

1. Reflection

Overview

The following chapter summarizes the main reflections around the methodological approach and the proposed adaptive framework, by explaining its advantages, parameters and possibilities for its effective practical implementation, considering the scientific, social and ethical relevance of this work.

Abstract

Challenges such as rising poverty rates, internal displacement, market-oriented development and social inequalities can be clearly identified in the binary configuration of Bogotá's formal and informal environment. Urban informality emerges as one of the main and most diverse ways for producing urban space and being characterized, given the complex development circumstances, by entailing high social, ecological and socioeconomic vulnerability rates.

Bogotá's slum upgrading program, despite being a crucial instrument in the transformation of informal settlements, has proven to be insufficient to overcome the fragmentation between formal and informal urban systemic dynamics and has shown a limited strategic vision to counteract in a correlated and adaptive way the multidimensional vulnerability in informal environments on a long-term perspective.

The thesis proposes an adaptive planning framework, understood as a complementary approach to the current planning structures. This framework aims to guide the cohabitation and co-evolution between social, economic and environmental systems over time, and expand the current planning scope by redefining the interrelation and role of formal and informal actors as co-agents of change in the adaptive process.

Chapter Structure:

1. **Research and Graduation studio and Master Track (The relationship between the graduation topic, the studio topic, the master track and the program.)**

2. **Research method approach and scientific relevance. Elaborating on the research method and approach reflecting thereby upon the scientific relevance of the work.**

2.1 Research Method approach

2.2 Analytical Framework

- Vulnerability index and the multidimensional vulnerability diagnosis

- Critical assessment of the current planning approach

2.3 The design of a co-evolutionary framework (research-oriented design)

2.4 Social and scientific relevance of the work.

3. **Relationship between the proposed framework and the possible transferability of the results and potential applications of the results in practice.**

4 **Ethical and Final Considerations (A reflection on the advantages and limitations of the chosen methodology, ethical issues and dilemmas encountered in doing the research)**

This thesis seeks an answer for the following question (main research question): How can an adaptive strategic framework create a new planning vision for vulnerable areas in the city of Bogotá in order to achieve a sustainable, dynamic and cohesive urban environment?

The following chapter summarizes the main reflections around the methodological approach and the proposed adaptive framework, by explaining its advantages, parameters and possibilities for its effective practical implementation, considering the scientific, social and ethical relevance of this work.

1. Research relevance, graduation studio and master track. The relationship between the graduation topic, studio topic, master track and program

The development of the proposed adaptive strategic framework, and the critical assessment of the current slum upgrading approach for informal environments in Bogotá (Colombia) is naturally related to urban planning and, therefore, to the selected study (Complex Cities). Nowadays, the complex co-existence of social, political, and economical dimensions is challenging the traditional dichotomy between the 'formal' and 'informal city' and contesting the definition of the 'informal' itself. Driving the meaning of informality beyond the 'classic' understanding of this phenomenon as the 'city of the poor', not just applicable to Colombia, but to Latin America and, in general, the Global South; and calling for urgent co-production of more fair and conscious urban spaces (Lutzoni, 2016).

Considering the above, the socio-spatial and socio-economic fragmentation between the formal and the informal city must be understood as clear evidence of the failure of the urban planning sphere, by lacking to recognize informality as a fundamental part of a city's operational and organizational system. There are several pressing issues on the international agenda that must be addressed through innovation e.g. the challenges posed by programs aiming for the elimination of poverty, the structural and functional transformation of urban systems, and the latent need for adaptation and socio-ecological resilience in an era threatened by climate change and diverse sorts of natural disasters (even a pandemic that would certainly change the world). Now, it is more vital than ever to adopt strategies that embrace the full extent of the varied and diverse formal and informal actors, bringing their backgrounds, disciplines, realities and needs and considering them when thinking the solutions, as part of a creative and democratic transformation path with a long-term vision.

Traditionally, planning instruments are based on stability and predictability, while informal settlements are characterized for being dynamic and changing environments. In this sense, the proposal explores how, from the field of urbanism, designing a novel planning methodology might reinforce the adaptive capacity of informal settlements in order to respond to dynamic, foreseen or unforeseen, changes. Such a proposal requires a non-linear approach, based on development conditions rather than a fixed development plan. Thus, the implemented adaptive approach is grounded on the multi-scalar understanding of the challenges, strengths, weaknesses, and threats of a particular space and the possible interrelations to the systemic operability of the city.

2. Research method approach and scientific relevance. Elaborating on the research method and approach reflecting thereby upon the scientific relevance of the work.

2.1 Research method approach

The complexity in understanding, analyzing and addressing specific challenges of informal environments, which are determined by a wide range of conditions, requires in turn a complex assessment system as solution. It should be noted from the outset that seeking the improvement of informal areas, certainly, is not a new challenge in the urban planning policies in Colombia. The country has been recognized worldwide for the efforts related to the informal neighborhoods upgrading programs on a number of occasions. Cities such as Bogotá (the capital) and Medellín (the second largest city and economic platform) have been awarded for their proposals around concepts (and theories) such as 'social urbanism' or their well-known innovations in mobility issues. In spite of these efforts, it is evident that the referred interventions have not achieved structural transformations over time and that many of these proposals do not end up being carried out, at least fully or properly, due to funding problems, time management concerns, or corruption, among others.

Taking into consideration the specific case of Bogotá, the mechanism through which the District Administration (Alcaldía Distrital) promotes and orients the upgrading, complementary and/or reordering actions of housing units as well as, in general, the informal urban space, is compiled in an upgrading program which is carried out by the District Habitat Secretariat (Secretaría Distrital de Hábitat). Despite the specific challenges and necessary changes in each of the informal areas in the city, the district program has been developing generic interventions on a short-term perspective, with a physical and technical approach that lacks an integral development assessment. Such a desired integral assessment must address the evolutionary and complex challenges of self-built environments from a correlated perspective between social, socioeconomic, environmental and political spheres.

In the following section, some essential elements and main reflection on the analytical and design methods will be elucidated.

2.2 Analytical framework

Vulnerability index and the multidimensional vulnerability diagnosis

Based on the previous considerations, the analytical framework was structured based on the creation and development of a 'vulnerability index'. The main value of this tool is that with it is possible to organize and prioritize the diverse analytical variables regarding socio-spatial, ecological and socioeconomic vulnerabilities that have an impact on the systemic operability of a city. Furthermore, this index was also instrumental when developing the assessment, in terms of bridging the adoption of a critical understanding and realizing the correlation of diverse systems (both social and ecological) in the structural causes of particular problematics evidenced in the selected areas of analysis. Secondly, the isometric and three-dimensional representation presented in the analysis intended to capture the complex topographies, the degrees of consolidation and the systemic operations of the analyzed systems, resulting to be an essential tool in qualitative terms. Using such a representation to illustrate the realities of these places proved to be a powerful instrument.

Critical assessment of the current planning approach

The second analytical method focuses on exploring actions and strategies carried out by two different District Administrations (each period of four years) under their upgrading programs in two critical and very indicative locations from the informal area of Bogotá. This analysis was necessary to understand the structural problems of the current program i.e. lack of long-term vision, implementation of isolated actions as solutions and, ultimately, the evidence of persistent high rates of vulnerability over time.

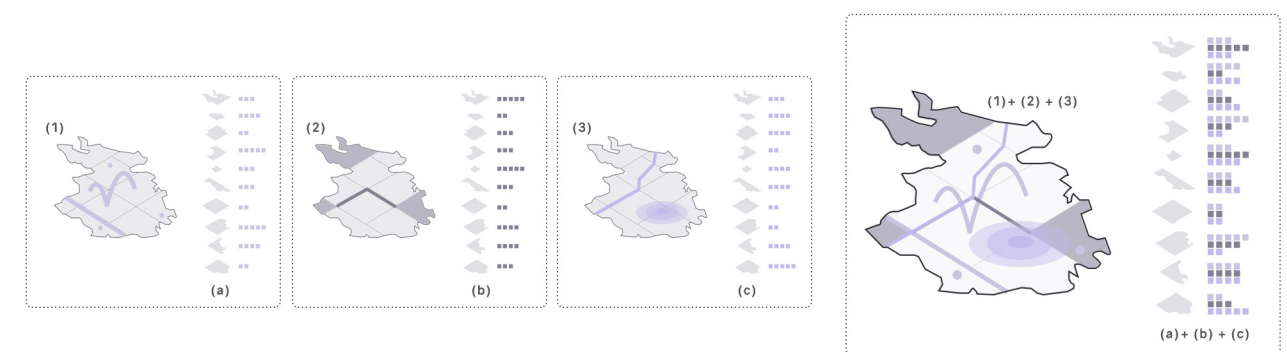
The current upgrading program is conceived as an end and not as a vehicle to strengthen and expand the capacities of the communities and, therefore, to increase their autonomy and adaptability. Regarding the physical interventions in the environment, the program proposes interventions in both the public domain, e.g. road infrastructure and service actions, as well as in the semiprivate and private domain, e.g. interventions in facades and dwellings. However, the intervention models, and the urban and architectural design processes, are ignoring the particularities of the settlements, forcing and imposing generic interventions that do not recognize any differentiation between one settlement and other, despite being in different locations, distinct time of consolidation, population structure and characteristics, among others. This same approach to very diverse informal settlements, ends up imposing the same aesthetics and formal conception of "how these spaces should look like".

Therefore, the understanding and application of the notions of 'co-production' and 'local participation' in processes of socio-spatial transformation is challenged through findings. It must be clearly noted that the idea of involving communities is not new, it has been adopted in different strategies of upgrading programs in the past, yet the scope and focus transform the idea of co-production into a formally pre-established notion, in which the involvement of local communities merely represents a final check at the very end of the implementation of the strategy.

The analysis stresses the importance of rethinking the role of the urban planner and designers in informal contexts. On the one hand, it is crucial to redefine the practical foundations of design and co-creation tasks and, on the other hand, to redefine the long-term goals, where strategic interventions must activate a path that allows an evolutionary transformation of the formal and informal agency. The continued participation of all actors must be ensured through strategic interventions over time. Informal communities must be equipped with the necessary tools in order to continue developing and transforming their environments endogenously and, consequently, lowering their vulnerability and exposure to risk in structural terms.

The design of the planning framework is supported by evidence, comprised in the findings provided by the two analytical tools. This framework embraces the co-evolution of social and ecological systems and, through the alignment of the biophysical, social and socioeconomic systems, it is capable of activating and transforming the role of formal and informal agents into co-agents of change in the adaptive process.

Fig. 1.1 - Correlated Understanding of the Vulnerability results



2.3 The design of a co-evolutionary framework (research-oriented design)

By designing a co-evolutionary framework what is pursued is the creation of a collaborative process for action. The development of such a framework is proposed as a complement to the current upgrading program in Bogotá. One in which the existing conditions of an urban context can be appropriated and, subsequently, guide the co-evolutionary transformation of a specific location. As explained in the previous section, the cross-dimensional analysis which was defined through the 'vulnerability index', resulted in a multi-dimensional and correlated approach to vulnerability.

Based on the definition proposed by Giorgos Kallis, where co-evolution is understood as the progressive and evolutionary transformation between interacting social and environmental systems (Kallis, 2007), three co-evolving systems were defined which structured

the long-term goals and the strategic actions of the proposal. To be more specific, an example of one of the proposed goals, is the one framed under the notion of 'Productive Ecology', which interrelates and adopts the vulnerability in the ecological domain and the vulnerability in the socioeconomic domain, in a same co-evolving system. This is implemented by proposing nature based solutions and possible environmental related economies. The approach aims to counteract ecological and socioeconomic vulnerability and achieve the systemic stabilization of social and ecological systems in the long-term.

In turn, the proposed 'co-evolutionary pathway model' (Haasnoot et al. 2013) was instrumental, when exploring the implementation of diverse actions classifying them according to spatial-temporal scales, to visualize the possible outcomes in adaptive scenarios that stabilize the socioecological systems over time. These co-evolutionary actions enabled the exploration of potential paths once an action reached a culmination point (Kwadijk et al. 2010).

Then, the possible adaption paths helped to understand the implications derived from each action through a testing-by-design process. In addition, this process was also a convenient tool to determine the feasibility of applying the notion of 'collaborative process' between formal and informal actors. This function could range from co-production of knowledge, co-production of space and joint maintenance, co-monitoring and co-evaluation of the measures proposed.

Fig. 1.2 – Co-evolutionary Goals



2.4 Social and scientific relevance of the work.

2.4.1 Social relevance of the work

Historical context

In order to highlight the social relevance of this thesis, it is important to note from the outset that Latin American countries are characterized for having strong contrasting social realities. In Colombia, specifically, almost 30% of families (3.8 million households) live in vulnerable and inadequate conditions and around 670,000 families are reportedly homeless, mostly as a result of the protracted internal armed conflict (according to Ministry of Housing estimates from 2013). Fortunately, the strongest and most enduring illegal actor, the Revolutionary Armed Forces of Colombia ('FARC' for its acronym in Spanish), laid down its arms and sealed a peace agreement with the Colombian government in 2016 (Casey, 2016). However, peace, equality and social justice are far from being a reality in Colombia. As a consequence of this, and a number of related factors such as: widespread corruption, the cross-cutting influence of drug trafficking, rural neglect and underdevelopment, among others, high numbers of population migrated, or were forcedly displaced, to urban areas leading to a proliferation of informal settlements on the peripheries of the cities (Pizarro, 2015) (Codhes, 2014).

Additionally, in recent years there has been an overwhelming trend of Venezuelan migration, which further exacerbates the problem of informality in Colombian cities (Tiempo, 2018). Lastly, climate change cannot be ignored, as its implications increase the risk of disaster in the most vulnerable populations which have fewer adaptive and reactive capabilities against external threats (Nugent, 2019). The combination of all these factors generates the necessity for district authorities to formulate policies which involve those living in informality with the obligation of ensuring their access to the full scope of the State's prerogatives.

Current events and state of affairs

In 2019 Colombia, and in the last few years in many countries of Latin America (Bolivia, Chile, Ecuador, among others), has seen massive social mobilizations and widespread discontent with corrupt, unjust and inequitable power systems and economic structures. This sense of civic unity and collective consciousness must be used to promote creative and innovative changes, introducing alternative policies, and opening dialogue spaces with citizens. All these, would generate results in terms of both cooperation and joint development towards a more equal and more opportunity-rich society (Dabène, 2019).

This proposal reflects a personal motivation towards recognizing the urgent need to implement and develop the concepts and principles of equity, equal opportunities and spatial justice. As it is displayed since the cover image of this study, the aim of the intervention actions in informal settlements should not be the imposition of formal standards, but rather an intermediate process of co-creation between the authorities and the populations that inhabit these territories. In this scenario, not only the role of the local is reinterpreted, ceasing to be a 'victim' to be considered as an active agent of change with long-term adaptation and development skills, but furthermore the role of the urban designer and planner is also reinterpreted, by reframing the practical foundations of design and co-creation, power relations and built space management.

COVID/19

An assessment of the social relevance of this thesis would be somewhat outdated if the implications of the COVID-19 outbreak are not considered, at least briefly. This crisis poses major challenges for this type of environments. Problems such as: the lack of access to clean water, trouble to implement basic hygiene measures, overcrowding, lack of public services, and hospital infrastructure to properly attend these vulnerable populations, reopens the question about the inadequacy of measures and tools to address the high levels of vulnerability of these territories (Castro, 2020).

Working conditions in the informal sphere, where direct day-to-day contact, and personal or whole-family economies are based on daily production and sales, makes conditions of isolation difficult to implement. In this sense, the adaptive and resilient conditions for these informal populations are more necessary than ever. For instance, the adaptability of the so-called 'public multi-functional structures', as stated in the proposal, could be transformed to provide temporary shelter for COVID-19 positive people. The stabilization and provision of ecosystem services that might improve health and hygiene conditions become indispensable to face the current scenario. This crisis in turn leads to further reflection on the structural causes of epidemic processes and public health, where the implementation of strategies focused on the resilience of social and ecological systems could provide both formal and informal agents with the capacity to adapt and react to uncertainty (Castro, 2020).

2.4.2 Scientific relevance of the work

Opening the debate about public policies, upgrading planning mechanisms, and the disconnected institutional and social dynamics, is relevant for future urbanization processes and current urban environments, especially those in developing countries like Colombia. Recognizing the importance of local groups as agents of change and the adaptive condition of complex systems within the planning structures could activate and change the segregated dynamics of the city, empower the local communities, reinforce bottom-up approaches and provide alternative possibilities for more resilient urban reconfiguration. This represents a call for the re-inclusion of socially produced spaces as more than just sub-products, by way of suggesting that social disparities have an interrelation and interdependence with the generating structures, influenced by formal development instruments rooted in the hierarchical notion of control (Leanne, 2013) (Marx, 2011) (Soja, 1980).

Incorporating theories of 'evolutionary resilience' (Davoudi), 'complex adaptive systems' ('CAS') (Dooley, 1996), 'adaptive governance' (Leanne (2013) (Adger, 2012) and 'adaptive pathways' (Haasnnot, 2013) in the design and implementation of urban planning strategies for developing countries contexts, provides new tools for the practical upgrading mechanisms of informal settlement. In the academic arena, the discussion around socio-ecological resilience and adaptability in planning frameworks remains mostly at a theoretical level and still requires further exploration in the field of design and practical application. Colombia, as has been evident throughout this work, despite having good advances and being pointed as a global example in upgrading informal settlements, still requires many efforts, in the academic and professional fields, to achieve a co-relation between various disciplines and actors.

Therefore, this proposal represents a contribution to develop a theoretical and practical link, that is able to provide the potentiality of "new" knowledge, which later can be transferred to comparable programs and strategies in other countries of Latin America or the Global South. In addition, this study also serves on a scientific level to test these theories in practice and extract conclusions that will generate empirical evidence to support them.

3 Elaborating on the relationship between the proposed framework and the possible transferability of the results and potential applications of the results in practice (social, professional and scientific framework)

The selection of critical exemplary areas

The two areas selected (Lourdes and La Flora), for unfolding the analytical method and testing the implementation of the proposed co-evolutionary framework, are characterized for representing the most critical variables and circumstances in relation to the multidimensional vulnerability in Bogotá. At the same time, both locations respond to a typological selection that serves well as general example of inherent characteristics of the informal areas in the city. While one of the areas accounts to recent development conditions in the periphery, high poverty rates and ecological vulnerability, the other one addresses higher consolidation characteristics and to a better connection with the formal city. These general features are found in multiple areas of the city, revealing that the assessment and planning method can be replicated to other locations.

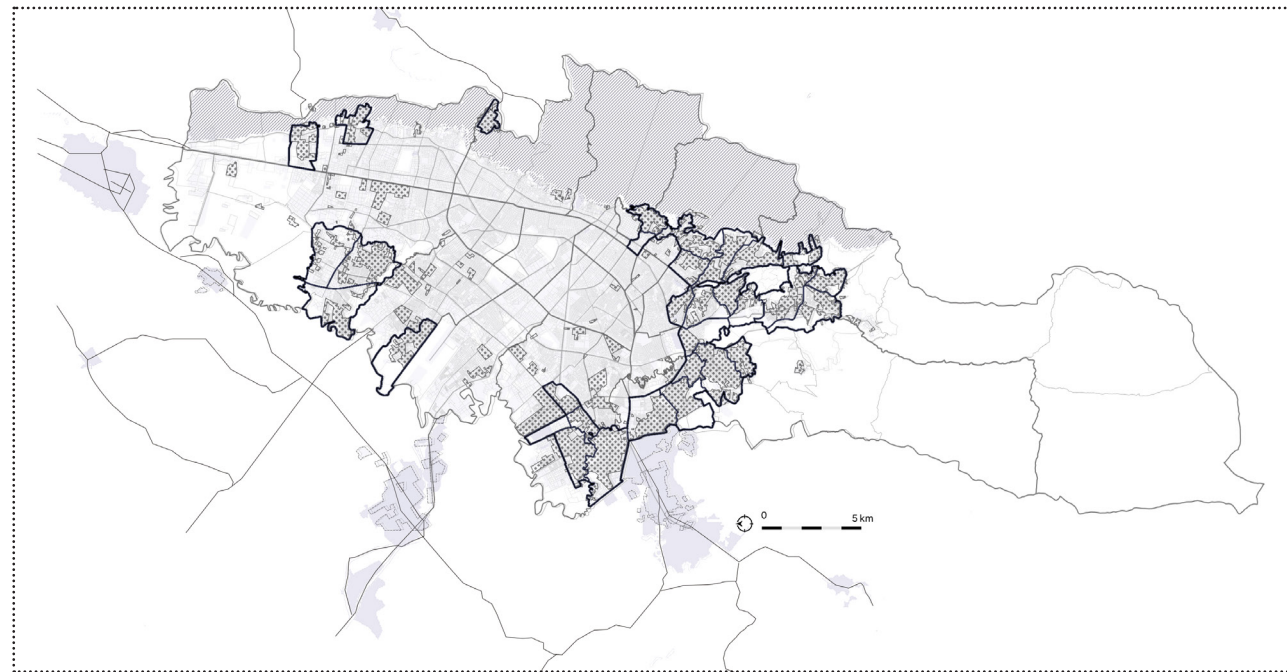
In this sense, the proposed methodology provides an operational frame, which guides the steps that must be followed in relation to the assessment and elaboration of potential strategies without rigid and generic designs. The co-habitation of social and ecological systems and the low-income population empowerment, as a result of the dissemination of the innovative strategies, the co-production of knowledge and space, new management and maintenance rolls and the evolutionary synergies with other functional systems of the city are part of the general objectives of the proposal. These general objectives, and the developed tools, might also be implemented in diverse environments and formal urban structures, not only for diverse informal settlements.

The overall method could in itself adapt and expand its capacities by integrating or redefining the strategic goals of a proposal and be transferred to analyze other areas. Consequently, the definition of the variables does not define or restrict the assessment, evaluation and design method. The reasoning behind the structure of this framework could create a useful exploration approach to the necessary actions to implement inclusive, comprehensive and effective policies. Further research would be necessary in order to test the adaptability and other actions in different informal contexts, in which the identification and gradient of vulnerabilities and challenges will vary.

Naturally, this approach has limitations. There are major obstacles when it comes to devising strategies that break down generic and rigid intervention models. It is acknowledged that this type of proposals involve more time, resources, efforts, and require deeper analysis, greater willingness to evaluate multiple management and development models and, in turn, needs multi-stakeholder cooperation, which challenges current power hierarchies and traditional methods.

Therefore, the proposed adaptive approach is not meant to replace the more traditional planning methods. Instead, it can be seen as a valuable enhancement to the existing planning structures.

Fig. 1.3 – Territorial Delimitation of the current Slum Upgrading Program in Bogotá.



4 Ethical and Final Considerations (A reflection on the advantages and limitations of the chosen methodology, ethical issues and dilemmas encountered in doing the research)

Advantages of the chosen methodology

The main advantages of the proposed methodology are in the operability of the model. By correlating the analysis variables to the design proposal, the application of each phase facilitates decoding a large amount of information. Despite being a complex (this does not necessarily implies that its application is difficult), its step-by-step approach facilitates its implementation. Furthermore, since the proposal is based on existing planning platforms, the identification and critical assessment of the current involved actors allowed a better reconstruction of the cooperation and collaboration networks in the adaptive process.

A great advantage of the co-evolving method is the correlation between different scales and complexity ranges in the implementation. By proposing strategies at different scales and complexities (from dwellings to urban scale), the importance of understanding the correlated impact between a dwelling water collection facility and a water treatment and collection infrastructure is made visible.

Challenges encountered in doing the research and ethical dilemmas

One of the main challenges faced during the research process was to collecting the necessary demographic and social data from informal settlements. Due to the fact that certain informal areas are not considered within the formal structures of the city, the social, economic and cultural data of the community is not collected through the district planning programs. It is evident that this dynamic, as it occurs in a spontaneous and complex manner, makes the compilation of information a difficult and challenging task.

This leads to a reflection on the construction of information and on the characterization of these settlements from early stages of development. The idea of 'co-production' must transcend to fields of information and data of current situations and in the evaluation of proposals. Bogotá's upgrading program has incorporated in its method a system of control and follow-up of informality in which the monitoring management carried out by municipal entities is focused on identifying, Geo-referencing and avoiding the expansion of informal settlements.

By broadening the scope of this type of strategies could involve the community in task such as gathering demographic information and other data. Also, engaging the community in joint activities for the construction of knowledge, for instance examining the reasons for the arrival of different populations to this sector, creating awareness of the structural roots of the problems they face as a commune, in order to better portray the social and cultural conditions of these places.

Regarding a dilemma faced in the development of this work, there is one that stands out for its relevance. This is that strategic urban planning programs must be efficient (optimize results using the least amount of resources available) but also fair in social and economic terms. When proposing an adaptive planning strategy that is characterized for being democratic, involving as many actors and visions as possible, to achieve results that endure and improve people's living conditions in the long term, the efficiency of planning systems unilaterally imposed, or at least lacking a solid collective construction, is somehow abandoned. In the face of this dilemma, the balance suggests that inclusion implies investment of more resources (in terms of time, money, effort, etc.) and that this investment and extra effort is justified because it seeks the well-being of the neediest populations and aims simultaneously to generate changes and long-term improvements.

Final considerations: The challenge of uncertainty

The implementation of co-evolutionary pathways that, on the one hand, address different types of uncertainties and, on the other hand, are able to guide sound decisions to respond to unforeseen changes, represents a major challenge. The exploration model, that redefined current static approaches into dynamic methods seek to develop, through the construction of a long-term vision, an awareness capacity in order to overcome the risks and threats, react and take decisions (Haasnoot, 2017).

The explorative development of two different pathways with a same general procedural framework, revealed how the same method could develop pathways and strategic combinations regarding the context variables, as well as how the co-construction of knowledge and awareness was a key constant element in the definition of each phase. The extent of the proposal's capacity to respond to external factors is framed within the constant demands of the co-evaluation process aimed at strengthening the response capacity of urban areas and integrating into the education and capacity-building actions for the population, not only within the framework of the co-construction of the space. This includes providing training for evacuation in the case of natural disasters or emergencies, rapid reaction capacity and awareness of the potential reactions needed in case of failure of actions being taken at present. The model redefines the risk approach as a tool to improve local conditions and at the same time the method to build a city which is integrated over time (Haasnoot, 2017). Such measures are related to the specific design capacity for each action and the development of a systemic operability network.

Despite the main challenges facing the proposed planning framework and the major concerns in terms of inequity in the urban sphere, major policy changes are currently under way in relation to informality in Colombia and, in general, in Latin America. As a result, it is clear that there is enthusiasm and hope for change and that the proposed model can contribute to the evolutionary path of inclusion and transformation that the world demands today.

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