Urban Planning Reimagined

A manifest for a digitally enabled new way of working

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Urban Development Initiative – Urban Planning Reimagined

The Urban Development Initiative (UDI) is an organisation that focuses on innovation in the unique innovation climate of Brainport Eindhoven. Innovation as a mean to provide answers for the complex urban challenges. Founders of the UDI are City of Eindhoven, City of Helmond, Eindhoven University of Technology (TU/e), Brainport Development

Urban Planning Reimagined is one of the programs within the UDI and it focuses on developing a digitally enabled new way of working in Urban Planning. This animation explains the vision.

UDI is one of the ecosystems involved in the Dutch Societal Innovation Hub. Together with four other ecosystems and together with VNG and IPO, we aim to strengthen the innovation infrastructure in the Netherlands in order to be able to get to innovative digital solutions for societal challenges.

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Introduction

What is the issue? (problem statement)
The future is urban. It is also increasingly complex to plan for and manage. In an ever more urban world, the built environment will be the arena of many urgent societal challenges. The built environment also is and will be a crucial part of solving these fundamental challenges. Furthermore, many urgent societal challenges, such as affordable housing shortage, energy/climate/mobility transition, and improving the quality of life, are interconnected through the urban environment. Finally, there is a need to balance the interests of various stakeholders involved in our urban future.

It is beyond the capabilities of any individual sector to solve multiple interrelated environmental, socio-economic, and spatial challenges in a dynamic and complex multi-stakeholder system that faces an unpredictable future. Therefore, a holistic approach is needed to plan for future urban systems while considering the complexities and interdependencies of their many subsystems.

Fortunately, the digital revolution provides the potential for addressing this complexity and enables **a new way of working** for integrated urban planning. This revolution has occurred through the emergence and pervasive use of digital tools, data and models that facilitate (real-time) observing, measuring, modelling, and designing our cities. Examples are (real-time) big data, information systems and GIS technologies, data analytics and visualizations (VR and AR), artificial intelligence and the internet of things (IoT) and urban digital twins (UDTs).

How do we suggest solving it? (Our vision)
We believe that urban planning needs a paradigm shift. The new urban planning should be user-centric, holistic, multi-disciplinary, evidence- and knowledge-based, and digitally enabled. This new planning paradigm requires **a new way of working** where the citizens and users are placed at the centre. Realizing the potential of the digital revolution depends on the engagement of all stakeholders. Thus, this new way of working enables and facilitates a systemic multiple-helix approach.

We believe a systematic integrated urban planning paradigm that supports this new way of working is crucial for our sustainable future. This systematic approach should first identify the main dimensions of spatial scale, temporal scale, disciplines, and stakeholders involved in the urban planning processes. It should then establish the relations between these dimensions to ensure a comprehensive representation of these relations. These dimensions and their corresponding relations are dynamic in nature; and addressing these dynamics in the broader scope of urban planning facilitates an integrated view of the complexities of the city.

Who are we? (The task force)
The Urban Planning Reimagined group of the Urban Development Initiative (UDI) is an ecosystem of companies, knowledge institutions and planning authorities that aims to develop a new digitally enabled working method for integrated urban planning.

Manifest! For whom?

This is our manifest. We believe that developing this new way of working cannot happen in isolation. Therefore, this manifest aims to kickstart the necessary societal discussion on "*How should we use the potentials of digital technologies in planning and managing our cities?"*. Our work within the Urban Planning Reimagined group, including this manifest, aims to inspire various users:

- Companies who want to:
    - Have a head start to access and adopt for new markets and open business models by a new way of working.
    - Learn and build capacity based on the best practices and next-level use cases.
    - Gain insights from the ecosystem research and development outputs.
    - Participate in cutting-edge projects.
- Academics who want to:
    - Contextualize and embed theoretical and methodical research, pushing the academic developments further up the TRL scale.
    - Collaborate closely and effectively with other partners from the ecosystem in developing a new research agenda.
- Planning authorities who want to:
    - Gain insight into more robust approaches to planning procedures from a research and practice perspective.
    - Improve the value of the primary procedures with more evidence-based and transparent approaches.
    - Share their immediate and long-term questions to other partners in the ecosystem and gain a more comprehensive perspective over their multiple dimensions.
- Citizens who want to:
    - Have a more direct relationship with the planning and decision-making process of their living environment.
    - Voice the concerns and preferences through closer participation

Manifest Structure

In Chapter 1, we will elaborate on the innovation challenges that burden this new way of working. In Chapter 2, we provide guidelines to address these innovation challenges. In Chapter 3, we present the new way of working. Finally, in Chapter 4, we make a call to action for the next steps in reimagining digitally enabled integrated urban planning.

UDI: Innovation Challenges of Reimagining Urban Planning

The ecosystem partners have identified five innovation challenges that potentially hinder the new way of working. Therefore, identifying and addressing them is crucial in developing and implementing a new way of working. This will pave the way for realising digital revolution benefits for stakeholders and society.

Integrated Impact Assessment Framework
Today's work suffers from disciplinary silos. We require a systematic, integrated urban planning approach that helps us in our challenge towards evidence-based decision-making, which supports involving citizens as part of this process. For this, we require an Integrated Impact Assessment Framework (IIAF). An IIAF identifies the problem areas, goals, objectives, digital enablers and KPIs while structuring the planning process. It provides a systematic way to consider the impact of policies and actions on different stakeholders. This allows us to determine whether an intervention is effective or not. Moreover, it will enable us to learn from previously implemented decisions and replicate positive results. Therefore, an IIAF provides a multidimensional and multilevel framework to: (1) Integrate data, design, and evaluation, (2) support decision-making, (3) indicate the strengths and weaknesses of different policy options, and (4) monitor (real-time) and assess the impact.

Digital Infrastructure, Data Analytics and Visualization
Digitally enabling urban planning includes collecting static and real-time data in the built environment, using big data for analytics, predictions and simulations for real-time information provision and possible scenario evaluations. However, developing and using digital technologies requires hefty investments.

Digital co-creation and innovation flourish in an open urban digital space for data, tools, and rules as an exchange, where experimenting with different digital systems has a low threshold and is accessible to all stakeholders. This can be only achieved with a digital platform embodied as an institution with competencies and resources for facilitating the creation and adoption of successful developments. Such a platform primarily enables the stakeholders to co-create and co-develop the components of this new way of working. It establishes a digital marketplace of co-created data, tools, and rules for digitally enabled urban planning. The main innovation challenge is identifying and specifying the functionalities of an ideal (minimal) infrastructure and workflows for enabling this new way of working.

Law and Ethics
We live in an information society, and technology is not neutral. Each technology changes the interaction of citizens with each other and the built environment. Therefore, operationalizing digital technologies within urban planning and decision-making processes requires us to understand how these technologies will influence every stakeholder. For this reason, our new way of working must rely on an ethical and legal framework that can prevent any undesirable consequences of using technologies for stakeholders.

Creating User Value
The development of digital tools and digital twinning should facilitate informed decision-making for various user groups, i.e., professionals, policymakers and citizens. It should focus on creating value engagement and participation in decision-making processes. Identification and integration of user needs for these digital tools is necessary. This will also improve the user

acceptance of the developed digital solutions. Law, ethics & validation are part of this user-centric design process. The design process of these digital tools should unite the worlds of society, knowledge, and technology.

Guidelines

To overcome the innovation challenges, our ecosystem has developed four guidelines. These are **IIAF**, **Game Rules**, **Ethics** and **Engagement**. These guidelines describe the subject, explain why they are essential, specify how to do this, and call all stakeholders to action. Here we present the requirements for this new digital way of planning, managing, and designing cities and how digital technologies can be applied in decision-making while placing citizens at the center of the design process and involving them.

IIAF

What?

Impact Assessment (IA) is "an information-based analytical approach to assess probable costs, consequences, and side effects" of plans (OECD 2001). The Integrated Impact Assessment Framework (IIAF) goes one step further from IA and integrates different impact areas with a holistic approach into a single assessment procedure. IIAF is a form of assessment that covers a range of domains/sectors that may have previously been assessed separately by their specialized departments and disciplines (i.e., mobility, housing). It consists of diverse methods and practices for which the common goal is to integrate environmental, economic, social, and other forms of impact assessment (Milner et al. 2005). Such a holistic approach makes IIAF relevant to all actors involved in integrated urban planning and design.

Urban Digital Twins (UDTs) are operationalized, contextual digital systems based on a compound of urban models. They aim to represent physical assets and processes related to citizens and urban environments. UDTs are contextual, as their models and data are customized to the specific qualities of the urban environment they represent. UDTs are operationalized as they support various stakeholders' decision-making and planning processes by allowing systematic exploration and evaluation of plans and scenarios. However, these plans and scenarios might have unfavourable effects on others. Therefore, UDTs should incorporate IIAF to ensure the compatibility of multiple criteria for multiple stakeholders.

Creating awareness of the need for a systemic approach and cross-sectoral dependency within organizations starts from acknowledging the complexity of urban systems with interconnected multi-disciplines/sectors, multi-stakeholders, and multi-criteria challenges. Addressing these interdependent challenges requires evidence-based decision support systems that employ digital tools and data advancements. In this regard, developing UDTs with IIAF principles enables the planning process to have a holistic and systemic approach to interdependent challenges and their impacts.

Why?

Urban areas face immense societal, economic, and environmental challenges such as climate change, diminishing resources, biodiversity decline, public health, social inequality, ageing, polarized economic growth, etc. These challenges are interdependent in terms of their cause and impact. Moreover, the urban and spatial planning profession involves a highly sophisticated sequence of interactions and decisions that result in policymaking for solving these interdependent challenges (Batty and Yang 2022). Therefore, we need a holistic and systemic approach to identify challenges and provide solutions. Understanding and implementing the Integrated Impact Assessment Framework (IIAF) is crucial for tackling our significant societal challenges, as IIAF is a holistic, information-based, analytical urban planning tool.

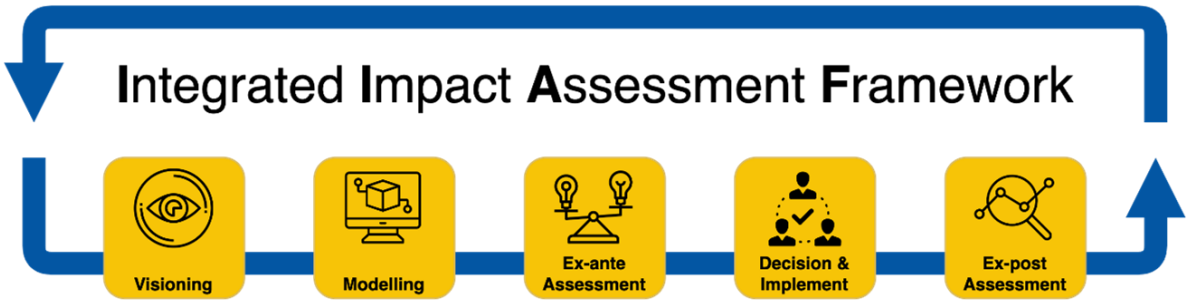
Such an integrated approach will increase efficiency, reduce complexity, avoid redundant efforts, increase transparency and openness in decision-making, support interdepartmental, cross-disciplinary and sectoral cooperation, and address cross-cutting issues on policy integration (Jacob and Hertin 2007).

Mainly, IIAF puts forth two types of evidence-based assessments: Ex-ante and Ex-post assessments. Ex-ante assessments are performed before implementing the plans and policies and allow us to predict the impact of a policy. Ex-post assessments are performed after implementing plans and will enable us to measure the impact of the decision and policies.

Within this framework, UDTs function as the workbench that provides various data and models for implementing various assessments specified in IIAF. Additionally, they can provide relevant information through visualization and dashboarding capabilities so stakeholders can curate information. This means that the Ex-ante assessment can be conceived as an interactive process of altering the decision, evaluating various aspects of it, representing the evaluations, and comparing it with previous iterations until we reach satisfactory and consensual decisions. In parallel, UDTs can integrate dynamic data gathered from various sources such as sensor networks, IoT devices, satellite imagery, etc. This can facilitate Ex-post assessment to measure the realized impact of plans and policies. Integrating these dynamic data streams in the assessment workflows can provide an automated and integrated assessment procedure.

The most crucial contribution of IIAF is coordinating the isolated planning processes toward a holistic goal. This entails that various stakeholders can co-create a shared vision, assess multiple policies in their contribution to that vision, implement policies, and reflect on their impact. Accordingly, residents can voice their preferences and concerns, policymakers can evaluate the influence of various policy measures, and developers can adapt their short-term and long-term strategies according to their utility. Therefore, IIAF can provide a structured way to consider the impact of policies and actions on different stakeholders and allows us to learn and replicate.

How?
The outline of IIAF is a 4+1 step iterative process that integrates the diverse yet interdependent aspects of urban planning: Visioning, Modelling, Ex-ante Assessment, Implementation, and Ex-post Assessment (see Figure 1.)



Conceptual model of IIAF and its support for the decision-making process

Visioning
The visioning phase sets the agenda for the planning process. It defines where we are now and where we should be in the future. In this phase, the qualities of the envisioned future are described, and the KPIs to benchmark those qualities are distinguished.

Modelling
In this stage, we investigate and establish the relationships between different domains, various aspects, and the envisioned goals. Accordingly, we define a set of qualitative and quantitative

workflows to simulate the trends, predict the outcome of plans, assess the impacts, and integrate the assessments.

Ex-ante Assessment
Using the workflows of the modelling phase, we predict and investigate the impact of a policy before its implementation. Next, we assess the predicted impact with respect to KPIs and integrate these KPI values to achieve a holistic evaluation of the proposed plan.

Decision-making and implementation
In this stage, stakeholders will collaboratively select, adopt, and implement one of the alternative plans based on their holistic evaluation. Essentially, the detail of this process falls outside the scope of IIAF. However, we position it in the framework since IIAF phases are defined in relation to this step.

Ex-post Assessment
Using the modelling phase's workflows, we investigate a policy's impact during or after its implementation. The outcome of our investigation will inform all the phases in the next iteration of the IIAF cycle.

Call to Action
IIAF's main objective is to streamline planning and implementation processes by establishing an integrated and evidence-based planning procedure.

- For governmental institutions and policymakers, this is beneficial as it allows them to coordinate the decisions of various departments. This is made possible through the integration process that bridges the inherent interdisciplinary gaps in urban challenges.
- For inhabitants, IIAF provides a transparent mechanism to express their preferences and track the influence of their opinions on policies and interventions.
- For developers, IIAF provides transparency into governmental decision-making and inhabitants' preferences. This, in turn, can help them to adapt their strategies and tactics to ensure efficiency in using their resources and the effectiveness of their business plan.

All in all, integrating procedures within one framework can facilitate the interaction of all parties involved to reach an inclusive consensus.

Implementing IIAF in digital systems, decision-making processes, and participatory sessions must be challenge-driven, context-specific, comprehensive and inclusive, transparent and trustable, adaptive and adjustable, evidence-based, multilevel, and interoperable.

Following these principles, IIAF can augment the planning process in three dimensions:

- It can facilitate exploratory co-creation by including various stakeholders in the decision-making process. It can provide for interactive scenario building, public communication, and citizen feedback to close the gap between society and planners.
- It can support the evaluation of the outcome of alternative policies in scenarios through qualitative and quantitative assessment of the direct and indirect consequences of interventions.
- It can provide for systematic, holistic, and integrated decision-making through collating various data sets and incorporating different models.

Realizing this in the UDI Digital City Program ecosystem can be done by establishing an "Integrated Impact Assessment Framework for Urban Digitally enabled Urban Planning" with Social and Organizational.

Regarding the social aspect, this asks for:

- Creating awareness of the need for a systemic approach and cross-sectoral dependency within organizations.
- Creating resources for capacity building on the analytical capability of the urban planning staff by training, additional research, and facilitating the flow of data and information.
- Support urban planning education with digital tools for students, current practitioners, and non-specialists.
- Increase citizen participation in the IIAF development loop and build trust between all stakeholders, including the citizens.

On the organizational front, it requires:

- Developing a cross-sectoral strategy at local urban planning organizations.
- Adopting participatory multiple helices (including citizens) and cross-sectoral approaches for developing and implementing IIAF
- Increasing awareness of the ethics and governance of using data, digital tools, and UDTs together with IIAF.

Game Rules: how to change the game of creating value?

What?
Within the context of digitally enabled urban planning, there is an inherent challenge in how the new digital technologies can create user value. We believe that it ends up in a new way of working and a new way of collaboration between a growing number of stakeholders. It will change current business models. It is changing whether we like it or not, but *how* it will change and whether it will be replaced by new solid business models for every stakeholder is uncertain. As a result, partners in the ecosystem know they have to be open to change and want to collaborate to take the next steps. At the same time, there are limitations on collaborating when some partners feel the changes would be more disadvantageous for them. This is what we mean by 'competitive collaboration'. It is a thin line between collaboration and competition, and this line cannot be drawn before starting the collaboration. Therefore, trust and transparency between partners are vital. We believe we shouldn't only focus on the game rules of the end game as we're convinced they will change over time. Concentrating on the game rules through the transition is more important. Game rules that support taking the next steps!

Ultimately, we believe game rules are more about the social-organizational challenge than the technical one. They specify how to work together. Therefore, these rules must be developed with the future developments in mind. Moreover, these rules should allow organizations to get involved in the ambition of creating a digital urban planning ecosystem.

An essential part of the game rules is the digital game rules. Digital rules that improve cooperation and lead to innovative digital solutions are part of the new way of working. Digital solutions must be transparent, replicable, scalable, ethical, and trustworthy. More specifically, this brings us to the question of how we can integrate these digital technologies in the societal, organizational, and economic context, and ensure their wider adoption.

The game rules will also influence the digital urban planning process itself. The process dependencies will also become evident by making the dependencies clear from a data/information perspective. This will help drive innovation to a higher level.

Why?
Developing a viable business model for a digital urban planning ecosystem is essential to ensure long-term sustainability. A business model outlines how all partners in the ecosystem will generate revenue and create value for its stakeholders. It is crucial to identify business models that are both financially sustainable and aligned with the goals and objectives of the urban planning ecosystem. Therefore, beyond the obvious technical challenges, we must also address new digital technologies' opportunities for businesses and how they can adapt their specific business model to use them. The game rules focus on sustainable business models and have a few additional objectives:

- Act as a shared set of guidelines by all partners that provide necessary guidance in the ecosystem on a technological level to help shape the digital landscape in the years to come.
- The game rules consider upcoming regulations, ethics and technological innovations, which can impact the business models and innovation.

- Provide transparency: a shared view of the data and the information models that are the basis of the ecosystem and the roles and responsibilities that need to be in place.
- Building trust: a mutual understanding of interests, added value and business cases, allowing trust to emerge and develop applications with minimal effort.
- Ensuring cooperation: a clear view of the roles and interests of all partners in the ecosystem will enable guarding collective interests, leading to the smooth development of both individual and joint business cases,

How?
As a first approach, we feel that the business modelling process needs to be continuously evaluated based on the changes in the ecosystem's environment, be it ethical, legal, financial or disruptive technological innovation, as they can significantly impact the feasibility of business models and value propositions. We will, therefore, focus on progressing with small steps that can bring immediate impact for the partners.

A digital business model strategy for an urban planning ecosystem would need to consider many different factors, such as the current state of technology, the needs and preferences of the knowledge community, and the goals and objectives of the local government. Some possible steps to formulate such a strategy could include identifying areas where technology could improve efficiency and effectiveness and consulting with key stakeholders to gather input and feedback.

The key to developing a viable business model for a digital urban planning ecosystem is to understand the needs and preferences of the community and align them with the goals and objectives of the local government and other partners while creating financially sustainable solutions. We will take the following steps to clarify the underlying business model and information structure.

<u>Identify the value proposition</u>
The value proposition is the unique benefit the digital urban planning ecosystem provides its customers. It should be clear, compelling, and differentiated from competing offerings. Identifying the value proposition is critical to developing a business model aligned with the community's needs and the local government's goals. The urban planning ecosystem also provides a fertile environment to brainstorm such value propositions.

<u>Map the information model of the digital ecosystem.</u>
This describes the relationships between the different components of the ecosystem, including the data, systems, and processes used to support the ecosystem's operations and goals. To create an information model of a digital ecosystem, you can follow these general steps:

1. Define the scope of the digital ecosystem. Identify the boundaries of the ecosystem and the systems, data, and processes included within it.
2. Identify the critical components of the ecosystem. This can include systems, data sources, data flows, and processes.
3. Analyse the relationships between the components. Identify how the components interact with one another and how they support the ecosystem's operations and goals.
4. Create a diagram or model that visualizes the relationships between the components.
5. Identify the data flows and dependencies between the systems and processes in the ecosystem.
6. Identify the ecosystem's data governance, security and compliance requirements.

Assess the data value streams

Once the value proposition has been identified, assessing the potential data streams and digital services the digital urban planning ecosystem could provide is crucial. These could include fees for access to the platform, data-sharing agreements or partnerships with other companies.

Develop a financial model

Based on the revenue streams identified, it is essential to develop a financial model that outlines how the digital urban planning ecosystem will generate revenue, what the costs will be, and what the expected profitability will be.

Analyze market opportunities

An essential aspect of developing a viable business model is analysing market opportunities and identifying the market size and the target customer segments. This analysis will help to determine where the most significant growth opportunities are and what the key drivers of success will be.

Identify key partnerships

Partnerships can be crucial in developing a viable business model for a digital urban planning ecosystem. Identify potential partners that can help to drive adoption, such as technology companies, consulting firms or other urban planning organizations.

Establish clear metrics and KPIs for success

It is essential to establish clear metrics for success and monitor them closely to determine whether the business model is viable. These metrics should be closely tied to the revenue streams and the digital urban planning ecosystem's overall performance.

Call to Action

Thinking about business models can be challenging without explicit examples. Consequently, we will focus on the opportunities of our use cases to help achieve this objective. We'll take the first steps by creating a common language with the stakeholders involved in the use cases. We need to dare to experiment. This experimentation helps us achieve our goals concerning the content and is also a social experiment that requires trust and transparency. This is an iterative process of creating game rules, experimenting, evaluating and adapting them. In future steps, we analyse the different use cases to find their similarities and differences and to consolidate a first set of game rules that could be scalable. We need to involve the entire ecosystem of the UDI and beyond to test this.

Ethics

Why?
We live in an information society whose form is constantly evolving. Resident, government and market are using new digital technologies that are fundamentally changing the way we interact with each other. A common slogan in this respect is "technology is not neutral." Technologies are part of power relations between humans and society.

In 1980, Langdon Winner wrote a landmark article called "Do artefacts have politics?" In that article, he defended the hypothesis that the design of a specific technology can be used to solve societal problems in a particular community. Technologies are never isolated artefacts but have a social impact (that is why some scholars define artificial intelligence as a socio-technological construct).

Artefacts (technologies) can have politics: they can signal specific forms of power and authority. The politics of artefacts depends on ever-changing circumstances in a network of people and technologies. This means we must make informed political and ethical choices when developing technologies.

What?
Morality and ethics are two interlinked notions. Morality is the set of (moral) norms and values that an individual, group, institution, or culture considers an essential guideline for its actions. A moral standpoint contains reasons and arguments arising from moral values and norms. Ethics is the critical reflection on what is (morally) right to do. Ethics studies morality.

Within the field of ethics, data ethics is a branch of ethics that evaluates data practices and the deployment of algorithms. Within data ethics, there are generally three concerns: epistemic concerns, normative concerns, and concerns regarding moral responsibility. **Epistemic concerns** address the question of the production of knowledge by digital technologies. Digital technologies can lead to misleading outcomes about social reality. They tend to ignore the complexity of social reality, which can lead to unverifiable and untransparent results. **Normative concerns** highlight the potentially unfair outcomes of digital, such as direct or indirect discrimination and gender inequality in the public space. The **concerns regarding moral responsibility** in multi-layered public-private partnerships vary and are driven by different interests. With digital technologies that can act more or less autonomously, the attribution of moral responsibility becomes even more complicated. Who is morally to praise or to blame when values are impinged? Is it a collective moral responsibility, and what are the implications of such a collective responsibility? Does it change the nature of moral responsibility?

How?
An ethical evaluation is an iterative process systematically analysing stakeholders, impact and values. We can discern 6 phases in an ethical assessment.

Phase 1: Understand the societal context
Technologies are tied to their use context and related to the larger social context. Thus, it is necessary to understand this context and the technology. In this phase, we explore the societal challenge and the technology that aims to address this challenge.

Phase 2: Necessity and proportionality
In this phase, we explore the necessity and proportionality of the technological measure. Necessity means that the content and the form of the technology shall not exceed what is necessary to achieve the objectives of the technological measure. Proportionality, in a broad sense, encompasses both the necessity and the appropriateness of the technological measure, that is, the extent to which a logical link exists between the technological measure and the (legitimate) objective pursued. Furthermore, for a measure to meet the principle of proportionality, the advantages of the technological measure should not be outweighed by the disadvantages of that measure. This latter element describes proportionality in a narrow sense and constitutes the proportionality test.

The following steps can be followed to complete the necessity and proportionality test:

- Step 1: argue why the objective for which the technology is deployed is legitimate;
- Step 2: make it plausible that the deployment of the technology will achieve that objective;
- Step 3: establish whether the technology deployment is necessary to achieve the objective or whether there are less intrusive means (alternative means).

Phase 3: Stakeholders
In this phase, we examine the relevant stakeholders on whom the technology can impact. Which actors (persons, groups, organizations or other non-humans) can be positively influenced by this project and which can be negatively affected by the technology? If the wishes or interests of the people involved are very diverse or cannot be brought clearly into focus, the project leader is advised to organize a meeting with them. All perspectives can be put on the table only with sufficient diversity of thought.

Phase 4 Impact of technology on humans and society
Technologies mediate how we think, act, plan and behave. Technologies affect the power relations between technologies and stakeholders. In this phase, we will explore the positive and negative impact of the technology on the different stakeholders. The objective is to get the broadest possible yield of the effects of technology on the stakeholders.

Phase 5: Values discussion
In this phase, we discuss which values play a role and how they are affected. Ask questions such as: How does the proposed technology contribute to relevant values? And to what extent does the proposed technology infringe values? Values can be personal values such as happiness and altruism. They can also be public values such as control of technology, justice, legality, etc.

Phase 6: Action options
In this phase, we will, based on the values analysis, define options for acting ethically. These options for acting can be encompassed in the technology itself or other measures such as legal options, policy options, education, etc.

Calls to actions

The realization and implementation of such an ethical framework in this new way of working requires the collective participation of all stakeholders. Therefore, we foresee the necessity of a positive, open and critical mindset that facilitates transparency in discussions. Moreover, each stakeholder needs to focus on the practical implementation of such ethical evaluation

within their domain to have a holistic view of how developing and using these new technologies will influence citizens.

Furthermore, the new way of working consists of critical partnerships across multiple helices. Therefore, it is to establish a consensual framework for the division of moral responsibilities. Such a framework can only be co-created by the active participation of the stakeholders from different sides of multiple helices.

Engagement throughout the entire planning process

What?

Urban planning is a matter of many stakeholders and requires a strategy of engagement in practice. The term' stakeholder' denotes an individual, a group, or an entity with an interest or role in a plan/course of action. From public to private sectors, scholars to citizens, the stakeholders of innovations and decision-making in urban transformations are diverse — and so are the types of knowledge they bring to the process and the expectations they hold from the process. This diversity of stakeholders, knowledge, and expectations can be both an opportunity and a challenge for urban planning. 'Engagement' covers the full range of efforts to understand these variations and forms the basis of reasonable decisions that are well communicated and discussed with the stakeholders. Decisions founded on a broad knowledge base help secure longer-term support for strategies; improve the quality, coherence, and effectiveness of actions; and are more robust and transparent (Soma et al., 2018). Nevertheless, the involvement of diverse stakeholders in the planning process means different expectations, competing priorities, and different information needs. Within the network of those with a stake in urban decisions, the diversity of expectations, priorities, and needs makes them sometimes cooperate and sometimes compete to influence a collective decision-making process (Yang, 2014).

Engagement lays out conditions under which the various stakeholders effectively communicate to influence urban innovations and decision-making (Konsti-Laakso & Rantala, 2018). Together with people-centrality and social responsibility, engagement is among the key principles of urban planning in practice (United Nations Economic Commission, 2022). In recognition of diversity in urban needs, priorities, and expectations, stakeholder engagement offers a paradigm where conflicts are mediated and a collective future vision is negotiated (Liu et al., 2022). At different planning phases (i.e., intelligence, design, choice, and implementation), engagement may take the form of sharing information, consulting, or deliberating on decisions. Planners should perceive that stakeholders may desire a particular form/level of engagement/involvement. The engagement process should be dynamic and iterative in search of more inclusive decisions.

Dynamic, iterative, and early, the most comprehensive lens of engagement in urban planning that ensures inclusive decisions. A dynamic engagement process connotes the shifting character of decision-making in urban transformations; indicating the role of strategic responses and timely innovations when future conflicts become complex to foresee (Panda & Sangle, 2020). Iterativeness amplifies the process into appropriately adapting, integrating, and reconfiguring the stakeholders' skills, knowledge, and functional competencies (United Nations Development Programme (UNDP), 2020). As a complement, early engagement not only transmits knowledge but also creates relationships and helps stakeholders gradually balance their power and legitimacy (Cullen et al., 2010). 'Power' is "the potential ability of stakeholders to impose their will" (Parent & Deephouse, 2007, p. 2), and legitimacy is "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 580). Fulfilling coherence, transparency, openness, and accountability is part of early engagement.

The solution to these concerns for engagement is not straightforward (Quick & Bryson, 2016). Although interest in and expectations of stakeholder engagement in urban planning are increasing, the engagement methods and process design vary. In this regard, key concerns are the diversity, inclusion, and legitimacy of stakeholders and challenges regarding the design and implementation of dynamic and iterative processes.

Ensuring a comprehensive and effective solution to stakeholder engagement requires a process that allows all relevant stakeholders to take part in the entire planning process and share control over development initiatives, reaches a balance between different levels of knowledge and expectations; creates a platform of equitable conditions for stakeholders to communicate; establishes a productive dialogue that allows participants to reach consensus; builds commitment and ownership of the process and the final planning outcomes; and empowers individuals to address problems and to set priorities.

Why?
Since the early 1990s, the stakeholder engagement strategy in planning processes has been more clearly seen. The common theme permeating all the strategies so far is proactiveness. Unlike the rarely succeeded engagement strategies, including reactive, defensive, and accommodative, the proactive strategy embraces the highest level of stakeholder engagement (Panda & Sangle, 2020). It maintains an open and transparent dialogue among the stakeholders. Urban planning has been reinventing and delegating equal power to stakeholders by employing the proactive engagement strategy. This has been accompanied by the rise of new approaches to stakeholder engagement that move beyond conventional methods and attempt to maintain the equality of opportunities for involvement. In conventional urban planning, most methods (e.g., public surveys or focus groups) require stakeholders to be physically present in the process. Recently, digital opportunities have been increasingly adopted to enable interactions among stakeholders on an unprecedented level (Hasler, 2017). Whether as a method, a technology, or a tool, digital opportunities allow the stakeholders of urban planning flexible participation at convenient time and location; provides the opportunity for earlier feedback, knowledge communication, and the ability to optimize and fix design decisions together; thereby reducing the likelihood of costly and complex late changes (Toukola & Ahola, 2022). Though under the current approach to engagement implementation — a series of short-term decisions — digital is unlikely to achieve its full potential.

The furtherance of stakeholder engagement relies upon circumstances, including administrative capacity, social trust, and power relations (Åström, 2020). Organisational capacity lies in the quality of local policy cultures (Healey, 1998). Some are well-integrated, well-connected, and well-informed and can mobilize readily to capture opportunities and enhance conditions. Others are fragmented with insufficient connections to sources of power and knowledge. If planning delegates equal power to different stakeholders, higher levels of trust are established, and integrated policies are formulated (Soma et al., 2018). Cities of the future need to adopt a far more strategic approach, of which digital technology is only one, though essential, part.

The engagement process needs to be reimagined. Digital opportunities should be integrated into communicative stakeholder engagement practices in planning processes. This way, the stakeholders become active agents of city change instead of passive policy recipients.

How?
"From the practice of sharing information and consulting to open levels of participatory decision-making, digitalization has become the point of transition."

Making the transition to digital engagement of stakeholders in urban planning requires ensuring that stakeholders from different backgrounds and societal positions have (the economic means and technical capacity to) access, are aware of the options, continue to be motivated, and are aware of what they can expect from their input (Kleinhans & Falco, 2022). In turn, the public sector must adapt its procedures to ensure they can adequately respond to, incorporate, and decide upon the stakeholders' inputs and materialize these in decision-making and subsequent interventions in the real world (op. cit.).

In practice, cities need a comprehensive strategy for stakeholder engagement in urban planning — one that incorporates digital methods, tools, and technologies to facilitate inclusive solutions. An ideal strategy requires a decision about the form of engagement, suit of activities, type of data to be used, timeline, spatial scale of the project, stage of planning, level of technicality, and immediate and future risk barriers.

Call to Action
While digitalization is often considered a solution, trade-offs exist between the benefits and sacrifices of its wide use. The experience of digital communicative practices differs widely across different phases of the planning process and the stakeholders. In its essence, the digital involvement of stakeholders in the process usually requires language processing, decision-making skills, and critical thinking. The design and development of relevant methodologies, tools, and technologies should break down the likely barrier of digital illiteracy for participatory urban planning.

Here are some recommendations to deploy and execute a comprehensive and effective strategy of digital stakeholder engagement for urban planning:

- Make decision on the purpose of the stakeholder engagement priority rather than the technology and the choice of methodology for engagement. The foremost importance should be defining what success would look like for the stakeholder engagement process.
- Suit the technology to the desired outcome of engagement. Variations among the methods and technologies are significant, and the engagement process design should reflect adequate inputs from stakeholders to the urban challenge in question and proper solutions to their needs.

Incorporate digital methods and technologies into communicative actions with stakeholders. Digital is not the only solution to stakeholder engagement; it complements current participatory approaches. Given the purpose of the engagement, the suit of activities, and the desired outcome; digital methodologies and technologies should be combined with conventional approaches that enable broader inclusion and more transparent discussion**.**

Next Steps

This new way of working cannot be created by one party. It fundamentally requires the participation and involvement of all stakeholders and the broader society. Therefore, this manifest aims to open the conversation about the innovation challenges and potentially valuable approaches. But more importantly, this manifest calls all the potential stakeholders to action of developing, expanding, and advancing this new way of working.

IIAF

- Creating awareness of the need for a systemic approach and cross-sectoral dependency within organizations.
- Adopting participatory multiple helices and cross-sectoral approaches for developing and implementing IIAF.
- Developing a cross-sectoral strategy at local urban planning organizations.

Game Rules

- Focusing on opportunities for adapting the existing value chains to the digital revolution to ensure the economic and societal sustainability of the new way of working.
- Developing a cross-sectoral strategy for partnerships that can practice new ways of collaboration.
- Developing feasible and practical use cases that put the new way of working into experimentation.

Ethics

- Creating a positive, open, and critical mindset that allows transparency and trust.
- Focusing on the practical implementation of ethical assessment from each stakeholder's perspective.
- Create a framework for division of moral responsibilities with the partnerships among different parts of the multiple helices.

Engagement

- Emphasizing the primacy of stakeholder engagement objectives over technological considerations and methodological choices.
- Ensuring technology choices are strategically aligned with the intended outcomes of stakeholder engagement.
- Harnessing digital methodologies and technologies to enhance and optimize interactions with stakeholders.

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