

Urban Agglomeration and COVID-19 Clusters: Strategies for Pandemic Free City Management

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Abstract Cities become central locations that coordinate most of the socio economic networks of a country. Therefore the urban agglomerations that have high population densities are identified as the most vulnerable hotspots during a period of pandemic in a country. Therefore this study focuses mainly on the identification of sustainable strategies for pandemic free city management in developing countries in a post COVID era. Literature related to the context along with the scholarly articles were reviewed in fact collection in this study while using diagrams and flow charts in information presentation. The study could investigate the urban agglomerations of developing countries as the most vulnerable sites for the clustering of COVID 19 cases in the world. Further the underserved settlements, public service places, manufacturing industries, retail service centers, transportation hubs, banking and finance sections, educational institutions and health care centers were identified as the clustering hot spots of infection carriers in more than 85% of the developing countries. Thus the study concluded that the practical measures should be implemented by deviating from prevailing liberalized policies and major urbanization characteristics like human interactions and movements while strengthening and monitoring the prevailing social distancing and health precautions for a better achievement in almost all the socio economic sectors of the country in the reawakening after a period of two month quarantine until the discovery of a reliable cure for the pandemic.

Key words: COVID 19, urban agglomeration, Developing countries, COVID 19 hotspots

I. INTRODUCTION

Cities are the central hot spots for capital, labor, information and innovations. Being the central locations for more than 80% of the socio economic services, the cities play an important role in the socio economic structure of the world (Acuto, 2020). Urban agglomeration which concentrates the people from a number of cities and their suburbs together regardless of administrative boundaries, have created a feasible platform for the accumulation of high densities of urban dwellers. This urban agglomeration has automatically interconnected most of the important carriers of global economic development (Fang & Yu, 2017). Although the cities become major functional bodies of a country, they are dual edged during an infectious disease outbreak. Cities play the role of transmitting the

infectious disease in an alarming rate while becoming a place of providing health care assurance on the other hand.

Today, roughly 4 billion people, more than half of the world's population is living in the cities and it is projected that more than two third of the global population would be living in cities by 2050. According to the recent studies it is revealed that around 600 cities generate two thirds of global GDP. Precisely because they are hubs for transnational commerce and mobility, densely populated and hyper-connected cities which can magnify the pandemic risk (Desai, 2020). However, the disease has now spread to 215 countries including Italy, Spain, USA, United Kingdom and many South Asian Countries and all the countries are in a giant life risk having nearly 537,179 deaths and about 11,580,119 confirmed cases by 7th July 2020. COVID-19 is causing global trade to be disrupted, flights are being cancelled, and many people are now working or staying at home. The world is facing a huge socio economic threat with this coronavirus outbreak as most of the economic centers and many active non sleeping cities of the world have been locked down with this rapidly spreading virus.

As it is not just cities that are at risk of COVID 19, but also their local and global supply chains, housing schemes, travel networks, industrial zones and specific neighborhoods that have become the sources of contamination. Especially in the developing countries like Sri Lanka, India and Pakistan, this issue has become more serious booming more clusters in urban areas with the high concentration of underserved urban dwellers in the cities. Therefore managing epidemics in urban agglomerations is incredibly important. In the reawakening of the cities of the developing countries after a full or half lockdown for more than two months of quarantine, the cities need more preparedness to combat the Covid 19 as a frontline victim. Therefore this paper intends to discuss about the contamination hotspots of COVID 19 in urban agglomeration and the sustainable strategies that can be adapted by developing countries for a Covid free urban territory.

II. URBAN AGGLOMERATIONS IN DEVELOPING COUNTRIES AND COVID 19 CLUSTERS

Urban agglomerations have become the urbanized "growth poles", especially against the background of increasing population flow to cities. Therefore the cities become the main centers of collecting more population from per urban territories irrespective of administrative boundaries. The cities have become the attractive centers of population especially in the

developing countries mainly due to the clustering of main service providing hubs in the cities. Therefore the urban agglomerations are considered as the centers which are at the highest risk during a period of a pandemic.

The COVID 19 pandemic outbreak is identified as one of the fast spreading pandemic diseases identified so far. Figure 2.1 clearly shows the different magnitudes in the spread of this deadly pandemic all over the world. Also the figure evidences for the fact that COVID 19 is not a pandemic which is specific only for a particular region in the world where it has affected the entire world in different magnitudes. Asian, European and

North American regions are prominent among the highly affected areas in the world. One significant factor is that more than 90% of clusters are identified associated with densely populated urban agglomerations and mega cities in the world.

According to the figure 2.1, it is much clear that most of the COVID 19 clusters are identified associated with the urban agglomerations of developing countries where most of the vulnerable areas have highly impacted from all its socio economic aspects. The impacts of COVID 19 on urban agglomerations which need more managerial solutions are discussed in the next section.



Figure 2.1: Clustering and spread of COVID 19 all over the world

Source: [https://www.cell.com/trends/molecular-medicine/fulltext/S1471-4914\(20\)30065-4](https://www.cell.com/trends/molecular-medicine/fulltext/S1471-4914(20)30065-4)

III. THE IMPACTS OF COVID 19 CLUSTERING IN URBAN AGGLOMERATIONS

This rapid spreading deadly pandemic has become an area of interest for most of the researchers during the period of quarantine. Most of the studies that have been carried out regarding the COVID 19 have basically addressed a number of socio economic impacts all over the world. When going through different studies that have been done on the impacts of COVID 19 throughout the world, it was understood that a study of identifying the sustainable measures for a pandemic free city management is a study which needed more attention in the current world. Therefore the socio economic impacts of COVID 19 which need more attention and sustainable measures can be discussed as follows.

These lock-downs and the Covid-19 prevention measures have resulted in an observable decline in the economies of most of the developing countries as the main city centers which handled more than 80% of country's economic activities became stand still. Wuhan city which became the epicenter of the infection it was estimated that revenue lost in both retail and food services during the Chinese New Year week is reported to be RMB 1 trillion (\$142 billion), as major chains shuttered stores across the country (Lu, 2020).

On the other hand, the fishing industry which is a prominent livelihood of the developing nations have become stand still due to the lock down and quarantine measures. The effects on small-scale fisheries are felt throughout the entire fish chain, from harvesting to processing and marketing. In countries like Norway and Philippines, the surveying reports

suggest that the fishing industry has been declares a critical industry and stays open with social distancing mandated at places of work. Major metropolitan areas, such as Manila and other parts of the country are ordered to go on lock down or stay at home. Truck drivers are facing quarantine or preventing from moving seafood from outlying fish landing sites to big city markets. Therefore it is much clear that reliable and sustainable measures are utmost important in reawakening of the cities for a pandemic free life style (Brito & Eyng, 2020).

When considering about the apparel and textile industry which is a labor oriented source of income has completely been disrupted with the low demand for cloths during this time as well as due to social distancing and less labor precaution methods. According to a recent news reports, in Bangladesh, the world's second-largest garment exporter, about one million garment workers have lost their jobs as a direct result of sourcing changes. An online survey of Bangladesh employers, administered between March 21 and March 25, 2020, indicated that 72.4% of furloughed workers have been sent home without pay, and 80.4% of dismissed workers have not received severance pay. In most of the countries these labor oriented industries including construction and engineering, textile industry which support nearly a half of GDPs of many developing countries have become stand still with the current pandemic situation and are identified as the areas which need more concern in sustainable city management (European Civil Society, 2020).

Transportation sector has been one of the primary victims of COVID-19. From rickshaw pullers to airlines, all have been

affected economically by the pandemic. For instance, India's overall energy demand has been fallen down by 11% in March 2020. Due to lockdown in many countries, the demand for passenger transport has been adversely hit. The freight segment has had a mixed short-term effect in terms of transportation demand. There is a surge in demand for truck drivers in transportation of essential goods. For instance, there is 40% to 60% increase of product being moved into grocery stores and warehouses in US since COVID spread started. Public transportation modes and also the terminals and transits are also identified as the main hotspots of the pandemic spread. In developing countries, much concern should be paid on the health security of public transport modes as it plays an important role in the daily lives of the people (Harikumar, 2020).

According to the World Tourism Organization (UNWTO) the international tourist arrivals will be down by 20% to 30% in 2020 when compared with 2019 figures, equivalent to a loss of 300 to 450 US\$ billion in international tourism receipts (exports) – almost one third of the US\$ 1.5 trillion generated globally. out of the top 10 destinations by international tourists arrivals (France, Spain, United States, China, Italy, Turkey, Mexico, Germany, UK and Thailand), 8 result to be the hardest hit by COVID-19, implying that the economic shock on tourism will be further exacerbated in these countries. Also the estimates suggest the developing countries that depend mainly on the tourist industry will be greatly hit from this sudden downfall in the industry thus they need more attention on the health security to attract more tourists to those countries with the most appropriate health precautions (Maniga, 2020).

To date, COVID19-driven school closures have impacted over one billion students. By current World Bank information gathering, at the time of writing this, 150 countries are reporting school closures. These numbers have increased rapidly since late February. Apart from its direct impact on schooling, the pandemic impacts include the possible use of school facilities as make-shift hospitals, as in some low-infrastructure rural areas the school may be the only public building available. That may cause lengthier disruption of education services making the building

unavailable for education purposes. Also, as part of the coping mechanisms the practice of offering alternative services of remote learning may work better for those students in households with better connectivity and with higher initial digital skills. This leaves those already disadvantaged further behind, so school closures with the inappropriate system coping mechanisms, might imply an exacerbation in inequality in education (UNESCO, 2020).

When considering the impacts of COVID 19 discussed above, it's an uncomfortable truth to accept the fact that the main cities which function as the hearts of the countries should be back to normal after a period of fully or partial lock down to unfreeze the frozen economies of the countries. Therefore, a study which aims on elaborating healthy measures for a proper preparedness with a continuous monitoring system is an urgent necessity in the current day world which has kind of a research gap. The next section brings out the sustainable strategies that can be taken to build up sustainable pandemic free urban agglomerations in recent future.

IV. STRATEGIES FOR THE SUSTAINABLE PANDEMIC FREE CITY MANAGEMENT

Countries play an important role in mitigation and adaptation to this pandemic environment to restart the non-functioning city centers before the discovery of a reliable cure for this deadly pandemic. But the preparedness of the cities for the reawakening is varied over the world. The levels of development, socio economic perspectives of its people and the awareness of the people play a big role in speed recovery of the country. The cities with a high concentration of urban poor and deep economic inequalities are potentially more vulnerable than those that are better resourced, less crowded and more inclusive. Therefore, some strategies can be introduced for the optimal preparedness of cities in developing countries which are mainly woven around primary, secondary, tertiary and quaternary economic activities for a speedy recovery as shown in figure 2 in summary form.

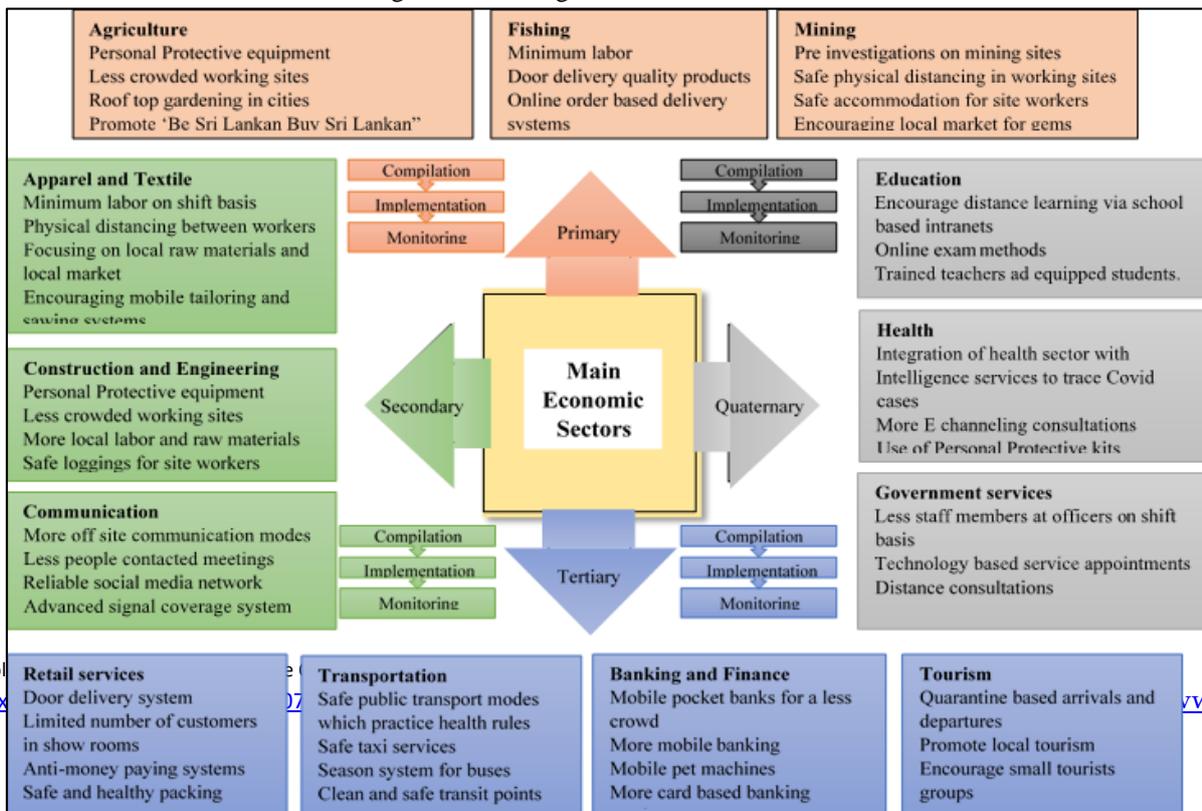


Figure 2: A summary of sector specific strategies for a pandemic free city

In most of the developing countries, majority of the cities are agglomerated with high population densities clustered around different economic activities and services. Therefore a complete lockdown of the country during a period of pandemic would not provide equal opportunities for all to stay at home and work from home to receive their monthly stipend to the bank accounts as more than 50% of the city dwellers engage in daily stipend based informal economic activities which need daily movements from the city and towards the city. Moreover, the urbanized and per-urban populations have a higher risk of disease contamination due to unplanned settlement structures, high population densities, extensive public transport systems etc. Therefore, the strategic measures should be compiled under a well-established monitoring system preparing cities to be functioned in a pandemic situation in a country. The interaction between these adoptable strategies pertaining to different socio economic sectors can further be depicted through figure 3.

The priority of the pandemic free city planning should be given to the public health implementing the most suitable measures that mostly address the health conditions of those who are in crowded and substandard houses in urban areas. Informal settlements in most of the cities available in developing countries like Sri Lanka, India and Pakistan have relatively limited access to safe water, sanitation and hygiene facilities where their vulnerability for a spreading epidemic is absolutely high.

Although the main cities are identified as a center for advanced medication, they have been paralyzed in front of the unexpected increase in the number of COVID 19 cases day by day. Therefore the coordination and coherence in health precaution measures such as the spot checking of body temperature, sanitary precautions like masks, gloves and hand sanitizers using a randomly selected samples from the community while directing the needful to the medical consultations are much important for pandemic control among urban communities. For example, Kigali City in Rwanda is providing access to basic water and sanitation facilities for free. Therefore, the functioning of government sponsored water tankers, mobile hand washing facilitators can control the spread of pandemic to a considerable extent.

The health sector which becomes the backbone of a country during a period of pandemic should maintain all prevailing health precautions when handling with normal patients and COVID cases. Government and private health care providers of the countries must step up efforts to provide access to emergency services in cities' most under-served areas, as well as help those who need to quarantine like in the countries such as Colombia. Further the methods like herbal steams, herbal beverages can be promoted and encouraged in tourist industry as health precautions in post COVID era.

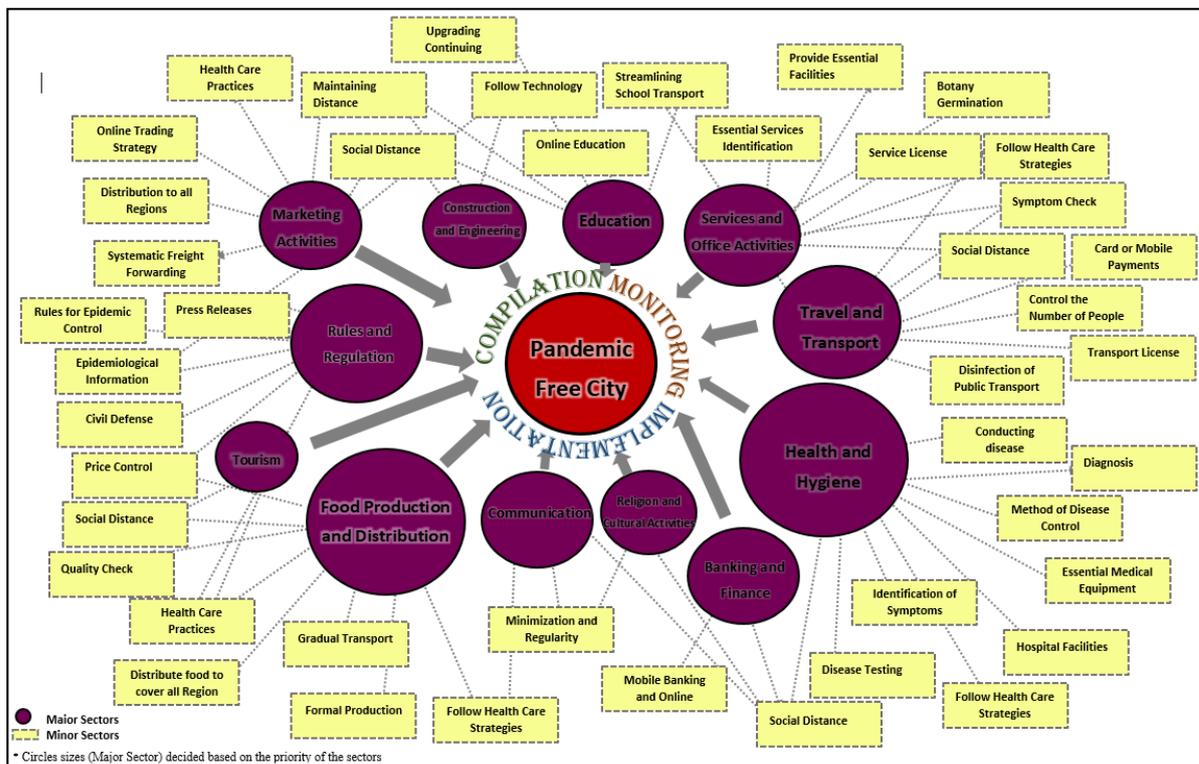


Figure 3: Interactions between adoptable strategies pertaining to different socio economic sectors

Additionally, the health sector should closely interact with the state intelligence services which have the quick access to trace and detect all the locations where a COVID 19 patient has visited. Formulation of a civil task force which works closely with health sector would be an additional benefit for the tracing of COVID 19 cases in the underserved settlements of the countries. As more than half of city dwellers are settled in these underserved settlements in countries like Sri Lanka, India and in most of the African countries, this kind of a strategy would be more beneficial to manage the COVID 19 clusters in those areas. Few members can be appointed for the task force from the same environment as representatives as they have strong mental databases which have the ability to grasp all necessary locations within that underserved settlement during a short period of time with his/her experienced social links. Moreover, City governments must work more closely with community leaders and NGOs that work in informal settlements and other at-risk communities to minimize and prevent the impact of the pandemic. Like in Hong Kong and Singapore creative partnerships with communities, NGOs, the private sector and universities can be highlighted as the necessary measures in pandemic control in majority of developing countries.

The other major factor that should be considered in pandemic free city planning is food production and delivery process. The continuous supply of food in adequate amounts and required qualities under health precautions in urban and per urban areas is an essential necessity in a period of pandemic to address the food related problems among city dwellers especially who have limited access to safe food sources. Price fluctuations in essential food items should be discouraged while ensuring food security of the community. In door food delivery systems, the quality and the safety of the products should be well concerned and the delivery mode or the vehicles used should be under the high health and hygiene measures. It would be really appropriate to discourage the large gatherings in restaurants and cafeterias encouraging more efficient home delivery and take away services. Anti-money methods can be encouraged in payments for food products to avoid the number of customers gathered in food stalls and restaurants as a health precaution method to reduce the increase of COVID 19 clusters in urban agglomerations. As the efficient and sufficient food provision is an important aspect to be discussed in a period of pandemic, the methods should be under the continuous monitoring system for better achievements in such a period.

Further, the discouragement of food miles can be identified as one of the most suitable solutions for a country during a pandemic. Food being the major primary necessity of the human beings, the mobility and movements associated with food production, transportation and marketing are relatively high. The encouragement of city and per urban dwellers for more home gardening and roof top gardening can reduce the food miles of the entire area. The food security and the quality of the products are also assured in this method. If all the city dwellers living in urban areas can practice with sustainable measures of home gardening, the movements and interactions may be reduced while limiting the number of food supplying vehicles entering to the cities daily ensuring the self-sufficiency of that particular area or the region.

Fishing industry being an important livelihood among urban dwellers along the coastal belts of most of the developing island nations like Sri Lanka, Maldives, India and most of African nations, precaution methods are much important in their process of back to normal. Limitation of the number of vessels that can land on the beach or at fishing ports at any one time and limit only essential personnel at landing sites, keeping individuals that are not directly involved in the capture, unloading, transport, purchase, sale or processing of fish away from landing sites, provision of information to fishing communities on ways to reduce the spread of the virus through the practice of social distancing via their traditional leaders and respected leaders in fishing communities. Further the regular thermal checkups before and after the arrival of fishing boats in sea journeys can be encouraged under a well monitoring in a period of pandemic. The door delivery system should be more efficient and the quality of the products should be maintained. Rules should be compiled to have mobile fish stalls under convenient prices with government recommendations and health precautions in such a way that it does not cluster more customers at a point in a particular time. The continuous practice of correct health advices by sellers and door delivery services should be monitored under strict rules and regulations.

The retail services become very much important in a country as it includes the services associated with Fast Moving Consumer Goods (FMCGs). The consumer goods should be high in quality and in good brands where the safe door delivering should be done via a taxi service or through self-driving by the seller. In addition to that, the marketing process should be keen enough to enroll the customers of a particular product making them feeling like involving in indoor shopping allowing a bargaining system in online shopping as well. In the indoor shopping centers, measures should be taken to maintain the social distance between the customers and while reducing number of customers gathering at one place at a time. More human free markets and mobile vending machines can be established in highly crowded urban areas to avoid the gathering of more people in a particular place at a time. Credit and debit card based payment systems can be promoted to avoid the clustering of more customers around the shop cashiers. Anti-money system would be a better sustainable strategy which can be implemented during a period of pandemic in a country.

Introduction of an entry fee system in the supermarkets in city agglomerations can discourage the clustering of more customers in market places. This fee can be changed according to the time of shopping like a considerable amount per head in peak hours of marketing to discourage the number of individuals visiting the shop. This method would increase the proportion of people enjoying the online shopping as well as it will limit the number of family members out for shopping at a time. Further, the supermarkets can be rearranged in a periodical manner which directs the customer to the place where they need to get their essentials. For example if the areas have been allocated separately for vegetables, fruits, grocery and other items, the customers can directly go to the areas where they have the necessity.

Further, the transport system of a country which manages the movements of people from one place to another is relatively at high risk during a period of pandemic in a country. Therefore

the arrangements should be made to carry fewer and more dispersed passengers in buses and trains and public spaces are needed to be dispersed especially at entrances and the exits at stations and bus terminals. The public transport modes can be made safer and secured using a card payment system which allows the passenger himself to punch the card at the entrance. This allows the travelers to buy and authenticate tickets on their mobile phone like in countries such as Norway, China and UK. This would be a sustainable remedy to break the conductor authority based over loadings in public buses in Sri Lanka. Introduction of different bus charges in peak hours and non-peak hours may encourage the passengers to travel in non-peak hours. And also the clustering of passengers in transport terminals can be reduced by introducing different starting and finishing hours or the working hours in the offices and service centers. Cycling can also be promoted as a safer and faster way for the transportation of short distances. For instance Cities like Bogotá, Berlin and Mexico City have expanded such efforts to discourage the rapid spreading of pandemics.

When it comes to the construction and engineering section, it is identified as a labor oriented industry which needs more labor to be functioned. During a period of a pandemic like COVID 19 which has a very high transmitting rate, importing labor from other countries like China and Korea (the most popular labor importing destinations of developing countries), is highly vulnerable. Therefore the use of local labor in constructions under the supervision of local and foreign expertise knowledge received via off site communication methods such as online discussions can be encouraged in the post COVID era. Further, the sites which have already started working with foreign labor should be highly monitored compiling rules and regulations assigning the responsibility of providing healthy accommodation and transportation facilities to their mother companies.

Textile industry which plays an important role in Sri Lankan economy should be refunctioned under government recommended health precautions. The labor practices should be properly monitored concerning on social distancing at work places and the wearing of sanitary kits during working hours. The accommodation places should not be clustered and the factories should make duty rosters for their workers in shift basis in such a way that it uses the minimum number of labors per day to function the industry. At the same time the local sewing industry can be promoted introducing mobile tailor shops which can visit the customer for measurement taking and fit-on adjustment of the garments.

Mobile and online banking, cash less card based transactions should be encouraged for a secured and safe banking and finance services in post COVID era. All government and private sector banks can make arrangements to facilitate their customers with effective mobile banking methods where their mobile phones serve as wallets encouraging anti money system in all monetary transactions. More walking pet machines in city areas would encourage its customers to have safe banking services at their door steps which would ultimately become a controlling factor of the rapid spreading pandemic.

The online teaching methods which are based on school or institutional intranet systems can be promoted as a sustainable strategy in pandemic free city planning. In this distance learning system, all the students and teachers should have equal level of access to equipment and technology. And also

the priority should be given on marginalized and rural settings which have limited access to the latest technologies as the education system is something that cannot be fragmented based on their rural urban settings. Therefore, the distance learning process along with online exam methods should be promoted with training sessions and equipment for both students and teachers for sustainable achievements during a period of pandemic. The schools and educational institutions located away from the main city centers can be started under health precaution methods that allow the students to be present in schools in a roster basis as the senior classes first and then the junior and primary.

Finally the government services sector which addresses the needs and wants of the majority of the local community needs to be reopened under a well monitored health precaution system. The government office services can be rendered in shift basis under previously arranged appointment methods. Further, the consultations can be done via official websites and over the phone under a well monitored time table. Consultation time slots can be prepared in such a way that it does not gather a large number of people in a particular place at a time. The efficient and quality service via off site modes as much as possible would be an additional beneficiary to avoid the clustering of people in front of the government offices for services. Further the methods can be compiled to receive and submit the essential government service related documents and certificates like educational certificates, birth and death registrations, driving license etc. on an online basis to reduce the office visits.

V. CONCLUSION

The COVID 19 pandemic has turned the world outside our door steps into a very different environment limiting all our complicated social linkages to the size of our homes. This layout has made most of the cities which were internationally connected hubs filled with millions of people working, commuting, sightseeing, drinking, dancing and hugging one another, isolated with social distancing and with face covered, mask wearing people whose eyes are filled with frighten and wear no single smile of companion with each other. This condition all over the world has brought out the attention of responsible authorities and executives to compile, implement and monitor the necessary health measures to reawake from the current pandemic situation.

Accordingly, the itchy truth is that, no one can predict that this is neither the first nor the last pandemic that our modern cities will face. Until the discovery of a reliable cure, the emergence of victims of COVID 19 is absolute. But the avoiding of clustering and community spreading can be controlled to a considerable extent through the safer practices of the community. Sustainable measures are indeed essentials to rethink, re plan and redesign before the reopening of the country to the public community. Therefore, it is crystal clear that COVID 19 pandemic has hit the reset button of the entire world allowing global community to find sustainable strategies to rebuild the empty streets, quarantined urban dwellers, locked-down cities and Stand stilled economies with an astonishing consent.

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