An-Najah University Journal for Research – A
Natural Sciences

Exploring an Architectural Paradigm for the 15-minute City Planning Model: Towards Reforming Gaps of Services in Nablus

Received 20th Sep. 2023, Accepted 12nd Nov., 2023, Published 1st Feb, 2024, DOI: 10.35552/anujr.a.38.1.2164

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Abstract: The existing literature on the 15-minute city planning model mainly covers conceptual strategies, responsive urban transformations, and innovative urban development projects at the neighborhood level. However, little attention has been given to the actual architecture of the 15-minute city. This planning model emphasizes the relationship between time and space of services in neighborhoods, which can be used as a scientific method to fill the gaps in services in Nablus neighborhoods. Local feedback on the distribution of services, proximity, and mobility in Nablus neighborhoods has highlighted the need to reimagine the comprehensiveness, density, and accessibility of services. Additionally, the prioritization of services has changed during COVID-19, which emphasizes the importance of architecture that considers flexibility in services. To address these challenges, this paper proposes the use of prefabrication construction technology in the placement of urban service units as a sustainable architectural model to realize the 15-minute city planning model. The paper presents the integration of structural system analysis, environmental considerations, and sterilization criteria into the model and proposes guidelines for the feasibility of this model. The resulting urban service framework of the architectural paradigm responds to the pointed-out needs of the population, and the temporary introduction of the model makes the application of the model responsive to the local shortage of vacant lands.

Keywords: 15-minute city; Architecture; Building technology, Services Distribution, Post-Covid, Urban units.

Introduction

A recent analysis of critical environmental conditions and social disconnections resulting from the contemporary car-based schemes of modern cities has highlighted mobility as a key factor for potential planning reformation. In 2016, a neighborhood-planning model called the '15-minute city' revised the time-space relationship in neighborhoods as a method to reform and design people-based and environmentally and socially sustainable neighborhoods. The initiator of the model, Carlos Moreno, suggested that accessibility to inclusive services of six social functions, depicted in Figure 1, be provided within 15 minutes of soft mobility, such as walking or cycling (1). Principles of the model, like proximity of services and service density, come in line with the post-COVID targets of urban experiences (2).

Literature on strategies, urban transformations, and urban development projects of the 15-minute city planning model is illustrated in several cases. In Paris, where the concept originated, the occasional closure of the Seine River motorway applied the walkability and community involvement aspects of the planning model (3). In Milan, the traffic-congested roundabout was transformed into a public square, enhanced with

Figure (1): Social Functions of 15-minute City Model. Source: Redrawn by researcher, 2023>

amenities and urban social functions (4). The railway site of Tuscolana was converted into a sustainable urban campus that used low-carbon timber buildings and modular structures (4).

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The neighborhood projects of Croydon South, Strathmore, and Sunshine West emphasized the necessity of housing diversity and streetscape improvements as key opportunities for livable neighborhoods (5). In the case of the American conventional cityscape, Portland implemented the strategy of complete neighborhoods to reduce travel distances among fragmented service distributions (6). Each country has implemented the model differently, allowing for flexible versions of the model to respect local context, existing infrastructure, cities' goals, and development aims. Though they branch from the same concept, the 15-minute cities of Paris and Milan are distinguished from the 20-minute cities of Melbourne and Portland due to the subjectivity of the reasons mentioned (7).

While macro-scale planning contains micro-scale design of architecture by default, cases of 15-minute neighborhood planning do not indicate any preference, guidelines, or implications for adopting innovative architecture that responds to the making process and the contextually iterative nature of the planning model. The literature shared about the architectural adaptation to the 15-minute city is limited to two sources, shown in Figure 2. The first speaks about the adaptive reuse of abandoned buildings (brownfields) as a strategy for the making of the model (8), and the second suggests the after-use of buildings in their non-operating times for the same aim (1). These strategies cannot be generalized; abandoned buildings are usually tied to cities of industrial background, which is not an international reality, and the only mentioned example of schools adopting the after-use strategy sounds to offer a conditional functioning of space.

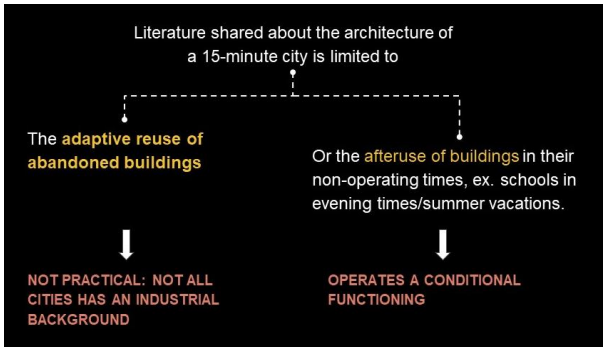

Figure (2). Literature shared about the Architectural Adaptation to the 15-minute City Model. Source: Researchers, 2023.

The parameters for designing architectural hosts of servicing have expanded to include affordability, flexibility to accommodate changes in user type and usage duration, resilience in critical conditions, and overall sustainable construction, operation, and maintenance. These parameters are addressed under the architectural genre of prefabrication. For example, in South Korea, seven foldable packs were used to construct a deployable classroom system for the COVID-Responsive Pop-Up School (9). The project prioritized social distancing and safety during the pandemic while also being able to expand to offer capacity for potential rapid urban growth. In Istanbul, the Fold & Float project was designed to offer housing units in cases of emergency. These units consisted of lightweight steel structures that were duplicated and installed in a waterfront context (10). In the United Kingdom, a temporary setting for performance introduced the experience of attending sports matches in an arrangement of theatre/urban stadiums, constructed of timber beams and post modules (11).

A comparative analysis of these cases, shown in Figure 3, highlights distinctions in typology, scale, and local needs of cases of prefabrication. These cases successfully display the role of architecture to respond and sometimes remediate changing social and urban matters.

Project Name	Typology	Location	Scope(Area)	Capacity	Temporality
Fold & Float - Floating Emergency Structure	Residential	Turkey	NS (Not specified)	Each suits 4 to 6 people.	↘
COVID-Responsive Pop-Up School	Educational	South Korea	143 m² 7 Foldable Packs makes 11*13m class	50*7 350 people	↘
A Temporary Setting for Performance	Recreational	UK	NS	450 people	↘

Project Name	Variety of Materials	Key Elements	Conclusion	Images
Fold & Float - Floating Emergency Structure	2 Light steel structure that includes all the fixed furniture -Floating pontoon made of concrete	-Uses the seafront as main resources in emergencies. -Demonstrates how a system/community can be formed through modularity.	-Potential research on Assembly, and quick installation. - Lots of seafronts in the city of Abu Dhabi can be used to expirement similar research. -Responds to an Emergency. -Is a temporary installation.	
COVID-Responsive Pop-Up School	3 -Flat Packed Panels -Raised Floor System -Easily Sanitized Finishes	-Uses Sea as a safer location for emergency condition settlements.	-Responds to a current emergency situation. -Showcases an example of assembly.	
A Temporary Setting for Performance	5+ -Concrete Pillars -Glazed ceramic -Coated grey -Wood -Glass	-Suggests a temporary settlement on a playground	-Reimagines an urban space as potential for social interaction through performances.	

Figure (3): Comparison between Cases of Prefabricated Projects. Source: Researchers, 2023.

Due to the sustainable significance of prefabrication, and for the target of identifying adequate architectural systems in the literature of the 15-minute planning model, this paper expands on the role of architecture, particularly in examining the use of prefabricated sandwiched panels as a building technology that is responsive to the process of the planning model. The paper suggests a prototype of an architectural paradigm that is drawn from both Emergency and Temporary architecture, paralleling the notion of architecture that instantly offers services with architecture that responds to COVID-19, and with architecture that meets post-COVID realism.

The suggested paradigm is a design toolkit project structured of urban prefabricated units, that add the measure of sustainable constructability to the 15-minute city goals of sustainable environment, use, and society. The paper uses the word ‘paradigm’ to refer to a design pattern that works as an approach to design solution/ design problem solving, as described in some literature (12). These units are designed to host flexible functions and geometric forms and are intended to distribute the services covered in the 15-minute planning model. The paper presents the possibility of inserting the developed paradigm to reform the services of Nablus, a city where there is no neighborhood planning. Medical services are highlighted as essential (13); hence, the paper focuses on the application of building technology to the typology of medical services, identified as ‘Caring’ in the model’s social functions. The paper also acknowledges the contribution of the suggested technology to functions for other types of services through experimentation with their distribution in a neighborhood.

To develop the architectural paradigm, the paper looks at the literature of the suggested building technology, and the environmental and sanitization considerations accompanied by COVID.

A. Structural Studies & Assembly

Sandwich panels come in different types and standardized dimensions. The variations in numeric values are influenced by the applications and manufacturing processes. Typically, sandwiched panels are composed of two steel sheets placed internally and externally to a thick insulation layer using sealant (14). This construction method has proven to be efficient in cost and energy savings during manufacturing and transportation compared to conventional methods (15). The panels can be reused in other projects, further reducing the need for new materials and recycling waste. Prefabricated sandwiched panels are modular and mass-produced, making the construction process faster. By controlling the time and costs of building, sustainable architecture can be achieved.

B. Environmental Studies

In the field of environmental studies, buildings are monitored for their impact on the environment and the mechanism of space usage. With the COVID pandemic affecting space usage in direct and indirect ways, researchers emphasized the link between the indoor environment and the spread of COVID-19 infection (16). The quality of ventilation and airflow in enclosed spaces, the thermal value of spaces, and their role in carrying the virus droplets are key factors in evaluating a healthy environment.

Instructions for COVID-19 protection include ensuring good ventilation either by bringing fresh air in through open windows or by filtering the air inside using technical systems. The Centers for Disease Control and Prevention recommended the use of ceiling fans, window exhaust fans, central heating, ventilation, and air conditioning systems (HVAC) to improve airflow. Proper use of portable high-efficiency particulate air (HEPA) cleaners depends on the room area that requires filtering (17).

C. Sanitization

Sanitization is an important aspect of producing and designing healthy and contamination-free envelopes. Materials can be inspected and tested under heat and other factors to limit the spread of viruses. Some materials are replaced, adjusted, or sprayed with antimicrobial coatings (18). Social distancing measures control communal interaction, and are used as a first line of defense before treatments and the use of sanitization tools.

Methodology And Experimental Design

The paper depends on both qualitative and quantitative methodologies to build the design paradigm. Two processes are suggested to come up with the outcome of the architectural paradigm: First: Analysis and data collection, and Second: Experimenting with the design of proposed urban units in neighborhoods. The processes are shown, together with their associated methods in Figure 4.

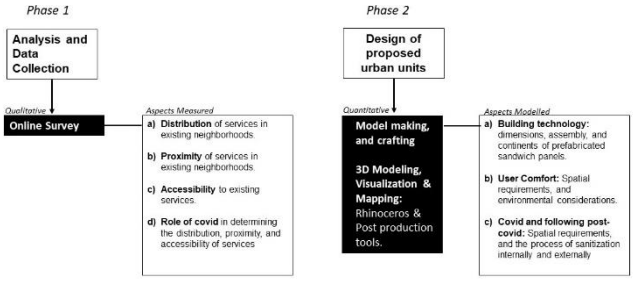

Figure (4): Phases of Research & Associated Methods. Source: Researchers, 2023.

A. Analysis and data collection in Nablus

In the first part of the analysis, the study uses the service type identified in the planning model of a 15-minute city to layer an investigation on services of existing neighborhoods. An online survey, of 15 questions, was conducted on 50 participants and was distributed among different age groups living in Nablus in different contexts. The survey offered an open link that could still allow more participants to contribute. The latest registered number of participants is 53, and the answers were similar to those of previous participants. The study classified data of demographics based on their age, marital status, and educational background. Ages were divided into 4 categories: 13-18, 19-39, 40-64, and 65+, however, the study realized that most attendance, (almost 87%), was from participants of 19-39 years old shown in Figure 5. Figure 6 shows that most participants were single, and Figure 7 shows that most of them held bachelor's degrees.

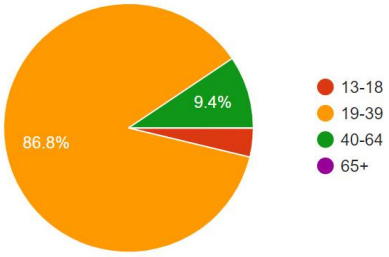

Figure (5): Number of survey participants based on their age groups. Source: Researchers, 2023.

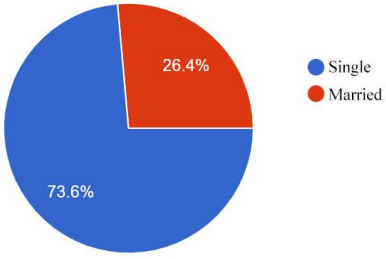

Figure (6): Number of survey participants based on their marital status. Source: Researchers, 2023.

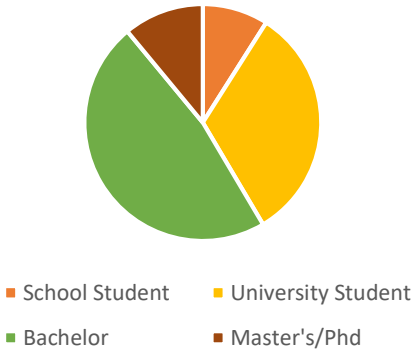

Figure (7): Number of survey participants based on their educational background. Source: Researchers, 2023.

The survey aimed to analyze local services in four aspects: the distribution of services in existing neighborhoods, the proximity of services in existing neighborhoods, the accessibility to existing services, and the role of COVID-19 in determining the

distribution, proximity, and accessibility of services. The survey took into account the relationship of different service types to the needs of distinct social groups, as observed during COVID-19. Additionally, the survey aimed to examine the type of architectural changes that neighborhoods have undergone, as a measure to predict the spectrum of accepting temporary, modular, and irregular architecture to the rigid, unified built context. The designation of age groups in the survey was adopted from the National Institute of Health (19), including; children, adolescents, young adults, adults, and older adults.

B. Experimenting design of urban units

Proceeding to the experimental design, the study referred to the literature on building technology and COVID-19 and post-COVID spatial requirements to inspire the design proposal. Such included prefabricated sandwiched panels in terms of their dimensions, assembly, and continents, spatial requirements in terms of environmental considerations, and the process of sanitization internally and externally.

The design of the urban units developed from the considered aspects was explored through model making and crafting, using Rhinoceros software for 3D modeling and visualization. Further mapping was used to test the paradigm size and possible fitting within suggested neighborhood plots. Post-production proceeded for the visuals.

Results and Discussion

A. Analysis and data collection in the city of Nablus

1) Distribution, Proximity, and Accessibility of Services

The conducted survey gave an overview of the rate of classified services in existing neighborhoods. In Figure 8, it was no surprise that (92.5%) of respondents approved the inclusion of commercial services in their neighborhoods, followed by (77.4%) approved educational, (52.8%) approved medical, (39.6%) approved residential, and (21.2%) approved recreational. The figures indicate the frequency of choosing each service type, rather than the ratio of each service type among the whole study scope, thus percentages of the analysis do not sum to (100%). Respondents were constrained to choose at least one service type, and the same applied to the set of discussed results below. There is a clear demonstration that the type of services is not equally distributed in the city's neighborhoods, and services are not equally distanced from users, as illustrated in Figure 9. There is a general lack of consideration of recreational amenities, outdoor leisure areas, and green spaces, that affects the quality of living for people in the urban area of the city, accompanied by the high percentage of local dependence on automobiles (71.7%) stated in Figure 10. For the (28.3%) who considered walkability, their classification of most accessible services to least accessible services follows the order of service rate among neighborhoods. (69.8%) of respondents approved walking to commercial amenities, followed by (60.4%) who approved accessing educational services, (52.8%) approved medical, (39.6%) approved residential, and (30.2%) approved recreational.

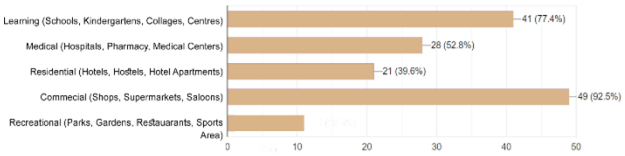

Figure (8): Measuring Local Services Distribution. Source: Researcher, 2023.

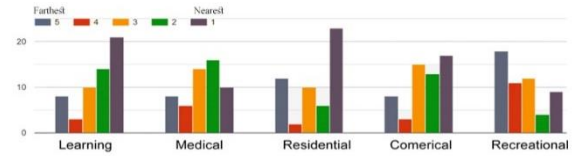

Figure (9): Measuring Local Services Proximity. Source: Researcher, 2023.

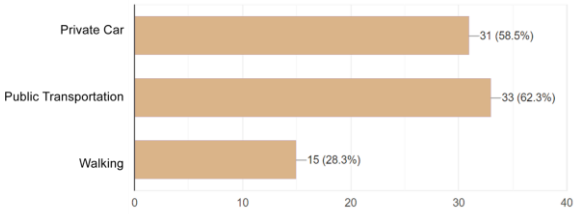

Figure (10): Measuring Local Accessibility of Services. Source: Researcher, 2023.

2) Distribution, Proximity, and Accessibility of Services during COVID-19

The survey witnessed the expected shift in valuing some neglected service types in conventional scenarios, due to COVID. Evaluation of service distribution in COVID realism considered the requirement of essential support. In response to the pandemic core issue, (58.5%) of respondents stressed their need for medical support services, (50.9%) stressed psychological support services, (35.8%) stressed social support services, (24.5%) stressed professional/financial support services, (20.8%) stressed nutritional support service, and (3.8%) stressed residential support service. Questioning the proximity of services matched the rate of services under COVID realism; considering medical support services as essential to be in high proximity to users, and residential support services to be in low proximity. Figure 11 shows the radical distinctions of proximity of the two types of services. Moreover, the survey expressed the unpreparedness of neighborhoods for instant response to needed services, sensed from how they dealt with COVID-19. The observed weakness in applying a system that provides essential medical support in the neighborhoods, indicated in (18.1%) of respondents approving the assigning of location for testing and vaccines, gave an assumption on the possible weakness of the application of other services.

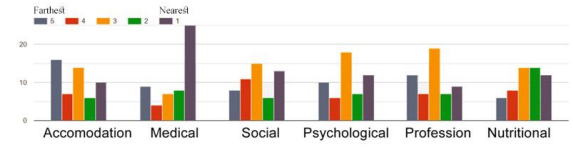

Figure (11): Measuring Local Services Proximity, during COVID. Source: Researcher, 2023

3) Evaluating the Acceptance of An Architectural Paradigm

From the perspective of testing the adequacy of a generated architectural paradigm in the local context, a review of the history of architectural changes in the city's neighborhoods was collected in the survey. (41.2%) of respondents specified that the neighborhoods experienced temporary buildings, as expressed in Figure 12. With such a figure, the study questions the technology of the temporary installations, the reasons for their temporality, the period of their temporality, their functions, and their size. However, in comparison with local observations - where the city's fabric barely experienced so- the study assumes that respondents mistook 'Buildings Temporality' with the temporality of building construction. Nevertheless, the study gives coverage of the communal observation of changing architecture.

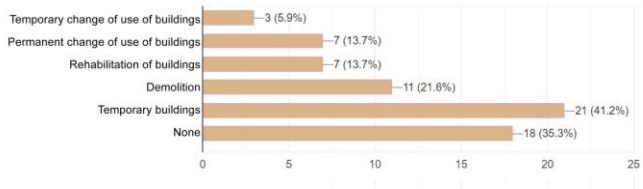

Figure (12): Measuring Local Architectural Changes. Source: Researcher, 2023

B. The paradigm in the city of Nablus

In response to the distribution, proximity, and accessibility analysis of services in existing neighborhoods and the communal feedback on injecting missed services, the paradigm attempts to use urban-arch units to meet the inclusive planning of services. Implementing the aims of the paradigm, four principles are focused on the concept: Constructability, Extendibility, Flexibility, and Temporality, as depicted in Figure 13. The use of modularity in the building system, together with the cost and time-effective building technology characterize the application of efficient Constructability. Application of Extendibility is obtained in the use of proposed units in plots of neighborhoods, with proximity to each other. Units are envisioned to function as extendable, duplicated urban elements. Such refers to the use of these units at either empty plots of the neighborhood, or as extensions from existing buildings. Embedding the flexibility of geometric form and flexibility in the use and the reuse of the units create a system of architecture that moves from one site to another, from time to another, and for another function. Temporality makes the paradigm responsive to the continuous changes in aspirations and communal needs. It further fits within the issue of limited empty lands in the local context. Both Flexibility and Temporality fill the gap in the contextualizing of the paradigm. Figure 14 shows the proposed implementation of different typologies within a holistic service chain in a suggested neighborhood boundary.

Figure (13): Principles of Conceptual Paradigm. Source: Researcher, 2023

Figure (14): Paradigm in a neighborhood. Source: Researcher, 2023

1) Massing Exploration

Aiming to meet the four principles of the paradigm, a toolkit of masses is explored. It is initiated with a single tilted unit, that gets duplicated and combined with conventional geometries of prefabs in the exploratory version of Figure 15. A partial process of assembly is crafted. Placement of these units responds to site deliverables such as circulation, orientation, environment, etc.

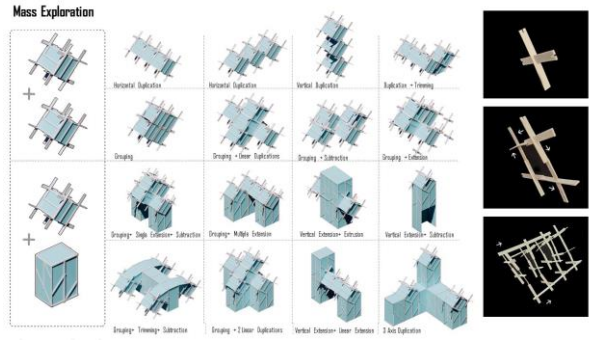

Figure (15): Massing Exploration. Source: Researcher, 2023

2) Structural & Assembly Studies

Illustrated in Figure 16, the paradigm uses sandwiched panels of 25-30cm thickness and 100cm width. Each panel can

be used as a prefabricated modular structural system panel. Joining one panel with another includes the addition of sealing tape to the exposed part of the insulation layer. Some of the panels include side profiles which are meant to integrate flushing with each other. A further cladding cover is screwed on the joinery between the two panels. The module of sandwiched panels is varied to be either completely solid on a one-story module or to hold glazing on a two-story module.

The structure of the paradigm includes a system to frame the building and a system to support the prefabricated panels. Framing the building uses a post and beam steel structure, that works as a primary structural system carrying the load of the building. In such cases, the load of horizontal beams is transferred to the vertical columns. The sandwiched panels are used horizontally as slabs, and vertically as walls, both supported with a secondary set of structural members whose load is carried to the primary structure too. The primary structure supports the roof structure, added with a secondary structure to support the glazing and the cladding covers.

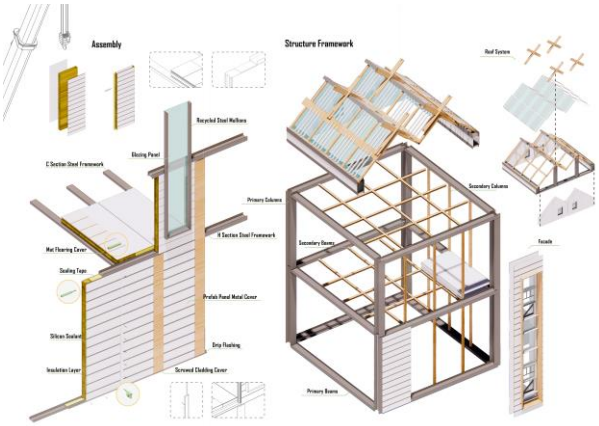

Figure (16): Structural & Assembly Study. Source: Researcher, 2023

3) Environmental Studies

The design of the proposed units encourages the application of clean and comfortable spaces through a series of passive strategies, included in Figure 17.

The first is in the creation of openable windows on the modules of prefabricated panels, allowing some natural ventilation to run in the building in some spaces. The second is in integrating treatment elements in the interior design of spaces. Figure 18 shows the technologies and the electrical tools used to filter the trapped air. Technologies such as (UVGI)- ultraviolet germicidal irradiation directly detect the microbes and limit them. Otherwise, electrical tools like purifiers speed up the ventilation of air without necessarily treating microbes. In the case of existing HEPA systems, advancements include either increasing filtration to lower the droplets or redirecting the direction of exhaust vs intake fans. The third is using the designed unit as a collector and filter of external air. The proposal explores the extended value of creating a titled mass by orienting the units to allow west-northern wind to penetrate through louvers. The opposing direction of the air collector areas (up to the west vs bottom to the east) creates an innovative layout for the application of cross ventilation.

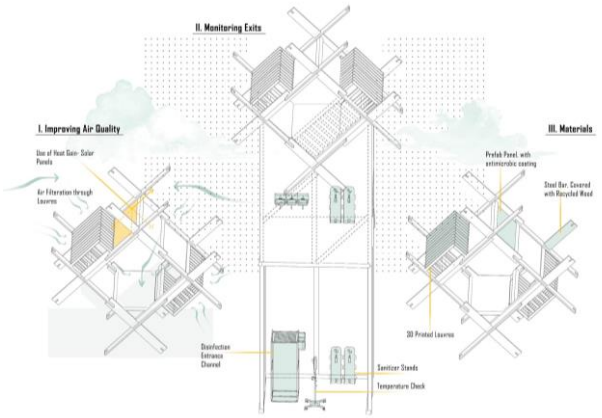

Figure (17): Conceptual Unit. Source: Researcher, 2023

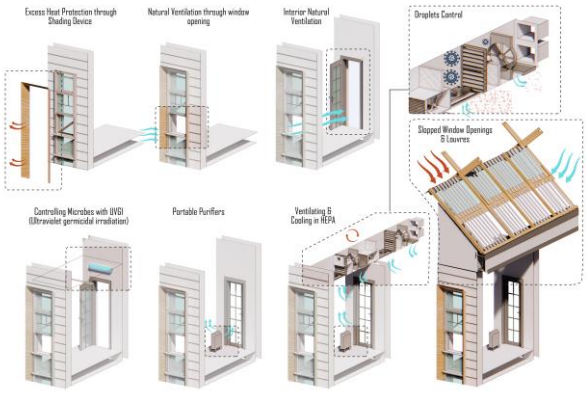

Figure (18): Environmental Study. Source: Researcher, 2023

4) Sanitization

New norms assigned by COVID-19 in maintaining health safety measures inside and outside buildings blend into the design of the proposed project. In the distribution of the program in the proposal, controlling circulation is a necessity to lower undesired infection possibilities and limit unnecessary interactions. Figure 20 shows that entrances split from exits and get segregated according to user type. Such creates a set of classified zones, where the degree of interaction is analyzed, therefore the need for sanitizing is measured. Generally, most interior spaces welcome the use of sanitizers in corridors with equal distances, in areas of gathering, in entrancing, and before exiting a place. Internal spaces maintain the needed space for social distancing in the application of signage, and wider corridors. Thermal scanners and disinfection channels are set as integrated urbanism for sanitization measures before accessing the building, as Figure 19 shows. A landscape matrix in Figure 21 is set responsively, following the same language of temporality and flexibility in the usage of the proposed building units.

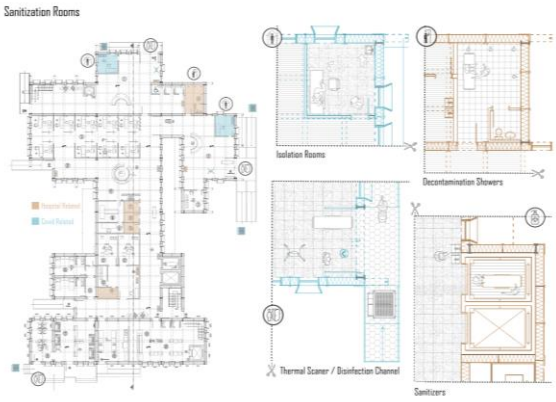

Figure (19): Sanitization Design Strategies. Source: Researcher, 2023

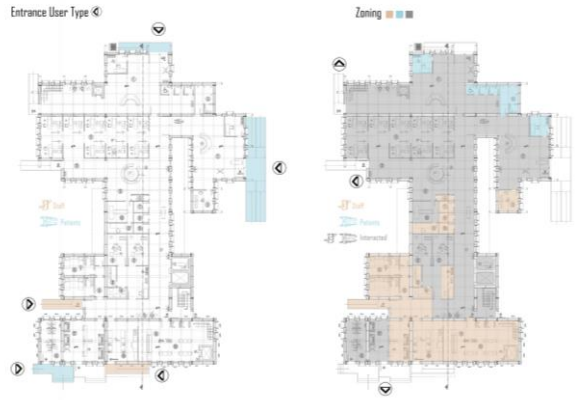

Figure (20): Circulation Study User Type. Source: Researcher, 2023

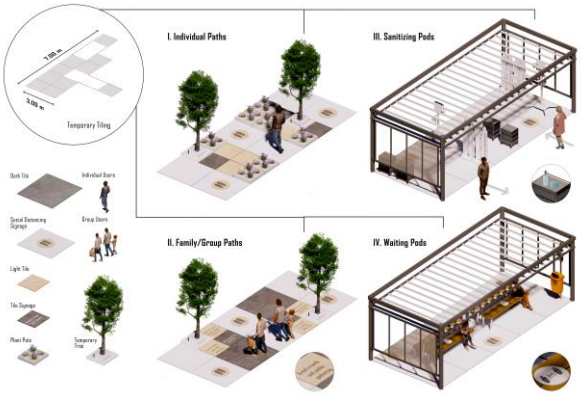

Figure (21): Landscape Matrix. Source: Researcher, 2023

Conclusion

Overall, the paper observes the role of architecture in service planning models. It proposes a paradigm that reforms existing neighborhoods using the service types and structure of one of the recent neighborhood planning models, the 15-minute city. When the suggested services are based on the revised needs of the community post-pandemic, a strategy of responsive architecture can be adopted, as shown in Figures 23,24,25. The resulting architectural paradigm utilizes sustainable building technologies which spread in the urban plan. The iterative, flexible, sustainable units can help fulfill and examine the extension of communal services using the existing purchased unused lands in the city of Nablus.

This research examines with one typology, medical, showing the development of construction in Figure 22. In this case, the proposed units bridge the gap of missing services, which is attained by measuring the implications of local planning. To make use of the suggested building paradigm, various future research may extend. First, local mass production of the system components can become a benchmark for an innovative and self-sufficient industrial economy in Nablus. This may include recycling existing materials for insulation layers, or more interestingly, the outer surface texture. The paradigm's texture can become a language that stores an accumulative representation of neighborhood demographics and cultures. It can be hybridized with other local materials. Second, with the continuation of temporality in the use, the system can become a machine that carries social layers as traces each time it sits in a neighborhood. Thus, becoming a tool for urban observation. Third, storing the system's components supports the use of neglected warehouses, otherwise; supports constructing local industrial infrastructure. Fourth, the form of the paradigm still needs to be sensitive to site constraints and urban regulations. Setbacks, surrounding building heights, plot size, and topography influence the application and its sitting in context. Further research may include experimenting with the unit form depending on its urban scenarios of sitting and function. The presented paradigm is an initial prototype and it still needs to be developed in accord with the local context and environment.

Finally, the paper stresses the relationship between architecture and urban planning and presents an innovative architectural application that follows the innovation of urban planning models. This two-way relationship helps in understanding the local condition of city planning and therefore initiates a physical strategy to develop it adequately. The paper supports the notion that cities cannot work as rigid incubators for the growing urbanism and the dynamic, constantly changing cultures and demographics.

Figure (22): Medical Typology: Assembly. Source: researcher, 2023

Figure (23): Developed Paradigm, Image 1. Source: Researcher, 2023

Figure (24): Developed Paradigm, Image 2. Source: Researcher, 2023

Figure (25). Developed Paradigm, Image 3. Source: Researcher, 2023.

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The raw data required to reproduce these findings are available in the body and illustrations of this manuscript.

Author's contribution

The authors confirm their contribution to the paper as follows: Diana Enab: Study Conception and Design Modelling, Survey Preparation, Analysis and Validation, and Manuscript Preparation. Nadia Mounajjed: Supervision of Design work. Zahraa Zawawi: Supervision of Survey & Theoretical background, and Manuscript Revision. All authors reviewed the results and approved the final version of the manuscript.

Funding

No granted funding

Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this article

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Appendices

Survey Questions

1- Age:

under 13years

13-18

19-39

40-64

65+

2A-Martial Status

Married

Single

2B-In case you're married, please mention how many children your family includes: _____

2C- Which context do you live at?

Urban areas of Nablus

Rural areas of Nablus

Refugee camps

3- What is your educational background?

Master's/ PhD

Bachelor

University Student

School Student

None

4-What is the name of your living neighborhood? _____

5-Did your living neighborhood experience any of the following:

Temporary change of use of a building/(s)

Permanent change of use of a building/(s)

Rehabilitation of buildings

Demolition

Temporary buildings

6-Which services do your living neighborhood include?

Educational (schools, kindergartens, centers, etc.)

Medical (hospitals, pharmacy, center)

Accommodation (Hotels, Hostels, renting apartments)

Commercial (shops, supermarkets, etc.)

Recreational (park, restaurants, sports area)

7-Arrange the services according to their proximity to your house location?

Educational

Medical

Accommodation

Commercial

Recreational

8-What is the location of your workplace?

In your living neighborhood

Outside your living neighborhood, same city

Outside the city

Working remotely

Do not work

9-On what means of transportation do you depend on to access services of your neighborhood?

Private car

Public transportation

Walking

10-Which services of your living neighborhood do you depend on walking to reach?

Educational

Medical

Accommodation

Commercial

Recreational

11-During covid, which of following services you felt was needed in your living neighborhood?

Accommodational Support

Medical support

Social support

Psychological support

Profession support

Nutritional support

12-During covid, rate the importance of the closeness of services to your home location?

Accommodational Support

Medical support

Social support

Psychological support

Profession support

Nutritional support

13-How did your living neighborhood respond to covid?

Lockdown and ban of interactions

Disinfection programs

Assigning locations for testing and vaccines

14-Do you believe that post-covid realism differs/will differ from pre-covid realism? How?