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Enabling Inclusion in Smart City Development: A policy toolkit

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Contents

Smog at work camp in Phuket, Thailand

Photograph taken by Andaman Suwannakarn

Introduction

Objectives of the toolkit

- Demonstrate the ways in which social equity considerations are central to urban planning and design, particularly in smart city developments that focus on technology and infrastructure.
- Provide a set of guidelines for conducting stakeholder engagement that is geared towards achieving inclusive urban planning.
- Suggest a framework for analyzing and synthesizing the social equality impacts of smart projects.

This policy toolkit provides insights and recommendations for urban planners to help them adopt more inclusive and gender-sensitive approaches to smart urbanization. It is designed specifically for municipal-level urban planners and metropolitan development authorities who aspire to develop inclusive 'smart' projects. Stakeholder engagement can be an effective way to achieve greater inclusivity. The toolkit highlights the need to consider inclusivity in smart city projects and describes some participatory methodologies that may be employed to help meet this goal.

The 'right to the city' framework is actively employed in the toolkit to argue for better governance approaches and urban agendas that protect rights to land and livelihoods of the urban poor and assert their claims for participation in the creation of smart cities. From a gender perspective, the toolkit also challenges the dominant assumption that "gender issues" simply equates to "women's issues," a belief which overlooks the relational dynamics of gender, as well as the cumulative effects of gender, sexuality, race, income, class, ability, age, etc. on the lived experience of urban residents. At the same time, the urban planning sector is male dominated, which restricts the expression of experiences of other groups who live in urban areas.

The policy toolkit is informed by a research project titled "Entrepreneurial urbanization and masculine identities in Khon Kaen, Thailand",[1] which is funded by the Seed and Innovation Fund of the Stockholm Environment Institute. The project identified the constructions and performances of gender roles and identities of men in defining the conceptualization and implementation of smart city projects. The aim of the research was to identify the social pre-conditions needed for inclusive climate-relevant urban interventions and infrastructure projects across Asia.

This toolkit builds on findings from the case study of Khon Kaen city, where a model smart city project (SCP) has been in development since 2016. The primary intervention of the SCP in Khon Kaen is a light rail mass transit project. In addition, a 'smart block', that targets area-based

[1] For more information on the project, see: https://www.sei.org/projects-and-tools/projects/entrepreneurial-urbanisation-and-masculine-identities-in-khon-kaen-thailand/

development in the central area of the city and 'creative' business revitalizations such as the setting up of co-working spaces and cafes, is also envisioned. Other interventions in the areas of traffic and waste management are also being planned. Key stakeholders in the policy and business sectors in Khon Kaen were interviewed; this was combined with a desk review of news and policy archives to understand the policy drivers of smart city interventions. In addition, interviews were conducted with different groups such as community leaders, truck drivers, home-based workers in informal settlements and shophouse owners. The interviewees were asked about their aspirations for urban development and occupational mobilities, shocks and stresses to their livelihoods arising out of rapid urban growth and adaptation mechanisms adopted by the urban poor to cope with rapid changes. Quotes, examples and anecdotes from the Khon Kaen case study are used to illustrate some of the issues and solutions that arise when incorporating inclusivity into smart city planning. While the empirical base for this toolkit is Khon Kaen, the toolkit aims to provide insights and guidance that may be broadly applicable to various other contexts. Thus, while the actual applicability of these lessons will differ on a case-by-case basis, the guidance provided is easily transferable to other scenarios and can be used to help urban practitioners think through various social equality topics related to smart-city development in a step-by-step manner.

Goals of an inclusive smart city

The main goals of an inclusive smart city are to:

- ✓ Address and combat imbalances in development processes that exclude the interests of marginalized communities from the decision-making process;
- ✓ Ensure inclusive stakeholder engagements which challenge isolated and disconnected planning processes that excludes the interests of socially or economically disadvantaged groups;
- ✓ Proactively promote and prioritize the agency of those who may not benefit from technocratic development pathways;
- ✓ Mainstream gender equality into smart city agendas; and
- ✓ Re-align the allocation resources and the direction of investment to support the land and livelihood rights of the urban poor.

Trends and implications of smart city development in Thailand

Thailand, like many other countries, has embraced the "smart city" concept. This is reflected in national policy goals to create 100 smart cities by the year 2024 (see box below). The push for a knowledge-based economy, fostered by creativity and innovation, is driven by the current national strategy called "Thailand 4.0". This move from the industrial to a service sector is envisioned to lift Thailand out of its middle-income trap (Bangkok Post, 2020). It is therefore not surprising that the idea of a smart city, which promises to solve urban issues by using innovative digital solutions while also creating jobs and boosting the economy, has gained traction in policy circles.

> Smart cities can be defined as "places where different actors employ technology and data to make better decisions and achieve a better quality of life" (McKinsey Global Institute, 2018, p. 22). In the Thai context, this could apply to interventions in seven sectors: the economy, mobility, energy, living, people, governance and the environment (Bangkok Post, 2020).

However, the smart city concept has attracted a wide range of criticisms and concerns. There is no single agreed upon definition of smart cities , and therefore the concept has been inconsistently adopted and co-opted in different contexts for furthering different agendas (Mosannenzadeh & Vettorato, 2014). While they are often depicted as a sustainable urban solution, the long-term environmental effects of smart infrastructure have been questioned (Colding et al., 2018). A smart city plan often projects aspirations to create a 'world class city', but when implemented in many under-resourced contexts, the plans starkly disengage with grounded realities, capacities and contexts (Butsch et al., 2017; Kaika, 2017; Watson, 2015). The emphasis on technical solutions poses a risk of excluding people from decision-making processes (Willis, 2019), such as community networks of the poor with non-technical expertise. There are also issues with adopting technical solutions with groups who lack familiarity with digital modes of engagement, such as the elderly (Lee et al., 2020). A smart city could lead to private control of spaces for urban beautification and development projects, thereby undermining the existing use of land for dwelling and access to economic opportunities for the urban poor (Watson, 2015). In addition, smart cities can transform how a city is governed and surpass democratic and accountable means of participation and decision-making, through the creation of parastatal or special purpose bodies (Benjamin, 2000). Questions regarding surveillance and the privacy of citizens due to the collection of large amounts of sensory data have also been raised (Halpern et al., 2013; Kitchin, 2015). n such a context, it becomes essential to understand the 'right to the city' approach and its usefulness in countering increasing entrepreneurial and technocratic approaches of place-making. The 'right to the city' framework, introduced by Lefebvre in 1996 (Lefebvre et al., 1996), remains an influential concept today. It encompasses:

- The right to access, occupy, use and make claims on urban spaces
- The right to participate in the various arenas of local political debate (Purcell, 2002).

Many social movements in cities in the Global South have invoked the 'right to the city' in their fight for improved housing, employment and mobility rights. These rights may be closely linked with one another, for many of the urban poor. For instance, informal dwellers, or informal workers in the Global South, use domestic spaces for seeking access to or carrying out informal employment activities in the city (Idiculla & Madhav, 2021). The 'right to the city' framework has even been applied to smart cities, dubbed the 'right to the smart city' (Cardullo et al.,

2019), an idea which aims to reclaim spaces in privatized 'smart' enclaves and create access to information and participation in a digitized city for all citizens.

Keeping in mind the 'right to the smart city' of all people, the following sections of the toolkit, explain why a more inclusive smart urbanization process is needed and explores ways to incorporate gender and social equity considerations into urban planning.

Understanding gender and social equity in smart cities

Smart cities have the potential to optimize urban infrastructures, but there have been criticisms of the ways in which the technology and investment-centered nature of many smart city projects overlook the needs of socially or economically disadvantaged groups (Hollands, 2015). While smart city projects have general goals of improving residents' quality of life, it is easy to overlook how conventional norms and attitudes in the urban development sector (e.g., in terms of leadership, decision-making and bureaucratic structures) may inhibit equitable outcomes, especially for those who are already socially and/or economically marginalized. For example, smart cities' emphasis on information and communication technology (ICT) development may fail to consider people's unequal access to technologies as well its potential impacts on certain livelihoods (e.g., those whose jobs are being phased out because of automation or other technological interventions). Without the explicit integration of gender and social equity goals into smart city development projects, these initiatives may simply serve corporate interests and only financially benefit wealthy individuals, rather than addressing the needs of citizens.

A gender disaggregated analysis of changing livelihood activities under urban shifts is important for devising gender-sensitive and ultimately transformative policies and programs. Development schemes such as smart city planning can restructure the ways in which activities such as productive work, mobility, and access to public spaces are defined and conducted. For example, these changes can be brought about via the re-shaping of public spaces through infrastructure change, changing of available jobs and technological advances. As these changes happen, women and men in lower income communities, whose livelihoods are threatened or eliminated to make way for smart city development, can struggle to find new employment opportunities due to their educational and social backgrounds. In particular, across many parts of Asia, productive work, earning and spending money, as well as physically being in public spaces are traditionally seen as masculine activities (Chopra, Osella, and Osella, 2004; Rai, 2020). Studies have shown that when such activities are restructured or even taken away, masculinities and ideas of what it means to be a 'capable man' are destabilized, which can lead to aggressive responses, such as increased violence against women (both within public and private spheres) in order to assert dominance and compensate for lost social status (Srivastava, 2010; Hill et al., 2017). Thus, when integrating gender concerns into urban and smart city planning, it is not only crucial to put women's issues at the forefront, but equally important to address impacts relating to men.

Consequences of a lack of inclusion in smart city planning

This section outlines some of the impacts when there is a lack of meaningful integration of social inclusion measures in smart city planning (adapted from BCNEUJ, 2021; Cities Alliance, 2020; Willis, 2019). When there is a failure to consider key aspects of accessibility and inclusivity, smart city interventions run risks as follows:

- Creates institutional structures that concentrates power or lacks accountability
- Does not enable transformative citizen participation and inclusion of civil society organizations
- Leads to unequal access to information and knowledge about smart city plans amongst citizens
- Results in unequal access to use of smart city provisions and infrastructure (based on class, gender, age, race, and / or ethnicity)
- Supports programs or designs projects that exacerbates social inequalities, such as increase in pricing of essential amenities or eviction of informal housing dwellers
- Drives out low-paid, informal workforce through a rapid shift to automation and privatization of urban services
- Drives interventions that make public spaces hostile or inaccessible to the urban poor, disabled, or the elderly
- Includes urban rejuvenation or other area-based interventions that create long term displacement and gentrification of low-income neighborhoods
- Unequally distributes environmental health outcomes across the city.

> “Only the rich can benefit from outcome of those project. Have you taken a look at the model of the SCP? There are beautiful gardens, and luxurious shopping malls. Do you think the poor like us will be using those things? What if we are forbidden from entering the garden? Who knows, right? The idea of SCP is actually good, but it would be better if their model contains some facilities that suits our lifestyle…We never think to stop the project, but there should be some space for the poor. We don’t want tall buildings or flats.”
>
> -Interview with community leader from Khon Kaen

In order to reduce these risks, active engagement with multiple and diverse stakeholders from the outset of a project is crucial because it can help urban planners to understand how certain interventions can either benefit or unintentionally exclude certain people groups. The following section provides guidelines on how to conduct stakeholder engagement so that it achieves inclusive planning.


Street vendor in Chiang Mai, Thailand

Photograph taken by Andaman Suwannakar

Guidelines for conducting stakeholder engagement that achieves inclusive urban planning[2]

How to design participatory planning and designing processes and activities

Step 1: Identify participants: select individuals from target communities

→ You may refer to the guidance section on "Stakeholder mapping and identification"

Step 2: Select facilitation staff and design the community engagement process

→ You may refer to the section on "Inclusive approaches to data collection"

Step 3: Conduct the community engagement: residents have an opportunity to communicate the benefits and burden of projects with practitioners and co-design solutions

→ You may refer to the "Appendix section" for a list of question guides

Step 4: Communication: how outcomes will be fed back to the people who have contributed to the planning process.

→ Ensure that the entire process and the knowledge created is clearly documented and transparently made available to all stakeholders in the city.

[2] This section is adapted from Barquet et al. (forthcoming) to better fit the context of urban planning and design

Stakeholder identification, mapping and involvement

To achieve the objectives with smart cities (as well as other types of projects) it is necessary to involve the relevant stakeholders. In this toolkit, we build on the work by Barquet et al., (2022) that distinguishes three steps for engaging stakeholders: 1) Stakeholder identification; 2) Stakeholder mapping; and 3) Stakeholder involvement.

Broadly defined, stakeholders are any group or individual who can affect or is affected by a process, issue or objective (Freeman, 2010). Weible (2006, p. 96) states that stakeholder analyses typically include the following questions: "Who are the stakeholders to include in the analysis? What are the stakeholders' interests and beliefs? Who controls critical resources? With whom do stakeholders form coalitions? What strategies and venues do stakeholders use to achieve their objectives?" Such questions should equally be asked when brainstorming who to include in the mapping and planning processes.

1. Stakeholder identification

The first step is to identify the relevant stakeholders. This is done according to stakeholder groups and stakeholder roles. Groups and roles are defined according to the objectives and area of focus in a policy process or development project, such as a smart city development project.

- Stakeholder groups

Stakeholder groups should represent the main sections of society, such as authorities from governmental agencies, political representatives, community representatives, civil society, the commercial sector, academia, media, and international and transnational organizations.

- Stakeholder roles

While stakeholders can only represent one group, it is possible for them to have several roles. In an SCP several different roles are potentially relevant, such as decision-makers, implementers, coordinators, knowledge providers, financers, lobbyists and gatekeepers.

2. Stakeholder mapping

When the stakeholders have been identified, two different maps of them should be created: one according to representation and one according to influence.

Table 1 shows an example of stakeholder mapping according to representation, adapted to the governance structure of Khon Kaen city. Notice how stakeholders only represent one group but may play different roles. As many stakeholders as deemed feasible can be included but a balance between the roles is ideal.

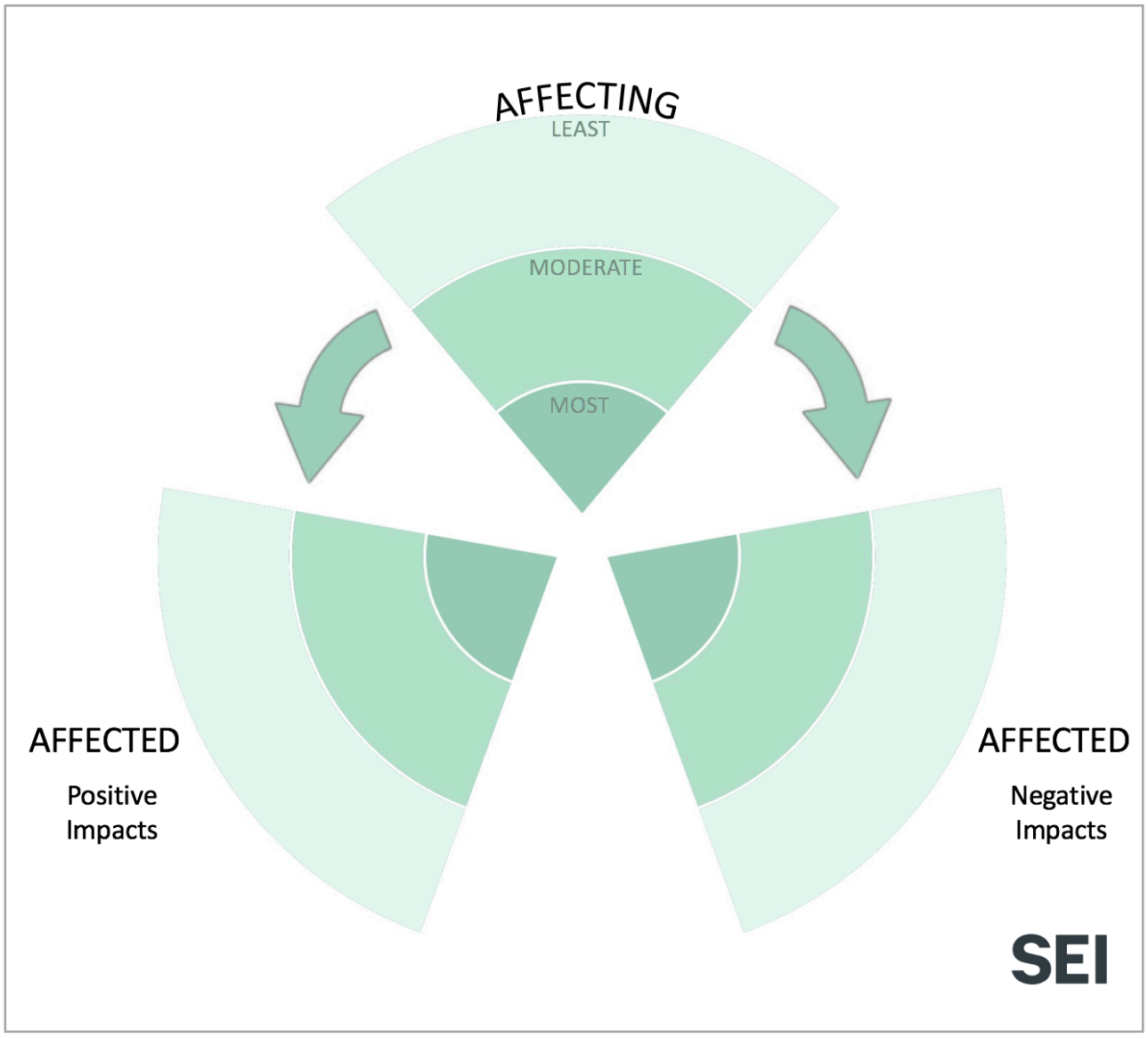
Table 1. Example of stakeholder mapping according to representation (Source: Barquet et al., 2022)

Stakeholder Group	Name, Position and Organization	Role						
		Decision-makers	Implementers	Coordinators	Knowledge Providers	Financers	Lobbyists	Gate keepers
SH1: Authorities	Central administration e.g.: Digital Economy Promotion Agency, Ministry of Interior, Ministry of Railways	X	X	□	□	X	□	□
	Provincial administration, Municipality	□	X	X	□	X	□	□
SH2: Political Representatives	Mayor	□	X	□	□	□	□	□
	Elected community leaders	□	□	X	X	□	X	□
SH3: Civil Society	Slum networks e.g.: Four Regions Slum Network	□	□	X	X	□	X	X
	Business associations e.g.: Srichan club (association of shophouse owners), Khon Kaen Chamber of Commerce	□	□	□	X	□	X	X
SH4: Private Sector	Multinational corporations e.g.: Grab	X	□	□	X	X	X	□
	Regional / local private companies	□	□	□	X	X	X	□
SH5: Research	Research units in government agency	□	□	X	X	□	□	□
	Researcher, University	□	□	□	X	□	□	□

The second mapping focuses on stakeholder influence. A rainbow diagram (Burgers & Farida, 2015) can help analyze the extent to which stakeholders a) influence the smart city development (e.g. decisions, structures, dynamics) and b) are influenced by the smart city development (e.g. control over resources and access to benefits) (Figure 1). The results from this methodology can be used to help assess whether the most influential or influenced stakeholders are being included in the stakeholder map.

Separate diagrams are used for 1) stakeholders affecting the smart city development, and 2) for stakeholders being affected by the smart city development.

Figure 1. Rainbow Diagram *(Adapted from Barquet et al., 2022)*

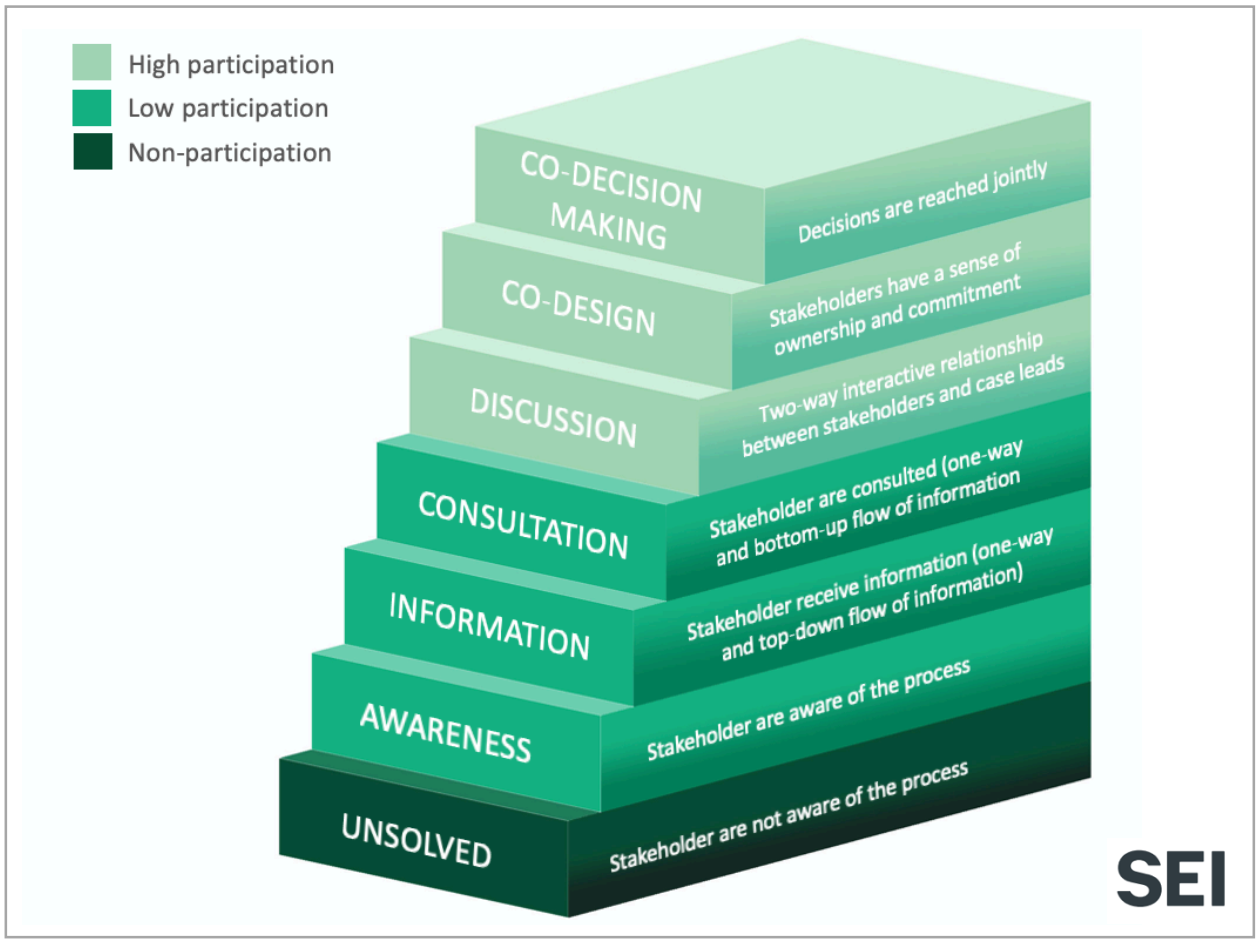


3. **Stakeholder Involvement**

The third step of the stakeholder analysis is to assess the level of involvement or participation required and desired by each stakeholder (Figure 2). This addresses the following questions: what stakeholders are needed at different stages to obtain necessary inputs? How much and in what way do stakeholders want to be involved? And how much should stakeholders be involved and when?

> Mostly, they [the government agencies] didn't invite us, the affected people, to join the meeting [on Smart City developments]. There was one incident where we tried to get into the meeting, but they didn't let us in. After that, we blamed them and told them that we're the people who were affected, but why didn't they allow us to take part in this discussion? They invited outsiders who are not affected by this project.
> -Interview with community leader from Khon Kaen

Figure 2. Levels of participation *(Adapted from Basco-Carrera et al., 2017, p. 100)*



Once the stakeholders are identified and mapped and the desired involvement of each group is established, affected stakeholders can potentially transform decision-making processes and become 'co-decision makers' (Figure 2). For this, the mode of engagement must be designed with care so that it creates a comfortable space for participants. The group should be invited to come forth analyze social equity impacts and redesign the intervention in a more equitable manner. In the following sections, some useful guidelines are presented to help the practitioner organize stakeholder engagement activities.

Analyzing social equality impacts of smart projects

This section provides guidance on analyzing the social equality impacts of smart projects in two key steps. First, it outlines inclusive approaches to collecting data that will inform the social impacts of smart city interventions. Second, it provides a guiding worksheet to help the practitioner organize their collected data in a simplified way via showcasing the types of impacts in different domains of a smart city project.

Inclusive approaches to data collection for analyzing social equality impacts

In order to accurately analyze the various needs, and thus social equality impacts, of different populations, the data collection process should include the various community groups in the city. Below are three key considerations to prioritize when developing a data collection strategy.

Understanding norms and building trust

The first step towards creating an inclusive data collection process is to consider the types of techniques that can facilitate meaningful participation. It is important to consider the varying norms, behaviors and dynamics of different population groups, in order to engage with people in ways that will allow them to feel the most comfortable (Escobar et al., 2017). This may influence the choice of person that does the data collection – respondents may feel more comfortable responding to questions from someone that they can identify with, or to someone who identifies with the subjects or empathizes with their situation (Vigil et al., 2020). Thus, it is important for the data collector to reflect on their own identities and assumptions about the community they are trying to get information from, as this can impact the power dynamics between the interviewer and interviewee. The identities and positions of the data collector will also influence the way questions are formulated when collecting data, as well as the type of answers the respondents will provide. The data collector must also be flexible enough to engage with those who have limited availability (e.g., those with limited mobility, people who work irregular working hours, caregivers, etc.). Ultimately, these considerations will help ensure that communities are engaged in a way that makes them feel comfortable and respected, which is crucial to establishing trust between parties.

Data collection methods

While quantitative methods (e.g., statistical data collection) can provide an overview of trends and patterns on a given topic (e.g., via sex disaggregated data), these approaches alone are insufficient in capturing the experiences and perceptions of individuals and their communities. Thus, qualitative approaches play a critical role in capturing various aspects of social relations and are a better way to identify various social equality impacts (World Bank, 2013, p. 12). Methods such as interviews and focus groups can provide more in-depth information that centers on individual experiences. This is crucial to understanding the diverse needs of communities and thus essential for analyzing social equality impacts of a smart city intervention.

Individual interviews are a valuable way to gain insights into people's experiences and understandings of a given issue and/or phenomenon related to smart-city interventions. Individuals can express their perceptions of smart-city developments and share experiences or perceptions of how certain interventions may impact them.

Focus groups are a data collection strategy which entails organizing small groups of participants to discuss one or more issues. While focus groups can be used to identify themes for individual interviews to focus on, they can also help facilitate discussions around community memories and issues or concerns experienced by a particular group (Segnestam, 2014). This can be valuable to collecting community experiences with or perceptions of smart city interventions. In addition, when conducting focus group discussions, it may be important to organize separate discussion groups based on different identities to avoid certain individuals either dominating discussions or refraining from participation. For example, organizing women and men into separate focus groups can address gendered experiences of a particular issue (some women may feel uncomfortable sharing certain viewpoints or experiences in the presence of men, etc.). As a general principle, do not mix people that perceive themselves as having more or less power than others.

It is important to note that ethics are of upmost importance during both the research design and execution phases. Key ethical considerations include informed consent (i.e., is the participant fully aware of the purpose of the study, including how the data will be used, and explicitly agree to take part), right to privacy/confidentiality, fairness (i.e., is the power relationship between the researcher and the participant fully considered), and data protection.

Sampling strategy

The sampling of respondents is crucial in determining the type and scope of responses that will be received. Thus, it is critical to develop a sampling strategy that is inclusive in order to capture the different experiences between groups (e.g., men, women and non-binary folks) and within groups (e.g., migrant women/men and non-migrant women/men) (Vigil et al., 2020). Methods and strategies such as interviews and focus groups should ensure an approach that considers the heterogeneity of identities. This means that different genders, ethnicities, people with different socio-economic status and ages etc. are included in the sampling. Prioritizing a broad and diverse sampling size will help ensure that those who are typically marginalized or made invisible in decision-making processes can have their voices heard, which will provide a more accurate representation to the actual needs to different populations.

Table 2. Example exercise to selecting interviewees to obtain proportionate representation of social identities[3]: ages, abilities, gender identities, ethnicity.

	Interviewees from low-income class			Interviewees from middle-income class			Interviewees from high-income class		
	Elderly*	Adult**	Adolescent ***	Elderly	Adult	Adolescent	Elderly	Adult	Adolescent
Women									
Men									
Other / non-binary									

*60+ years old
**18-59 years old
***<18 years old

Table 3. Example exercise of focus group composition to account for multiple identities

	Men-only group	Women-only group	Non-gender binary group (e.g., transgender individuals)
Class (e.g., low, middle and high income classes)	4* members	4 members	4 members
Ethnicity (e.g., minority ethnic groups and majority ethnic groups)	4 members	4 members	4 members
Age (e.g., elderly, adult, adolescent)	4 members	4 members	4 members
Disability (e.g., individuals with certain physical or mental disabilities)	4 members	4 members	4 members

*Numbers are hypothetical. Members can also include individuals from grassroots that represent or advocate for these populations.

[3] Table 2 and 3 are adapted from *Critical Gender Analysis Guidance* Note by Vigil et al. (2020)

Appendix 1: Worksheet to analyze social equality impacts of smart projects

This section can be used as a worksheet or question guide for stakeholder involvement when using research methods such as focus group discussions or interviews.

STEP 1

In the table below, list all your smart city interventions in the second column of the table below. You can print the page in A3 size and use sticky notes to populate each field.

STEP 2

Using the above methodologies, consider if each of the smart city intervention benefits people from different groups in the city. Reflect whether there are barriers or negative outcomes for different groups. Some guiding questions that can be used as data collection guides for interviews or focus groups are presented in Appendix 2.

STEP 3

With the consultation of stakeholders, rethink and redesign your intervention to make the plan more inclusive or establish redressal mechanisms for adverse social impacts

Think through each of the columns, in terms of **benefits** created for each group. These could mean employment opportunities created, access to use of the infrastructure, control over the infrastructure created, vulnerabilities to environmental impact of the intervention, and also their representation in planning bodies and positions of power (see Appendix 2).	Consider if there are **barriers** for different groups in terms of employment created, access to use of intervention, control over the infrastructure created, vulnerability to environmental impact of the intervention, and if they are represented in the planning levels. Think how you can make the intervention inclusive to the group.	Consider how you can **redesign** the intervention to make it inclusive to the group of people belonging to more than one vulnerable groups (e.g., how to make the public transport service accessible to low income, disabled women).

Table 4. Synthesis of interventions and experiences by different user groups. Examples of smart city intervention derived from Smart City Action Plans in Southeast Asia (ASEAN Smart Cities Network, 2018)

Smart city project domain	List the details of your smart city intervention (some examples listed below)	How do people from different backgrounds experience the intervention?					
		Gender and sexuality	Class	Age	Ethnicity	Disabled	Other
Public spaces	Area-based development, footpath construction						
Transportation	Traffic management, Introduction of new public transport service						
Security	Pedestrian traffic sensors						
Healthcare	Inventory of health care data						
Waste							
Energy							
Water							
Tourism							
Community Engagement							
ICT solutions / Digitalization							
Disaster risk management							
Other public services							
Other resource management							

Appendix 2: Guiding questions for making an inclusive smart city plan

These questions are adapted from the social impact analysis guidelines developed by the Cities Alliance (2020) and World Bank group (2013) to fit the smart city context . Please treat this list as a guiding list of questions, and that these questions may not be exhaustive to guide gender and social equity analysis in every urban context. Even though the differences at times are expressed for "men and women", change the questions based on the stakeholder mapping exercise.

1. Livelihoods (means to make a living)

The impacts of smart city interventions on employment can work differently for different people (based on gender, class, race, age, disability) because they have significantly different positions in the labor market.

- Are men or women disproportionately employed in the sector of the intervention (e.g., transport, ICT and construction sectors can be male dominated)?
- Do women and men have the same skills in the reformed sector?
- Are men and/or women constrained in any way from taking advantage of the benefits of the intervention accrued through employment, such as constraints from household responsibilities (e.g., domestic care-taking roles), lack of access to resources, limited role in decision making, or others?
- Does the intervention have an impact on the quality of jobs for men and women (e.g., earning gaps, access to social security)?
- If the intervention results in the loss of employment how does it affect men and women as employees?
- Does the intervention redress loss of jobs for those employed in established traditional/ alternative mode of service provision (e.g., Informal transport providers such as the *Songthaew*[4] drivers affected by a push for e-commerce platform aggregators)?

2. Access (ability to use and benefit from a resource)

Different groups of people (based on gender, class, race, age, disability) have different levels of access to goods and services, and smart city interventions may not have equal access for all. Changes in the prices of urban public services can affect different groups of people differently, depending on the role of the two groups as producers or consumers in the smart city project domain.

[4] A four-wheeler truck with affixed benches/ share-auto used as para-modal or primary mode of transit in cities of Thailand.

- Which group comprises the majority of the population using the service brought about by the intervention (e.g., men and women from a certain income group)?
- Does the intervention create a space that feels safe and accessible to all groups? If not, what are the barriers?
- If user fees are introduced or removed for certain services, are they expected to discourage or encourage certain groups from using these services? Will this influence gender or other social inequalities (e.g., privatized provision of water leading to women walking longer distances to fetch water from public sources)?
- Will the intervention change men and women's access to infrastructure facilities and natural resources? If it does, how may these changes affect gender relations?
    - For example, will one group have more access than the other, thus leading to an imbalance of resource control and/or dominance of certain spaces?
- Do certain groups across society and within the household (e.g., male and female household members) have different consumption patterns because of differences in their priorities, needs and available substitutes?
    - For example, women's disproportionate burdens in domestic care work may mean that they have different needs and priorities when it comes to accessing resources (such as needs for reliable source of water to carry out domestic tasks).
- Does a change in the prices of goods or services have an impact on household members other than the household head (e.g., looking beyond the typical male household head and consider female members, children, elderly) in terms of time use, household work, and access to health and education, among others?
    - Instead of looking at household as a single unit, consider how intra-household dynamics influence access to goods and services. (eg: Relocation of poor households from the inner city to periphery can lead to higher transportation costs at the household level and lowered workforce participation amongst women, in order to cut down household costs (Coelho et al., 2012))

3. **Control** (not only have access to, but also make decisions about how to use the resource)

- Does the reform facilitate or impede certain groups' access, use, ownership and control over assets (e.g.: eviction of informal dwellers or removal of street food vendors for rejuvenation and construction of private properties such as malls and restaurants)?
- Does the smart city agenda support the right to land and livelihoods of the urban poor? Does the reform affect certain groups' ability to accumulate wealth?
- Does constrained control over hitherto public assets prohibit some groups from benefiting from the intervention?

- Does the intervention affect assets that are disproportionately owned and accessed by certain groups of people?
- Does the intervention leave out people with traditional skills and capabilities?
- Does the intervention affect social ties and networks held by vulnerable populations?
- Does the data collected pose threats to the data security of some groups (e.g., use of facial recognition for improving 'security' can lead to gendered differences in public safety)?

4. Environment

- Does the intervention concentrate pollution to specific areas within the city? Does this disproportionately affect certain groups of workers or inhabitants?
- Does the intervention (e.g., greening of public spaces, development of railway systems, etc.) lead to the gentrification or displacement of low-income households?
- Are certain interventions (e.g., development of parks) only concentrated in specific areas of the city, making it less accessible to certain populations?
- Are workers employed by the intervention protected by sufficient health safeguards and social security (e.g., waste workers or traffic workers)?
- Are the materials used for setting up the smart systems sustainably and ethically sourced?
- Are the green jobs created accessible to different groups of people? For example, are people being displaced from their current jobs because of the 'green transition'?
- Are environmental outcomes distributed unevenly within the city (e.g., the location of incinerators and recycling industries can disproportionately pollute low income neighborhoods occupied by waste pickers (WIEGO, 2021)?

5. Public participation and planning

- Are different groups of people (based on gender, class, race, age and disability) represented in the planning process?
- Are different groups of people represented in the planning body or expert groups? Are their voices sufficiently prioritized?
- Are grassroot civil society groups and organizations represented in the planning bodies or expert groups?
- Can different groups of people spend time on voluntary work and political activities? How can you enable this in your engagement?
- Do different groups of people have access to information about the smart city plans and progress? What may be some barriers?
- Does the selected mode of citizen engagement (such as digitized modes) hamper the participation of specific groups like women, the disabled and the elderly?

- Do the identified interventions sufficiently encapsulate the visions of all groups of the urban population?
- Are there mechanisms to gather feedback from all groups of people after implementation of the intervention?
- Do you collect gender-disaggregated data and correct outcomes and unintended consequences that exacerbate social inequalities?

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