

# BECOMe—Business ECOsystem Design for Sustainable Settlements in Mogadishu



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**Abstract** The paper introduces the “BECOMe” project, winner of the PoliSocial Award 2018. BECOMe deals with sustainable affordable housing in developing countries. In particular, the research aims to deliver an integrated development plan for a new business ecosystem design model oriented to new sustainable settlements in Mogadishu (Somalia), involving local entrepreneurship, social facilities and renewable energies. Indeed, the topic of sustainable affordable housing in developing countries is gaining increasing importance for Somali and international stakeholders. Nowadays, the major gap in the provision of adequate and affordable housing is to build a social community and to go beyond just providing basic shelters, to create sustainable durable settlements. The fragile and uncertain nature of the social, political and economic context, characterized by the lack of common shared legislative references and business strategies within the housing sector, makes Mogadishu a complex and challenging reality to be explored and improved.

**Keywords** Sustainable housing settlements · Circular economy · Affordable housing · Mogadishu/Somalia/African countries

## 1 Background of Mogadishu Application Context

The research focuses on Somalia, a country which entails significant challenges and, despite decades of international involvement (UN-HABITAT 2008), is still placed among the five least developed nations according to the ranks on the 2012 Human Development Index (UNDP 2012). In particular, the extent of the project is narrowed to Mogadishu, the capital of Somalia where all the challenging, interrelating problems and opportunities are noticeable.

After the Civil War of 1991, Mogadishu was characterized by a period of instability where abuses, destruction and security issues led the majority of the population to

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escape from the city—since the war left massive devastation of houses and infrastructures—looking for better living conditions (Grünewald 2012). In the stream of time, the continual presence of no stable government in Somalia has caused a real people suffering and overall poverty, along with the citizens' displacement (Ahmed 1999). In this way, political factors strongly affected the social and economic development of the city with relevant implications for the whole Somali country.

Today, the situation has improved but it is still distinguished by poverty, social and political instability, shortage of basic services and institutions, as well as pervasive insecurity (Aisen and Veiga 2011). Hence, citizens are more and more expressing their need for ransom. As an evidence, currently Mogadishu is characterized by economic recovery, reconstruction and by a strong sense of optimism to the point that many Somalis residing outside the country are returning to their motherland (Aisen and Veiga 2011). However, it is important not to overlook that the concurrence of these factors could cause a sudden and uncontrolled growth with a consequent risk of speculation as well as purely economic strategies that do not take into account social and environmental sustainability aspects. Moreover, since there are no observatories and agencies that collect data on the financial situation in Mogadishu and in Somalia, this possible accelerated growth and the related negative effects may not be easy to recognize, track and analyse (Webersik 2006). In addition, although it has been at the centre of humanitarian operations in the twentieth century, it is possible to observe how recently Mogadishu is basically absent from the debates on humanitarian aids in Somalia (Grünewald 2012).

In this context, the BECOMe project focuses on the housing sector with the aim to mitigate the risk of the occurrence of this accelerated growth, proposing alternative models in line with the Sustainable Development Goals (UN 2014) promoted by the United Nations in the Agenda 2030 (e.g. Goal 1—end of poverty; Goal 3—good health and well-being; Goal 7—affordable and clean energy; Goal 11—sustainable cities in communities).

Concerning the housing sector, the political instability has limited the development of an affordable social housing and the protracted conflicts that have gradually destroyed the local architecture, engineering and construction (AEC) firms as well as the manufacturers of construction materials and components (IIED 2019). Indeed, the commercial policies strongly influence the building-related choices (Davies 1987) and induce the operators of the sector to opt for the cheapest choice even if it is not the most effective one. Furthermore, the sector has been influenced overtime by the intense growth of population, the high levels of poverty, the destruction of the building stock, the displacement of population and the insecurity of the area as result of Civil Wars (UNFPA/PESS 2014), which has increased the housing demand (Chirisa and Matamanda 2016). However, nowadays, the construction sector is on the rebound exclusively for what concerns the high-level housing but not for the affordable housing, whose demand still remains unsatisfied (IOM 2018). Indeed, the business dynamics concerning low- and medium-level housing are highly affected by the context specificities and the uncertainty conditions that discourage both local and foreign investments. Moreover, there are two major additional barriers for the improvement of housing sector. Firstly, Mogadishu is characterized by widespread

destruction of infrastructures (hard connection) and of supply chains (soft connection), posing challenging issues for rebuilding programs. Secondly, the unemployment rate is in overall terms higher than 60% (CAHF 2018), and the per capita income is around US\$435 (Altai Consulting 2016), leading to a low purchasing power.

In this complex and challenging scenario, it is ever more recognized the necessity to promote and support a sound and conscious growth towards a new sustainable affordable housing development.

## **2 Interpretive Hypotheses for Sustainable Development of Mogadishu**

The selection of Mogadishu as a specific application context is due to the need to provide informative and interpretative supporting tools useful to mitigate the risk of a sudden accelerated economic growth in the construction sector—operating according to undefined commercial policies—that may prevail over environmental and social issues. Moreover, the construction sector currently focuses only on high-level housing without involving the low and medium levels. To face the challenges that characterize the reference context of Mogadishu towards sustainable development, the research pursues the three pillars of sustainability. Hence, it is based on the following interpretive hypotheses:

- the development of a model of housing that integrates spaces for local craft-ing/manufacturing activities, ICT development environments (learning by shar-ing) and social services as key factor to facilitate, support and stimulate the local micro-entrepreneurship of Mogadishu;
- the integration of on-site renewable energy production (at no cost for housing units and at an affordable cost for local entrepreneurs and social and business services) as an enabler of optimization and innovation of energy production and manage-ment practices, as well as the promoter of new sustainable and high-performance technological solutions;
- the revamping of the local building sector with the manufacture of construction materials/components and the creation of new appropriate supply chains and train-ing strategies as a means to make the most of local resources and boost the local construction sector.

It is worth mentioning that these interpretive hypotheses must be validated and adjusted (if needed) according to the results of a preliminary investigation of the specific context of Mogadishu, taking into account political, legislative, economic, financial and social aspects.

### **3 Goals and Objectives Towards Sustainable Affordable Housing in Mogadishu**

In this context, the research project aims to propose a new business ecosystem for sustainable settlements, developed through an integrated model that embraces affordable housing, local entrepreneurship and social facilities, also exploring the exploitation of local loops in a circular economy approach.

Therefore, the research goal is to outline

- a set of possible scenarios able to stimulate new investments within the building sector, ensuring a balance between all three pillars of sustainability.
- a methodology for evaluating, for each scenario, feasibility conditions (economic, legislative, social), assessing direct and indirect benefits and risks.

In particular, from the social point of view, the proposed affordable housing model is designed to target a pre-defined housing price that can be affordable for the 70% (at least) of the population, through the optimization of the entire construction process and the use of the local renewable energy. From the economic and financial point of view, it suggests an investment plan, leveraging financial aids for local entrepreneurs and renewable production as well as showing the potential for sustainable intervention by external investors. From the environmental point of view, it strives to offer a high energy performance of buildings and consequent adequate comfort levels through climate-responsive design and the exploitation of most appropriate construction materials and techniques.

In addition to these three main sustainability goals, BECOMe has a broader purpose; the research involves the use of bottom-up actions to increase in the new generations the civil maturity and responsibility in order to overcome the ethical, economic and environmental challenges of the future. At the same time, BECOMe aims to raise awareness of the local government on the potential for providing affordable housing solutions to a larger part of the population, creating—through the involvement of local entrepreneurs—a lively and almost self-sustaining environment and local community.

### **4 Methodology to Deal with the Fragile, Dynamic and Uncertain Nature of Mogadishu**

The research follows a multidisciplinary approach involving the deep interaction among four key disciplines, considered as fundamental for developing the proposed business ecosystem of sustainable settlements adopting a holistic perspective:

- architectural design (typological/functional aspects and the relation with the context);
- building technology (construction technologies, process organization and supply chain management);

- energy and building physics (energy design and the integration of renewable energies);
- management engineering (business ecosystem models and their economic sustainability assessment).

The research addresses the business ecosystem in its entirety, framing the complexity of the project from several points of views, but focusing, in this paper, on technological and productive aspects.

The development of the methodology derives from the awareness of the specific social and political conditions in Somalia characterized by a very fragile, uncertain and dynamic nature. The specificity of Mogadishu context, with respect to the research, involves issues of different nature related to the difficult collection and retrieval of data, the lack of certain and up-to-date references and sources, as well as the ambiguity in reading the political, legislative, financial, social and productive contexts. Given the difficulty of acting in such a fragile context, the proposed methodology may change over time according to the results of each phase of investigation and experimentation.

On the basis of these premises, the project will be developed following a methodological approach according to different interconnected phases that may be adjusted according to the partial results of each phase. In particular,

- the first investigation and analytical phase is based on the searching, collection, assessment validation and processing of data, related to the various characteristics of the context.
- the second phase identifies the needs and requirements (regarding the integration of housing, working activities and services) and relates them to the available resources (skills, funding, production capabilities), which can be activated both at the local level and at the international scale. The result is a settlement model based on strategies and rules regarding appropriate/appropriable urbanization, typological schemes, integration of solar systems, production approaches, facilities, technologies and materials.
- the third phase aims at identifying leverages and barriers for the application of the settlements model in relation to various internal and external opportunities and risks connected within the context. In this phase, the research investigates various aspects (stakeholders' interests, funding forms, financial instruments, etc.) putting them in relation to the data collected in the first phase. The expected results are the development of business ecosystem hypotheses, outlined in relation to different context scenarios (settlement dimension, type of investors, forms of business relationships, financial instruments, etc.) and the elaboration of business relationships and plans.
- the fourth phase adopts the methods and tools of the risk assessment and of the PEST/SWOT analysis in order to evaluate both the feasibility and sustainability of the proposed scenarios and develop notes for guidance for the stakeholders of AEC sector and of the related industries, identified in the first and third phases of the research.

- the fifth phase deals with a series of actions aiming at disseminating and communicating partial and final results. In particular, the results of the first and third phases are useful to activate and/or support capacity building and the creation of enabling tools and environments. Besides, the development of training modules directed to different kinds of users is necessary in order to share a basic knowledge between the identified stakeholders.

From the first phase of investigation of the application context of Mogadishu, it emerges the technical difficulty in finding updated and validated information, able to describe the applicative context. The absence of information tools and consolidated interpretative instruments, the presence of uncertain legislative framework and institutional systems imply epistemological issues that impose the formulation of an ad hoc research method, open to modifications during the research development.

Nevertheless, the proposed methodology is expected to be highly scalable to other similar application contexts. Indeed, given its uncertain, fragile and dynamic nature (lack of infrastructures/technical skills, political instability, etc.), Mogadishu can be considered as a complex application field that allows to envision the replication of the proposal in other realities (African countries) as a downgrade in complexity.

## **5 A New Business Ecosystem to Boost Mogadishu Housing Sector**

The core goal of the research consists in designing and proposing a business ecosystem suited to the social/economic context and issues, able to activate a new housing market and to attract and engage different stakeholders. For this purpose, the research defines the conditions of pre-feasibility of the proposed business ecosystem, and it suggests the methodological framework and tools for drawing and assessing possible scenarios of development.

Starting from this main objective, the project results are as follows:

1. a model of modular settlements, to integrate low-cost houses, business units for artisans/small local enterprises and social services. The settlements are characterized by
  - pre-defined housing prices affordable for at least 70% of the population;
  - typological schemes appropriate to the local culture;
  - integration of photovoltaic systems to ensure reliable and affordable energy access.
2. a set of scenarios of possible actions, related to the development of the business ecosystems on large scale, aiming to create local enterprises and to stimulate foreign investors for the revamping of the national AEC sector and of the related industries. The scenarios are methodologically defined by linking in a matrix form the different topics, such as the production approaches (from artisanal and

traditional production to industrialized processes), the types of construction materials, their sources (local resources, resources from outside, recycled local war debris), the types of building components, the local and foreign stakeholders and the forms of business relationships;

3. a methodology for evaluating, for each scenario, economic feasibility conditions, through assessing direct and indirect benefits and risks. Financial instruments (e.g. mortgages and loans) and available financial aids programs supporting economic feasibility have been investigated.

Up to date, concerning the technological and productive aspects, the research is still at an early stage of development facing—starting from the very beginning—difficulties in the collection of updated, reliable, consistent data, information and documents. This lack of consolidated sources and references implies a significant effort in the identification and definition of the specificities of the application context. The information shortage and inconsistency lead to develop a strategy to engage key stakeholders that may affect or be affected by the proposed affordable housing model. In particular, from the results of the stakeholder analysis, the following four macro-categories are identified:

- *Private stakeholders of the AEC sector*: (a) Local and international construction and manufacturing firms, SMEs, medium/small social cooperatives, developers; (b) Local and international architects, engineers, builders, etc.
- *Institutional stakeholders and NGOs*: policymakers, national and local authorities (Government, Municipality of Mogadishu, etc.), NGOs.
- *Investors and donors*: private/public investment funds.
- *Citizens*: displaced people from Mogadishu, middle and lower class, workers looking for new opportunities.

From the dialogue (interviews, brainstorming sessions, e-mail correspondence, etc.) with these key stakeholders, it was possible to extract useful information concerning the recurring technological solutions. In particular, the most used solutions (i) for the structural systems are the reinforced concrete pillars; (ii) for the wall system are the hollow cement blocks; (iii) for the slab system are the full reinforced concrete slabs; (iv) for the roof system are the wooden trusses on corrugated galvanized sheets. This first exploration on the recurring technological solutions allows to concentrate the investigation on the production and supply chains of these products and materials. In this regard, actually in Mogadishu, it is possible to observe few attempts of supply chains development that involves both local and international stakeholders (e.g. Turkey, China, United Arab Emirates, etc.) for the provision of the above-mentioned technological solutions.

In addition, the first research results show a very challenging picture of Mogadishu for what concerns the construction sector, firstly, in terms of lack of sensitiveness about high-performance technologies (the common practice is to opt for the easiest and cheapest solutions without considering performance and sustainability issues). Secondly, there is a proven complexity in mapping the production and supply chains both at local and international levels, due to the difficulty in finding updated, reliable and shared data on the application context.

These initial results must be taken into account as a knowledge base for further phases of the research project, conceived as an iterative process continuously fed by the new retrieved information.

## 6 Social Impacts for Mogadishu Local Community

BECOME is purposively designed to have an impact on three different but interrelated players as follows:

- (i) the population of Mogadishu;
- (ii) the local Architecture Engineering Construction (AEC) sector;
- (iii) the local entrepreneurs (cooperatives, social enterprises, etc.).

More in details, by proposing solutions for meeting the demand of low- and medium-level housing, the project addresses the needs of the local vulnerable segment of the population. In particular, on the one hand, the population that currently lives in shelters could benefit from the opportunity to move into houses that are no longer improper and temporary but adequate and durable, increasing their conditions of hygiene, safety and well-being and, in general terms, ensuring a higher quality of life. On the other hand, the population that presently resides in low-level housing could have the opportunity to upgrade their conditions moving into medium-level housing, with the chance to integrate micro-entrepreneurship spaces as a support for their business development.

In addition, the actors of the local AEC sector may strongly benefit from the definition of a model of modular settlements, where different alternatives and chains of supply have been already analysed and grouped. This “plug and play” model will help them in the evaluation of practical business opportunities and in establishing tighter relationships along the supply chains. The potential for creating a circular economy approach exploiting the local presence of specific materials has been also explored. Specific training sessions and materials have been developed by BECOME team in order to ensure a proper understanding and practical utilization of the model.

Moreover, BECOME project has the aim to provide an impact throughout the entire life of the settlements. Indeed, the idea of creating a local community of entrepreneurs, offering services to the inhabitants of the settlements and to the local community is one of the key point of the proposal and has brought in the project the need for adding some specific facilities, such as—among others—the office/SMEs dedicated spaces in the buildings and the renewable energy production plants.

Local entrepreneurs can benefit from the above-mentioned facilities and from a dedicated training and documentation aimed at helping them understanding the potential for the use of such facilities in their businesses. The emergence of local services for the support of the life cycle of the settlements, such as electric maintenance and refurbishment construction materials supply, has the potential to create a virtuous circle helping the settlements becoming an almost self-sustaining ecosystem within the local community.



## 7 Conclusions

BECOME project proposes a new business ecosystem model for sustainable settlements, integrating affordable housing, local entrepreneurship and social facilities, also exploring the exploitation of local loops in a circular economy approach. The project takes into account the fragile, uncertain and dynamic nature of Mogadishu application context, facing—among others—issues concerning the difficulty in data acquisition, the lack of reliable and shared references. In this regard, the project proposes new informative and interpretative supporting tools useful for both foreign and local investors, allowing them to gain a comprehensive and holistic view of the real conditions, opportunities and barriers of Mogadishu context. Indeed, the project can help foreign and local investors in the assessment of business opportunities, providing valuable context-aware information and indications useful for the development of pre-feasibility and sustainability plans for investments.

Lastly, BECOME supports the research community by studying in details the practical applicability of a model of modular and replicable settlements in a high-risk environment like the one of Mogadishu. The replicability of the developed models and tools of analysis in other high-risk environments, e.g. in other African countries, could open interesting avenues of research. Furthermore, the same multidisciplinary approach used in BECOME applies in this respect to different research streams: from circular economy approaches applied to buildings in war contexts, to sustainable affordable housing design and construction materials production.

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