

How Important is Sustainable Urban Development for Our Future World?

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Abstract:- This paper looks at the concept of Sustainable Urban Development, from a global viewpoint, providing specific information from past and ongoing research and projects. There is initially discussion around the popularity of urbanization in recent years and the subsequent unsustainability of this trend representing a dire need for a change to be made in development systems. Particularly, this paper enforces the need for our world to start adopting a holistic and systematic approach at all stages of design development ensuring sustainability and strategic fulfilment of all stakeholder interests. It also includes certain important environmental procedures which have been a key instrument in many developments, such as Triple Bottom Line (TBL) and Environmental Impact Assessment (EIA). This paper also draws focus to a key example of a sustainably developed city, i.e., Singapore, which has taken into account many frameworks and concepts mentioned throughout the paper proving to be a strong example for other cities to look up to and learn from.

Let's talk about the urgency of making architecture green

I. INTRODUCTION

By 2050, 70 % of the world's population will live in cities, making cities critical in achieving a sustainable future for the world (GRI, UN Global Compact and WBCSD, 2015). Businesses, together with Governments at various levels, and civil society organisations and citizens will undoubtedly need to engage in pursuing ambitious objectives to make cities more competitive, safe, resource-efficient, resilient and inclusive.

Urbanization defines the process whereby people leave the countryside to live in cities for varied reasons particularly including better opportunities and higher standards of living (Cambridge Dictionary, 2021). As per the UN, the world is becoming increasingly urbanized but not without presenting a set of difficult challenges (Urbanization and Population Division, 2021). In a bid to accommodate the ever-increasing number of people in restricted land areas, urban development has taken a dark turn and become highly unsustainable over the last few years. Poorly planned urban development has direct links with increasing hazards and expedited exposure to diseases. This was further proven by the COVID-19 outbreak which hit the vulnerable the hardest, including the 1 billion residents of the world's densely populated informal

settlements and slums. Even before the new coronavirus, rapid urbanisation meant that 4 billion people in the world's cities faced worsening air pollution, inadequate infrastructure and services, and unplanned urban sprawl. It is very clear that our futures already are and will continue to be highly threatened if sustainable urban development is not accepted on an individual, national and global basis.

Sustainable urban development relies heavily upon the successful management of urban growth to develop sustainable cities in both developing and developed nations. Understanding the importance of sustainable development, the United Nations enforced The Sustainable Development Goals (SDGs), also known as the Global Goals, in 2015. These were adopted by all United Nations Member States as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (UN, 2016). As per the United Nations, the key areas in need of achieving progress are; identifying and agreeing on the most sustainable ways to achieve the targets while ensuring practical processes for multi-stakeholder engagement in all stages of urban development. More importantly, the 17 SDGs take into account that action in one area will affect outcomes in other areas as well and that development must balance social, economic and Environmental Sustainability. The targets of SDG 11, particularly, include investment in public transport, creating green public spaces, and improving urban planning and management in participatory and inclusive ways (UNDP, 2021).

On the whole, unsustainable urban development is a very prevalent issue that could lead to several larger problems for the world's populations if not contained appropriately. If the severity of the problem was not already obvious then the pandemic has further made it clear that urban planning is crucial for better public health and for mitigating people's vulnerabilities to other hazards, such as natural disasters. At the end of the day, how we plan and develop our urban areas, infuse infrastructure and services, mitigate risks and respond to the needs of growing populations determines the long-term prosperity of cities and their people. Though many countries have some form of the national urban plan, it is high time governments revisit these to ensure they are sustainable from an economic, social and environmental perspective. On the basis of the above, this research paper aims to answer the research question: **How important is sustainable urban development for our future world?**

II. THE PRESENT PICTURE

For most of human history, all the people across the world lived in small communities and with a small set of people. The increase in urbanisation occurred during the

industrialisation period which took place in Europe in the late nineteenth and early twentieth centuries. Over the past few decades, there has been a drastic increase in urbanization across all continents as seen in the graph below.

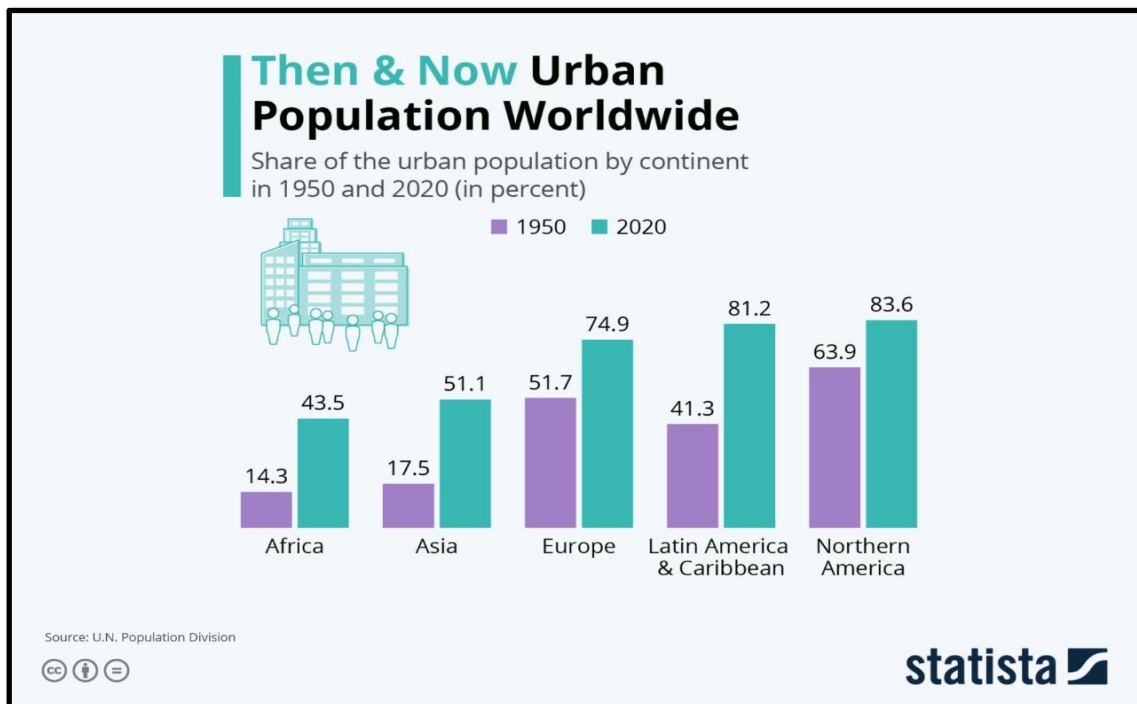


Fig 1:- (Buchholz, 2020)

Now with more than half the world living in Urban Areas, which will rise to almost 68% by 2050 (UN, 2018), sustainable urbanisation becomes a crucial aspect in big cities with growing populations. Over the years, many arguments have been advanced by scholars on whether urbanisation is sustainable or unsustainable. In order to understand the sustainability of urbanisation, it is good to consider the economic, social, political, cultural and environmental effects of the same. With Cities having to solve multiple problems regarding their growing populations the most important factor is doing them in a sustainable manner.

The movement of people from rural to urban centres occur mainly due to increased population pressure and limited resource availability for the large populations in the rural areas. Global change can be majorly associated with urban drift and it contributes mostly to the people moving to the cities and towns and leaving their earlier homes in far off places. This has resulted in cities growing quickly and the majority of the growth is taking place in low-income countries mainly in Asia and Africa (Gelb, 2018). The mass migration from rural to urban areas has been seen as

beneficial for most people making the move since urban living offers many benefits to residents including more job opportunities and higher incomes, and to businesses including lower input costs, greater collaboration and innovation opportunities.

Although Urbanisation has its benefits, it comes with many disadvantages and has taken a turn for the bad. With increased amounts of people moving to Urban Areas housing has become of great importance. New developments change the environment or ecosystem, for instance, the expansion of paved, impermeable areas, which prevent rain from being absorbed by the soil thereby increasing flood hazard, particularly in low-lying areas. Inadequately planned and managed cities also create new risks. The lack of adequate infrastructure and services, unsafe housing, inadequate and poor health services can turn a natural hazard into a disaster. Furthermore, it is estimated that about 25–50% of the world's urban population lives in slums and that the absolute number of slum dwellers will increase in the coming years. (F. Pelz, Taubenböck, Friesen and Wurm, 2019)

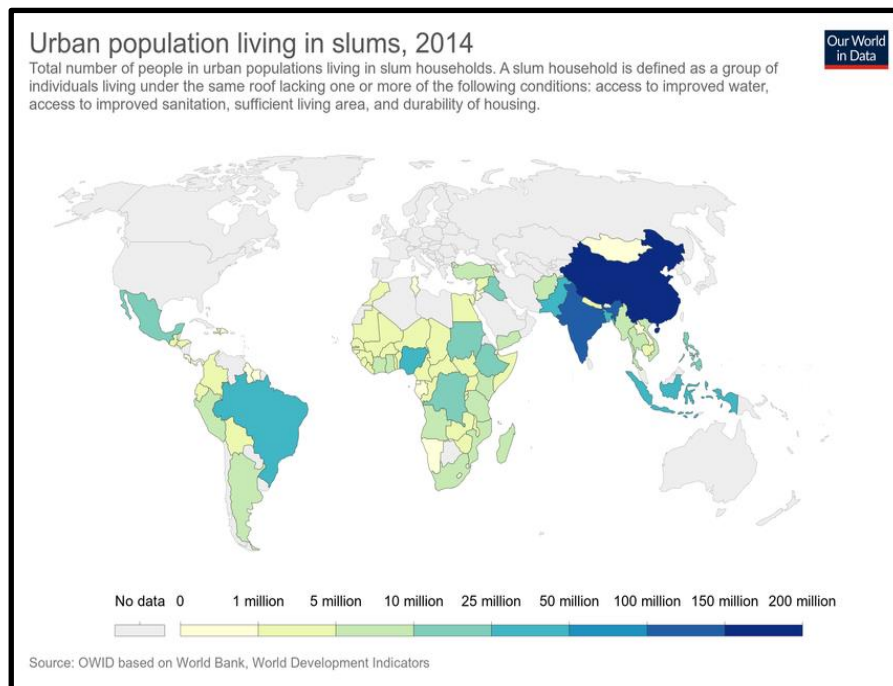


Fig 2:- (Wikimedia, 2014)

The above map from Our World In Data shows the urban population living in slums as of 2014. As visible, the situation seems to be the worst in countries located in the Asian continent which is explained by the rapid growth they are undergoing. Moreover, the current COVID-19 crisis is likely to have disproportionately damaging effects on the lives of slum dwellers compared to other urban residents, particularly those residing in low- and middle-income countries (Anon., n.d.).

Urbanisation can also increase income inequality because wages are higher for urban jobs than rural work. Income inequality refers to an unequal distribution of income among individuals or households resulting in people struggling to afford basic needs in life. Although it remains true that most receive higher pay in cities and urban areas, the average standard of living has increased making it difficult for the lower classes to sustain their pays for longer periods of time. However, the effect of urbanisation on the economic structure and income inequality depends on the specific country. When we analyse Asian countries particularly, there are four factors that drive inequality: the degree of urbanization, urban-rural income gap and urban and rural inequality. Of all the factors, the urban-rural income gap is expected to have the largest marginal impact on inequality. However, in the long term, when urbanisation is highly developed, the difference in income distribution in the region may decrease, and income inequality will subsequently decrease. The overall impact will ultimately depend on many other factors which prevail in the country. For example, urbanisation contributes about 300% to the increase in inequality in the Philippines, more than 50% in Indonesia, and nearly 15% in India. On the other hand, urbanization has reduced inequality in China.

In summary, urbanisation has shown us both positive and negative effects and thus studying its impacts is important to understand whether it is sustainable or unsustainable. Socio-economic and political effects of urbanisation serve as the main indicators of the level of sustainability of urbanisation. Based on the effects of urbanisation it is clear that it is not sustainable, and it presents more negative effects than positive effects. 95% of urban expansion in the coming decades will be taking place in developing countries and this will result in these countries needing more area and expanding already existing urban areas to meet the steadily increasing demands. Therefore, more action needs to be taken to make cities and urban development more sustainable to ensure that people can live in an inclusive, safe, resilient and sustainable environment.

III. SUSTAINABLE URBAN DEVELOPMENT

Urban development planning that does not take into consideration sustainability is more prominent now than it has ever been. However, concerns over climate change, clean air and water, renewable energy and land use continue to draw attention to sustainability, particularly sustainable urban planning - the developmental strategies and practices that ensure liveable, self-sustaining communities over the long term. According to a 1987 United Nations report, sustainability is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UTA, 2016). Sustainable development also attempts to; prevent urban and regional pollution, reduce production capacities of the local, regional and national environment, support recycling, reduce support for any harmful developments as well as eliminate the gap between rich and poor. In order to successfully meet all these goals of sustainable development, it is vital to ensure that a holistic approach is adopted, and all stakeholders

involved are considered. As part of the holistic approach, it is important to note that Sustainable Urban Planning requires knowledge of many disciplines, including architecture, engineering, biology, environmental science, materials science, law, transportation, technology, economics, and accounting and finance, among others (UTA, 2016). The main aim of Sustainable Urban Planning is to develop innovative and practical approaches for land use while considering its impact on natural resources. Furthermore, these goals are achieved through urban, regional and national planning which is in accordance with the law and control of land uses.

As mentioned above, there are many factors that must be taken into consideration when building sustainable urban developments. Currently, energy sources, materials and costs are arguably three of the most important. A more detailed analysis of these factors in the context of sustainable urban development can be found below:

➤ *Energy Sources*

The global demand for energy has increased enormously. It is no surprise that energy systems play an important role in the environment and its impact. Therefore, a sustainable global energy system should be adopted to optimise efficiency and limit emissions. To achieve a sustainable method of energy consumption in urban developments, renewable energy sources such as solar energy, wind power and hydropower are now being used. These renewable energy sources emit far lesser CO₂ and other greenhouse gas emissions than conventional fossil fuels. There are many benefits of renewable energy for the people residing in urban developments. These include the ability to breathe easier, stay cooler, and create a more comfortable world for generations to come (Seckin Salvarli and Salvarli, 2020). Overall, these energy sources are easier to sustain over the long-term period and are successfully being adopted more frequently into newer developments around the world.

➤ *Materials*

Over the decades most people have used traditional methods of building using earth bricks, concrete, and wood. They have been, and continue to be used in everyday construction, meaning the continued destruction of trees for timber, and the mining of resources to produce cement for binding sand, gravel, and bricks. Particularly, concrete is one of the most important materials in building and construction and has been used over the years to build up and hold our cities together (Peckenham, 2016). From homes and apartment buildings to bridges, viaducts, and sidewalks, this ever-present grey material's importance to modern urban life is undeniable. However, the actual process of making concrete releases loads of greenhouse gas carbon dioxide (CO₂) into the atmosphere each year, contributing to the

calamity that is climate change. The trend of unsustainable building materials may now be coming towards an end with the changing consumer demands driven by heightened awareness and the increasing access to more environmentally friendly methods. Therefore, there are now many more alternative and new green building materials available. Some of these include Bamboo, which with its combination of tensile strength, lightweight, and fast-growing renewable nature has proven to be a promising building material for the future and modern urban developments. Another example can be recycled plastics (Rinkesh, 2021), instead of mining, extracting, and milling new components, researchers are creating concrete that includes ground-up recycled plastics and trash, which not only reduces greenhouse gas emissions but reduces waste and provides a new use for landfill-clogging plastic waste.

➤ *Costs*

Making a city sustainable comes with a huge cost attached to it. The problem is simple, it's generally cheaper to use the resources that have a worse impact on the environment than the equivalent resources that do less harm (Chouinard, Ellison and Ridgeway, 2011). A research study conducted jointly by UN-Habitat and AidData shows the average annual cost of achieving SDG 11 from 2019-2030 for four countries i.e., Bolivia, India, Malaysia and Colombia. Results from the four sampled countries show that the total average annual cost for small cities to achieve SDG 11 ranges from \$18 million USD in Malaysia to \$54 million in Bolivia. For medium-sized cities, the total average annual cost ranges from \$144 million in India to \$516 million in Malaysia (Kamiya, Prakash and Berggren, 2020). This shows that each of the different countries has different investment needs based on country-specific characteristics. Overall, even though it may seem as though building a sustainable city comes with an expensive price tag, the long-term benefits of it are undeniable and makes the investment worth it.

Based on all the above research and analysis, it is quite clear that sustainable urban development is important for our future world. Considering the increased availability of many sustainable alternatives in the world of development, it seems as though it should now be easier for countries to facilitate sustainable development. In fact, the integration of specific tools is also crucial and can help aid the process.

➤ *Environmental Impact Assessment (EIA)*

Human Well-being is linked with environmental sustainability. Therefore, all forms of human development, such as building infrastructure have an impact on the surrounding natural environment and vice versa (Anon., n.d.). There are many tools that help developers, builders and policymakers understand this critical link between urban development and the natural world. In particular, a popularly used tool is the Environmental Impact Assessment (EIA).

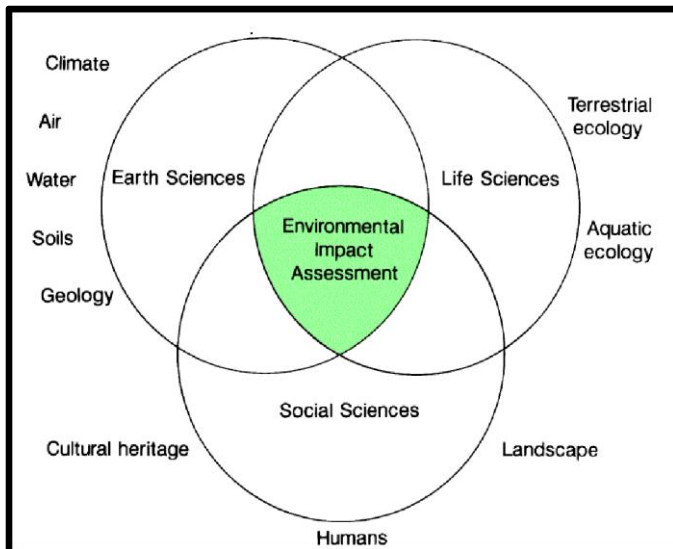


Fig 3:- (iLearnCANA, 2020)

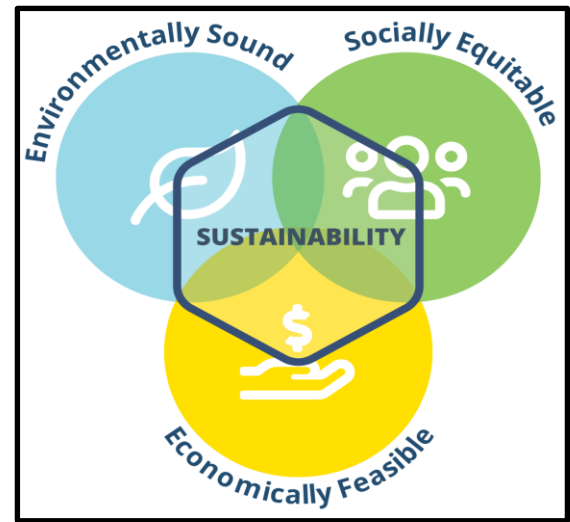


Fig 4:- (SLI, n.d.)

The main objective of environmental impact assessments is to offer information to decision-makers concerning matters that may be brought about with regards to a new project, program, plan or policy. Moreover, rather than just highlighting the impacts, the EIA also provides scope to mitigate and modify the same to the best of the abilities prior to any developments (Soni, Kharadiya, Mathur and Loonker, 2010). Simply put, the purpose of an EIA is not to prevent actions with significant environmental impacts from being implemented but rather the intention is that project actions are authorised in the full knowledge of their environmental impacts. Regardless of the benefits which may be linked to an EIA and subsequent sustainable developments, many times there are cases in which EIA's takes place in a political context. In such scenarios, it is inevitable that economic, social or political factors will outweigh environmental factors and the project will go on contributing very little towards the sustainability of the development. Overall, EIA has been identified as an important instrument for facilitating sustainability and should be implemented before most projects for them to minimise adverse environmental effects, to achieve environmentally sustainable developments.

➤ *Triple Bottom Line (TBL)*

Another tool that may be useful in the context of sustainable urban development is the Triple Bottom Line (TBL) which was traditionally a popular concept in the world of accounting and finance. It was later re-introduced in 1994 by John Elkington to measure the level of social responsibility, economic value and environmental impact of a business (Anon., 2020).

The main aim of this tool is to widen the focus of businesses from the traditional financial bottom line to include social and environmental responsibilities. It sought to build on the concepts of sustainable development which had been defined by the UN's Brundtland Commission in 1987 (Jarvie, 2016). Particularly, adding the concept of sustainability to the TBL measure seeks to minimise the environmental impact of developments as much as possible, or to benefit the natural environment in some way. There are many ways in which the ecological footprint of a building can be reduced, managing energy consumption, switching to renewable energy sources, reducing manufacturing waste, adopting safe disposal methods or recycling, and so on. The TBL is constantly being updated considering the factors which are of utmost importance in the more holistic picture. For example, while energy efficiency, cost reduction, and green building certification remain important goals, future office designs are also prompted to take employee health and happiness into consideration. As per Eric Ubels, Chief Technology Officer at OVG, the leading real estate developer in the Netherlands, "Since 2004, we have only built sustainable buildings, even if the client doesn't want it. But it's not just about sustainability. It's about comfort, it's about intelligence, and more importantly, it's about the health of people in those buildings." This further proves how companies and businesses are taking a more holistic approach to sustainability and urban sustainable development (Anon., 2016).

Another key use of the TBL is that, unlike an EIA, this tool may be used to evaluate the sustainability of buildings that have already been developed. There are specific social, environmental and economic measures that could be assessed in order to gauge the exact sustainability of a building or project. Some examples of these measures can be seen in the table below:

Factor	Example Measures
Social Measures	The different ways to measure and evaluate the social sustainability of already existing developments would be by taking into account the quality of life and the accessibility to and standard of education received by the people residing there. Furthermore, access to other kinds of social resources which are required to live a safe and healthy life must also be present and accessible to all. Lastly, another factor that may not get a lot of attention but is equally important to consider is the mental and physical wellbeing of the residents.
Environmental Impact Measures	When it comes to measuring the environmental sustainability of developments, we could start by assessing the air and water quality, the energy consumption and analyse if these levels are safe and sustainable for long term use. If this is not the case, then it must be analysed how these factors could be altered to achieve the most sustainable methods. Moreover, it is also crucial to consider the overall use, replacement, and/or protection of natural resources present within or around the development. Another factor that must be highlighted is waste generation wherein we can evaluate if the waste generated can be used in a beneficial manner and help create more sustainable practices in the ecosystem.
Financial Impact Measures	When taking into account the financial sustainability of a development, we look at four main factors. Three of these factors broadly include; the income levels of people living in the area, the expenditure or costs that are involved in everyday living and the taxes that are being paid. The fourth and most relevant factor to assess is the business climate of the area. This plays a big role as it will show the political attitude of the government towards this area and their willingness to help and implement change and create a more sustainable environment.

Table 1

On the whole, as seen above, when considering urban sustainable developments, a holistic approach that satisfies all stakeholders involved should be taken. As part of this, the developers may make use of tools such as EIA's which can help modify and mitigate the extreme environmental impacts of development that are yet to be constructed. On the other hand, for projects which have existed for a while now, sustainability can be assessed using a tool such as TBL by comparing the development to certain social, environmental and financial measures.

IV. SUSTAINABLE URBAN DEVELOPMENT IN PRACTICE

Based on all the information above, it may seem as though there is a lot that needs to be considered when developing sustainable urban development. However, at the end of the day, the benefits which can be gained on national and international levels from such developments are crucial for our survival and that of future generations. Prime

examples of successful sustainable urban developments include; The city of Singapore.

Singapore started becoming known as the "Garden City" in the 1980s – a testament to the country's success in achieving relatively environmental-friendly economic progress (ELLYSYALEE, 2016). Singapore has had an ambitious eco-building programme since 2008, they are also set to make 80% of the cities buildings green by 2030 and aim to become one of the world's greenest cities in the future (Toh Boon Kwan, 2018). They've made it a "whole-of-nation movement" and have further advanced it to a national agenda to help with sustainable development. As a small yet densely populated island nation and having no natural resources they are focusing on four key areas which are in relation to the holistic aspect mentioned through the paper. The four are Building a sustainable economy; creating a sustainable living environment; ensuring sustainable development for their people; and contributing to international collaboration.



Fig 5:- (Kwan, 2018)

Further, they have also focused on including other various aspects than just green buildings, for example, they have made a walking and cycling plan for the city in which they aim to make walking, cycling, and riding public transport a way of life for Singaporeans. To achieve this, they've made some new paths which meet the needs of pedestrians and cyclists, instead of catering mainly to vehicular traffic. Another aspect they've focused on is to improve the safety of streets for senior residents of the city by adding "Silver Zones" in areas densely populated with the elderly. These zones will include road safety features, such as lower speed limits, centre dividers, and road humps and chicanes that slow down motorists and remind them to look out for pedestrians (Ministry of Foreign Affairs, 2018). As of now, they have made 15 of these "Silver Zones". Lastly, they have built an extensive network of collaboration with international partners and governments over the years to exchange knowledge and best practices on building sustainable cities. This has helped them in the past and will continue to help them in the future in achieving their target of becoming the most sustainable city in the world.

The prime reason Singapore has succeeded at sustainable urban development is because of the holistic approach adopted towards development and consideration of all stakeholder interests. This further proves that it is very much possible for cities to invest in sustainable urban development.

V. CONCLUSION

Overall, with the increase in Urbanisation during the industrialisation period which took place in Europe in the late nineteenth and early twentieth centuries - there has been a drastic need for an increase in resources like housing, education and healthcare in the cities. This increase in Urbanisation was justified by the many advantages one can gain from shifting into the city but it is equally, if not more, important to talk about the adverse effects that this wide-scale Urbanisation has had on individuals, societies and ecosystems.

With more than 50% of the population gradually finding themselves living in urban areas, Sustainable Urban development will be an important and crucial part of our future world. This implies that businesses, governments at various levels, civil society organisations and citizens will have to work together and engage in pursuing ambitious objectives to make cities more competitive, safe, resource-efficient, resilient and inclusive. All in all, a holistic and systematic approach is required at all stages of design development, which will satisfy all stakeholders.

There are already many examples of wide-scale city development and small-scale project development that are actioning the above with support from the United Nations particularly through their SDG 11 (which talks about investment in public transport, creating green public spaces, and improving urban planning and management in participatory and inclusive ways). It is to be expected that an increasing number of cities that have not already taken any action will gain an understanding of the importance of green architecture as we move into a hopefully sustainable future.

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