

Research for Development

Niccolò Aste · Stefano Della Torre ·  
Cinzia Talamo · Rajendra Singh Adhikari ·  
Corinna Rossi *Editors*

# Innovative Models for Sustainable Development in Emerging African Countries

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di Milano 

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# Research for Development

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# Preface

This book belongs to a series, which aims at emphasizing the impact of the multidisciplinary approach practised by ABC Department scientists to face timely challenges in the industry of the built environment. Following the concept that innovation happens as different researches stimulate each other, skills and integrated disciplines are brought together within the department, generating a diversity of theoretical and applied studies.

Therefore, the books present a structured vision of the many possible approaches—within the field of architecture and civil engineering—to the development of researches dealing with the processes of planning, design, construction, management and transformation of the built environment. Each book contains a selection of essays reporting researches and projects, developed during the last six years within the ABC Department (Architecture, Built environment and Construction engineering) of Politecnico di Milano, concerning a cutting-edge field in the international scenario of the construction sector.

Undoubtedly, the African continent will see the most interesting trends in the near future for the construction sector, as well as the most serious risks in terms of sustainability of the development models. These countries face two parallel challenges: fighting the lack of resources and channelling their development along a sustainable path. In both cases, innovative methods and technologies can offer a significant contribution: affordable housing set within the social context should develop in parallel with a wise exploitation of the energetic resources; the sustainability of the entire system partly depends on how waste is handled and how to set up a virtuous recycling system; emergency situations must be addressed rapidly and efficiently, and the introduction of low-cost technologies may allow to turn study and preservation of the cultural heritage into an opportunity for development, without subtracting resources from humanitarian assistance. In general, connecting past and present will help to shape the future of countries, where carefully chosen innovative instruments can really make the difference and can allow giant leaps towards a sustainable social, cultural and environmental balance.

The book presents a selection of innovative projects carried out in African countries, aiming at tackling two main areas: offering practical solutions to specific necessities and experimenting cost-effective methods and technologies, which could be easily applied in order to achieve high-quality results. The papers have been chosen on the basis of their capability to describe the outputs and the potentialities of carried-out researches, giving a report on experiences rooted in the reality and at the same time introducing the perspectives for the future.

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# Introduction to Volume

Estimating population, urban and economic growth for Asian and African countries (United Nations 2014) highlights the need to draw up new design approaches that promote the development of original architectural languages appropriate to the local identity and to the new development models. These models support the consolidation and growth of local cultures and economies and at the same time aim at reducing energy consumption, minimizing environmental pollution, increasing the use of renewable sources and effectively responding to water demand.

Therefore, a change of paradigm is required, together with a novel approach to urban (and peri-urban and rural) planning and usage of territories. In this perspective, a holistic view should influence the entire built environment, i.e. the configuration of goods, the structure and use of land and the way in which basic services—such as energy, water, food and waste treatment—are handled. It is about working to move away from the current model of linear urban metabolism—based on the ‘take-make-dispose’ approach—to a circular one, where the consumption of resources and the waste production are minimized.

Combining these changes into practice requires working in two main directions. It means, first of all, focusing on the relationship between the architectural, urban and physical aspects of new developments, climate and energy demand. Secondly, it requires identifying and integrating the necessary strategies and infrastructures to close off the energy–water–food–waste circle, searching for a high level of efficiency and self-sufficiency.

The present book revolves around these issues and describes the contribution of the ABC Department of Politecnico di Milano regarding the multidisciplinary research and development (R&D) activities, carried (and being carried) out on these multifaceted issues. It presents a selection of innovative projects carried out in African countries, aiming at tackling two main areas: offering practical solutions to specific necessities and experimenting cost-effective methods and technologies that can be easily applied in order to achieve high-quality results.

Emerging countries face two parallel challenges: channelling their development along a sustainable path and fighting the lack of resources. In both cases, innovative methods and technologies can offer significant contributions, presented in this book:



affordable housing set within the social context should develop in parallel with a sustainable exploitation of the energetic resources (Part I); the sustainability of the entire system partly depends on how waste is handled and how to install a virtuous recycling system (Part III); emergency situations must be addressed rapidly and efficiently, and the introduction of low-cost technologies may allow to carry out study and preservation of the cultural heritage without subtracting resources from humanitarian assistance (Parts II and IV). In general, connecting past and present (Part V) will help to shape the future of countries where carefully chosen innovative instruments can really make the difference and can allow significant leaps towards a sustainable social and environmental balance.

Cinzia Talamo  
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Rajendra Singh Adhikari

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# New Foundation Cities



Massimo Ferrari, Claudia Tinazzi and Annalucia D'Erchia

**Abstract** As part of the Italian tradition related to urban projects, some experiments throughout the twentieth century have shown, in the comparison between the different possibilities, the specific ability of architecture to lend concrete form to the living environment of a civilisation in a specific age. The design of the city, of its way of expanding, has outlined, in the succession of examples built or even only conceived on paper, the possible prerequisites for the definition of some principles aimed at the determination of sections of the city, or in the most virtuous examples of new foundation cities. Every latitude, just as every epoch, enjoins in this sense the need to re-examine these principles, which, if on the one hand express universal and timeless values, on the other hand, search for increasingly greater relevance to specific cultures as well as to needs and demands associated with one's own time. Africa's living future rests on a recent past already quite rich in experiments, on a founding custom that in the previous century has built new urban centres, capital cities, transfers of centrality to regular federations of states. Living in Africa, besides contemporaneity, represents from this point of view the most extreme modernity; living consistently with the culture, history and traditions of a country that has forever portrayed in Western imagination no more than the mystery and exotic dream of a continent that is still unknown if not actually stigmatised in its most conventional characters.

**Keywords** Urban projects · New city · Le Corbusier · New leaving · Tropical belt

## 1 Imagining the Future in Africa

[...] Inside Tibesti, an indigenous guide asked me whether by any chance I wanted to see the walls of the city of Anagoor, as he would have accompanied me there. I looked at the map but the city of Anagoor was not there. Not even on the guides for tourists, normally so rich

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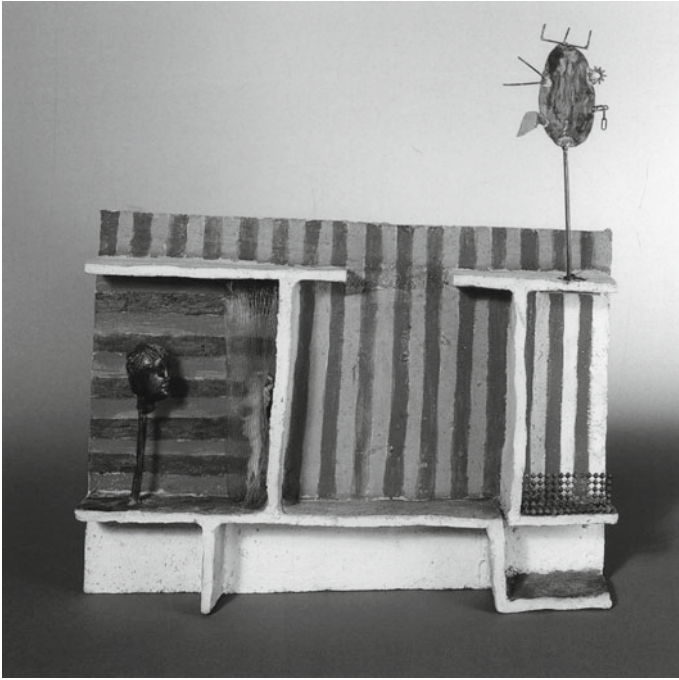
of details, was there any hint to it. I asked, ‘What kind of a city is this that is not marked on the geographical maps?’ and he replied, ‘It is a large city, extremely rich and powerful, but the geographical maps do not indicate it as our Government ignores it, or pretends to ignore it. It fends off for itself and does not obey. It lives independently and not even the kings’ ministers may enter it. It does not trade at all with other countries, whether near or afar. It is closed. It has lived for centuries inside the circle of its solid walls. Does the fact that none has ever exited it not mean perhaps that they live happily there? [...] (Buzzati 1958)

As an exemplary retribution, an unexpected vision built by a fervid imagination, the happy discovery of the city that is not, in the thirty-ninth short story out of the sixty Dino Buzzati wrote immediately after the Second World War of the twentieth century, urges us to research—by contrast—the concrete possibility of inhabiting an ideal city imprinted precisely in the African territory that has provided the background of the story as well as our utopia while reading the text. Written Africa, in the literature of any country in the world and in Italy depicted more recently by Ungaretti, by Marinetti, and then by Manganelli, Celati and before them Moravia, with all the suggestions conveyed to the artist and architect friends and shortly before him by Bianciardi—as true as the sour Italian life—betrays in the anxiety for truth every exotic dream or, by contrast, shrinks down sometimes to folkloristic cultural stereotypes and exits the simple and measurable reality to appear as a mirage brimful of qualifying adjectives like the beginning of this text.

The walls of Anagoor are an invisible possibility of living out Africa, a precise limit between being inside or outside a place. They represent a way perhaps too western to imagine a space to inhabit, fruit of the subconscious of our civilisation that retains these high walls in the roots of its own history; they are—still—the naive demonstration of superimposing one’s peculiar reality on other cultures despite the recognised ability to the surprise of a special writer like Buzzati, who throughout his opus has entertained a happy relationship with the dimension of lived space, translated into a constant process of rarefaction and abstraction within his stories.

Founding a city, imagining its construction within a single time span, even in the circumscribed hypothetical scenario, as in the precious character of Anagoor, might possibly mean to image first of all a way of living free from an excessive weight of the memory of past forms, a way contemporary to the current age, suited to the host place, suited to the general conditions of entrenched nature as well as to the special qualities that are read on the smaller scale. It means—still—to face historical and cultural anthropological diversities so that their inequality can shape the forms and the distribution of new city sections, to imagine shared principles, rather than predefined forms, criteria capable of ordering and highlighting the nature typical of the territories and the needs of those inhabiting them, to translate the habits into precise and recognised spaces and ambitions into new places.

The future of Africa, never so close as in our age, must, because of this, face the most genuine and radical features of a land that for too long has been viewed solely as a ground for conquest similarly to many other parallel countries in terms of latitude, social history and quality of primary resources; at the same time, however, the research must necessarily avoid ascribing a protected role, frozen in conventions or portrayed in foreigners’ images, fruit of a popular tradition directly proportional



**Fig. 1** Fausto Melotti, *L’Africa*, 1966

to the physical distance from the black continent and reconsider Africa, instead, according to its peculiar qualities, needs and possibilities, just as any other inhabited place on the planet. Imagining, perhaps already in the intentions, a more consistent evolution in the way these places are inhabited speaks to us of the future (Fig. 1).

Another writing, this time by Giorgio Manganelli, almost impossible to find, clarifies this antipathetic position, far from myopic, and helps us freely read the possible comparisons with a territory forever in motion:

[...] «Animals populate the African space as an emblem they are required to make intelligible. Not colosseums but lions, not towers but soaring giraffes, not acropolises but craters crowded with wild beasts» [...] (Manganelli 2006)

Africa in motion, a vast chessboard consisting of constantly migrating *live monuments* in lieu of habitual and familiar stone constructions, clarifies the idea of a territory it is difficult to come to terms with, an environment we need to know and interpret starting from the violence of the extreme conditions that have designed it and still continue to design it today (Figs. 2 and 3).

As written earlier, the reality of Africa has shown a founding custom transcribed into new urban centres, capital cities and transfers of centrality to regular federations of states. The colonial capital cities and later the federal independence represent the social and economic drive for these new designs that trace in the first half of the twentieth century, already since 1900, vaguely traditional urban centres, Western-style

**Fig. 2** Romuald Hazoumé,  
Wax Bandana, 2009



**Fig. 3** Yinka Shonibare,  
How to Blow Up Two Heads  
at Once (Ladies), 2006



cities in which the orthogonal matrix structure, with minimum diagonal variations in its distributional evidence, accompanies without contaminating the pre-existing indigenous forms: thus are born, for instance, N'Djamena in Tchad, a military city founded by the commander Émil Gentil, Abidjan in Ivory Coast, de facto capital even after the political power was moved to Yamoussoukro in 1983, and later Kinshasa in the Zaire of the 1930s as well as Niamey in Niger in 1937. The end of the century even prior to the 1900s had laid the colonial bases for these foundations that are in actual fact re-foundations or continuations of long-term plans of occupation of

the territory or further new expansions, precisely like Kinshasa vis-à-vis Brazzaville founded on the other side of the Congo river in 1881. Cities of the calibre of Bamako in Mali, Porto-Novo in Benin and Lomé in Togo, to mention but a few of them, mark the northern European challenge of the second half of the nineteenth century, an age of explorations and simultaneously of the slow decline of Western expansionist dreams. Their regulatory blueprints collide with the different dispositions of road networks arranged without any overall designs, centralities absent or disconnected from the fabric confine the urban relevance of these centres to no more than their distribution on the territorial scale, to the juxtaposition to connecting historical paths or to favourable inclinations to settlement along the coast.

Still a memory, one just elapsed, should be acknowledged to the North African experience; from the colonisation of French Algeria, occupied by approximately 600 small centres between 1836 and 1914, leaving aside the utopian and more famous visions for Algiers of Le Corbusier, to the realities built in Ethiopia, Eritrea and Libya through the Italian experience in the age of fascism, which without any second thoughts superimposed, on the African territory, small European matrixes. Meta-physical cities narrated by Gherardo Bosio's plans for Gondar and Dessiè and those for Asmara of Odoardo Cavignani, the drawings of Ignazio Guidi and Cesare Valle define the character and geometries of Addis Abeba, of which it might be important to recall the earlier, freer and more modern general development plan drawn by Le Corbusier in 1936 and offered directly to the Duce; a unified design rediscovers the characteristic themes of Le Corbusier's philosophy, nature, residence, public places set up in an open structure, arranged through precise geometries, organised by the infrastructures that never found a concrete possibility of implementation. The very recent history delineates yet a different phenomenon in the design of these new centres, transfers, movements of capital that pursue a political logic associated with the governmental independence of some nations; displacements that from the second post-war period to the middle of the eighties built Dodoma in Tanzania, Abuja in Nigeria and Lilongwe in Malawi, anthropising, within the individual nations, strategic positions often limited to the perspective of political opportunities, replacing the previous orthogonal thread with a more organic geometry and yet ending up with the same inconsistencies.

The relationships between these hubs and the territorial connection networks, vital skeleton of any country, raise, perhaps without any mediation, a crucial issue for the African continent. The territorial structures that, without disregarding their obvious functional usefulness and the clear construction necessity, have mostly influenced over time the ancient landscape in its natural dimension are undoubtedly traceable, since the original epochs, to the infrastructural system and to all the possible variations and expressions of such a vast topic susceptible of being defined in its pivotal points: roads, bridges, aqueducts, without any hierarchical or chronological order, have first disclosed, in their rational habit, the features of necessity vis-à-vis a project of collective work capable of transcending the single idea of living (Fig. 4).

However, the traces, as we continue this diachronic journey that sums up different attempts at foreign anthropisation, have been imprinted on the African soil since epochs long before the recent past, starting from those crossed lines that the Romans



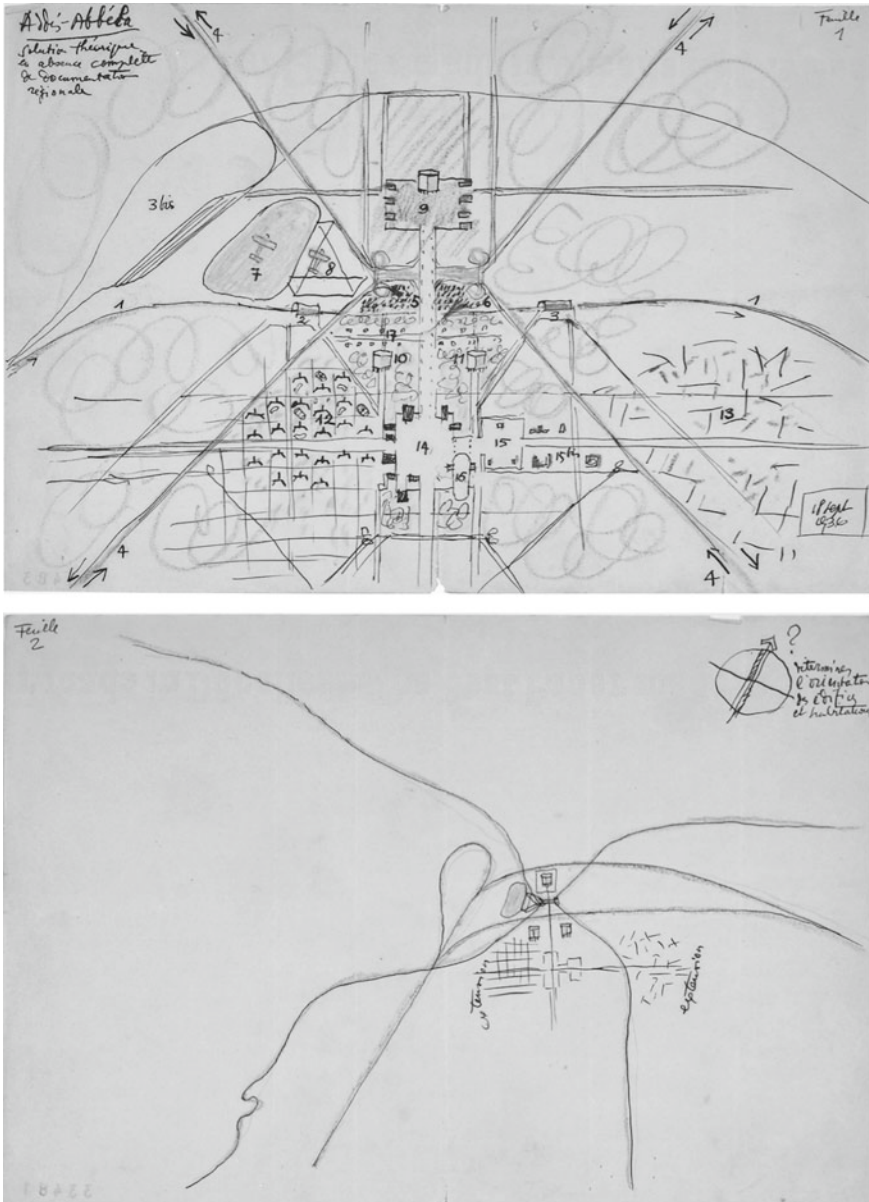


Fig. 4 Le Corbusier, Sketches for the plan of Addis Abeba, 1936

indelibly engraved on the sandy ground north of the continent, the structural system of Decuman roads, the residential typologies absorbed and revisited by subsequent periods and the variations on the collective places of the Forums and the Thermal Baths (Furlong 1990) which, precisely on account of their functional adequacy and the features of generality tailored to the environment, have been able to turn into a matrix of subsequent typological and urban developments, so much so that they could become successfully integrated and shape up in later eras the true constants and the recognised character of the inhabited environment preserved until our times.

After all, leaving aside the recent attributions to the system of journeys the Carthaginian admiral Annone seemingly undertook up to the African equator around the sixth century BC, the ancient indigenous reality marks, unlike these steady elements, all the transient characters of the systems of human settlement, from nomadism to transformation, from precariousness to the variation of orientation: exemplary in this sense is the physical rotation of each individual building inside the primitive villages to face the residence of the new chief after the death of the previous one; the sole constants might be set for a long time in the use of materials and the building techniques.

In this suspended space, we can place the difficult balance of contemporary research around living in Africa, which, moving from the highest imagination, must nevertheless entrench itself in a new awareness of the reality that considers without differences the territories long incomprehensible, borrowing a leaf from the words of Gianni Celati at the end of the last century:

[...] Let us mull over the fact that by now anthropologists have hardly anything to do with primitive populations, reduced to degenerate tramps or exotic background actors. Some rare team chases after the last groups in the forests of Amazonia, but if they find them still naked with bow and arrows, they infect them at once with cold or influenza, lethal diseases for them [...]. (Celati 1998)

## 2 A Collective Research Laboratory

[...] See, O future, I have mounted on your horse; what new banners are you raising towards me from the towers of cities not yet founded? What rivers of devastation from the castles and gardens I used to love? What unforeseen golden ages are you preparing, poorly mastered, you harbinger of treasures paid dearly, you kingdom of mine to be conquered, you ... Future [...]. (Calvino 1959)

The idea of future always gathers in the common imagination all the conventions that, without authentic reasons, crowd contemporary history and without any concrete logic produce relationships out of size with the historical ability to read changes and transformations. It is, however, typical of architecture, in its disciplinary custom, to launch and substantiate designs starting from parallel researches generated by social, humanistic and scientific disciplines without in any event ever transcending the horizon that from its viewpoint narrates the future. Living in Africa, beyond

contemporaneity, means to search without any hypocrisy for the reasons that might represent the peculiar qualities, the dimensions, the timeframes and the needs of a settlement that have invariably evinced all the hardships of living in an extreme region in terms of a latitude and longitude, not just in a geographical sense. Settling in the territory ultimately means to forge an agreement with the environment that hosts us, capable of listening to the reasons of a nature often removed from our imaginations; it means thinking of the future as opportunity to know and accept differences and thereby live out the world coherently. Throughout the African continent, over the last centuries, lifestyles and traditional cultures have undergone profound changes in the encounter–clash with the modern age. The economic, political and social conditions have been altered first through the establishment of the colonial states and then through the creation of the independent autonomies, within a society internationalised in an increasingly worse manner.

We thought that one of the most concrete ways of imagining the future of this continent was to conceive of it as inhabited, ideally built, using the typical tools of our discipline to provide answers to the urgent contemporary needs, combat extravagant possibilities and propose new idealities, leaving the question open: showing a way of living in Africa. The work proposed is a collective research, not a celebratory exhibition of individual design skills; it is a choral work of engagement around a topic as urgent as ideal. A laboratory constantly in motion, experimental and virtual, which shows the need to supplement research, the precious critical work of reorganising both the recent and the distant past, with new design proposals, reflections that are not conclusive yet profoundly achievable. We thought of inviting some architects and design groups so that they could narrate to us their idea of settlement, free from any preconceived constraint, unburdened by any pre-existing grid or design, aware of the past but leaning towards the future (Fig. 5).

We thought that to know and inhabit the tropical belt, live out and interpret a unified geographical area, in many respects common to South America, Africa and Asia, might be a necessary premise to get consistent responses for the interpretation of a territory, of a landscape, of an environment as hostile as captivating. A choice detached from any economic or neo-colonialist logic, a selection respectful of concordant geographical units that in a certain sense unify a community of architects influenced by a habitual style of living; a geographical identity, the tropical one, still



**Fig. 5** Tropical strip in which the architects were chosen for future city projects

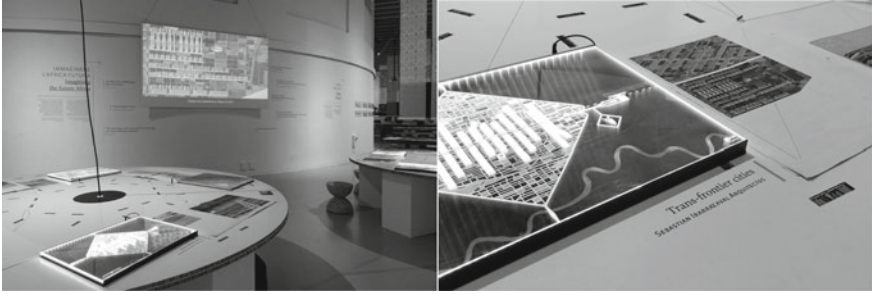
to be investigated in depth, to be ascertained through a reading capable of enlarging the customary geography and smashing several prejudices, to find new and different forms of mapping more influenced by the climatic bands, by the styles of living, by the common cultures rather than by the political limits of regions, states and nations whose certainty exists only on paper. We thought that one of the qualities for selecting the proposed architects could lie in the fact that they had not been involved at international level with territorially large-sized designs and had built consistent architectures with a clear interpretative logic, acknowledging to the invitees a pronounced critical–compositional ability to put to the test on this extended occasion. We thought that an additional selection criterion might involve the generational sphere and that, accordingly, the authors invited might be identified within that band of intermediate age, younger, who in our view currently has the chance to lend an unexpected contribution to the topic of the future architecture. In many instances, the architects belonging to this geographical area have been trained in Europe or in North America with the desire at present to rediscover their roots transposed into a profoundly modern spirit. Architects chosen without any intended election, far from each other in terms of distance and yet, we believe, mutually close in terms of cultural sensitivity and geography, capable of representing today the possibility of a sincere discussion in which multiple ideas of future cities can be tested and verified (Fig. 6).

We asked each architect to briefly show his interpretation of a possible way of inhabiting and living the future in Africa, providing his own design of a future city free from an enforced geographical positioning or from predefined settlement quantities, a reflection and an urban structure loaded with ideality, references and suggestions steeped in the specific African reality (Fig. 7).

Bom architecture, Gabinete Gabinete de Arquitectura + Solano Benítez/Laboratorio de Arquitectura + Javier Corvalán/Taller E, Sebastian Irrarrazaval Arquitectos, NLE, Mariam Kamara, Anupama Kundoo Architects,



**Fig. 6** Triennale di Milano, The exhibition “Africa Big Change Big Chance”



**Fig. 7** Triennale di Milano, The exhibition “Africa Big Change Big Chance” with models and research notebooks “imagine the future of Africa” (Albrecht 2014)

Boubacar Seck are but the first 7 architectural firms that along with us have concretely imagined new ideas for living Africa’s future.

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