REGENERATION OF A DECAYING URBAN INDUSTRIAL AREA DRIVEN BY ENDOGENOUS HOME INDUSTRIES: A CASE STUDY OF MARÉ FAVELA, RIO DE JANEIRO

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ABSTRACT

Favelas are low-income urban communities in Brazil, and Maré in Rio de Janeiro has the largest cluster of favelas in the country. The prevailing view of a unique, regulated, and normative city conflicts with the reality of the continued expansion of the favelas, posing challenges for architects and urban planners in developing new strategies for integrating informal areas with the main city. This study focused on a decaying industrial area adjacent to the Maré favelas and explored a sustainable path for improving both the quality of the built environment and the quality of life of the residents. Effective infrastructure and socioeconomic links between the favelas and the city were proposed. The home production model that emerged from the favelas inspired the use of the abandoned industrial area as a home-industry incubator. The study proposed an urban regeneration strategy involving a bottom-up industry-space process evolving from home industries to group industries, and finally to larger community industries. This strategy can accelerate Maré's development and integration with the city of Rio de Janeiro.

KEYWORDS

urban industrial area, favela, regeneration, home industry, bottom-up pattern

1. INTRODUCTION

Maré, located near downtown Rio de Janeiro, with an area of approximately 427 ha, is a traditional industrial area and residential community that was formed during the early stages of Brazil's urban industrialization (Marijsse, 2016). However, with urban de-industrialization, the industrial area in western Maré gradually declined, and numerous factories lie idle or are occupied informally, with only a few (mostly along the Brazil Avenue trunk road) in use or transformed into commercial places, auto repair shops, and public service facilities. The eastern side of the industrial area contains the largest favela cluster in Rio de Janeiro, where the built environment is of low quality and includes some repurposed factory warehouses that form unique "intramural favelas" (Seldin & Canedo, 2018). The favelas are surrounded by traditional government-planned communities (Figure 1). Due to inadequate government involvement,

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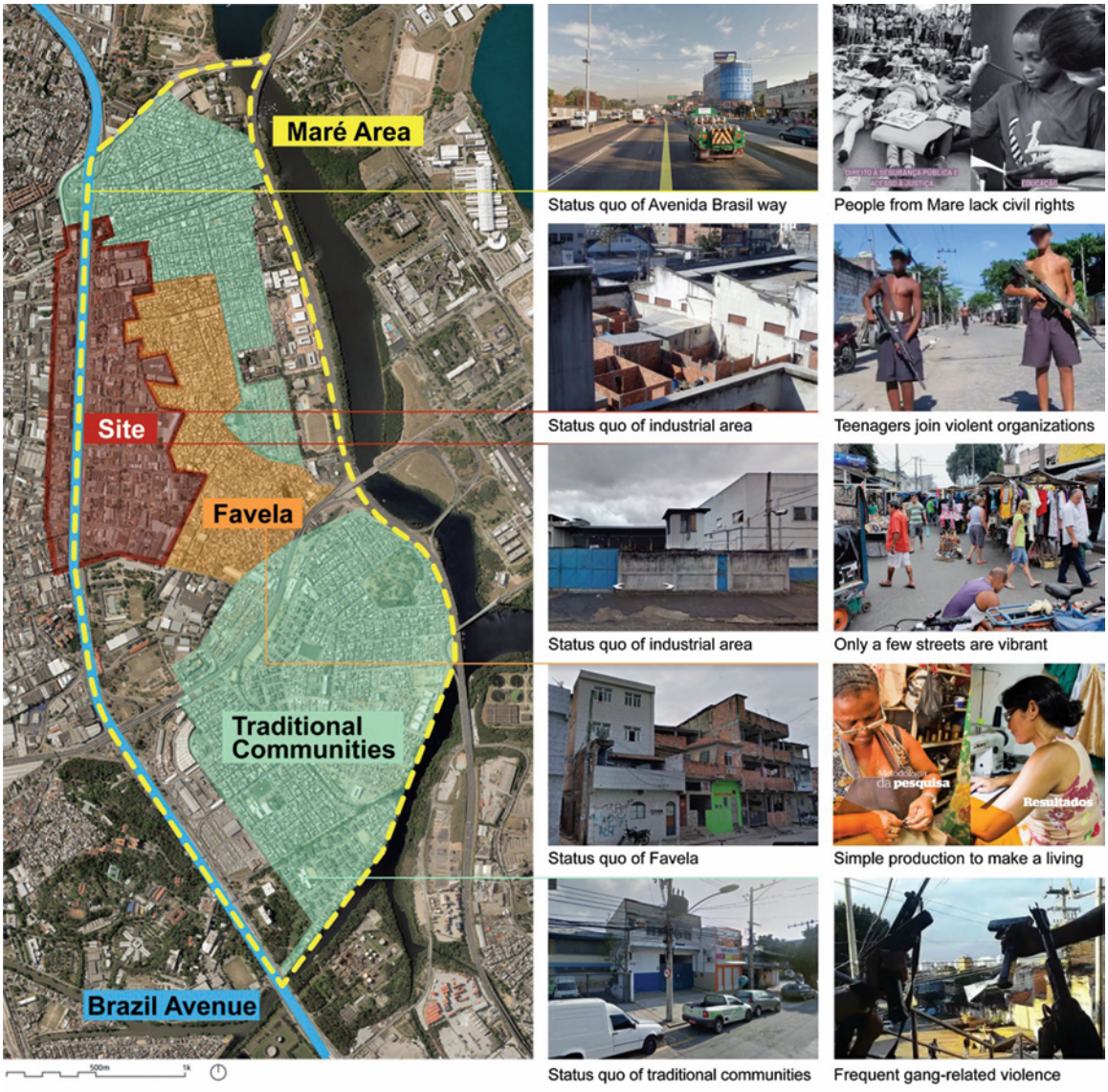
Maré has been relatively independent and self-governed. Moreover, the existence of the favelas has caused a lot of problems in this area and the government has isolated it from the main city by building a long wall along the boundary of Maré (Rodrigues & Ansel, 2011). This has weakened the links between Maré and the downtown center in economic, social, and spatial terms (Otávio Ribeiro, 2016). The characteristics and effects of this isolation were examined by the authors of this paper and corresponding practical design solutions were developed.

Many Maré residents have lost their jobs because of severe social prejudice; they have been deprived of civil rights and suffer from a chronic lack of sustainable industries. To survive, many locals (especially young people) participate in violent criminal activities, such as drug trafficking, shootings, and robberies (Raposo, 2014); this forms a vicious cycle that threatens public safety (Redes da Maré, 2019). Therefore, to end this cycle, a broad range of industrial activities

FIGURE 1. Status quo of Maré.



and shared infrastructure should be introduced to meet the basic socioeconomic needs of Maré residents. The development of suitable industries will provide a sustainable endogenous driving force and can effectively link Maré with the downtown areas of Rio de Janeiro (Maimon & Carvalho, 2015).

Designs for the renewal of the decaying industrial area in Maré were solicited by the 2020 international competition section of the UIA World Architecture Congress (organized by the Union International des Architects [UIA]). This triennial international competition is known as the "Olympics for students majoring in architecture." College students worldwide participated in the 27th annual UIA competition conducted in 2020, which aimed to find solutions for integrating underdeveloped and isolated areas with highly developed metropolitan areas. The design goal of the competition was to improve the quality of the built environment and the quality of life of Maré residents by integrating available resources and proposing an innovative and sustainable development strategy for the comprehensive revitalization of Maré (UNE, 2020).

The scheme *Small Industry & Home Industry* (*SIHI*)—designed by students from the School of Architecture, Xi'an University of Architecture and Technology, Shaanxi, China—won the first prize in the 2020 UIA competition. The winning strategy proposed that abandoned urban industrial areas can be gradually regenerated by promoting and developing home-based industries.

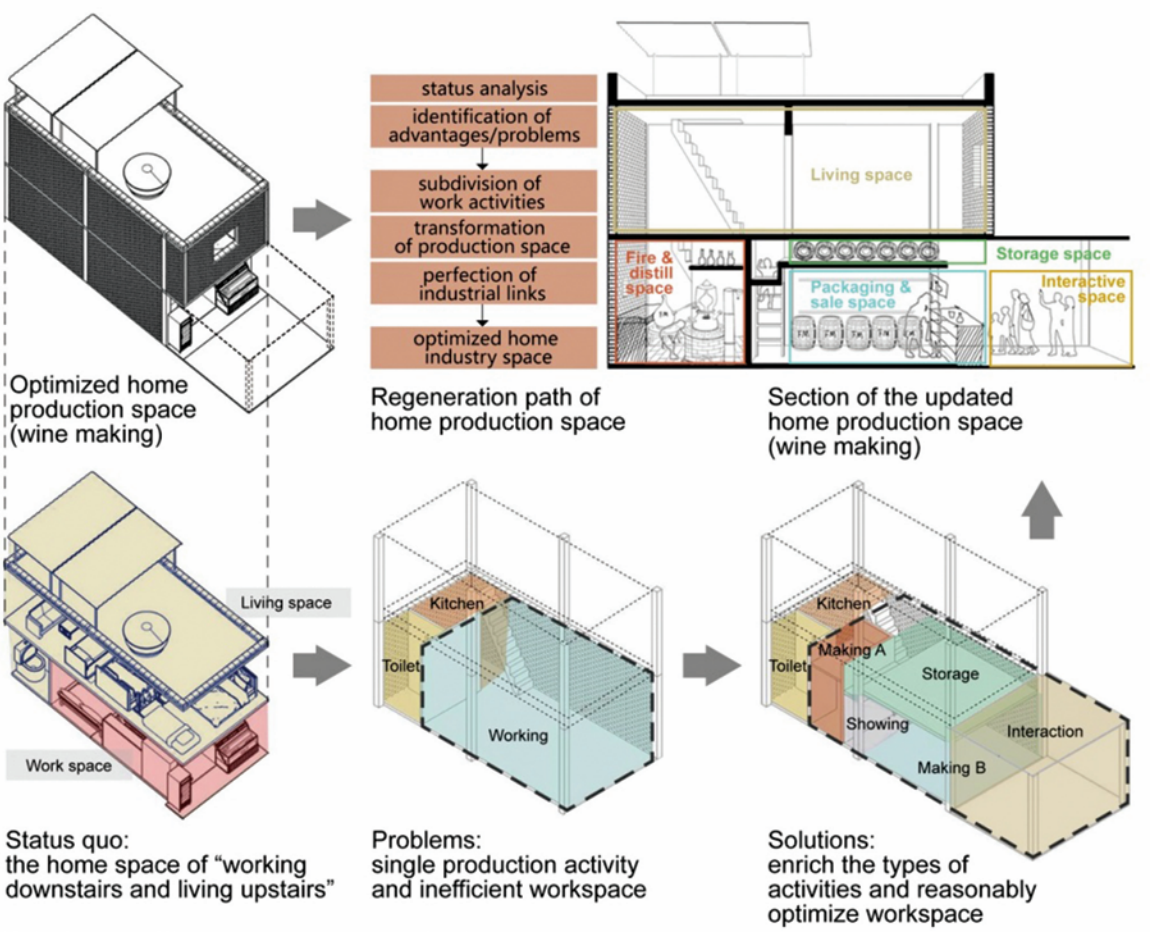
2. STRATEGY CONSTRUCTION

Improving the economic conditions of Maré is the most urgent practical need at present. Through an investigation and analysis of the local conditions, a potential factor has been found—the existing home production activities in the favelas, which can serve as a practical solution to the issue of the residents' unmet needs for employment and basic necessities such as food and clothing (Pizzimenti, 2017). Two types of home production activities, processing and service, have survived in the favelas located near abandoned and decaying industrial areas for a long time: processing production principally involves textiles, woodworking, handicrafts, wine making, and pottery, and service production primarily involves catering, clothing, retail sales, food takeaway, warehousing, and distribution. These are prototypical home industries that have sprouted in the unit homes of favelas, following the "working downstairs and living upstairs" model. However, existing home production in Maré is too fragmented to provide significant economic benefits for the residents. Therefore, a more integrated home industry system based on the specific characteristics of home production should be built by optimizing industrial links and workspaces (Chagas Cavalcanti, 2019; Weitao, 2018) (Figure 2).

As self-governed home production units mature, industries of the same type can be integrated into a single industry (for example, woodworking and handicrafts can be integrated into handicraft workshops), and the interactions between industries (such as the interactions between catering, wine making, and pottery making) can be improved. This will expand their scale and benefits, transforming individual home industries into "group industries" and enabling them to better export their goods and services to the city of Rio de Janeiro.

The ultimate goal of this design is to end the isolation of Maré from the downtown area by promoting the growth of local endogenous industries. Internally oriented home industries and group industries should be cultivated and expanded by bringing industries and community businesses, offices, and public services together to build "community industries" (Miao, 2016) with more effective branding and greater social benefits. In addition, community products reflecting

FIGURE 2. Prototype of Maré's existing home production space and corresponding optimization strategy (considering the wine making industry as an example).



the unique identity of Maré can be produced and marketed based on an overall operating model that makes full use of external resources, technology, and talents.

Favela industry-space systems of different types, scales, and levels should be built based on the existing production status in the region, forming an overall renewal strategy that evolves from the "S-home industry" stage to the "M-group industry" stage and then to the "L-community industry" stage. In the S-home industry stage, the focus will be on updating the production space on the ground floors of home units and improving the efficiency of space use to accommodate more production and service functions. In the M-group industry stage, abandoned factories and sites around the home production units will be renovated to form a multifunctional neighborhood industry group with various functions, such as public venues, comprehensive production centers, and external service exhibition centers, effectively expanding the scale and economic benefits of home industries. In the L-community industry stage, the S and M industries will be linked with life-supporting services and other industries to form a community industry cluster with wider economic benefits (Table 1). This gradual regeneration strategy will be advanced according to the industrial development characteristics and requirements that exist at different stages without the limitations of "space ontology." Moreover, a reasonable model of

industrial development for the renewal of architectural spaces and the site environment will be developed by transforming the specific functional-use models (Miao & Zhenyu, 2019).

3. SOLUTION DESIGN

A specific "industry-space" scheme was designed by further subdividing the development strategies of the "S-home industry," "M-group industry," and "L-community industry" stages. This is consistent with the principle of low-cost and high-efficiency flexible building renovation, and applies low-tech and available green ecological technologies that consider the hot and humid climate of the region.

TABLE 1. Strategies and models for industry-space development at different stages.

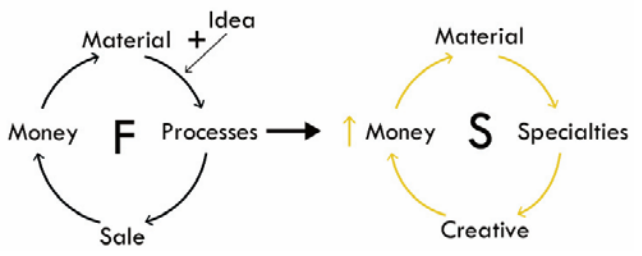
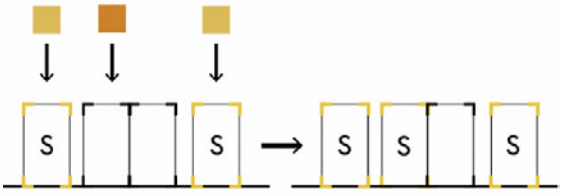
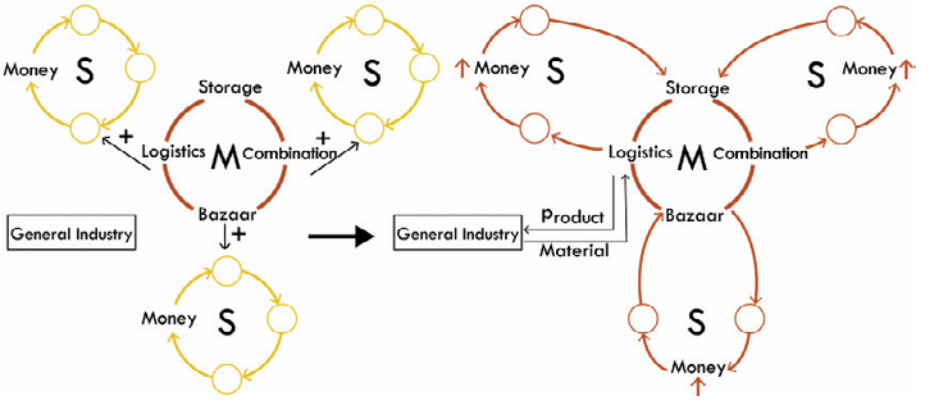
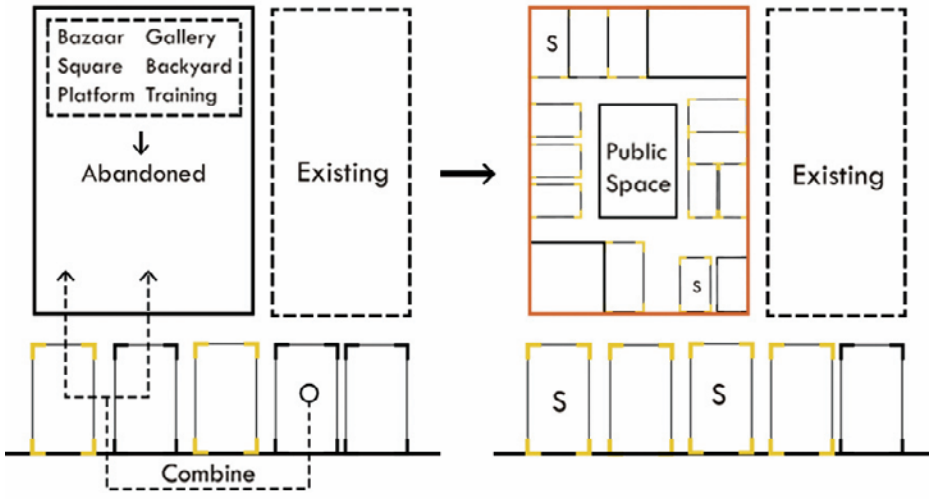
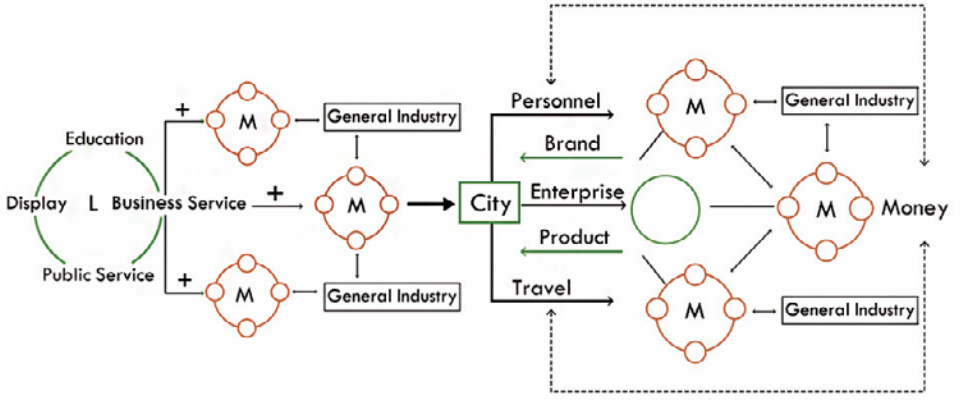
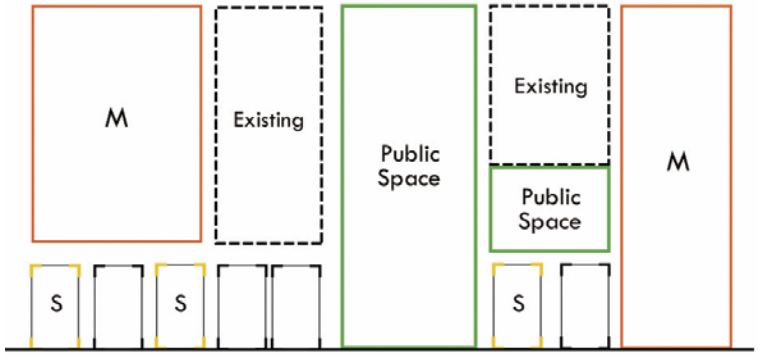
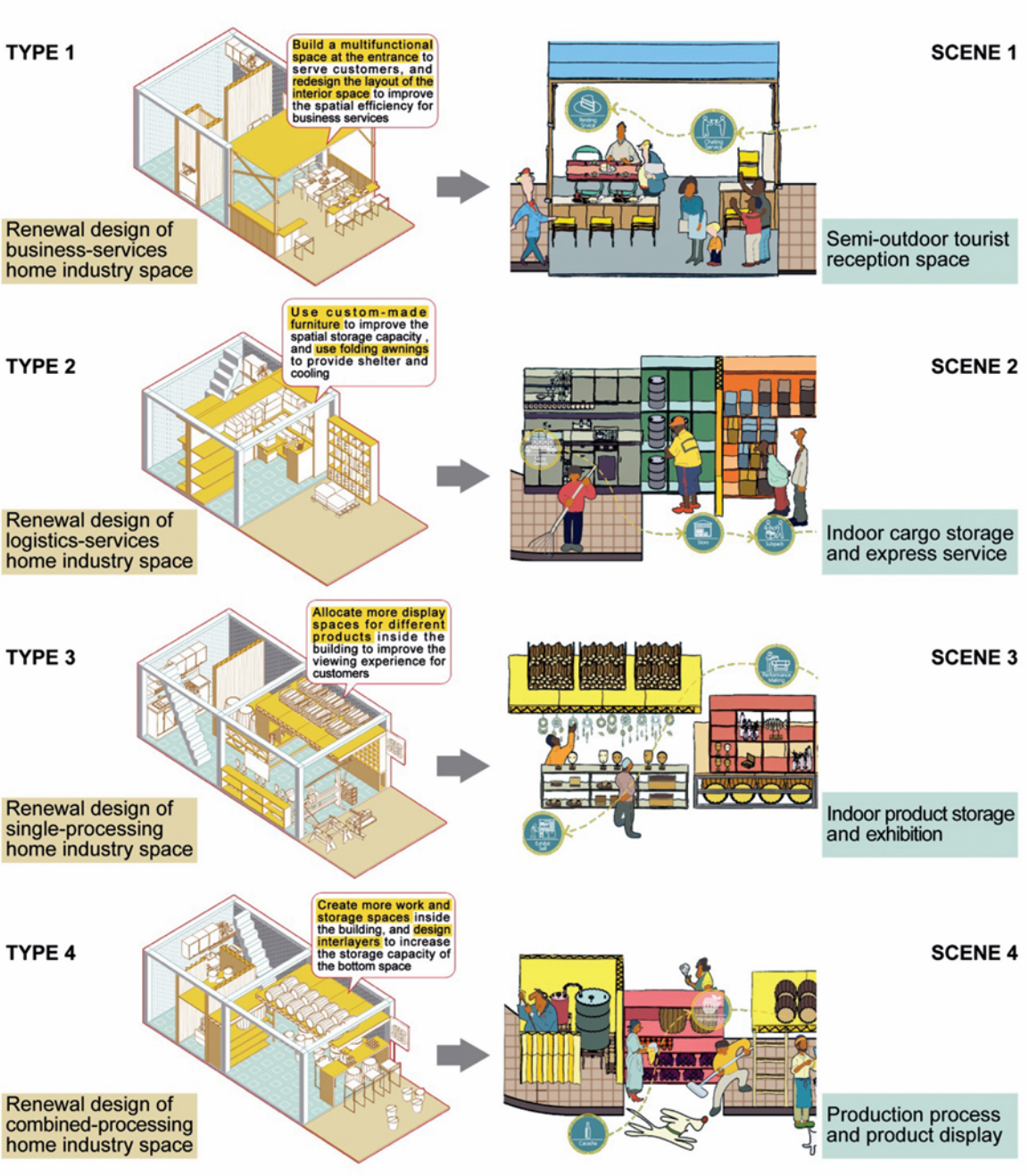
1. S-home industry stage	
Industry model	
Space model	
2. M-group industry stage	
Industry model	

TABLE 1. (Continued)

Space model	
3. L-community industry stage	
Industry model	
Space model	

- **S-Home Industry Stage:**
  The existing home production within the case study area was subdivided into four basic types: business services (catering, retail, hairdressing, clothing, etc.), logistics services (takeaway, warehousing, etc.), single processing (textiles, woodworking, etc.), and combined processing (pottery making, wine making, etc.). We conducted a detailed space renewal design (Liqing, 2019) based on the development requirements of various home industries (Figure 3).

FIGURE 3. Space renewal design for the S-home industry (four basic types).



For the business-services home industry, a multifunctional space will be built at the entrance of the original building to attend to tourists during the day and serve as a family living space at night. In addition, the layout of the preparation, checkout counter, and selling spaces inside the building will be redesigned for efficient utilization of space.

For the logistics-services home industry, the storage capacity and space utilization efficiency will be improved by using custom-made furniture. Additionally, the business scope can be expanded outdoors using folding awnings to provide shelter and cooling.

For the single-processing home industry, more display spaces for different products inside the building will be allocated, and the viewing experience and product experience of customers will be greatly improved through practical space design.

For the combined-processing home industry, more work and storage spaces will be created inside the building. For example, a workspace for firing and distillation can be added and connected with the kitchen in wine-making home production units. In addition, we will design interlayers to increase the storage capacity of the ground floor space used for product display and sales.

Due to the high demand for water resources in home industries, the poor economic conditions of the favela residents, and the shortage of centralized municipal sewage treatment facilities, a simple rainwater collection and recycling system will be designed and installed to service the home units, thereby, reducing the water consumption associated with production (Figure 4).

- **M-group industry stage:**
  When home industries mature, abandoned industrial plants and idle spaces within the community will be used to connect home industry units together in three models: co-living, co-working, and co-enjoying (Figure 5).

FIGURE 4. Rainwater collection and recycling systems in updated home units.

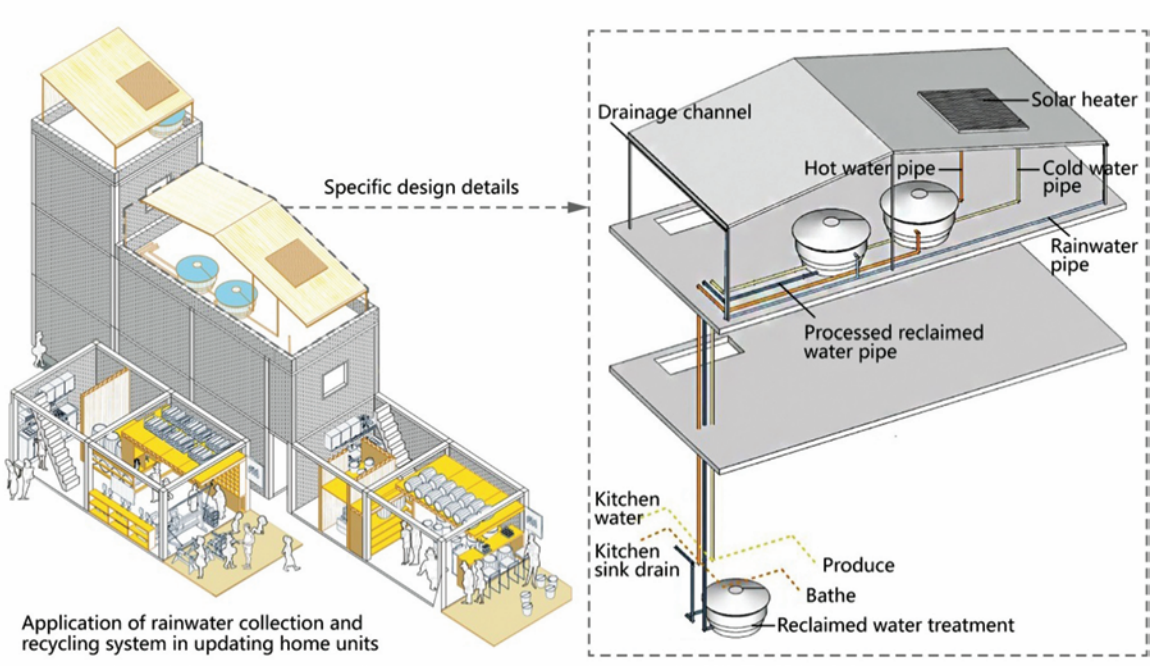
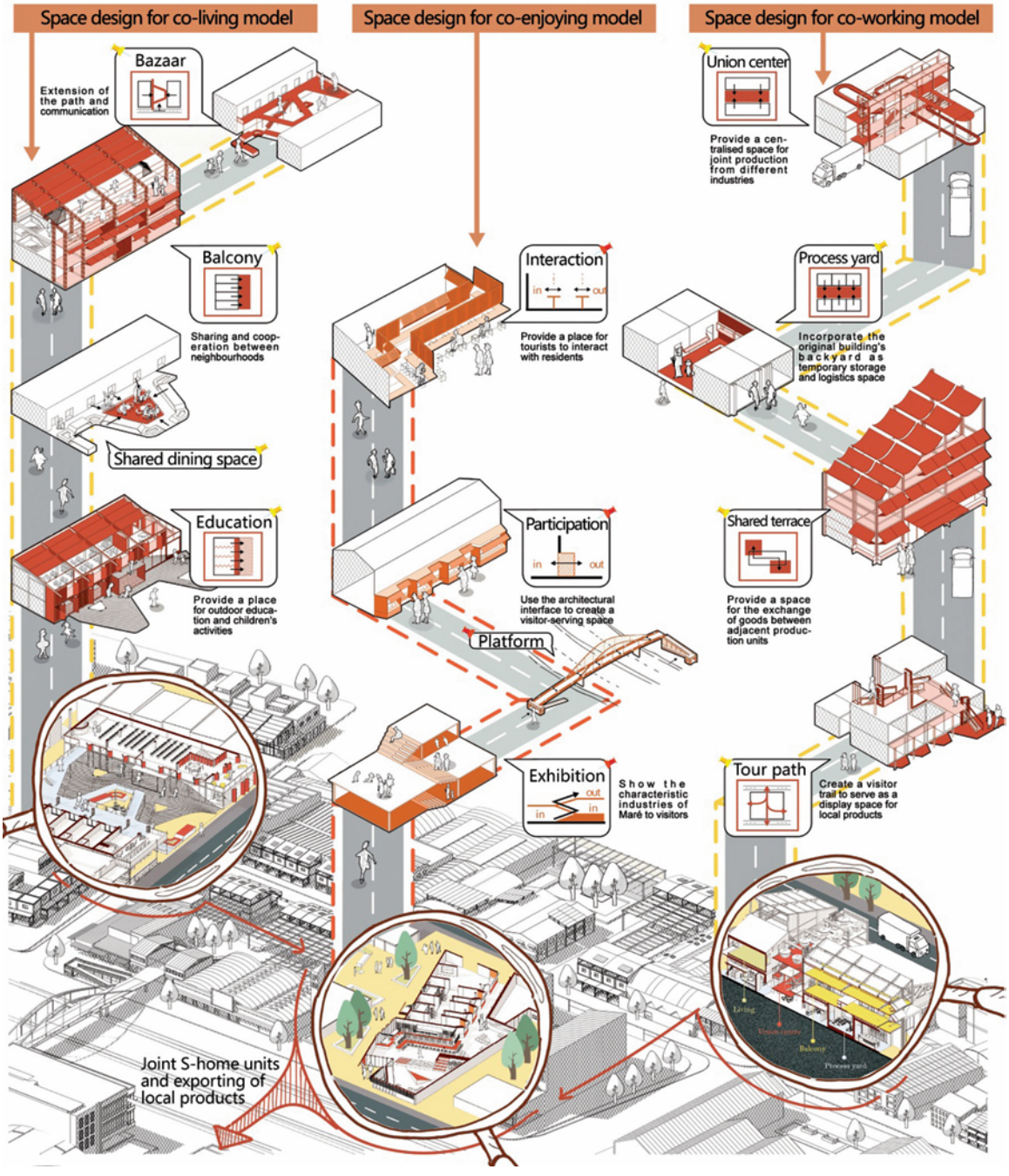
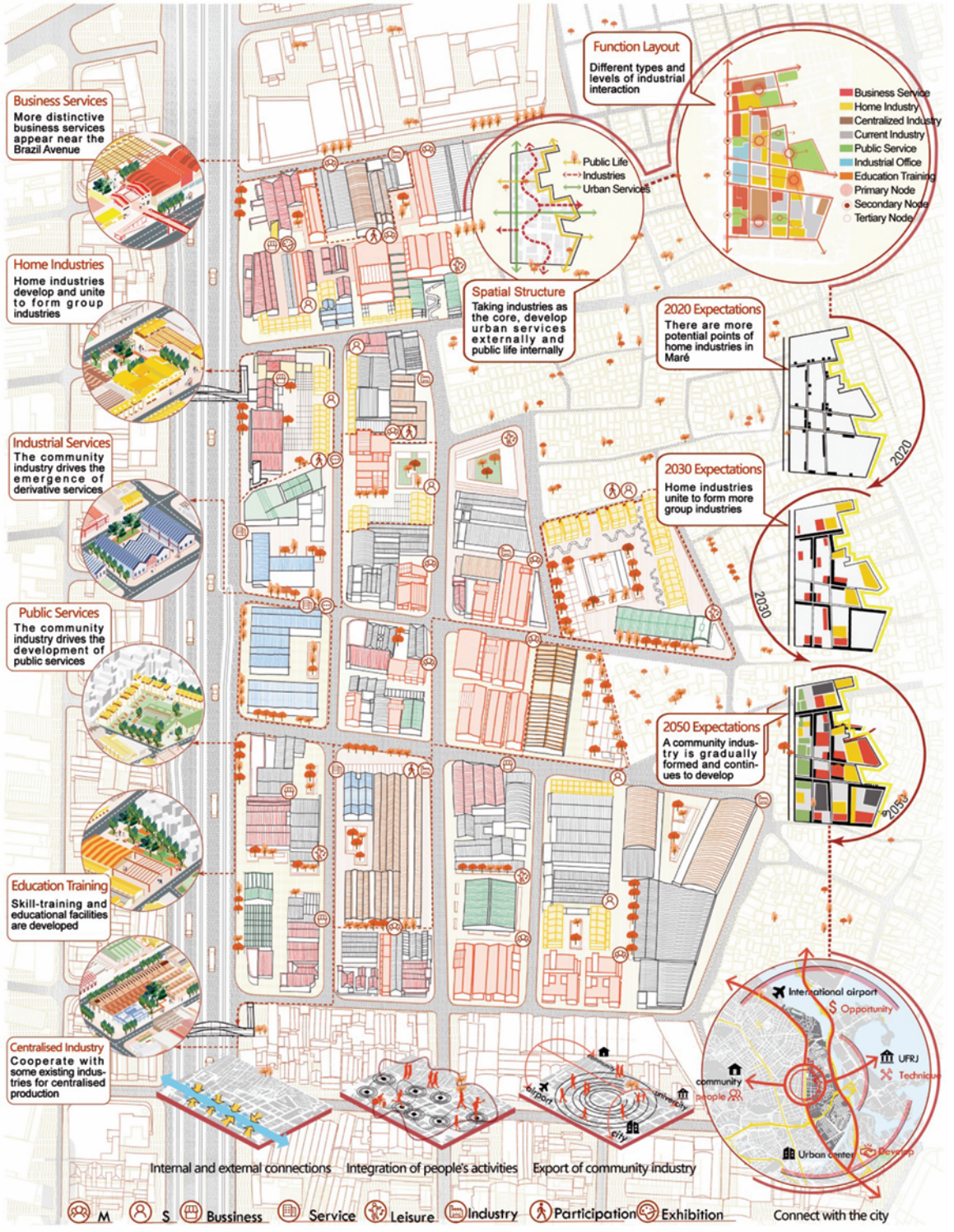


FIGURE 5. Space design of the three models for the M-group industry.



Co-living is a model for the union of single-processing industries. The chosen demonstration site will be near a market and beside a favela where some home industry units already exist. The architectural interfaces and enclosure spaces will be renovated and a composite area with shared spaces such as balconies, restaurants, a space for children's education, and a free market, will be built. This model of combined "life and work" spaces not only expands the scope and benefits of industrial services, but also enriches

FIGURE 6. Overall design for the L-community industry.



the social life of local residents by meeting needs associated with the residents' and children's activities.

Co-working is a model for combined processing industries and related service industries. The chosen demonstration site will be in industrial plants adjacent to main traffic roads and bordered by several home industry units. These abandoned plants will be converted into a joint production center to serve the nearby home industry units. This center will be a place for the shared development of industries. In addition, we will design shared balconies and street markets in the home industry clusters to form new production cooperation methods and broaden product output channels.

Co-enjoying is a model for the output of urban services and brands. The chosen demonstration site will be in an abandoned industry plant along the outermost urban arterial road (Brazil Avenue). Considering the advantages of its open and accessible location, the site will be transformed into a joint space that can be used for the display of Maré's characteristic products, viewing areas for tourists, and industrial exchanges, providing ample opportunities for Maré to connect with the city of Rio.

- **L-community industry stage:**

  Through up–down urban planning, mature home industries and group industries in this region will eventually give birth to characteristic industries at the community level with the interconnected development of S-home industries, M-group industries, commerce, offices, public spaces, and other production activities. More co-living models on land close to favelas will be planned, based on the status quo of industrial production and the characteristics of land use in the region, to form a regional public space system with home industry units, sports venues, leisure and entertainment spaces, and small-scale green landscapes. Furthermore, additional co-working and co-enjoying models on land close to Brazil Avenue will be designed, enabling the transformation of Maré into a multifunctional favela industry incubator that integrates home industries, business services, and industrial offices. This will also provide venues for education, training, and exhibition and display areas for publicity and promotion. Thus, Maré can be connected to the downtown center effectively and sustainably (Figure 6).

4. CONCLUSION

Although existing social and economic problems, as well as the complex status quo of Maré's social space, pose great challenges, positive factors that can spur regeneration have been identified (Raposo, 2015). Maré's residents actively create production value in their crowded living spaces despite suffering social discrimination and prejudicial treatment. Thus, this project is an effective catalyst for Maré's regeneration. Consequently, based on economic strategies for solving real-world problems, a renewal scheme was designed, which was not based on conventional architectural space ontology paradigms for an abandoned industrial area, that is, the interactive development of "industry–space." As the competition judges noted in the evaluation of the scheme: "As a first prize, the jury selected this design scheme for its clear economic strategy applied throughout the project from the conceptualization to formal solution. The jury appreciated the idea of favela as an incubator and a solution for households. The refreshing approach demonstrated a good understanding of the local eco-systems, economy, social and identity. This creates the opportunity for incremental growth with a holistic approach considering the complexities of the site. The project puts livelihood at the center of the design, and the scheme

for regeneration makes a strong connection to the identity of the place. It is a project that can be started easily and will immediately improve the lives of those in the community."

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