URBAN MARKETS REDESIGN FOR SAFE OPERATION IN THE AGE OF COVID 19, CASE STUDY: TABLITA MARKET, CAIRO, EGYPT

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ABSTRACT
The world is facing a new pandemic that affected all aspects of life and interrupted normal daily activities, which urges rethinking the ability of the urban realm to adapt to change especially when it comes to basic human needs. Urban markets play a vital part in securing daily access to food; thus, it is crucial to keep them operating safely during pandemic. The paper starts by discussing socioeconomic implications of pandemic in the urban realm in general and in markets in particular. Guidelines for designing markets are briefly reviewed, followed by guidance provided by responsible organizations for operating markets safely during pandemic. The paper demonstrates some of the solutions and ideas applied and suggested worldwide to avoid the consequences of markets’ shutting down, then it introduces the case study: Tablita market as one of the enclosed urban markets in Cairo, Egypt, the market’s situation during pandemic is studied through observation, structured and unstructured interviews with vendors. The results from market observation and interviews show some of the socioeconomic implications of COVID on the market as well as the behavioral challenges that require innovative solutions to force the adherence to protection measures. Accordingly, the paper suggests applicable short-term and long-term solutions for Tablita market redesign in the light of these implications, challenges and protection measures that can also be applied in similar cases in Cairo to help markets operate safely and avoid severe consequences of lockdown.

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Introduction
The global impacts of the new pandemic COVID-19 are widely recognized and assessed in various aspects of life by researchers and responsible governmental and non-governmental organizations. Thinking about the urban future and how can it face such events is essential, many questions have been raised in an age of uncertainty about this pandemic and new norms, immediate actions and measures need to be applied besides short-term and long-term plans for enhancing our communities abilities to comfortably
adapt to change; it is also necessary to understand the reasons that pose more pressure on some communities more than others and restrict their ability to apply protection measures and live safely during such crisis. There is no doubt that the urban realm in densely populated cities like Cairo faces many challenges and suffers a lot of socioeconomic implications in the age an unexpected pandemic, urban food markets are among the most challenging environments that need to operate safely during COVID-19, they are an irreplaceable source for food supply and distribution in residential areas and the only source of income vendors and their household rely on. At the same time, many socioeconomic, behavioral, and urban challenges can complicate the adherence to some protection measures.

**Socio-economic implications and behavioral challenges during COVID-19**

While the impacts of the pandemic vary from country to country, it is well known that impacts of the global COVID-19 crisis are increasingly, directly and severely affecting societies and economies, this requires urgent socioeconomic responses and immediate development plans in order to reduce global suffering and posed risks on lives and livelihoods [1]. Economic activity dramatically dropped leading to the loss of income on various levels especially lower income groups, and those relying on the cash economy such as small urban market vendors [2].

Urban areas with higher densities may contribute to a more rapid and broader spread of some infectious diseases; overcrowding in some areas makes behaviors such as low self-hygiene and social distancing becomes particularly difficult [2], especially when there are no designated spaces for lining up or queuing in an organized distanced manner, or when compounded by lack of access to health care and inadequate water, sanitation and hygiene services [3].

Informal workers, street vendors and urban market vendors with a lack of labor regulations and social protections and possible exposure to health hazards are considered more vulnerable during pandemic [2]. Partial lockdown and people’s fear of the disease spread has resulted in low sales and economic losses for urban markets’ vendors, on the other hand the panic buying and stock piling behavior in large hypermarkets caused lower access to daily food needs for vulnerable groups who had to avoid markets, and people who cannot afford stock piling [4]. Despite this panic selfish behavior, some innovative business models appeared during pandemic like mobile applications and online platforms that display and sell fresh fruits and vegetables, offering contactless online payment and even contactless home delivery in attempts to save vendors and help people who adhered to staying home.
The Egyptian government implemented many measures starting from March 2020 to contain the spread of COVID-19, including financial support programs to daily labor, travel bans, nighttime curfew from 8 pm to 6 am, bans on gatherings, and the closure of schools and religious institutions [5], then gradually alleviated these procedures till the end of 2020 trying to maintain balance between protection measures and local economy; In a city like Cairo with an estimated total population of 20 million, a study found that about 20% of the population may not be able to maintain social distance and be at risk of rapid contagion, just because the built environment does not allow it [2]. Immediate, short-term and long-term development plans are needed to rebalance socio-economic conditions and maintain daily life activities during and after the crisis, plans that include convenient sustainable business models in an inclusive healthy urban environment [4], effective community engagement should be considered to help to curb the impacts of the virus outbreaks in such environments.

Public-enclosed market design guidelines before pandemic

In order to suggest design solutions for markets to adapt with protection measures, guidelines for designing enclosed marketplaces before pandemic are revisited and summarized in the next few lines.

In Egypt, the term “public market’ generally refers to a permanent, enclosed facility, built with local government assistance or the private sector, and continues to be managed by local government authorities on a specified piece of land covered or open air. Generally, groups of small independent vendors obtain individual stalls in the public markets to sell their goods; the stalls are lined up next to each other and the arrangement of product types vary depending on the public market. This traditional form of fresh products markets has been facing growing competition with modern hyper supermarkets since the 1980s [6].

Location of the market with the uses surrounding the site, and the pedestrian and vehicular movement around are very important factors that influence the success of a market, a vegetable market needs to be located along a lively active route within the neighborhood, for safer and easier access especially for women [7] and within walking distance from homes in residential areas to increase access to fresh food with affordable prices [8]. There are some other factors that should be considered when improving an existing market or designing a new one; those factors are related to market structure, circulation inside and around the market, natural lighting and ventilation and vending stalls distribution and design.

Market structure for simple rural and urban retail markets, need to be a low-cost, such as lightweight shade structures or blinds, materials and construction techniques should minimize cost and need for maintenance
Market structure should also maximize flexibility for future expansion and modifications of space utilization to adapt to changing social and economic circumstances.

Pedestrian and vehicle circulation areas around the market should be adequate in a way that products can be brought in or taken out with minimum obstruction [10], circulation should avoid different levels and separate pedestrian movements from heavy delivery vehicles, dead-ends should be avoided within the market to increase the opportunity to see most of the display products as shown in Figure 1.

Vending units should contain space for display, sorting, and storage without obstructing the shoppers’ circulation paths [7] as shown in Fig. 2. The width of paths should be in the range of 3.5 to 6 meters to allow three people walking together and pass one person standing by a stall. Wider width up to 6 meters allows other social activities like seating, socializing, and resting which could be in the main path in larger scale markets [9].

Providing sufficient lighting and natural ventilation is necessary, especially in meat and fish zone, maximizing airflow using open sided steel or timber-framed sheds [9] as shown in Figure 3.

Market stalls design depends on whether traders’ premises are enclosed or open and the method for selling the products. The design of the stall should give vendors the flexibility to choose the function and division of space that suits their needs. There are three basic alternatives for vendors’ use of selling space: the first is that the vendor stands behind a fixed stall and store and display products under the stall and behind the vendor, the second is where the vendor sits on the stall and serves the customer by reaching forwards over the displayed area, the third one the vendor stands in the aisle and serves the customer from goods displayed behind as shown in Figure 4.

Modular stall pattern allows combining stalls together to create larger units, stall or pitch should be 1.5-1.8 meters [10]. Full view of the market should not be obstructed by any visual barriers and vendors should be equally visible [7].

Spatial distribution of the different types of products, areas for selling animal products known as wet market, has to be located furthest from the entrances as they are not visited on a daily basis and separated from vegetables vending units. Drainage system, natural ventilation, properly clean running water should be provided, it is recommended for walls to be covered in ceramic tiles or an easy to clean material [7].

Guidance and recommendations from responsible organizations

Organizations responsible for public health and infection control such as World Health Organization (WHO), The Centers for Disease Control and Prevention (CDC) and others have set guidance to support communities
Figure 1. No dead-ends within the market circulation. Atarazanas Municipal Market Restoration Project, Aranguren & Gallegos Arquitectos, Malaga, Spain [11].
and authorities in the various urban settlements to control the virus spread and adapt with such an abnormal situation. Markets are identified by CDC as one of the priority community settings that national leaderships should focus on regarding mitigation measures, as they are one of the community gathering points and provide community access to food, also food market operators are considered among the critical infrastructure workforce [13].

Figure 2. Proposed solutions for shoppers’ and vendors’ circulation paths separation [7]

Figure 3. Baltic Station Market/KOKO architects, Tallinn, Estonia [12].
The organizations took into consideration vulnerabilities trying to limit possible social and economic implications for the suggested mitigation strategies by providing interventions that countries can select and calibrate based on their local context [14]. Special attention was given to markets operation during COVID-19 and the mitigation measures in low-resource settings. Mitigation measures are organized by mitigation principles (physical distancing, hand hygiene, cleaning and disinfection, and respiratory hygiene), and also by type of required controls or actions as follows: Personal controls, possible administrative and engineering controls, materials, activities, and personnel needed for implementation and the considerations and challenges for implementing these measures [15].

Personal controls encourage contactless buying and selling processes while maintaining physical distancing of at least 2 meters, digital payment methods are encouraged as well as signs and announcements as reminders for required protection measures. Administrative and engineering controls included guidance for spacing stalls at least 2 meters apart suggesting the use of every other stall, extending the market area wherever possible to allow

Figure 4. Details of small market stalls [10].
more distance between customers and vendors, and setting up markers for customers at least two meters away from vendors and from each other [15]. In order to limit crowding it is suggested to limit vendors to one vendor per stall, making aisles, entrances and exits go in one direction only and closing some entry points to control the flow, decreasing number of customers allowed in the market at the same time and the number of members of the same family per visit, which might require extending operating times. It is also important to consider separate days or times for the elderly and other vulnerable groups [15].

Actions related to facilitating the implementation of these measures and enabling adherence are also necessary such as ensuring access to affordable hygiene products and adding multiple wash points in public spaces, providing information on proper use, care, and disposal of masks, where used. Local governments are supposed to encourage innovation (e.g. hands-free or pedal-activated water or hand gel dispensers), assessment of response to adaptation measures and communication about changes, keeping access to food and water supply [14,15].

Effective management and monitoring are key challenges, as markets without clear management structures may have difficulty to implement and adhere to the proposed measures. Another major challenge is the cost associated with the development of communication materials, markings and disinfectants, installation and regular refilling of sanitization and hand-wash stations; besides limiting the number of people allowed in the market that could have a negative impact on households’ access to food [15]. A very considerable recommendation is making use of the existing market vendors and operators such as market master in management and monitoring in order to enforce the guidelines and measures, also governments need to discourage market traders from taking opportunity of such a disaster to make fortunes from raising prices [16].

Since it is crucial to keep access to food services and markets WHO and Food and Agriculture Organization of the United Nations (FAO) provided guidance about COVID-19 and food safety, for food businesses and food workers, highlighting the importance of maintaining good hygiene practices around open food displays, the guidelines include retail food premises and open food display and other workers dealing with food in other situations [17].

The African union has set some measures for supporting domestic markets during the COVID-19 outbreak in Africa assuring that keeping agri-food system functioning is essential during periods of lockdown. The Union discussed challenges to food transport, marketing and wholesale market functions, and informal food sector functions during COVID-19. A set of measures tailored to local context are proposed including issuing e-passes to market traders, workers and transporters; controlling truck deliveries and vehicle
traffic, daily market cleaning and disinfection and regular health checks of all workers and drivers. Some few extra recommendations such as displaying goods on raised platforms/stands/tables, regular collection of garbage to enhance hygiene, identifying designated places for sellers and buyers on the market borders, it is also suggested to establish additional markets temporarily in underutilized surrounding open areas, or turn distribution trucks into mini stores in residential areas and allow people to buy directly from the trucks to reduce overcrowding in markets [16,18].

**Worldwide ideas and case studies for markets during pandemic**

This part presents some ideas and solutions in different markets worldwide and discusses its convenience to the local conditions in Cairo.

**A Design Competition Idea**

MuseLAB, an architecture design firm based in Mumbai, proposed a design for “Market on wheels” that won the Coronavirus Design Competition hosted by goarchitect. The design transformed a hand-cart into a standalone kiosk with a concept that addressed social distancing and sanitization. Hand-carts are a well-known accepted method of hand delivery in the Indian subcontinent as well as in Cairo. The carts are designed as three-tiered modules that slide open to allow the display of groceries while providing the required physical distancing between customers and customers and vendors. The objective of the design is to separate between the two main functions: selection of products and checkout process. The design of the cart incorporated sanitization points and refrigeration containers.

Container modules of the cart was made of bamboo and placed on a metal base frame. The cart was shed by a canopy and on top of it mounted Solar panels that have retractable awnings providing shade for both vendor and customer as shown in Figs. 5, 6.

This idea is suitable for street vendors in Cairo streets, instead of displaying products a very primitive manner that ensures no hygiene or physical distancing, while this design idea can provide these vendors physical distancing, refrigeration containers, waste bin, electricity from solar panels and sanitization points. All of these not only provide disease prevention but a permanent solution for energy and cleanliness and ensure fresh [19]; some modifications can be added to the stalls inside the market as well such as bins and refrigeration and solar panels on the market’s roof.
Figure 5. Movable standalone kiosk [19].

Figure 6. Organization of kiosks in respect to social distancing [19].
**Myanmar real market**

The market stalls are located on the streets, positioned one block apart from the next as shown in Figure 7. This way, people would have more space to wait for their turns and vendors are at safe distance from each other [20].

This example could be applied in Cairo’s local enclosed markets taking into consideration engaging a management entity to be responsible for marking these locations on the ground of the market to limit the number of used stalls and monitor people’s adherence to distancing marks, as behavioral patterns observed by researchers and interviews held with vendors of markets indicate that empty spaces left between stalls might not be respected and so the design need to force people to respect it by occupying this space with a passive use like storage or display areas for stalls, to keep vendors committed to the assigned locations.

**St Paul Farmers Market in Minnesota**

Farmers markets in different areas has also applied a variety of solutions for safe operation, for example St Paul Farmers Market in Minnesota has implemented simple ideas for physical redesign for COVID-19 mitigation using empty tables to create physical barriers between the vendors and customers, 3 meters (10 ft) of empty space between vendor booths.

*Figure 7. Market stalls are located on the streets, positioned one block apart from the next [20].*
spreads out the customers as well as the vendors as shown in Fig. 8, chalk marks on the pavement, multiple handwash stations for customers were added (at entrances and information booth) signage to remind customers of social distancing, handwashing, setting up of market every other booth as shown in Figure 9. Other farmers markets started implementing ideas like simple redesign to create opportunities for preorder/curbside pickup, and market extra food donation to support population in need on low sales days during pandemic [21]. These very simple physical design modifications and mitigation measures could be easily applied to Cairo’s local markets.

From the above-mentioned examples, a lot of mitigation measures could be learned and locally applied such as

- Positioning stalls one block apart from the next.
- Using simple physical barriers like empty tables to create safe distance between the vendors and customers.
- Chalk marks on the floors and signage to remind customers with safety rules.
- Adding multiple handwash stations for customers (at entrances and information booth) signage to remind customers of social distancing, handwashing.

\textbf{Figure 8.} Using empty tables to create a physical barrier between vendors and customers [22]
Engaging a management entity that is responsible for marking designated locations on the ground of the market to limit the number of selling stalls and monitor people's adherence to distancing marks.

- Using movable carts for street vendors on the borders.

The following section introduces the selected case study ‘Tablita market’, one of Cairo’s local enclosed markets, it also observes the market’s situation during COVID-19 in order to propose the applicable modifications in the
light of the previously reviewed guidelines, measures and ideas, to set an example for similar markets, to have the flexibility to perform safely and successfully during and after COVID-19.

**El-Tablita market as a case study**

It is an enclosed vegetables market, as shown in fig.10 it is located in the street behind Al-Azhar main Street in front of Naguib Mahfouz Museum (Cairo), surrounded by Tikkyet Abu EL Dahab which hosts Naguib Mahfouz Museum now from its Northern side, right next to it is Abu el Dahab mosque and El Azhar mosque, to the Western side El Ghouri complex, and Haret El-Souk Street from its Eastern side which is occupied by a residential complex. The Market is blocked by an old residential building at its southern side, which constitutes one of the Market’s walls.

**Market’s origin and current condition**

The origin of the market would go back to the 1940s and 1950s, vendors of the market came from Upper Egypt, migrating to Cairo for better opportunities of livelihood. Originally, a printing house occupied the area where the market is located now. The printing house fell down by the second half of the 1960s and there were plans by the municipality to convert the place into a park. Gradually street vendors started moving into the land where the printing house was located, until they informally occupied it. At that time, the market consisted of tents and umbrellas where the vendors used to stand under with their carts. By the year 1980, as requested by local authorities, the vendors financed an asbestos roof supported by metal columns which are used architecturally as the vending units’ boundaries as well, and a surrounding brick fence was constructed to encompass the land of the market. The existence of the vendors on the land became official in 1989, the Market’s Sheikh (local leader or market master), upon request by the District Authority, divided the land into small units and distributed the units among the different vendors, usually one unit for each vendor; however, in some cases, vendors take more than one for family business. The historical background of the market represents the story of most of the major markets in Cairo and the whole of Egypt [24].

Like other small urban markets, Tablita market is now in a poor condition due to some common circumstances, the demand for stalls is high and spaces are limited, which make vendors spread in the surrounding streets, they also do that to be more visible for customers first and sometimes to avoid paying rent. Products are exposed in non-favorable weather conditions, which result in high losses especially on low sales days like those of pandemic spread peak.
Figure 10. Location of Tablita market with its surroundings [23]
**The importance of the market in this location**

Interviews with vendors showed that before pandemic the market was visited by tourists as it represents a part of the local culture, which makes the market existence in this location an asset to the area. Although economic conditions were not good enough a long time before the virus, losses increased as a result of the decreased number of customers during pandemic. Interviews with 17 different vendors in the markets showed that their sales became less as a result of reduced number of customers visiting the market during pandemic, also based on the response of 52.9% of the interviewed vendors, some vendors even had to close permanently. Redesigning the market to operate safely can reduce their losses and increase residents’ access to fresh food during and after pandemic without the urge for vehicle transportation, which is consistent with new approaches of urban planning worldwide, heading toward planning the ‘15 minutes cities’ that advocates for an urban set-up where residents can access all of their basic essentials including living, working, commerce, healthcare, education and entertainment at distances that would not take them more than 15 min by foot or by bicycle [25]. Also, if it is upgraded appropriately, the market can provide a flexible open space that could serve in emergency health purposes in such a dense area when necessary [26].

**Analysis of the market’s current condition and spatial organization**

Facilities and resources are very limited; there are only two washing basin, the whole market space is not efficiently organized, many spaces are occupied with old broken equipment and other masses of clutter as shown in Fig. 11. The current spatial organization of the market with its divisions, aisles, stalls and entrances as shown in the Market plan and section in Fig. 12 and 13, does not allow for adhering to the recommended protection measures required for safe operation during COVID-19.

From the plan, we can conclude the following problems:
- There four entrances and exits which opposes the protection measures of COVID-19 that require one entrance and multiple exits.
- Narrow two-way circulation while protection measures recommend a one-way circulation.
  - No waste collection area
  - No safe distance between stalls
  - No handwashing or sanitization stations for vendors or customer (just one serves a small food cafeteria which makes it inaccessible to other vendors)
- No toilets for males or females.
- The storage area in the end of the market is a wasted area
Figure 11. Pictures showing the market’s current condition. Source: Researcher.
Figure 12. shows Tablita Market plan analysis. Source: Researchers.
Figure 13. Section analysis. Source: Researchers.
- The fish stall is right next to the vegetables and fruits stalls which opposes market design guidelines and bothers the other vendors.

From section, we can conclude the following problems:
- No distancing between stalls
- No one-way circulation
- No appropriate ventilation

**Behavioral aspects and protection measures in the market during pandemic**

Observation inside Tablita market showed some practices that indicated lack of awareness with protection measures such as poor food hygiene practices during pandemic, the food preparation area and the display area are not separated and food is prepared without gloves or mask as shown in Figure 14. There is no regular garbage collection and waste in not appropriately disposed, which led to the presence of disposed waste in the surrounding streets as shown in Figure 15. Also shown in Figure 16 how narrow the main aisles are due to spreading the fruits and vegetables which leaves no space for social distancing, and Figure 17 shows that all stalls are right next to each other leaving no space for social distancing. While Figure 18 shows the poor level of hygiene in the market and the second tap.

Also, we can notice from all the above figures that neither vendors or customers are wearing masks.

The field study for the market includes structured interviews for 17 vendors, which represent 42.5% of the entire market’s vendors. The entire sample included 14 males and 3 were females, which allowed the researchers them to draw the situation in Tablita market during pandemic. The interview questions were in Arabic, designed to be answered in about 5 minutes. Interviews were conducted in the market in different days and different times during the day.

When vendors were asked to suggest solutions that can keep the market operating safely markets during the COVID-19: 60% of them agreed on the importance of having more handwashing basins with a maintained water supply and more ventilation inside the market, while more than 30% suggested adding handwashing points, sanitization stations in the market, 23% suggested adding floor marks and signs and to divide themselves on separate days in case of second wave of high severity.

The previous results show that vendors are aware of some measures, but none of them are adhering to all the required measures, the majority stick to keeping face masks with them but not necessarily wearing them. Not only the vendors’ practices are considered challenging behaviors but also customers’ responses indicated that customers were committed to wearing face masks but other measures like distancing and reducing contact with goods and other surfaces
were not strictly applied, which made 11% of the interviewed vendors suggest separating stalls using physical barriers to force the commitment to keeping distance.

Figure 14. An example of poor food hygiene practices during pandemic in Tablita market.
Results and suggested solutions

Based on the reviewed guidelines for markets design and the protection measures, the paper recommends solutions for keeping markets operating safely and have the flexibility to adhere to protection measures during pandemic, it starts with recommendations for markets redesign for safe operation during pandemic in general then moves to redesign recommendations specifically for Tablita market with some futuristic ideas that can help in further development for the market.

Solutions are suggested for different parts of markets including (entrances, circulation, vending stalls and market envelope and structure) to achieve the required safety measures as follows:

To Avoid gatherings and crowding: the market design should provide different entrances and to Separate between entrances and exits, design a docking location near to a designated entrance and establishing one-way flow for shoppers as shown in Figure 19.

The design should reduce the number of vendors by reducing stalls inside the market either by temporarily extending in nearby streets or by extending the market vertically using a light structure.

The design should also designate preparation areas for home delivery orders and pickup system can be applied in case of high spread rates as shown in Figure 20.

For personal protection measures: handwashing points need to be added as well as sanitization stations at entrances and exits along with signs for guidance. Provide doorless entrances or keep doors open to reduce touching surfaces and add closed touchless waste disposal bins.

Cleaning and food safety: The design should separate wet zones (meat-fish) at the end of the market and refrigerators in storage areas should be provided. Waste disposal bins for each stall should be added (preferably
Figure 16. The two main entrances with the main aisles and how narrow the aisles are due to spreading the fruits and vegetables and that there is no distancing between stalls.
hands free). Where possible counter surfaces should be changed to non-stick easy cleaning surface or use washable or disposable covers. A designated garbage collection point should be available as shown in Figure 21.

**To maintain physical distancing of at least 2 meters:** floors need to be marked to organize waiting lines at entrances when needed and spacing stalls (2+) meters apart suggesting the use of every other stall as shown in Figure 22 and adding barriers to keep distance between customers and vendors.

**To protect special populations and vulnerable groups:** the market design should provide pick-up point to vulnerable groups such as old people or people at risk for more serious illness and specify working hours for the elderly.
To provide good ventilation and lighting inside the market: the design should combine open air stalls with covered facilities and use clear story and skylight for natural light and ventilation by constructing a framed, open-sided shed.

Figure 19. Establishing one-way flow and different entrances.

Figure 20. Pickup area outside the market.
Figure 21. Garbage collection point.
There are administrative and governmental actions that should be taken to maintain using the market safely during pandemic such as facilitate an e-payment or contactless payment method, extending working hours, controlling number of customers entering the market to guarantee physical distancing, organizing workers in shifts. Maintaining regular access to clean water supply as well as affordable hygiene products, limiting number of vendors by allowing only 1 per stall (shifts) or two for separate tasks to save time and reduce contact interference between food and cash. Regular surface cleaning and disinfection and waste collection should be provided in the market.

Table 1 shows solutions suggested for different parts of markets in addition to the administrative solutions needed with regards to the different protection measures including crowd reduction, personal hygiene, physical distancing, food safety measures, lighting and ventilation as well as protecting vulnerable groups.

The suitability of these measures to the case of Tablita market is illustrated in Table 2 showing solutions applied to different parts of the market on schematic sketches in accordance with the corresponding measures.

![Figure 22. Spacing stalls (2+) meters apart.](image-url)
| Operational objectives | Entrances | Vending units design | Circulation | Structure and awnings | Methods of buying and selling | Administrative & governmental |
|------------------------|----------|---------------------|------------|----------------------|-------------------------------|-----------------------------|
| Hand washing and distancing | - Place facilities near exits and entrances | - Add handwashing facilities or use washables or disposable wipes | - Add directional signage | - Add directional signage | - Use of e-commerce platforms | - Establish an inspection point for visitors and vendors |
| Ventilation and lighting inside the market | - Ensure adequate ventilation and lighting | - Use of natural lighting and ventilation systems | | | | - Inspect and maintain electrical wiring |
| Maintaining physical distancing of at least 2 meters | - Mark floors to indicate walking areas or entrances after use | - Spacing stalls 2 meters apart | - Add barriers to keep distance between customers and vendors | | | - Ensure the market is clean and well-maintained |
| Safety and security | - Implement security measures | - Add security personnel | - Use of security cameras | - Implement security protocols | | - Establish a security protocol for visitors and vendors |
| Personal protection measures | - Implement face masks and sanitizers | - Add sanitizers at вход points | - Add directional signage | - Use of sanitizers at вход points | | - Ensure the market is clean and well-maintained |
| Ventilation and lighting inside the market | - Ensure adequate ventilation and lighting | - Use of natural lighting and ventilation systems | | | | - Ensure the market is clean and well-maintained |
| Methods of buying and selling | - Use of e-commerce platforms | - Establish an inspection point for visitors and vendors | | | | - Establish a security protocol for visitors and vendors |
| Administrative & governmental | - Implement security measures | - Add security personnel | - Use of security cameras | - Implement security protocols | | - Ensure the market is clean and well-maintained |
| Personal protection measures | - Implement face masks and sanitizers | - Add sanitizers at вход points | - Add directional signage | - Use of sanitizers at вход points | | - Establish a security protocol for visitors and vendors |
| Ventilation and lighting inside the market | - Ensure adequate ventilation and lighting | - Use of natural lighting and ventilation systems | | | | - Ensure the market is clean and well-maintained |
| Methods of buying and selling | - Use of e-commerce platforms | - Establish an inspection point for visitors and vendors | | | | - Establish a security protocol for visitors and vendors |
| Administrative & governmental | - Implement security measures | - Add security personnel | - Use of security cameras | - Implement security protocols | | - Ensure the market is clean and well-maintained |
| Personal protection measures | - Implement face masks and sanitizers | - Add sanitizers at вход points | - Add directional signage | - Use of sanitizers at вход points | | - Establish a security protocol for visitors and vendors |
| Ventilation and lighting inside the market | - Ensure adequate ventilation and lighting | - Use of natural lighting and ventilation systems | | | | - Ensure the market is clean and well-maintained |
| Methods of buying and selling | - Use of e-commerce platforms | - Establish an inspection point for visitors and vendors | | | | - Establish a security protocol for visitors and vendors |
Table 2 Solutions suggested for different parts of the Tablita market for safe operation during and after pandemic

| Operational objectives | Application of protection measures to Tablita Market |
|------------------------|-----------------------------------------------------|
| Avoid gatherings and crowding | ![Diagram showing suggested measures for avoiding gatherings and crowding] |
| measures for personal protection | ![Diagram showing measures for personal protection] |
| cleaning and food safety | ![Diagram showing measures for cleaning and food safety] |
| maintaining physical distancing of at least 2 meters | ![Diagram showing physical distancing measures] |
| Ventilation and lighting inside the market | ![Diagram showing ventilation and lighting measures] |

Legend:
- Original Section
- Suggested vertical extension
- Using empty tables to create a physical barrier between the vendors and customers
- Vending Stall
- Storage
- Waste disposal bin
- Garbage collection point
- Roof lighting and ventilation
CONCLUSION

- During COVID-19, some businesses and activities succeeded in accommodating the severe changes that occurred and some couldn’t. Activities like education, banking, administrative work, supermarkets, etc. easily shifted to online platforms to minimize the personal interaction during the pandemic, while some activities like local markets faced severe losses.
- It is crucial for the community to keep local markets safely open and in service; therefore, markets need to follow all the guidance and recommendations set by responsible organizations, as well as the design guidelines and standards for successful local market.
- Various international examples and ideas proposed for markets redesign during pandemic show that redesign of markets for safe operation is possible, starting from very simple physical barriers to innovative technological solutions.
- The case study of Tablita market in Cairo, Egypt, demonstrates the market condition and the negative socioeconomic impacts of the pandemic on the market operation.
- There are possible solutions in accordance with the reviewed protection measures for local markets like ‘Tablita’ to operate safely during pandemics and save the market from the risk of locking down and losing jobs and opportunities. Some of these solutions are simple enough to be immediately applied (such as reorganizing vending stalls and adding more washing basins, and others can be implemented within a long-term development plan to improve the market condition and resilience such as adding a second floor, changing some materials and surfaces to easy cleaning ones. Other plans are more futuristic such as developing a new business model like creating a system for online buying and payment (or even a virtual market space) to avoid economic losses for such small businesses and to keep access to food in case of complete lockdown. Redesign solutions and administrative actions need to be aligned with community engagement in monitoring and management of adherence to these solutions to guarantee a successful implementation.

RECOMMENDATIONS

Local markets like EL-Tablita need to be redesigned according to the following recommendations in order to keep operating safely during pandemic:

- The market re-design should provide different entrances and separate between entrances and exits and force a one-way flow circulation.
• The market re-design can designate preparation areas for home delivery orders and a pickup system.
• The required basic infrastructure should be provided to ensure better hygiene such as adding common wet area with taps and basins accessible for all to use, and WCs for males and females, handwashing points at entrances and exits along with signs for guidance.
• The design should separate wet zones (meat-fish) and refrigerators in storage areas should be provided.
• Waste disposal management area should be designated for the whole market and bins for each stall should be added (preferably hands free).
• Adding physical barriers that force keeping distance between stalls and between customers and vendors, which can be a passive space like a storage cabinet or a refrigerator.
• Making use of the existing market vendors or market master in monitoring of the adherence to protection measures.
• Innovative ideas that promote contactless buying and payment should be encouraged.
• Long-term re-design plans for enhanced lighting, ventilation, flexibility of extension and changing finishing materials (for easier cleaning) need to be considered.

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