

Sufficiency in Rapidly Urbanising Regions

Coproduction of Neighbourhoods as an Alternative Strategy for Sustainable Urban Design

Panel: Panel 05 Urban Design

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Key words

- **Urban Design: Less is happiness**
 - **Informal Urbanisation and Rapid Urbanism**
 - **Incremental Housing and Urbanism**
 - **Coproduced Neighbourhoods**
 - **Urban Coding**
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INTRODUCTION

In order to address the challenges of future architectural education, it is necessary to consider the concept of sufficiency as one part of a wider approach to sustainable urban development. In the global context of climate change, it is essential to include the role of rapidly urbanising regions in the discussion. This offers the opportunity to implement new strategies of sufficiency at a larger scale, with the potential to create long-lasting positive impacts regarding resource consumption and social development.

According to UN projections, the number of inhabitants of informal settlements in the global south is expected to increase significantly by 2050 due to continuous population growth and urbanisation.¹ Various experts are demanding to accept the informal sector as the predominant form of future urban space production, anticipate the development of self-built settlements, and incorporate them into formal planning processes.²

The concept of coproduced neighbourhoods takes up the above-mentioned approach of anticipation and develops it further into the 'Incremental City' strategy, a hybrid urban development model that brings together aspects of top-down planning and bottom-up self-organisation as well as giving ample space for informal self-building.³

Sufficiency in the form of co-produced neighbourhoods can constitute a central element of a sustainable urban development strategy. As part of a low-cost, low-tech approach, this results in a multitude of advantages, like reduction in land and material consumption, increase in building density, small-scale plot and building structures, diverse mix of uses, improved walkability and a reduction in resources for technical infrastructure and mobility.

In co-production and self-construction, the focus lies not on physical execution by the users, but on their decision-making authority. If they are at the centre of the planning process, we can create housing that is tailored to the needs and possibilities of those affected.⁴ In addition, it

can be argued that site-and-service and incremental housing strategies are more efficient in terms of resource consumption and speed of delivery than conventional social mass housing programmes.⁵

While the amount of living space per person is increasing, it is not a reliable indicator of happiness or a good quality of life. As stated by Henri Lefebvre in "Right to the City" other aspects like social participation and access to essential urban amenities such as education, health care, job opportunities, security and public space seem more appropriate indicators.⁶

To tie all the above-mentioned aspects together, especially the departments in the field of architecture and urban planning are able to develop alternative scenarios, and create utopian prototypes that inspire others outside of education and research to replicate them.

It can also be assumed that students today are aware of the importance of sustainability. To support that, it is important to give this topic sufficient coverage in the curriculum and to encourage testing of new problem-solving strategies. This will enable students to understand the impact they may have as professionals in the future.

This paper outlines the key aspects of the Incremental City planning strategy for coproduced neighbourhoods based on a dissertation published in 2021. In addition, it describes the process and results of an urban design master studio at KIT. It shows how these planning principles work in educational practice and how they could be applied in similar educational situations.

INCREMENTAL CITY STRATEGY

The following description of the Incremental City strategy is an extract from a dissertation⁷ and a summary in the paper 'Incremental City: An Urban Coding Strategy to Create Livable Future Co-Produced Neighbourhoods'.⁸

Starting point is the assumption that we have to accept the informal sector as the predominant form of urban space production in the future.⁹ Demographics and urban growth are predictable and sufficiently accurate to allow anticipating the extension of self-built settlements. The objective of the Incremental City strategy is to develop a modular and scalable planning approach for a co-produced city using a combination of robust infrastructure¹⁰ and flexible self-built infill.¹¹

The urban coding of this alternative development model is based on two pillars: the urban plan, a structural concept and the associated key figures for city planning, as well as the urban code, the fundamental rules and obligations for inhabitants and responsible authorities. Through the combination of spatial urban structures and application-oriented regulations, an alternative urban development model is created that may serve as a tool in various planning processes in the context of future co-produced cities.

„Expansion of Cities is important as long as they are well planned. Well planned doesn't mean making an instant, perfect city. It means providing the infrastructure of a messy and incremental city.“¹² (Ricky Burdett, *The Quito Papers: Towards an Open City*. LSE Cities, 2016, Min 10:30)

DE-CODING: Analysing the Self-Built City

To analyse and compare the urban qualities of planned self-constructed neighbourhoods the following six case studies have been selected: Nezahualc6yotl in Mexico City, Mexico; Solanda in Quito, Ecuador; Villa El Salvador in Lima, Peru; Carri6res Centrales in Casablanca, Morocco; Ard el-Lewa in Cairo, Egypt and Aranya in Indore, India.

Each of the six projects has a unique history of development and structure of stakeholders. In some analysed aspects of urban planning, we find similarities, in others, there are substantial differences. The following paragraph summarizes the five key findings:

Structure and Hierarchy: All projects follow a modular-hierarchical structure that ranges from rigid orthogonal grids like in Villa El Salvador or Nezahualc6yotl to complex spatial frameworks like in Solanda or Aranya.

Networks of Streets and Paths: Usually there are three to four levels of access hierarchy. In all projects, at least parts of the street network double up as multifunctional public spaces, mainly close to individual homes.

Open space and Social Infrastructure: Most projects use public open spaces as an integral part of their urban layout. Especially Solanda with its archipelago of differentiated public green spaces and the interconnected green network of Aranya show successful solutions for liveable neighbourhoods. Furthermore, all projects combine social infrastructure with public spaces to use the scarce resource of space in the most effective manner.

Plot and Block Structure: The chosen size and proportion of plots have a direct influence on the achievable long-term density and height of the buildings. The study shows that families stop extending their homes at a certain level, which causes stagnation of density. This brings us to the conclusion that the optimization of net building land and providing large individual plots above a threshold of about 100-150 m² are misleading. Small plots and additional public space create more attractive neighbourhoods while achieving similar densities over time.

Adaptation to local context: The analysed examples show a wide array of adaptations to the local context regarding social, cultural and climatic aspects. One example to point out is the strict hierarchical layout of Villa El Salvador, where the urban grid is a direct representation of the local system of self-organization on the block and neighbourhood levels. Also interesting is the adaptation to topography and climate, e.g. optimizing cooling wind directions and solar protection in the Aranya project.

These findings and best practice examples from the analysed case studies have been extracted as conclusions and form the basis for the proposed design patterns described in the Incremental City strategy for co-produced neighbourhoods.

CODING: Design patterns of the Incremental City

„In essence, coding generates urban order by the generic specification of allowable and necessary components and relationships.”¹³ (Stephen Marshall, *Urban coding and planning*, 2011, p. 6)

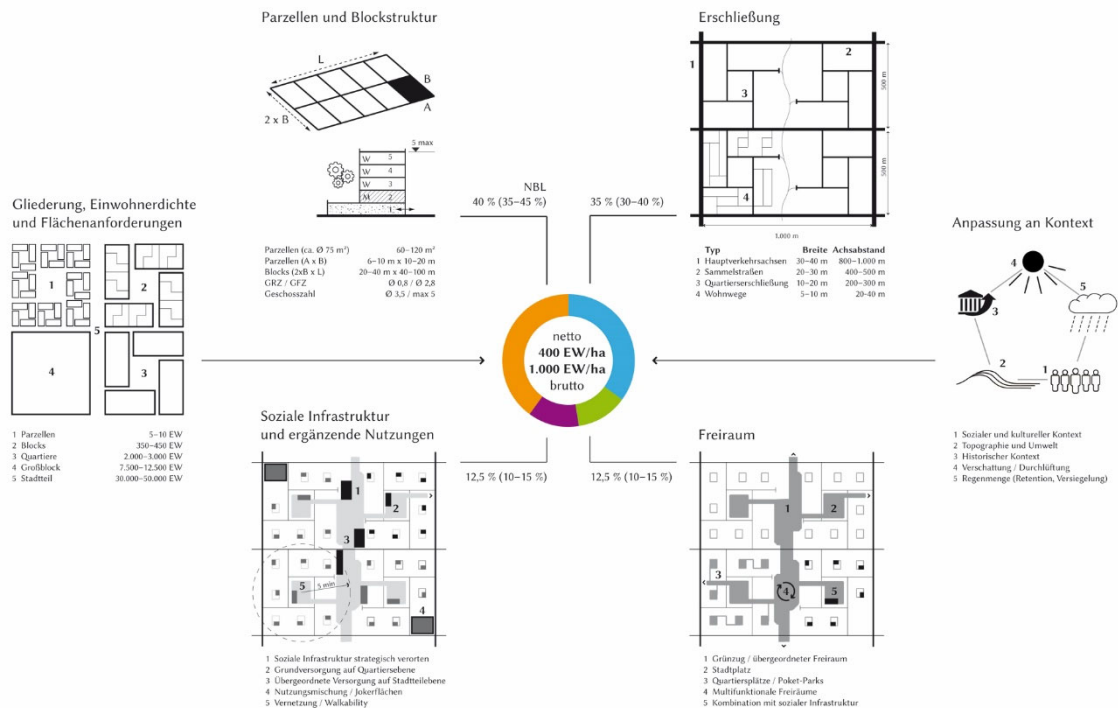


Figure 1: Urban Design Toolbox of the Incremental City

The following design patterns for co-produced neighbourhoods are the result of a research process in literature as well as the findings derived from case studies combined with the professional experience from practice as an architect and urban planner. The design toolbox for the Incremental City consists of six spatial components.

- 1) A hierarchical structure forms the basis for any modular and scalable urban system.¹⁴ An urban hierarchy of streets, public spaces, social infrastructure and distribution of functions provides orientation and identity.
- 2) The network of streets and paths. It provides a structure, which can be repeated and extended to a grid or multi-layered spatial framework. Combined with access to public transport, optimized network lengths and increased walkability it forms the basis of the infrastructure grid.
- 3) A framework of public spaces works as a powerful tool to structure neighbourhoods. These public spaces are multifunctional and cater for a wide range of uses and users. Multiple uses in the same space are staggered over time to maximize the use of the rare resource of public space.
- 4) Social infrastructures serve as gravitational centres in the urban system. Strategically located infrastructure guides incremental growth into desired directions and works as a protector of public or ecologically important spaces. Certain institutions may be used to create destinations of city-wide importance within new neighbourhoods and thus contribute to a more equal city.
- 5) The plots and block structure in which the principles of informal modernism serve as a blueprint of the urban design.¹⁵ Moderate height and full use of the plot create the basis for a low-rise and high-density urban development model. The gradual expansion and incremental growth of the neighbourhood and on individual plots are some of the most visible characteristics of the Incremental City.

6) The adaptation to the local context. All of the spatial components need to be adapted to topography, climate and natural environment and for example include solutions for shading, ventilation and precipitation. Finally yet importantly, the urban framework not only needs to be adapted to the social, cultural and historical context. Preferably, it should also use the specific context as a source of inspiration to create a unique neighbourhood with a strong identity.

APPLICATION IN ACADEMIC TEACHING

These urban planning guidelines were used as a basis for an urban design master studio at Karlsruhe Institute of Technology (KIT).¹⁶ To assist with the planning process, a design toolbox was provided, which sets guidelines for the distribution of space as well as assistance for the street layout and open space structure. This set of rules relates primarily to the organization and dimensioning of the basic structure. However, no rigid framework conditions are defined, but rather target corridors with certain spectrums of possible solutions are proposed, within which the designers can act freely. The aim is to use the design toolbox to speed up the planning process and quickly develop viable solutions.



Figure 2: KIT Urban Design Master Studio, Sebeta, Ethiopia. By Lukas Benz, Xiang-Ru Zhu

There was a total timeframe of 15 weeks from inception to the final hand-in and presentation of the results. This task was demanding in a sense that the students were confronted with unfamiliar geographical and cultural planning contexts as well as new planning tasks in the context of informal urbanization. In order to give the necessary guidance, the studio was structured in five consecutive planning steps.

We started the design in the first step with a global scan, a quick immersion into the topic of informal urban development and the search for a suitable planning area. Seven teams set out

to search their individual planning territory in the global south. The criteria for the country and site selection were a high population growth and urbanization rate, a moderate human development index, a small or mid-sized city and a site of 50 – 75 hectares. Five teams chose locations in Africa, ranging from Cairo, Egypt; Ouagadougou, Burkina Faso to Sebeta, Ethiopia and Athi River in Kenya. With Tenggara and Jayapura two teams chose sites in Indonesia.

The second step involved analysing the planning area regarding road access, landscape elements, structural context and climatic and cultural conditions that could be relevant to urban development. Parallel to the analysis, the planning basis was prepared using freely available aerial photographs, GIS and OpenStreetMap data.

The third step began with the development of the urban planning concept at the macro level. This involved designing a robust spatial framework that roughly structures the plan area through main access routes and an open space system. At this design stage, sub-concepts for mobility, open space, social infrastructure and supplementary non-residential uses as well as the overall neighbourhood structure were developed and brought together to form a large-scale structural plan. Within this basic infrastructural framework, individual urban blocks were created based on an adaptable, modular and scalable basic neighbourhood unit.

In the fourth step, a neighbourhood module of around 5-7 hectares or 2,000-3,000 inhabitants was developed, which provided more detailed information on the plot structure, street layout, open spaces and the location of residential plots.

In the fifth step, the infrastructure framework at the macro level and the neighbourhood modules are merged and developed further in an iterative process. The resulting urban design concept is further elaborated in site plans, 3D illustrations and other representations of choice.



Figure 3: KIT Urban Design Master Studio, Athi River, Kenya. By Julia Henschel, Johanna Olfen

CONCLUSIONS

As a result of the described case studies, combined with the findings of a professional urban planning workshop and the master studio at KIT some general findings can be formulated. General requirements for a co-produced city are a robust infrastructure framework of hierarchically organized access streets combined with a balanced network of public open spaces and social infrastructure. At the same time, the layout should provide ample space for individual construction within the blocks and plots. It should be easy to construct, modular and scalable.

The design guidelines should be communicated as an application-oriented planning tool. The complexity of these guidelines is consciously reduced to six interlocked spatial components to make the design patterns clear and easy to understand. In contrast to early critiques towards a seemingly reduced repertoire of design patterns, an interesting finding is the great variety of urban design solutions that resulted especially in the master studio in geographically, culturally and climatically very different contexts. In fact, professional urban planners as well as the participants in the master studio mentioned, that the design toolbox provided great help and considerably accelerated the design process. It seems therefore promising to transfer this method to other applications in which new planning contexts are to be explored together with students. In addition, the free selection of the planning area in compliance with the specified criteria ensures a high level of identification with the task and increased motivation.

Co-produced neighbourhoods can be a key component of a sustainable urban development strategy. This low-cost, low-tech approach offers numerous benefits towards sufficiency, such as decreased land and material usage, increased building density, small-scale plots and building structures, a diverse mix of uses, enhanced walkability, improved access to public transport, and reduced resource requirements for street networks and technical infrastructure.

In the context of the housing crisis in many western countries, it's worth considering if such a low tech - low cost approach for co-produced neighbourhoods could be transferred to Europe or other western countries. However, this would most likely encounter resistance from the responsible authorities. With designated special areas however, there might be a path towards controlled fields of experimentation in an urban planning scale. In fact, we already see a first approach towards such a form of controlled de-regulation and experimental construction on the architectural scale with the new experimental building type 'Gebäudetyp E' in Germany.

While the Incremental City approach lays the foundations for upward social mobility and the associated increase in prosperity, there is a risk of less sustainable behaviour due to the understandable desire for more living space, cars and consumer goods. The strategy aims to prevent this to a certain effect with a low-rise high-density development on small plots as effective guidelines to promote a small-scale mix of uses and sustainable mobility behaviour. Nevertheless, this urban structure will not be able to prevent the entire increase in consumption and the related rebound effect.

On an urban scale, the frameworks of co-produced neighbourhoods are able to create attractive living environments that are diverse, small-scale and mixed-use. They are rich in cultural and gastronomic amenities, shopping opportunities and services. Thanks to their high density, they

promote sustainable mobility and walkability. In addition, this strategy forms the basis for experiencing self-empowerment and creating home ownership, both of which contribute towards strong communities.

In summary, the positive conditions promoted in this urban framework are factors that are also sought after by more affluent segments of the population and are often implemented in contemporary formal urban design projects as well. This raises hope that this alternative development strategy may lead to more sufficiency in rapidly urbanising regions while simultaneously providing a framework for an empowering, attractive and sustainable urban lifestyle for all.

¹ United Nations World Population Prospects (New York, United Nations, 2019)

² Christian Werthmann Metropolis Non-Formal, 10 things designers need to work on (accessed June 3, 2020), <https://www.youtube.com/watch?v=hJiLiMIFotw>, Min 5:30–7:45.

³ John Turner: Housing by people. Towards autonomy in building environments (New York, Pantheon Books, 1977) and Horacio Caminos and Reinhard Goethert, Urbanization primer. (Cambridge, MA, MIT Press, 1978) and Alejandro Aravena and Andrés Iacobelli (eds.) Elemental. Incremental housing and participatory design manual. (Ostfildern, Hatje Cantz, 2016)

⁴ John Turner: Freedom to Build. Dweller Control of the Housing Process (New York: Macmillan, 1972)

⁵ Mike Davis: Planet of Slums (Paperback ed. London, New York: Verso, 2007)

⁶ Henri Lefebvre: Le droit à la ville. (3e éd., réimpr. Paris: Ed. Economica, 2015). The demand for the "Right to the City" can be traced back to Henri Lefebvre's original French edition of the same name: "Le droit à la ville" (1968).

⁷ Manuel Giralt: Incremental City: Urban Coding für zukünftige koproduzierte Städte (Karlsruhe, KIT, 2021), 18. accessed July 07, 2024, <https://publikationen.bibliothek.kit.edu/1000136020>

⁸ Manuel Giralt: Incremental City: An Urban Coding Strategy to Create Livable Future Co-Produced Neighbourhoods (New York - City College of Technology, AMPS Proceedings Series 34.3 [Chapter 15, p. 141-153], 2023)

⁹ David Gouverneur: Planning and Design for Future Informal Settlements (London, Routledge, 2015)

¹⁰ Shlomo Angel Making room for a planet of cities. (Cambridge, MA, Lincoln Institute of Land Policy (Policy focus report / Lincoln Institute of Land Policy)), 57.

¹¹ David Gouverneur: Planning and Design for Future Informal Settlements (London, Routledge, 2015)

¹² Ricky Burdett The Quito Papers: Towards an Open City (UN Habitat, NYU, Theatrum Mundi, 2016) accessed December 10, 2019, <https://www.youtube.com/watch?v=B4sJzJxXmNw>, Min 10:30.

¹³ Stephen Marshall (ed.) Urban coding and planning (London, Routledge, Planning, history and environment series, 2011), 6.

¹⁴ Christopher Alexander et al. A pattern language. Towns, buildings, construction. (New York, NY, Oxford University Press, 1977)

¹⁵ Eckhart Ribbeck, Sergio Padilla and Fatima Dahman Die informelle Moderne - spontanes Bauen in Mexiko-Stadt (Heidelberg, awf-Verlag, 2002), 14-15.

¹⁶ KIT, Institute for Urban and Landscape Design, Master Studio: Incremental City – Planen einer koproduzierten Stadt, (Karlsruhe, KIT, 2021) accessed March 15, 2023, <https://stqp.iesl.kit.edu/1156.php>