contribute with mapping and engaging local stakeholders through their Community of Communities.

3.4 RECOMMENDATIONS FOR THE JINGDEZHEN LIVING LAB

TRANS-URBAN-EU-CHINA will organise a partner meeting and corresponding living lab activities in Jingdezhen in autumn 2019. The correct timing will be discussed with CAUPD and the Jingdezhen authorities to ensure local capacity and engagement. Together with TRANS-URBAN-EU-CHINA partners present in China, TRANS-URBAN-EU-CHINA will organise fact-finding missions to Jingdezhen to prepare local conditions for this event and gather data for the involved Work Packages.

In the meantime, CAUPD will update the TRANS-URBAN-EU-CHINA partners on their Jingdezhen project activities during monthly WP5 meetings.

4. WUHAN

4.1 ABOUT WUHAN

General Background

Wuhan is the capital of Hubei province, and one of the nine National Central Cities⁶ of China. It is the most populous city in Central China and among the most populous in China. As of 2015, the city of Wuhan had an estimated population of 10,607,700 people. The surrounding metropolitan area was estimated by the OECD to have a population of 19 million (as of 2010). “It lies in the eastern Jiangnan Plain on the middle reaches of the Yangtze River's intersection with the Han River” (Wikipedia, 2018f).

“Arising out of the conglomeration of three cities, Wuchang, Hankou, and Hanyang, Wuhan is known as 'China's Thoroughfare'; it is a major transportation hub, with dozens of railways, roads and expressways passing through the city and connecting to other major cities” (Wikipedia, 2018f). Holding sub-provincial status and currently comprising of 13 districts, Wuhan is recognized as the political, economic, financial, cultural, and educational and transportation centre of central China. “Wuhan occupies a land area of 8,494.41 square kilometres, most of which is plain and decorated with hills and a great number of lakes and ponds, including East Lake and Tangxun Lake, which are the largest lakes entirely within a city in China” (Wikipedia, 2018f).

In 2008, winter storms damaged the city's water supply equipment and up to 100,000 people were out of running water when several water pipes ruptured. In 2010, the Han River at Wuhan experienced its worst flooding for twenty years, and in 2011 Wuhan was flooded again, with parts of the city losing power. In the summer of 2016, the city experienced 570 mm of rainfall during the first week of July, surpassing the previous record from 1991 (Wikipedia, 2018e).

Education and Scientific Research

Wuhan counts 35 higher educational institutions, which makes it a leading educational hub for China. Recognized institutions include Wuhan University and Huazhong University of Science and Technology. Wuhan ranks third in China in overall strength of science and technology, and features three national development zones and four scientific and technological development parks, as well as numerous enterprise incubators, over 350 research institutes, 1470 hi-tech enterprises, and over 400,000 experts and technicians (Wikipedia, 2018h).

Economy, Industry and International Cooperation

In 2017, Wuhan's GDP reached 1.34 trillion Yuan, which was the ninth highest in China (China Daily, 2018a). France, USA, South Korea and the UK have consulates in Wuhan. In addition, Russia, Japan and Thailand are planning on opening new consulates in Wuhan. By 2012, Wuhan had attracted foreign investment from over 80 countries, with close to 6000 foreign-invested enterprises established in the city with a total capital injection almost \$22.5 billion USD. Wuhan and France (opened their consulate there in 1998) are linked by strong economic partnerships (Wikipedia, 2018g).

⁶ The National Central Cities are described as a group of cities in charge of leading, developing, and performing tasks in political, economic, and cultural aspects. Their sphere of influence have great impact around the surrounding cities on modernizing and integrating services in fields such as infrastructure, finance, public education, social welfare, sanitation, business licensing and urban planning.

When it comes to domestic trade, Wuhan is one of the most competitive cities in China, rivalling first-tier cities such as Shanghai, Beijing, and Guangzhou in its volume of retail, and the municipal government offers different preferential policies to stimulate foreign investment, including tax incentives, discounted loan interest rates and government subsidies (Wikipedia, 2018g).

“Wuhan is an important centre for economy, trade, finance, transportation, information technology, and education in China. Its major industries include optic-electronic, automobile manufacturing, iron and steel manufacturing, new pharmaceutical sector, biology engineering, new materials industry and environmental protection. Wuhan Iron and Steel Corporation and Dongfeng-Citroen Automobile Co., Ltd headquartered in the city. Environmental sustainability is highlighted on Wuhan's list of emerging industries, which include energy efficiency technology and renewable energy” (Wikipedia, 2018g).

Wuhan also has economic and technological development zones, which offer preferential policies and incentives to companies that establish within these zones. The origin of such development zones in China can be traced back to 1978, and they have been pivotal for the country's economic development since (China Briefing, 2011).

Wuhan city and the city of Manchester became sister cities in 1986 and have maintained close contact since then, and the partnership has created business-to-business links, sporting and cultural ties and has seen a significant number of students from Wuhan studying at Manchester universities (Manchester City Council, 2016). In a joint announcement in February 2018 the two cities (or city-clusters) vowed to deepen cooperation in urban development and smart city construction (Xinhua, 2018e). In the Horizon 2020 funded GrowGreen-project the two cities are also collaborating (GrowGreen, 2018).

On December 12th 2018, the Wuhan-Manchester partnership was awarded for long standing and extensive cooperation on sustainable urbanisation, and was selected as the final winner at the Horizon 2020 URBAN-EU-CHINA Innovation Platform on Sustainable Urbanisation Awards Ceremony held in Beijing (URBAN-EU-CHINA, 2018b).

In 2016, “UN-Habitat and the Wuhan Land Use and Urban Spatial Planning Research Centre (WLSP) started a new programme to promote urban public space in China. The programme focuses on turning Donghu (East Lake), the largest urban lake of China, into a connected, integrated and people-friendly green space in the centre of metropolitan Wuhan. UN-Habitat and WLSP will work together on urban public spaces for three years. Improved urban public spaces are not only a target of SDG 11 on sustainable cities and communities, but are also increasingly in demand in China, where rapid, intense urban development is giving way to efforts to improve the quality of cities and places” (UN-Habitat, 2016). The intentions are that once open, Donghu will be a car-free area with public transportation services, which is open for bikes with free cultural parks and educational institutions along the lake without any barriers. The Donghu Greenway project started with strong public consultation, where WLSP gathered inputs from Wuhan's citizens through social media, web-applications and surveys. The centre has extensive experience with reaching out to settlement communities along the lake (UN-Habitat, 2016). In 2018, Wuhan Donghu Greenway Implementation Plan, by Wuhan Land Use and Urban Spatial Planning Research Centre (WLSP), won the ISOCARP Award for Excellence (ISOCARP, 2018).

In 2017, UN-Habitat and WLSP received funding for another project in Wuhan, the City Prosperity Initiative in Wuhan, China, which is to run from March 2017 until July 2019. Through this project, WLSP with the assistance of and in full partnership with UN-Habitat shall develop its capacity to apply the CPI as a tool for measurement, monitoring, evaluation and decision-making on sustainable urbanisation, in particular in relation to applications of land use and spatial planning (UN-Habitat, 2017).

Transportation

Wuhan Tianhe International Airport, one of the busiest airports in central China, is located around 26 kilometres north of Wuhan city proper in the suburban Huangpi District. Hannan Municipal Airport is a municipal airport that serves Hannan District, and is the biggest airport in China that handles general aviation only. Another airport, Caidian Municipal Airport is under construction and is planned to open in 2019 (Wikipedia, 2018i).

“China Railway Wuhan Group manages the Wuhan Railway Hub. Wuhan Railway Hub is considered one of the four key railway hubs of China. The city of Wuhan is served by three major railway stations: the Hankou Railway Station in Hankou, the Wuchang Railway Station in Wuchang, and the Wuhan Railway Station, located in a newly developed area east of the East Lake (Hongshan District)” (Wikipedia, 2018i).

The Wuhan Metro opened in September 2010, and Wuhan became the fifth Chinese city with a metro system. Trams came to the streets of Wuhan in the summer of 2017 with the first line (Auto-city T1 Line) opening in July, with more lines have opening since then. Wuhan also has long history of ferry services (Wikipedia, 2018i).

4.2 TRANS-URBAN-EU-CHINA INTERACTION WITH WUHAN EXPERTS & DECISION MAKERS

On 8-11 December 2018, NTNU, CAS, IOER and EUR participated in the Wuhan Placemaking Week, a week-long global gathering of place-makers that emphasized hands-on learning and innovative social events. The event was organized by UN-HABITAT and the Wuhan Land Use and Spatial Planning Research Centre (WLSP), who have collaborated since 2016 (see Section 5.1). The picture below shows some of the areas that were part of the Placemaking Week, including the already renovated concession area (picture on the left) as well as old city areas that are still to be transformed.

The theme of WPW was “SHAPING BETTER PUBLIC SPACES: Remaking Places – Transforming Cities” (Placemaking Week, 2018). Linked to the WPW, UN-HABITAT and WLSP organized an international student competition to call for creative and innovative proposals for a vacant waterfront site located in Wuhan inner city, at the confluence of Yangtze and Han rivers. The competition was part of the UN-HABITAT-WLSP programme “People Oriented Urban Public Spaces” for China, and focused on five general themes:

- Improving and innovating urban public spaces;
- Revitalization of waterfront spaces;
- Revalorizing industrial heritage;
- Socially inclusive and compact inner-city centres;
- Creating new tourism destinations.

The cooperation between UN-Habitat and WLSP provides a fruitful base for a TRANS-URBAN-EU-CHINA Living Lab, this will be further explored early 2019.

In addition, CAS had organized a meeting with a long-term cooperation partner, real estate developer “Shui on Land” who works with three major mixed-use projects in Wuhan, at about 1 000 000 m² per project:

- The Tiandi district, a renovated heritage site transformed into housing and commercial area;
- Innovation Tiandi, and expansion project / new area in cooperation with city group. The want to create a new innovation city, as an example for the government. This includes experimenting on

how to build an innovation community, with public social space, humanity, diversity and eco-environment;

- The Changjiang area, a new expansion area close to Wuhan. This area currently has a good landscape, two rivers and wetland, with low-rise buildings. How to develop this sustainably? TRANS-URBAN-EU-CHINA partner CAS is consulting on this project.

The residential housing Shui on Land develops is very expensive, but the retail areas are accessible to everyone. They also hold events free of charge. They aim to develop Wuhan as 21st century city, with mixed-use areas and the best resources. One of the main challenges is how this type of high-end upgrading also can give cross-over value to the surrounding areas. Their development projects have such a high reputation that the land value goes up even prior to starting a new project. This makes it more difficult for the government to relocate citizens, as they ask too much compensation. However, with larger development projects, there is now a possibility to do “local” relocations within the neighbourhood.

Challenges such as testing different ways for old towns to gain new life and connecting them to new developments, using public parks as event spaces open to the local community, or how to avoid relocation, i.e. keep the original residents in place, while adding other functions, could be relevant for cooperation with TRANS-URBAN-EU-CHINA, as they require new tools or approaches in order to solve them successfully. Shui on Land claims that their redevelopment adds value not only in the area itself but also in the surrounding areas. How to measure the added value, including qualitative elements? Being able to evaluate the added value of such projects would enable the government to ask for high quality among several competitors (i.e., what kind of transformation gives the best value for the investment, including social, cultural, spatial and other values?). Being able to document the added value / impact would be a good business model. There are many issues that could be measured, but are currently not.

4.3 DIALOGUE WITH THE TRANS-URBAN-EU-CHINA PARTNERS

Work Package 3 “Land Use Planning and Land Management” and Work Package 2 “Bridging the planning-implementation gap in eco- and smart cities” will both be using Wuhan as primary living lab, in close cooperation with their co-lead CAS. Work Package 2 aims to test and validate their instruments and tools for integrated planning and implementation in 1 or 2 local workshop settings. As of yet, they do not have existing or previous resources in the given city, with the exception of the experience and know-how of CAS.

PoliTo has a MoU with Huazhong University of Technology (2006 – ongoing), and a MoU with Wuhan University of Technology (2006 – ongoing). The Department of Planning has a visiting professor at the Wuhan University of Technology, who could contribute to local fact-finding.

Work Package 4 “Integrated transition pathways towards sustainable urban planning and governance” and Task 4.2 “Social Cost Benefit Analysis (SCBA) to support urban planning and governance” aim to organise a workshop with local stakeholders (possibly political representatives) to identify priority externalities to be reduced and other sources of information that can help documenting and assessing these externalities as well as existing or planned policies to reduce them. Task 4.3 “The digital transition in urban governance and planning” aims to contribute to the Wuhan Living Lab with their Community of Communities.

4.4 RECOMMENDATIONS FOR THE WUHAN LIVING LAB

TRANS-URBAN-EU-CHINA will hold its partner meeting in spring 2020 in Wuhan, with living lab activities organised back to back. This will potentially be achieved in cooperation with UN-Habitat, if UN-Habitat continues their cooperation with Wuhan. UN-Habitat has worked with local Wuhan authorities and the Wuhan Land Use and Spatial Planning Research Centre (WLSP) on place-making for several years, and connecting a TRANS-URBAN-EU-CHINA Living Lab to such cooperation would yield a lot of additional resources.

Cooperation with real estate developer Shui on Land give concrete regeneration projects, but TRANS-URBAN-EU-CHINA might not be able to influence the development projects in a more socially integrative direction. However, it would be interesting to see whether TRANS-URBAN-EU-CHINA knowledge would be able to persuade a high-end developer to include more socially integrative solutions or processes in their portfolio and approach.

5. TIANJIN

5.1 ABOUT TIANJIN

General Background

Tianjin is a coastal metropolis in northern China and one of the nine national central cities of China. In terms of urban population, Tianjin is the fourth largest in China, after Shanghai, Beijing, and Guangzhou, and it is the largest coastal city in northern China, with a total population of 15 621 200 (Wikipedia, 2018k).

Tianjin “is governed as one of the four directly-controlled municipalities of the People’s Republic of China and is thus under direct administration of the central government” (Wikipedia, 2018k). Tianjin is divided into 16 county-level divisions and in addition, “the Tianjin Economic and Technological Development Area (TEDA) in Binhai is not a formal level of administration, but nevertheless enjoys rights similar to a regular district” (Wikipedia, 2018k).

Tianjin is a dual-core city with the main urban area located along the Hai River, which connects to the Yellow and Yangtze Rivers via the Grand Canal, and Binhai, a New Area urban core located east of the old city, on the coast of the Bohai Gulf. “As of the end of 2010, around 285 Fortune 500 companies have set up base in Binhai” (Wikipedia, 2018k).

Tianjin’s total area is 11,860.63 square kilometres, with 153 km of coastline and 1,137.48 kilometres of land border. It is situated at the northern end of the Grand Canal of China, the canal that connects with the Yellow River and Yangtze River. The municipality is generally flat, swampy near the coast, and hilly in the far north (Wikipedia, 2018n).

Education and Scientific Research

Tianjin hosts two universities under the National Ministry of Education (Tianjin University and Nankai University), 15 universities and colleges under the municipal government, one under the Hebei Provincial government and one under the national Civil Aviation Authority. In addition to these, there are three foreign institutions (Wikipedia, 2018m):

- “The Florida International University Tianjin Centre, opened in 2006 as a cooperative venture between the municipal government and the Miami-based university;
- The Great Wall MBA Program Oklahoma City University Meinders School of Business, established in 1986 on the campus of Tianjin University of Finance & Economics;
- Raffles Design Institute Tianjin, a joint-project between Tianjin University of Commerce, Boustead College and Raffles Design Institute, Singapore” (Wikipedia, 2018m).

Economic and Technological Development

“Tianjin's GDP reached 1.572 trillion Yuan in 2014, an increase of 10.0 percent over 2013. The city of Tianjin recorded China's highest per-capita GDP with \$17,126, followed by Beijing with \$16,278 and Shanghai with \$15,847” (Wikipedia, 2018l). The city’s GDP reached 1.86 trillion Yuan in 2017, ranked sixth amongst China’s cities (China Daily, 2018b). Amongst Tianjin’s main industries one finds textiles, petrochemical industries, car manufacturing, mechanical industries and metalworking, and EADS Airbus is an important manufacturer with an assembly plant for its Airbus A320 series airliners (Wikipedia, 2018l).

Tianjin also has economic and technological development zones, which offer preferential policies and incentives to companies that establish within these zones. The origin of such development zones in China can be traced back to 1978, and they have been pivotal for the country's economic development since (China Briefing, 2011). Amongst these zones in Tianjin, one finds the Tianjin Port Free Trade Zone, which is the largest free trade zone in northern China and the only free trade zone in northern China. It lies at a distance of 30 kilometres from Tianjin city, less than 1 kilometre from the wharf and 38 kilometres from Tianjin Binhai International Airport (Wikipedia, 2018l).

Transportation

The Tianjin Binhai International Airport (ZBTJ) is situated in Dongli District around 13 km away from the downtown area. "The city will also be served by the new Beijing Daxing International Airport in Beijing, currently under construction and to be completed by late 2019" (Wikipedia, 2018p).

The Port of Tianjin is "China's largest artificial deep-water harbour, and the throughput capacity ranks fifth in the world. Located in Binhai Economic Zone, a national new economic zone of China, Tianjin harbour is the port of call of international cruises visiting the wider area, including Beijing" (Wikipedia, 2018p).

There are many railway stations in the city, Tianjin Railway Station being the main one. Tianjin West Railway Station and Tianjin North Railway Station are also major railway stations in the city, the Tanggu Railway Station is located in the port area of Tanggu District, and the Binhai Railway Station and the Binhai North Railway Station are located to the north of Tanggu, in TEDA. The Beijing-Tianjin high-speed rail was completed in August 2008 (China Lanka Education, 2018).

Until 2017 the municipality had two rapid transit systems, Tianjin Metro and Binhai Mass Transit (which runs between downtown Tianjin and TEDA in the seaside region), but in 2017 the two companies merged into the Tianjin Rail Transit Group Corporation, which now operates the Tianjin Metro. In April 2019, the entire network of the Tianjin Metro had 155 stations and 6 lines (Wikipedia, 2018o). Several more lines and stations are under construction (Wikipedia, 2019).

Tianjin's harbour area of Binhai/TEDA also has a modern, high-speed rubber-tired tram system, which was the first of its kind in Asia (Wikipedia, 2018j).

5.2 TRANS-URBAN-EU-CHINA INTERACTION WITH TIANJIN EXPERTS & DECISION MAKERS

Site visits with Tianjin Free trade zone representatives

On 17 May and 19 October 2018 CCUD and NTNU visited the Tianjin Free trade zone and met with local representatives. The area is located close to the international airport with well-developed infrastructure and facilities for business, industry and living. During the meeting, the authorities expressed their intention to move away from the traditional industry and park model and to develop the area towards more urban facilities, making it more attractive for company staff to live in the area. Developing the area into a smart and sustainable city with rich experience and good products and services, would require an agreement with the planning authorities in Tianjin, who are in charge of the planning of the area.

The trade zone representatives would like to use the TRANS-URBAN-EU-CHINA Living Lab to develop a good process for transitioning from traditional industry and Science Park towards a well-functioning area, and hence potentially becoming a role model for similar developments in the rest of the country. A policy innovation lab for planning and management of smart green industry parks with mixed use and urban facilities. They have released on-site office and representational space (see Figure below)

at the disposition of TRANS-URBAN-EU-CHINA partners, the interior design of which was under development in winter 2018.

One of the key challenges is how to bring the innovative technologies that are developed in the industry park into the city, to showcase, test and develop. Vice versa, how can TRANS-URBAN-EU-CHINA develop good processes for the citizens and other end users of the city and industry park to give input and feedback on the innovations to be developed in the industry park, to help develop better products with user-centred design and unique value creation? This type of process is already being tested in a local coffee shop renovation integrating ICT, and could be expanded towards urban transition challenges.

Tianjin Living Lab Ceremony, 18 May 2018, Tianjin

During the 2018 EU-China Forum on Sustainable Urban Development & EU-China Intelligent Technology Innovation Summit on “Technological Innovation and Intelligent Manufacturing”, an official launch ceremony was held for the Tianjin Horizon 2020 EU-China Research and Innovation Laboratory, with the Tianjin Port Free Trade Zone authorities and the project coordinator and living lab responsible of TRANS-URBAN-EU-CHINA. The event was organized by the China Centre for Urban Development, the China International Cities Development Alliance, JPI Urban Europe, the Tianjin Development and Reform Commission, and the People’s Government of Tianjin Binhai New Area.

5.3 DIALOGUE WITH THE TRANS-URBAN-EU-CHINA PARTNERS

The Tianjin Living Lab is a potential third living lab, provided additional facilitation and potentially additional funding by CCUD and local authorities. It is not a traditional case, but does offer interesting opportunities for each of the TRANS-URBAN-EU-CHINA Work Packages in terms of transformation towards a more urban context. For the time being, none of the Work Packages have identified Tianjin as their main living lab, but several are interested in working with Tianjin if this is facilitated by the project. Several partners already have experience in working with Tianjin.

PoliTO recently performed research on urban transformation and place-making in the former Italian Concession in Tianjin (under the scientific patronage of TRANS-URBAN-EU-CHINA), published in October 2018 by A. Bologna, M. Bonino (eds.) SAGEP, Genova. PoliTO has a MoU with Tianjin University (2008 - ongoing), and graduate and undergraduate student exchange agreement (2008 - ongoing).

Work Package 2 “Bridging the planning-implementation gap in eco- and smart cities”, led by AIT and CAS, would be interested to test and validate their instruments and tools for integrated planning and implementation in one or two local workshop settings.

Task 4.2 “Social Cost Benefit Analysis (SCBA) to support urban planning and governance”, led by ISINNOVA and CAS, would be interested to organize a workshop with local stakeholders (possibly political representatives) to identify priority externalities to be reduced and other sources of information that can help documenting and assessing these externalities as well as existing or planned policies to reduce them.

For Task 4.3, the Tianjin ULL could be interesting as there already is a clear user group for the Community of Communities: all of the companies and their staff and families using the industry park on a daily basis.

5.4 RECOMMENDATIONS FOR THE TIANJIN LIVING LAB

Given additional facilitation and budget by CCUD and local authorities, TRANS-URBAN-EU-CHINA and the local planning office could work together for creating plans for sustainable and liveable place-making in the free trade zone, in contact with the local department of urban planning that is in charge of the planning process for that zone.

Based on its Knowledge Base, TRANS-URBAN-EU-CHINA could make suggestions on how to transform the free trade zone into a more socially integrative, attractive and high-quality space for the foreign companies and their staff (attractive physical environment, services, mixed use functionality etc.), in the form of a workshop with local stakeholders followed by a report.

6. XIONG'AN

6.1 ABOUT XIONG'AN

General Background

The Xiong'an New Area is a state-level new area about 100 kilometres southwest of Beijing in the Baoding area of Hebei province, which was established in April 2017. Its main functions will be to serve as a development hub for the Beijing-Tianjin-Hebei (Jingjinji) economic triangle, as well as becoming the new host for non-capital functions that are situated in Beijing. This will include offices of some government agencies, research and development facilities and state-owned enterprises (Wikipedia, 2018q).

The announcement of the New Area was released to the public on the afternoon of April 1, 2017, and marked the launch of a historically significant strategy that will see the rise of another national new area after Shenzhen Special Economic Zone and Pudong New Area in Shanghai (Xinhua, 2018a). In the master plan document for the area, Xiong'an is described as part of China's "millennium strategy" (Xinhua, 2018d).

Xiong'an New Area encompasses the current counties of Anxin, Xiongxian and Rongcheng in Hebei, and Baiyangdian, a major wetland in northern China, is situated within the area. Xiong'an will initially cover around 100 square km, be expanded to 200 square km in the mid-term and about 2,000 square km in the long term, with a planned population of 2 to 2.5 million people (Xinhua, 2017a). As of 2010, Anxin had a population of around 440 000 residents, Rongcheng around 260 000 residents and Xiongxian around 360 000 residents (Wikipedia, 2018a). The New Area's name is a combination of the first elements of the names of two of the counties; Xiongxian and Anxin (Wikipedia, 2018q).

By 2035, it is planned that Xiong'an will "develop into a modern city that is green, intelligent and liveable, with relatively strong competitiveness and harmonious human-environment interaction. By the middle of the century, it will become a significant part of the world-class Beijing-Tianjin-Hebei city cluster, effectively performing Beijing's non-capital functions and providing the Chinese solution to "big city malaise" (Xinhua, 2018d).

In Xiong'an New Area, a green and low-carbon way of production, living, building and administrating will be promoted, and advanced environment-friendly and energy-saving materials and techniques will be used extensively during construction. The master plan for the Xiong'an New Area also stresses the development of Xiong'an into a digital city, and stepping up the construction of intelligent infrastructure, setting up a smart way of city administration and a management system for data assets (Xinhua, 2018b).

The China Academy for Urban Planning and Design (CAUPD) is responsible for developing the Master Plan for the Xiong'an New Area and is working on designing the digital planning platform for Xiong'an New Area. Therefore, the focus of the second high-level 2018 China-EU Conference on Sustainable Urbanisation held in Beijing on 12 December 2018, was "Digital Xiong'an Empowering the Future" (URBAN-EU-CHINA, 2018a). The previous year's conference was on "Innovation-Driven Development in New Areas", before the official launch of the Xiong'an project (see Section 6.2).

The architecture and layout of Xiong'an will include both traditional cultural elements and the best global design philosophies, and cultural heritage will be preserved and emphasized. Archaeological parks, museums and exhibition halls, and the protection of historic cities and villages will be integrated into the city's planning and construction (China Daily 2018c).

Education and Scientific Research

“A world-class university should be founded in the Xiong’an New Area in North China's Hebei province to nurture talent and support development of the area” (Zhang, 2018). Research and development facilities are expected to migrate to Xiong’an.

Economy, Industry and International Relations

Xiong’an in its current state enjoys a favourable location, easy traffic access, and relatively strong resource base and environmental carrying capacity. It is developed only to a small degree at the moment, and has abundant space for future plans, thus is suitable for high-standard high-goal development. The new area will be at the front line in promoting cutting-edge technology industries, with coordinated development of the real economy, technological innovation, finance and human resources. It will explore new models of optimised development in densely populated areas, and nurture new engines for innovation-driven development. Industries that are planned to thrive in the area includes biotechnology, new materials, modern services and green agriculture (China Daily, 2018c).

Xiong’an will work towards building international first-class technology and innovation platforms, with the best research institutions to nourish talent and innovative policies, and procedures to help growth tech firms (Xinhua, 2018c). “In its first phase, innovation-based projects such as big data, artificial intelligence and biotechnology will be transferred from Beijing to Xiong’an, according to the Xiong’an master plan. So far, the new area has more than 100 high-tech companies, attracting other innovation-driven entities” (Hu, 2018). The targets set for Xiong’an are very high and there should be significant potential to develop environmental protection-, smart city- and the financial sector industries (Hu, 2018). The plan also shows intent to attract international organizations involved in the Belt and Road Initiative to take part in its development, and host international and domestic high-end forums. Inter-governmental collaboration programs between China and foreign countries, and a comprehensive bonded zone are also to be developed (Xinhua, 2018c).

Transportation

In Xiong’an, the plan is to build a fast and efficient transport network, with only 20 minutes travel time by high-speed rail from Xiong’an to Beijing’s new airport in Daxing district, 30 minutes to Beijing and Tianjin, and an hour to Shijiazhuang (China Daily, 2018c). Currently the area is served by two expressways, G45 and G18 (Murphy, 2018). Baiyangdian station of the Tianjin–Baoding intercity railway is also within reach.

National Significance

The Xiong’an New Area is characterised as an area of national significance that should be developed into a green, eco-friendly, and liveable new urban area, a leading area in innovation-driven growth, and a model area in coordinated development (Xinhua, 2018c). With continuous commitment and efforts, it should be developed into a demonstration area for innovative development that reflects the new development concepts.

Seven key tasks in the planning and development of Xiong’an New Area (Xinhua, 2017b):

- To make sure new towns are green and smart, develop world-class green, modern, and smart cities.
- To create beautiful environment and ecosystem, build eco-friendly cities with blue sky over green land, and clear waters around.

- To develop high-end, high and new technology industries, attract and integrate innovation drivers to form new momentum for development.
- To provide high-quality public service and facilities that will set new models for modern urban governance.
- To construct fast and efficient transportation network, build green transportation system.
- To advance institutional and organisational reforms, let market play the decisive role in allocating resources and let government functions better to release market potential.
- To expand all-dimension opening-up by building new high grounds for expanding opening-up and new platforms for international cooperation.

6.2 TRANS-URBAN-EU-CHINA INTERACTION WITH XIONG’AN EXPERTS & DECISION MAKERS

Two high-level China-EU conferences were organized by TRANS-URBAN-EU-CHINA’s co-lead, CAUPD to inform the development of the Xiong’an area, in addition to numerous expert workshops and case studies. The 2018 China-EU Conference on Sustainable Urbanisation “Digital Xiong’an: Empowering the Future” was held on 12 December 2018 in Beijing at CAUPD’s premises, and co-organised by URBAN-EU-CHINA, TRANS-URBAN-EU-CHINA and the Urban Planning Society of China, with special support from the Delegation of the European Union to China.

During the conference, the importance of developing the Xiong’an area with global wisdom and Chinese characteristics was stressed as proof of the rapid development of the sustainable urbanisation cooperation and perfect match between China and Europe, and an excellent opportunity to promote sustainable urbanisation for the entire humanity (Li, 2018). Xiong’an can provide an important space for innovation and a global showcase for leapfrogging sustainable solutions:

- Improve the quality and efficiency of urban development;
- Placing the well-being of people at the core;
- Greener and more economic development;
- Digitalisation to provide better services to people.

6.3 DIALOGUE WITH THE TRANS-URBAN-EU-CHINA PARTNERS

All TRANS-URBAN-EU-CHINA Work Packages and partners may contribute to the Xiong’an Living Lab and inform the development of this new area, guided by CAUPD as Xiong’an’ chief urban planner.

6.4 RECOMMENDATIONS FOR THE XIONG’AN LIVING LAB

With CAUPD’s president Baojun Yang as chief planner of the Xiong’an area, TRANS-URBAN-EU-CHINA has an excellent opportunity to engage in the development of the area with the aim to make it socially integrative. As this is not transformation of an existing urban environment but rather development of a new one, TRANS-URBAN-EU-CHINA may contribute to think through diverse scenarios, and to test promising approaches towards achieving sustainable urbanization through a socially integrative city at a small scale before being scaled out.

7. CONCLUSION AND NEXT STEPS

In TRANS-URBAN-EU-CHINA, the Living Labs are intended to serve as innovation hubs for co-creation between project partners and local stakeholders, in particular urban authorities, real estate developers, public service providers and citizens. They are intended to be used to test, evaluate and optimise the real-life performance of the solutions developed in WPs 1-4, to learn, inspire and disseminate project knowledge. Even if the Living Labs do not work in their foreseen fashion, or in different ways than intended, they will yield valuable lessons and information about applying Living Lab methods in China.

In spring 2018, the TRANS-URBAN-EU-CHINA partners co-created a list of success criteria and potential pitfalls for the Living Labs, based on their collective previous experiences in China and Europe. Based on these criteria, four potential Living Labs were identified, each with at least one Chinese partner as main contact: Tianjin (CCUD), Wuhan (CAS), and Jingdezhen and Xiong'an (CAUPD).

Based on initial meetings with the corresponding Chinese partners, each Work Package and Task made a preliminary selection of at least one Living Lab with which they would like to cooperate during the TRANS-URBAN-EU-CHINA project period. In addition, each Work Package and Task has confirmed its intention to contribute to planning and development of the Xiong'an area if given the opportunity to inform urban expansion. This information was brought forward to the local authorities and decision makers in each of the potential Living Labs, and the cooperation potential discussed and detailed. Based on these dialogues, a set of recommendations for each Work Package or Task is described in this report.

TRANS-URBAN-EU-CHINA partner meetings in autumn 2019 and spring 2020 will be held in two of the Living Labs, in Jingdezhen and Wuhan, respectively. In cooperation with the local authorities, activities will be scheduled, back-to-back with the partner meeting. The Living Lab activities will gather TRANS-URBAN-EU-CHINA as well as local experts to investigate transformation strategies to make cities or a specific neighbourhood more socially integrative, in cooperation with local citizens, authorities and other stakeholders. In preparation of the Living Lab meetings, the responsible TRANS-URBAN-EU-CHINA partners will perform mapping of local community stakeholders as well as urban decision makers that need to be involved in the living lab, discuss appropriate governance models for interaction and decision-making between TRANS-URBAN-EU-CHINA partners and the local authorities, and set realistic targets for each living lab.

Similar activities will be organised in Tianjin in cooperation with CCUD and local authorities, back-to-back with the annual China-EU Sustainable Development Forum. TRANS-URBAN-EU-CHINA partners may engage in advising the development of the Xiong'an area when appropriate according to the corresponding planning process.

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REFERENCES

- BEIJING CITY LAB, 2018. About. [Online]. Available at: <https://www.beijingcitylab.com/about-1/> [Last accessed 24 May 2019].
- CHINA BRIEFING, 2011. Understanding Development Zones in China. [Online]. Available at: <https://www.china-briefing.com/news/understanding-development-zones-in-china/> [Accessed 01 October 2018].
- CHINA DAILY, 2018a. Top 10 Chinese cities by GDP in 2017. [Online]. Available at: http://www.chinadaily.com.cn/a/201802/12/WS5a80c8e0a3106e7dcc13c1ca_2.html [Accessed 27 October 2018].
- CHINA DAILY, 2018b. Top 10 Chinese cities by GDP in 2017. [Online]. Available at: http://www.chinadaily.com.cn/a/201802/12/WS5a80c8e0a3106e7dcc13c1ca_5.html [Accessed 27 October 2018].
- CHINA DAILY, 2018c. Xiongan New Area's master plan: Highlights: [Online]. Available at: <http://www.chinadaily.com.cn/a/201804/24/WS5ade5e68a3105cddf651a051.html> [Last accessed 13 May 2019].
- CHINA LANKA EDUCATION, 2018. Tianjin City. [Online]. Available at: <https://chinalankaeducation.com/tianjin-city/> [Last accessed 20 May 2019].
- CITY POPULATION, 2018. China: Jiangxi. [Online]. Available at: <http://www.citypopulation.de/China-Jiangxi.html> [Last accessed 23 May 2019].
- CLII, 2018. 中欧城市实验室项目落户千年瓷都景德镇. [Online]. Available at: http://www.clii.com.cn/qyfbz/201809/t20180907_3923724.html [Accessed 22 September 2018].
- DIZIKES, P. 2017. MIT launches China Future City Lab. [Online]. Available at: <http://news.mit.edu/2017/mit-launches-china-future-city-lab-1121> [Last accessed 24 May 2019].
- ENCYCLOPAEDIA BRITANNICA, 2017. Jingdezhen - China. [Online]. Available at: <https://www.britannica.com/place/Jingdezhen> [Last accessed 23 May 2019].
- EUROPEAN NETWORK OF LIVING LABS, 2018a. ENoLL. [Online]. Available at: www.openlivinglabs.eu [Last accessed 03 May 2019].
- EUROPEAN NETWORK OF LIVING LABS, 2018b. What are Living Labs. [Online]. Available at: <https://enoll.org/about-us/> [Last accessed 03 May 2019].
- EUROPEAN NETWORK OF LIVING LABS, 2018c. What is EnoLL? [Online]. Available at: <https://enoll.org/about-us/> [Last accessed 03 May 2019].
- EUROPEAN NETWORK OF LIVING LABS, n.d.. China LL Housing Lab (China Living Lab for Future Housing). [Online]. Available at: <https://enoll.org/network/living-labs/?livinglab=china-ll-housing-lab-china-living-lab-for-future-housing> [Last accessed 03 May 2019].
- ESCHENBÄCHER, J., THOBEN, K. D., & TURKUMA, P. (2010). Choosing the best model of living lab collaboration for companies analysing service innovations. *Projectics/Proyética/Projectique*, Volume 2 (5), pp 11-39. Available at: <https://www.cairn.info/revue-projectique-2010-2-page-11.htm> [Last accessed 24 May 2019].
- GROWGREEN, 2018. About. [Online]. Available at: <http://growgreenproject.eu/about/> [Accessed 11 October 2018].

- HKTDC RESEARCH, 2018. Jingdezhen (Jiangxi) City Information. [Online]. Available at: <http://china-trade-research.hktdc.com/business-news/article/Facts-and-Figures/Jingdezhen-Jiangxi-City-Information/ff/en/1/1X000000/1X0A1QQ4.htm> [Last accessed 23 May 2019].
- HU, Y. 23.04.2018. Xiongan pillars: infrastructure, high-tech. [Online]. Available at: http://english.gov.cn/policies/policy_watch/2018/04/23/content_281476121413364.htm [Last accessed 13 May 2019].
- ISOCARP, 2018. 2018 ISOCARP AWARD FOR EXCELLENCE. [Online]. Available at: <https://isocarp.org/app/uploads/2018/10/02-Wuhan-East-Lake-Greenway-0914.pdf> [Last accessed 16 May 2019].
- JINGDEZHEN CERAMIC INSTITUTE, 2018. Jingdezhen Ceramic Institute. [Online]. Available at: <http://jci.admissions.cn/> [Last accessed 23 May 2019].
- JPI URBAN EUROPE, 2015. Transition towards sustainable and liveable urban futures: The Strategic Research and Innovation Agenda of JPI Urban Europe. [Online]. Available at: <https://jpi-urbaneurope.eu/app/uploads/2016/05/JPI-Urban-Europe-SRIA-Strategic-Research-and-Innovation-Agenda.pdf> [Last accessed 24 May 2019].
- JPI URBAN EUROPE, 2016. URB@Exp. [Online]. Available at: <https://jpi-urbaneurope.eu/project/urbexp/> [Last accessed 27 May 2019].
- JPI URBAN EUROPE, 2017a. APRILab. [Online]. Available at: <https://jpi-urbaneurope.eu/project/aprilab/> [Last accessed 24 May 2019].
- JPI URBAN EUROPE, 2017b. Urban Living Labs by JPI Urban Europe. [Online]. Available at: <https://jpi-urbaneurope.eu/app/uploads/2018/01/Urban-Living-Labs-info-sheet-draft-171123-version-8.2-PRINT.pdf> [Last accessed 27 May 2019].
- LEMENINEN, S., NIITAMO, V., & WESTERLUND, M. 2017, "A Brief History of Living Labs: From Scattered Initiatives to Global Movement",. ENOLL Open Living Lab Days Research Day Conference Proceedings 2017. <https://biblio.ugent.be/publication/8534167/file/8534169.pdf#page=42> [Last accessed 24 May 2019].
- LI, L. 2018. China, EU should learn from each other in urbanization. [Online]. Available at: <http://europe.chinadaily.com.cn/a/201812/13/WS5c12604da310eff303290e44.html> [Accessed 15 December 2018].
- LUND UNIVERSITY, 2016. Malmö Innovation Arena - developer dialogues. [Online]. Available at: [https://portal.research.lu.se/portal/en/projects/malmoe-innovation-arena--developer-dialogues\(5207b4fa-371e-4736-8617-9be987468ba7\).html](https://portal.research.lu.se/portal/en/projects/malmoe-innovation-arena--developer-dialogues(5207b4fa-371e-4736-8617-9be987468ba7).html) [Last accessed 24 May 2019].
- MANCHESTER CITY COUNCIL, 12.07.2016. Manchester and Wuhan look to the future as they celebrate three decades of co-operation. [Online]. Available at: https://secure.manchester.gov.uk/news/article/7488/manchester_and_wuhan_look_to_the_future_as_they_celebrate_three_decades_of_co-operation [Accessed 15 December 2018].
- MEISTAD, T. 2015. "Sustainable building – From role model projects to industrial transformation", Doctoral Thesis, Norwegian University of Science and Technology, Trondheim, Norway.
- MIT-CFC LAB, 2018a. CHINA FUTURE CITY LAB – Research, Impact, and Solve China's Urban Challenges. [Online]. Available at: <https://cfclab.mit.edu/about> [Last accessed 24 May 2019].

- MIT-CFC LAB, 2018b. CITY LIVING LAB – Transforming cutting-edge research and startup innovations into viable projects. [Online]. Available at: <https://cfclab.mit.edu/LivingLab> [Last accessed 24 May 2019].
- MIT-CFC LAB, 2018c. FCIC – Introducing the Future City Innovation Connector. [Online]. Available at: <https://cfclab.mit.edu/FCIC> [Last accessed 24 May 2019].
- MURPHY, H. 2018. Xiong'an New Area: Crucial for the Millennium to Come. [Online]. Available at: https://www.businessnianjin.com/index.php?option=com_content&view=article&id=13674:feature-story-xiongan-new-area-crucial-for-the-millennium-to-come&catid=259:2018-march&Itemid=100 [Last accessed 14 May 2019].
- O'BRIEN, J. 2017. 'As white as a jade, as bright as a mirror' - Eight weeks in China's Porcelain Capital. [Online]. Available at: <https://asialink.unimelb.edu.au/stories/eight-weeks-in-chinas-porcelain-capital> [Accessed 06 October 2018].
- PLACEMAKING WEEK, 2018. Shaping Better Public Spaces. [Online]. Available at: <https://www.placemakingweek.org/wuhan> [Accessed 20 December 2018].
- RIEGLER, J. 2013. All you need to know about APRILab – innovative living lab experiences. [Online]. Available at: <https://jpi-urbaneurope.eu/news/project-aprilab-action-oriented-planning-regulation-and-investment-dilemmas-for-innovative-urban-development-in-living-lab-experiences/> [Last accessed 08 May 2019].
- RIEGLER, J. 2018. Urban Living Labs in China? [Online]. Available at: <https://jpi-urbaneurope.eu/news/urban-living-labs-in-china/> [Last accessed 08 May 2019].
- SANTONEN, T., CREAZZO, L., GRIFFON, A., BÓDI, Z. & AVERSAÑO, P. 2017. Cities as Living Labs – Increasing the impact of investment in the circular economy for sustainable cities. [Online]. Available at: https://ec.europa.eu/research/openvision/pdf/rise/cities_as_living_labs.pdf [Accessed 21 November 2018].
- SCHOLL, C., ABLASSER, G., AGGER ERIKSEN, M., BAERTEN, N., BLOK, J., CLARK, E., CÖRVERS, R., DOMIAN, W., DRAGE, T., ESSEBO, M., GRAHAM, T., HILLGREN, P., HOEFLEHNER, T., JANZE, A., KEMP, R., KLINGSBIGL, G., KÖHLER, W., DE KRAKER, J., LANDWEHR, A., LEITNER, G., NILSSON, P., PELIN, O., RIJKENS-KLOMP, N., SERAVALLI, A., SIMONS, J., VANDERMOSTEN, G., WACHTMEISTER, A., VAN WANROIJ, T., WLASAK, P. & ZIMMERMANN, F. (2017). Guidelines for Urban Labs, URB@Exp project 2014-2017. [Online]. Available at: http://www.urbanexp.eu/data/GUIDELINES_270617.pdf [Last accessed 08 May 2019].
- SUBURBANLAB, (2016). Urban Living Labs – As arenas for co-creation in urban areas. [Online]. Available at: http://suburbanlab.eu/wp-content/uploads/2016/05/SubUrbanLab_booklet_screen.pdf [Last accessed 07 May 2019].
- UN-HABITAT, 2017. City Prosperity Initiative in Wuhan, China. [Online]. Available at: <http://open.unhabitat.org/project/41120-3224/> [Accessed 20 December 2018].
- UN-HABITAT, 2016. Pilot Project launched for Improved Urban Public Spaces in China. [Online]. Available at: <https://unhabitat.org/pilot-project-launched-for-improved-urban-public-spaces-in-china/> [Last accessed 16 May 2019].
- URBAN-EU-CHINA, 2018a. 2018 China-EU Conference on Sustainable Urbanisation: Digital Xiong'an-Empowering the Future. [Online]. Available at: <http://www.urban-eu-china.eu/en/event/2018-china-eu-conference-on-sustainable-urbanisation-smart-city-development-in-xiongan-new-area/> [Accessed 19 December 2018].

- URBAN-EU-CHINA, 2018b. HORIZON 2020 URBAN-EU-CHINA INNOVATION PLATFORM ON SUSTAINABLE URBANISATION AWARDS CEREMONY. [Online]. Available at: <http://www.urban-eu-china.eu/en/horizon-2020-urban-eu-china-innovation-platform-on-sustainable-urbanisation-awards-ceremony/> [Accessed 16 December 2018].
- VOYTENKO, Y., MCCORMICK, K., EVANS, J., & SCHLIWA, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: towards a research agenda. *Journal for Cleaner Production*, Volume 123, pp 45-54. Available at: <https://www.sciencedirect.com/science/article/pii/S0959652615011439> [Last accessed 06 May 2019].
- WIKIPEDIA, 2018a. Baoding. [Online]. Available at: <https://en.wikipedia.org/wiki/Baoding> [Last accessed 13 May 2019].
- WIKIPEDIA, 2018b. Jingdezhen. [Online]. Available at: <https://en.wikipedia.org/wiki/Jingdezhen> [Last accessed 23 May 2019].
- WIKIPEDIA, 2018c. Jingdezhen. [Online]. Available at: <https://en.wikipedia.org/wiki/Jingdezhen#Education> [Last accessed 23 May 2019].
- WIKIPEDIA, 2018d. Jingdezhen. [Online]. Available at: https://en.wikipedia.org/wiki/Jingdezhen#Tourism_and_local_custom [Last accessed 23 May 2019].
- WIKIPEDIA, 2018e. History of Wuhan. [Online]. Available at: https://en.wikipedia.org/wiki/History_of_Wuhan#Flooding_in_the_2010's [Last accessed 16 May 2019].
- WIKIPEDIA, 2018f. Wuhan. [Online]. Available at: <https://en.wikipedia.org/wiki/Wuhan> [Last accessed 16 May 2019].
- WIKIPEDIA, 2018g. Wuhan. [Online]. Available at: <https://en.wikipedia.org/wiki/Wuhan#Economy> [Last accessed 16 May 2019].
- WIKIPEDIA, 2018h. Wuhan. [Online]. Available at: <https://en.wikipedia.org/wiki/Wuhan#Education> [Last accessed 16 May 2019].
- WIKIPEDIA, 2018i. Wuhan. [Online]. Available at: <https://en.wikipedia.org/wiki/Wuhan#Transportation> [Last accessed 16 May 2019].
- WIKIPEDIA, 2018j. TEDA Modern Guided Rail Tram. [Online]. Available at: https://en.wikipedia.org/wiki/TEDA_Modern_Guided_Rail_Tram [Last accessed 20 May 2019].
- WIKIPEDIA, 2018k. Tianjin. [Online]. Available at: <https://en.wikipedia.org/wiki/Tianjin> [Last accessed 20 May 2019].
- WIKIPEDIA, 2018l. Tianjin. [Online]. Available at: <https://en.wikipedia.org/wiki/Tianjin#Economy> [Last accessed 20 May 2019].
- WIKIPEDIA, 2018m. Tianjin. [Online]. Available at: <https://en.wikipedia.org/wiki/Tianjin#Education> [Last accessed 20 May 2019].
- WIKIPEDIA, 2018n. Tianjin. [Online]. Available at: <https://en.wikipedia.org/wiki/Tianjin#Geography> [Last accessed 20 May 2019].
- WIKIPEDIA, 2018o. Tianjin. [Online]. Available at: https://en.wikipedia.org/wiki/Tianjin#Rapid_transit [Last accessed 20 May 2019].
- WIKIPEDIA, 2018p. Tianjin. [Online]. Available at: <https://en.wikipedia.org/wiki/Tianjin#Transport> [Last accessed 20 May 2019].
- WIKIPEDIA, 2018q. Xiong'an. [Online]. Available at: <https://en.wikipedia.org/wiki/Xiong'an> [Last accessed 12 May 2019].

- WIKIPEDIA, 2019. Tianjin Metro. [Online]. Available at: https://en.wikipedia.org/wiki/Tianjin_Metro [Last accessed 20 May 2019].
- XINHUA, 2017a. WELCOME TO XIONGAN NEW AREA. [Online]. Available at: http://english.xiongan.gov.cn/2017-12/19/c_136835005.htm [Last accessed 13 May 2019].
- XINHUA, 2017b. 授权发布:中共中央、国务院决定设立河北雄安新区. [Online]. Available at: http://www.xinhuanet.com//2017-04/01/c_1120741571.htm [Accessed 13 October 2018].
- XINHUA, 2018a. China publishes master plan for Xiongan New Area: [Online]. Available at: http://www.xinhuanet.com/english/2018-04/21/c_137127416.htm [Last accessed 13 May 2019].
- XINHUA, 2018b. China publishes master plan for Xiongan New Area. [Online]. Available at: http://english.xiongan.gov.cn/2018-04/21/c_129855751.htm [Last accessed 13 May 2019].
- XINHUA, 2018c. China publishes master plan for Xiongan New Area: http://english.scio.gov.cn/topnews/2018-04/23/content_50952897.htm [Last accessed 13 May 2019].
- XINHUA, 2018d. China publishes master plan for Xiongan New Area. [Online]. Available at: <http://en.people.cn/n3/2018/0423/c90000-9452423.html> [Last accessed 13 May 2019].
- XINHUA, 2018e. Wuhan, Manchester to deepen cooperation in urban development. [Online]. Available at: <http://global.chinadaily.com.cn/a/201802/27/WS5a957e04a3106e7dcc13e702.html> [Accessed 15 October 2018].
- ZHANG, Y. 2018. Hebei official proposes Xiongan University. [Online]. Available at: <http://europe.chinadaily.com.cn/a/201803/30/WS5abda596a3105cddf6515567.html> [Last accessed 13 May 2019].