Urban regeneration and building retrofit. A strategy towards instilling a culture of innovation and entrepreneurship

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Abstract. The United Arab Emirates’ economy is transitioning to a knowledge-based economy by promoting innovation and research development. Supporting the UAE’s Vision at becoming among the best and most innovative nation in the world by 2071, the Government has developed frameworks that recognize the importance of innovation to an economy’s growth and development. This paper presents the results of a design research where the domain of architecture and engineering blend with economics and social studies to the serve the UAE’s vision, proposing urban solutions to launch the country in its ‘next 50’ years, with an eye for the preservation and revitalization of the exiting and valuable resources. The research project proposes a different geography of innovation and introduces urban regeneration strategies to stimulate innovative policies for the built environment of the entire UAE territory. With the intent of forming an intangible connection between the seven Emirates, the proposed intervention can be situated in every state. The study especially looks into the three neighboring Emirates or Dubai, Sharjah, and Ajman, and finally select the latter to test the introduction of strategically designed spaces in degraded (and disconnected) locations to encourage the community to innovate while at the same time reusing/refurbishing the existing resources/buildings/facilities. The specific case study involves the design of an incubator facility in an obsolete villa community in Ajman, formerly hosting locals (therefore luxurious) that now have left for better locations and cannot manage to resell their properties due to the decadence of the neighbourhood. The incubator, a building articulated in the interstitial spaces in between the villas, would reactivate the district by attracting young and innovative entrepreneurs, who settle there for both working and living, exploiting the incubator complex as a parasite of the existing villas. If successful, the project will revive the district, provide it a new brand, and create a new financial stream to self-support its gradual regeneration.

1. Introduction: economy and entrepreneurship in UAE

With the world rapidly changing, countries are trying to adapt and be able to maintain high-quality life for their citizens. In the recent years, it has been invested to understand the link between entrepreneurship, innovation, and a nations’ economic outcomes. Coupling innovation and entrepreneurship is the key-driver of a country’s economic growth and development. It was found...
affecting the economy by many means: growth, competitiveness, diversification, infrastructural development, employment, improvement in the quality of life, and trade.

Moreover, the Middle East has always been known as a home of economies which are greatly reliant on one sector: oil. However, in recent years, the Arabian Gulf nations, including the United Arab Emirates, have been working on shifting their economies to investing more into non-hydrocarbon sectors such as real estate, tourism, and trade [1]. Such movement helped the country in boosting both local and international levels of trade and investment.

The oil wealth in the United Arab Emirates is noticeably decreasing and its preservation for the future generations is crucial. The UAE believes that collaborating with the private sectors while providing more support to entrepreneurs and Small and Medium Enterprise (SMEs) can be key factors to allow citizens to contribute more to the country’s development. Furthermore, the encouragement of creativity and innovation is currently the UAE’s main focus, as the youth population is gradually increasing causing a demographic situation known as “Youth Bulge”, presenting both opportunities and challenges [2]. This prioritizes the government’s focus on entrepreneurship amongst the youth to encourage business activity into more knowledge-oriented sectors. Promoting entrepreneurship is not only aimed at increasing the UAE national’s contribution and involvement to the labour force but is expected to produce a great effect on lowering unemployment rates in the long-term scenario [3].

1.1. Economic Transition of the UAE
In its developmental phases, the UAE classifies as an innovation-driven economy due to the discovery of oil that improved the country’s GDP within a brief period of time. Economists continue to hunt for the key driver and the foundation for the growth of an economy. In a traditional economy, nations are mainly focused on the internal production factors; labor force, materials, resources and energy, and disregard knowledge and technology as they are considered external factors. However, nowadays more investigations are being developed so that knowledge can have a direct inclusion in the production of a nation’s output. Investing in knowledge and research will not only increase the productive capacity of the other factors, but it will also transform them into new goods and services. Moreover, it is evident that knowledge has an important role in a nation’s economy. The incorporation of knowledge into the regular economic production functions is not that simple, as it disregards some essential economic principles. The United Arab Emirates, whose economy has been significantly dependent on the export of one primary product, has put efforts in developing strategies of industrialization to diversify the sources of its national income and reduce its dependency on oil. Therefore, the economy is transitioning from an innovation-driven economy to a knowledge-based economy.

1.2. Economic Standing of the UAE Today
To sustain a long-term economic growth, the nation has put effort in order to diversify the income sources by introducing different strategies, including the investment in the SMEs and entrepreneurs, being the backbone of developing economies. Entrepreneurial activity is defined as an individuals’ behavior towards starting and running a business. Entrepreneurship is also a process that can be measured by an individual’s intentions, activities, and interactions. Using the 2009, 2011, and 2016 – 2017 Global Entrepreneurship Monitor studies, the change in entrepreneurial activities within the United Arab Emirates by nationals and expats were identified to further understand and analyze the entrepreneurial trends of the country against nations of similar phase of development. After the Global Economic Crisis in 2008, the United Arab Emirates had experienced a sharp decline in the economic activity, resulting in high unemployment rate [4] (figure 1).
Figure 1. UAE youth unemployment rate. Source: Macrotrends 2017

With fewer business opportunities, entrepreneurs were less likely to have the initiatives to take risks and start a business.

However, the UAE is home to 50% of Arab Youth’s Start-Ups (reference year 2017) and has one of the highest per capita incomes in the world. The UAE GDP per capita ranks 8th in the world (IMF) and 1st in the Middle East and North African (MENA) regions, and the 15th in the world per quality of life. The United Arab Emirates has already made many efforts towards diversification, entrepreneurship, and opening more opportunities towards different individuals. Thus, it has made a great impact on the countries rates and rankings. Based on the 2016-2017 GEM study, as of 2015, the United Arab Emirates ranked 12th and 29th amongst 64 participating countries on the entrepreneurship impact towards job expectations and innovation respectively [5].

2. Implementation of creative community spaces
For the past 10 years, innovation spaces such as accelerators, incubators, co-working spaces, and innovation hubs have been rapidly increasing across the globe. As cornerstone connections between startups and the industry, they offer a platform for new ideas to be tested contributing to local economies, resulting in economic diversification, development, and job generation [6-8]. Hence, nations worldwide have started to develop start-up ecosystems, as the impact of such creative community spaces have been proven to be very significant to a nation’s economy. Groves deeply analysed such spaces into four types: entrepreneurial communities building, urban regeneration, industry innovation, and building acceleration [9-11].

3. Project aim and objective
The United Arab Emirates aims at becoming the global hub for innovation [12]. However, the political independency of each emirate presents an obstacle to reaching that target, as it generates disconnections. Despite the unification of the Emirates, there is a considerable level of independence in regulations and policies per state. Innovation, when conceived as the means for creating new entrepreneurial activities, needs clear work-frames to develop efficiently and successfully.

This study proposes a strategy that aims at encouraging communication and connectivity through the promotion of a culture for innovation. And, given the above-mentioned obstacles, it does it by proposing the integration of innovation spaces in every Emirate, each one enhancing the local strong sector, nevertheless governed by common rules in terms of regulations, policies, and design.

4. Proposed strategy
The recent emerging landscape of innovation in the form of “Innovation Districts” emphasizes the significance of socially interactive spaces to innovation. The project proposes a different geography of innovation through combining different building typologies and functions, introducing a strategy
impacting the implications of policies and the built urban environment. The introduction of the new
typology of innovation spaces, strategically placed within each emirate, aims to transform the UAE into a
global hub of innovation and entrepreneurship. In this urban setting, creative community spaces are located
in proximity to the community, in an attempt to establish a stronger connection between them. The
proposed space for innovation acts as a platform for emerging entrepreneurs in different fields and sectors
allowing for the visibility of different work aspects. Thus, enhancing “open innovation” and enabling
innovators to experiment through testing products and services to bystanders. The space for innovation
also aims at promoting a culture of innovation among the community members through an inviting public
space with a variety of facilities in proximity to creative community spaces. Therefore, the observable
creative spaces provoke and incite curiosity. The community members, emerging entrepreneurs, and
innovation space form an ecosystem in synergy with the surrounding site. The proposed strategy targets
both the urban built environment and the economic development and growth, resulting in tangible and
intangible benefits. Tangible benefits are obtained through the addition of space for innovation into
communities reviving the urban surrounding through introduction of policies towards economic growth.
The implementation of the proposed strategy per Emirate is attained through respectively introducing the
space in proximity to vibrant areas. By introducing a communal space that is widely spread within a
walkable radius, fostering entrepreneurs, the community will be encouraged to interact with the spaces for
innovation. The distribution of the other secondary units, each assigned different functions serving its
location, creates a visible connection to the primary unit, inviting the community to explore the structures.
The visible connection will be achieved through the structures’ physical proximity and architectural
features like the use of colour (figure 2), as previously done in Les Folies by Bernard Tschumi at the Parc
de la Villette (Paris, 1982-1998) [13]. Hence, the observable creative spaces provoke and incite curiosity
creating a dialogue between the entrepreneurs and the community. Through providing a platform for
innovation serving the community, emerging entrepreneurs, and startups in multiple sectors and fields.
Therefore, the strategic locations help attract community members to take part in the innovation process
through inviting them to innovation spaces that are accessible, providing different public facilities.

Through stages of analysis and surveying of each Emirate, areas have been found possessing
individual strengths and resources, and have been identified as suitable for the introduction of the
creative space. The following paragraphs describe this analysis and design experimentation for the
emirates of Dubai, Sharjah, and Ajman, assumed as testing areas for the project. Finally, the site in
Ajman has been taken as case study to further develop the proposal.

Figure 2. peripheral structures to guide toward the innovation centre; the colour used as an
identification method.
4.1. Conceptual Proposal for Dubai
The site selected in Dubai is within an industrial area comprising of art galleries such as AlSerkal Avenue. To create a uniform dynamic within the area, the innovation spaces in Dubai focuses on art and artistic factors. The main space for innovation is placed in an empty site close to AlSerkal Avenue, while the smaller units of public and creative community spaces are strategically placed towards the street and exposed areas, catching attention and drawing the public towards the main space. The smaller units are distributed away within a walkable radius (figure 3).

Figure 3. Conceptual Diagram illustrating the potential sites in Dubai (a), the selected one (b) and its potential development (c).
4.2. Conceptual Proposal for Sharjah

Sharjah is known for its Industrial areas and the great amount of land it occupies in the Emirate. Hence, the industrial area was a resourceful site to exploit, illustrating how the spaces for innovation can integrate into the different Emirates with various purposes, based on the local inclinations. The industrial area is a congested place that is difficult to navigate through. The positioning of the public and creative community spaces along the perimeter of the area makes them into gates to the industrial maze, to create a means of pathfinding and therefore improving the area and reviving it as a place to gain resources. The main spaces are used to draw the people into the area where the smaller units are located strategically adjacent to the required warehouse. The creative community spaces in this site focuses mainly on entrepreneurship in technology and production (figure 4).

![Figure 4](image-url)

**Figure 4.** Conceptual Diagram illustrating the potential sites in Sharjah (a), the selected one (b) and its potential development (c).
4.3. Conceptual Proposal of Ajman

Ajman is the smallest Emirate. However, it is dense in population. In Ajman, the AlRumailah neighborhood was analyzed as it presented an exceptional geographic location. The site is situated in a critical part of the Emirate, in front of the corniche, making it a significant potential and a core point in the revitalization of the whole emirate. Placing the main space in this location, the public and creative spaces are distributed within the neighboring areas, revitalizing the existing structures. Additionally, it has a large residential area around the selected site, in which the houses are either unoccupied or in poor conditions. The proposed intervention for this location revives the quality of these houses adding value to them and aiming at densifying the area (figure 5).

The AlRumailah neighborhood is a highly dense residential area with commercial and mixed-use buildings, where the nearby corniche presents a significant activity node: with its vibrant community along, it rationalizes the introduction of the proposed intervention.

Figure 5. Conceptual Diagram illustrating the potential sites in Ajman (a) and the selected one with the identification and preliminary classification of the existing houses (b).

A survey of the Al Rumailah neighborhood allowed mapping and classifying the existing houses as occupied or unoccupied (table 1). In the recent years, owners have left these houses and moved inward into the city. Abandoned houses are either left unoccupied, rented out to labor, or adapted to other functions (i.e., shops, beauty centers, and restaurant). Figure 5 shows the locations of the houses in proximity to the selected sites for the innovation center. The survey highlights the houses’ potential for renovation or adaptive reuse with different functions. The proposed intervention aims to encourage individuals to move back into the area. Taking into consideration the profiles of both local and expat entrepreneurs with different spatial needs, the project proposes modular and transportable Pods to be attached to the unoccupied houses. One of these ‘parasites’ would start using a house space, gradually refurbishing it. Once it succeeds through this symbiotic relationship, it moves on to the next row of houses creating a ripple effect of house refurbishment resulting in an urban regeneration.
Table 1. Qualitative survey of the existing houses in Al Rumailah area, Ajman. The survey served to identify the houses’ potential for renovation or adaptive reuse.

| House Description | Image 1 | Image 2 | Image 3 |
|-------------------|---------|---------|---------|
| Several labor workers occupied the villa. Due to that, the villa is toady poorly maintained and left unoccupied. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |
| Located in front of the corniche, the villa is kept in bad state in the midst of all the sand and is currently occupied by a commercial trade. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |
| The untenanted house is located in proximity to a tall residential building currently undergoing construction. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |
| In spite of the house condition of, the villa was left unoccupied for a long period of time. The trees have overgrown, and the fence was vandalized. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |
| The 3-storey apartment block, rented out to expats, blends in with the rest of the existing houses, observed to be in bad conditions. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |
| The door of this villa is locked with a chain and the broken tree trunk implies that it was left vacant for a long-period of time. | ![Image 1](image1.png) | ![Image 2](image2.png) | ![Image 3](image3.png) |

5. Implementation of the proposed strategy to the Al Rumailah area, in Ajman

The project applied to the area in Ajman proposes combining different building typologies and functions to impact and regenerated the built urban environment, with the aim of encouraging innovation. This is achieved by introducing an innovation space in proximity of a potential location and providing means of sustenance and accommodation for the entrepreneurs inhabiting it.

5.1. Space for Innovation

The innovation space is designed to create a dialogue between the community and the entrepreneurs through the incorporation of functions that enable the surrounding facilities and users to interact with it, whilst the entrepreneurs maintain their private spaces. This strategy provides visibility to the entrepreneurs as well as introduced the community to the different activities (figure 6).

The masterplan was designed to accommodate both the public and the entrepreneurs. A hierarchy of facilities are introduced within the chosen site: main facility, incubation spaces, and recreational services. The main facility comprises a co-working space, reading space and multipurpose area. The facility includes different types of incubation spaces such as: kitchen incubator, wood workshop, and maker space (FabLab). The buildup of creative community spaces depends on the designated area. Also, recreational services, such as cafes and retail, are included to increase the liveliness of the Al Rumailah.

Figure 6 shows the area diagrammatic scale and site plan view) with the larger facilities of the innovation center and the smaller Pods connected to the nearby abandoned villas (top-left corner).
Figure 6. Diagrammatic site plan (a) and detailed one (b) of the innovation center in Al Rumailah area and identification of existing building to be implemented with Pods.

5.2. Accommodation for Entrepreneurs

Taking into consideration different entrepreneurial profiles, the proposal introduces Work&Live Pods to accommodate entrepreneurs willing to stay within the area. The Pods are both designed to be transportable, comfortable, and flexible. Moreover, the pods are thought as made from two modules that are prefabricated off-site then transported and simply assembled on site. Size limitations for transportation and accessibility were factors taken into consideration when designing the Pods. Figure 7 illustrates how the proposed Work&Live Pods attaches to a house in Al Rumailah. Size limitation in the Pods design also accounted for the necessity of associating a small object to a larger villa. One would becoming a symbiont of the other, in the spirit of a mutual benefit: The Pod would colonize the villa, gaining the space that its compact volume does not have; while the villa would be revitalized by the new function, with the aim of re-growing its commercial value and raising interest in potential buyers.

Figure 7. Prefabrication and implementation of the Pod to an existing villa. Diagram (a) and view (b)
6. Conclusion
Changing population demographics, technological advancement, and fluctuating market conditions are some of various dynamic forces continuously reshaping societies. To sustainably grow in the global landscape, the United Arab Emirates recognized the importance of the performance of the local industry and entrepreneurship to the economic and social advancement. Economic diversification, expansion, and competitiveness are achieved through the instillation of an entrepreneurial sector. For this reason, the UAE had developed frameworks to adapt to the rapid changes maintaining high-quality life for its citizens. This study tests a strategy targeting the urban build environment (tangible level) and the economic development of the nation (intangible level) to attain both tangible and intangible benefits. Innovation spaces act as a platform for emerging entrepreneurs in different fields and sectors allowing for the visibility of different work aspects and aim at promoting a culture of innovation among the community members. Therefore, the observable creative spaces provoke and incite curiosity. The community members, emerging entrepreneurs, and innovation space form an ecosystem in synergy with the surrounding site.

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