

Resilient mobility and logistics systems for future: Bangladesh Perspective

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Abstract: Resilient mobility and logistics (RML) system is now an emerging concept in the transportation system worldwide. Developing a transportation system is now a global challenge to support the economic development of any country. RML system is now a must to satisfy the mobility needs of its people, and participate in the global economy. This paper is based on secondary data analysis. It investigates how Bangladesh can handle the challenges it is facing now in becoming a developed country by implementing a more resilient mobility and logistics system in the future. It shows the impact of the transport and storage sector on the Gross Domestic Product (GDP) and economic development of Bangladesh. Besides, it tries to find out the barriers and limitations of the activities implemented till now or accepted and might be implemented in the future. It presents the current scenario of the transportation system of Bangladesh and proposes ways forward to overcome some of these challenges and promote sustainable development in Bangladesh. Under this backdrop, the study also aims to provide some possible solutions which includes implementing smart mobility, zero-emission, smart transport, development of robust modelling for resilience and response to the impacts of COVID-19 on the transportation system of Bangladesh.

Keywords: Resilient, Mobility and Logistics, Transportation System, Covid-19, Bangladesh

I. INTRODUCTION:

In any transportation system, there should be a built-in level of resilience that can recover its operational efficiency after any disruption (national or global) in the shortest possible time.

The current scenario of the coronavirus outbreak has severely affected the transportation system. It has affected people from different societies and cultures around the world, resulting in the tragic loss of life. We have seen the worst scenario of people facing unusual struggles because of severe limitations on movements and social contacts. These disruptive events or other natural disasters or global pandemics which could be predictable or unpredictable, natural or man-made have extensive impacts on the performance of the transportation system. As these things are unavoidable, so we must be prepared with a proper mitigation and response plan, which would help to minimize the impact to some extent. Developing a more resilient mobility and logistics system demands keeping alternative ways in hand to get fast recovery. Like, along with high-capacity routes with few links, it must enable more connections and alternative routes. In the broadly categorized three main transformation modes:

land, water, and the air we can see a new trend of integration through intermodal and multimodal transportation into production and distribution activities.

Now, Bangladesh should take the necessary steps to utilize its assets and develop more resilient mobility and logistics systems for a better future. Only implementing the resilient mobility and logistics system will transform Bangladesh into a progressive nation. This study is policy research to provide some possible solutions for resilience and response to the impacts of COVID-19 on the transportation system of Bangladesh.

II. LITERATURE REVIEW:

The concept of efficient and resilient mobility and logistics systems is essential for promoting the economic development of a country. The transport system in Bangladesh comprises different modes of transportation such as Airlines, Airports, and Aviation, Highway Transportation, Rail Transportation, Maritime and Inland Waterway Transportation, Freight Transportation, Ports, Coastal Shipping, etc. Here we can see that only the public sector, which is mainly responsible for the development and maintenance of transport infrastructure in Bangladesh. Presently in Bangladesh, there is about 55,000 km of paved roads, 2877 route-kilometers (or 3600 km) of railways, 3800 km of perennial waterways which increases to about 6,000 km during the monsoon. There are 3 Seaports, 3 international and domestic Airports (i.e., Shah Amanat International Airport, Chittagong, Shahjalal International Airport, Dhaka, Osmani International Airport, Sylhet), 5 other domestic Airports and 5 STOL (Short Take-off and Landing) Airports, with one new domestic Airport under construction (Wikipedia, 2021). Estimates project that by 2030, 60% of the planet's population will live in cities, up from around 50% today. While studies on understanding and defining social resilience because of disruptive events started early in the 1970s period. But studies focusing on transportation system resilience began in the 1990s. While writing about the Resilience modeling concepts in transportation systems, the researchers Ahmed, S., and Dey, K., (2020) have also made some remarks about the improvement of the present situation and the development of sustainable transportation. They were very much specific about the resilience and the overall system performance due to the natural or man-made disaster impact. Again, in Smart Urban Planning mentioned by Mazzarino, M., and Rubini, L., (2019) identified more sustainable,

operationally efficient urban mobility solutions based on innovative business models to improve the accessibility and livability of urban remote areas. I also would like to mention that in -3 lessons in logistics for a more resilient global trading system by Lane, L., and Tanner, C. G., (2020), where they focused on stakeholders from every corner of the world in pursuit of a modern logistics system worthy of the collective challenges. And last but not least, the future of transport resilience by the authors Ho, C., and Lee, N., (2020) has identified five traits of resilience in the future transport system. Moreover, new approaches are being developed and will be implemented in the future to create transport resilience and this research will take it to the next level and create a real difference in the process. Further research on resilient mobility and logistics systems in the context of Bangladesh is very rare. That's the approach that has been adopted, and this study also tries to explore the prospects of the resilient mobility and logistics systems in Bangladesh and find solutions to the challenges which we are facing now. However, there is not much specific study conducted on the impact of resilient mobility and logistics systems, according to the Bangladesh perspective and here lies the importance of this study.

III. TRANSPORTATION STATISTICS:

3.1 Airlines, Airports, and Aviation

From World Development Indicators (WDI), we can see that in the year 2019, air transport freight for Bangladesh was about 86 million ton-km. In different reports we can see Bangladesh air transport freight fluctuated significantly in recent years. Significant changes in the numbers, especially decrease was seen through the 2000 - 2019 period, ending at 86 million ton-km in 2019 (Knoema, 2021). From 2008 to 2014 there is a bit fluctuation in the freight which is a rising one but after 2014 we can see a huge fall in the freight number and after that from 2015 to 2018 the freight remained stable and between 2018 to 2019 the freight number increased dramatically (Figure 01).

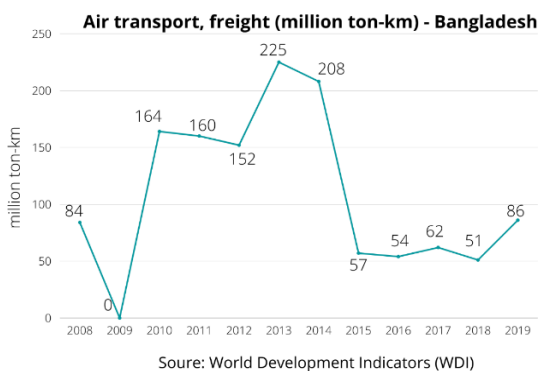


Figure 01: Bangladesh - Air transport freight

Again, according to WDI, in the year 2019, passengers carried by air transport for Bangladesh were 5.96 million. We can see a gradual increase in the number of passengers carried by air

transport of Bangladesh from 1.33 million in 2000 to 5.96 million in 2019, growing at an average annual rate of 9.11%, especially significant growth (Figure 02) is seen after 2009 till present (Knoema, 2021).

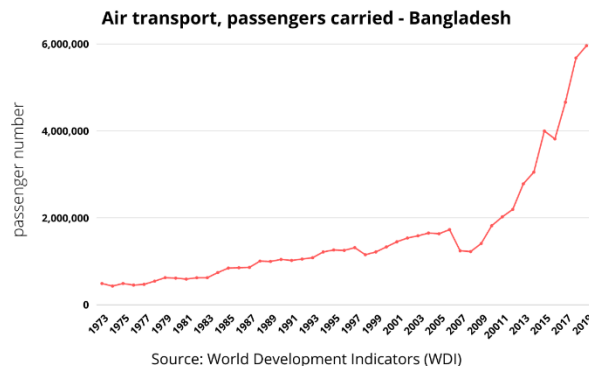


Figure 02: Bangladesh - Passengers carried by air transport

Then, as of WDI in the year 2019, air transport registered carrier departures for Bangladesh were 58,497. In different reports we can see that Bangladesh air transport registered carrier departures fluctuated significantly in recent years, significant changes in the numbers, more precisely increase (Figure 03) was seen through the 2000 - 2019 period, ending at 58,497 in 2019 (Knoema, 2021).

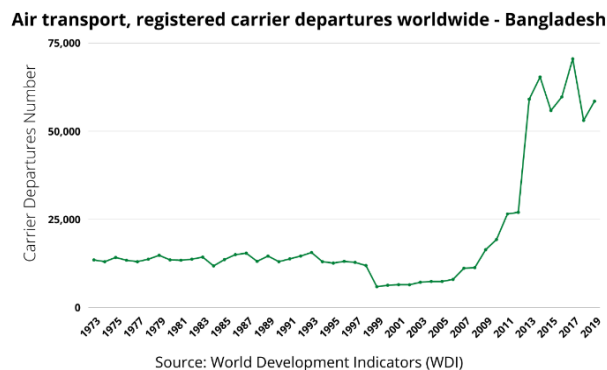


Figure 03: Bangladesh - Air transport registered carrier departures worldwide

3.2 Highway Transportation

There are more than 250,000 vehicles in Bangladesh (Wikipedia, 2021). Again, the country's population and infrastructure also exist and contribute to road transportation. Dhaka Transport Coordination Board started its journey in 1998. The government of Bangladesh commissioned an urban transport plan with the US consultant Louis Berger Group and Bangladesh Consultant Ltd (BCL). The comprehensive transport plan for Greater Dhaka City and its adjoining areas covered around 4,000 square km (Wikipedia, 2021). This plan consisted of 15 key policy issues, including safety, travel demand management, pedestrian preferences, public transport, non-motorized transport, and mass transit systems, and almost seventy policy recommendations were presented. 10 extensive transport strategies were assessed, using a paradigm of no BRT or metro service, and many alternatives were researched.

The accepted plan included roads, a Mass Rapid Transit (MRT), and a BRT of three-line. It included arrangements for fifty-four new roads in and around the city, 3-part elevated expressways, and a circular waterway program (Wikipedia, 2021). Our Prime Minister Sheikh Hasina inaugurated the highest road of Bangladesh, which is Thanchi-Alikadam Road in Bandarban District in a video conference from Dhaka in the year 2015. This road was constructed 2,500 feet (760 m) above sea level and was built under army supervision for 1.17 billion taka and is supporting education, healthcare, and development in the hill tracts (Wikipedia, 2021).

3.3 Rail Transportation

According to World Development Indicators (WDI), in the year 2016, passengers carried by railways for Bangladesh were 10,040 million passenger-km. We can see gradual increase in the numbers of passengers carried by railways of Bangladesh from 3,754 million passengers-km in 1996 to 10,040 million passenger-km in 2016, growing at an average annual rate of 5.62% (Knoema, 2021). Significant growth was seen after the year 2005.

Railways, passengers carried (million passenger -km) -Bangladesh

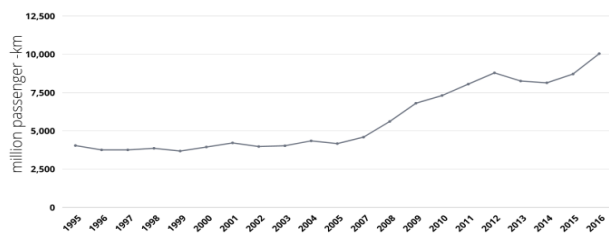


Figure 04: Bangladesh - Passengers carried by railways [Source: World Development Indicators (WDI)]

Table 01: Bangladesh – Passengers carried by railways

1	2	3
Date	Value	Change, %
2016	10040	15.26%
2015	8711	7.08%
2014	8135	-1.43%
2013	8253	-6.08%
2012	8787	9.13%
2011	8052	10.24%
2010	7304	7.40%
2009	6801	21.25%
2008	5609	22.31%
2007	4586	10.13%
2005	4164	-4.09%
2004	4342	

As of the WDI report, we can see that Bangladesh goods transported by railways were at the level of 1,053 million ton-km in 2016, up from 694 million ton-km the previous year; this is a change of 51.73% (Knoema, 2021). We can see a

dramatic shift from 2008 to 2013 as a downfall and then a sudden increase from 2013 to present was seen.

Railways, goods transported (million ton -km) - Bangladesh

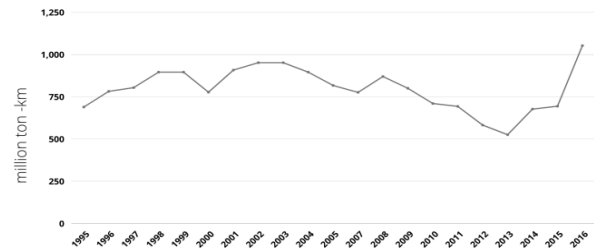


Figure 05: Bangladesh - Goods transported by railways [Source: World Development Indicators (WDI)]

Table 02: Bangladesh – Goods transported by railways

1	2	3
Date	Value	Change, %
2016	1053	51.73%
2015	694	2.51%
2014	677	28.95%
2013	525	-9.79%
2012	582	-16.02%
2011	693	-2.39%
2010	710	-11.25%
2009	800	-8.05%
2008	870	12.11%
2007	776	-5.02%
2005	817	-8.82%
2004	896	

3.4 Maritime and Inland Waterway Transportation

There is about 5,150–8,046km of navigable waterways that includes 2,575–3,058km of major cargo routes in Bangladesh. In the quarter before the aggression of Coronavirus, the per capita income in Bangladesh was assessed at USD 1909, while GDP growth was around 7.9% and climbing and the country successfully set its sails on an ambitious journey towards Vision 2041 for making a better, prosperous, and developed Bangladesh (Iqbal, M. K., 2021). By securing sustainable utilization of maritime potentials and possibilities, Bangladesh is expected to emerge as a developed country by 2041. At the same time, adequate implementation of SDG-2030 and Bangladesh Delta Plan 2100 and climate change resilience and resilient mobility and logistics systems will stand our country in good stead for future generations. Developments in all the important maritime sectors like ports & shipping, shipbuilding, ship recycling, oil & gas, marine fisheries & aquaculture, etc. while many initiatives are in the by-and-by related to dedicated freight corridors, energy hub, industrial growth belt, Floating Storage Regasification Unit and Special Economic Zones. According to the World Bank, the contribution of the blue economy to the economy of

Bangladesh in 2014-15 fiscal was 6.2 billion dollars, which is 3% of the total economy (Iqbal, M. K., 2021).

3.5 Transport & Storage (T & S) Sector impact on Gross Domestic Product of Bangladesh

Transport & Storage Sector plays a significant role in the economic development of Bangladesh by promoting internal and external trade, potential use of skilled labor-force, diversification of markets, creating mass employment, increase in production etc. From the BBS records we can see a steady growth of the impact of T&S sector on the GDP of Bangladesh since 2016-17 to 2019-20(p) FY is shown in table 03 below. We can also see a slight fall in the T&S sector share of GDP in this period (table 04). At the same time, when taking into account the T&S sector growth rate of GDP (table 05) we can see a fluctuation in the numbers. Analyzing the data, we can see the prospects of T&S sector and its impact on the GDP of Bangladesh. In the current scenario we understand the importance of resilience in T&S sector, to keep pace with this fast-growing world modernization and some key operational changes is also needed that will help this sector to grow and create greater impact on our GDP.

Table 03: Transport & Storage Sector impact on Gross Domestic Product of Bangladesh at Current Prices, 2016-17 to 2019-20(p) [Source: Bangladesh Bureau of Statistics (BBS)]

1	2	3	4	5
TRANSPORT & STORAGE	2016-17	2017-18	2018-19	2019-20
Land Transport	14,28,080	15,70,384	17,46,242	1,938,341
Water Transport	1,09,957	1,16,978	1,24,611	132,530
Air Transport	13,985	14,758	15,853	16,884
Support Transport Services Storage	87,074	97,055	1,06,499	115,708

Table 04: Transport & Storage Sector Share of GDP at Current Prices, 2016-17 to 2019-20(p) [Source: Bangladesh Bureau of Statistics (BBS)]

1	2	3	4	5
TRANSPORT & STORAGE	2016-17	2017-18	2018-19	2019-20
Land Transport	7.64	7.38	7.22	7.26
Water Transport	0.59	0.55	0.51	0.50
Air Transport	0.07	0.07	0.07	0.06
Support Transport Services Storage	0.47	0.46	0.44	0.43

Table 05: Transport & Storage Sector Growth Rate of GDP at Current Prices, 2016-17 to 2019-20(p) [Source: Bangladesh Bureau of Statistics (BBS)]

1	2	3	4	5
TRANSPORT & STORAGE	2016-17	2017-18	2018-19	2019-20
Land Transport	11.66	9.96	11.20	11.00
Water Transport	7.73	6.38	6.53	6.35
Air Transport	3.47	5.53	7.42	6.50
Support Transport Services Storage	8.43	11.46	9.73	8.65

IV. RESILIENT MOBILITY AND LOGISTICS SYSTEM:

A resilient mobility and logistics system can minimize the disaster impacts by maintaining the performance of system components and enabling the rapid restoration of the system. The resilience of transportation systems can be defined with 10 dimensions-

- (1) Redundancy (i.e., same functionality of several components),
- (2) Diversity (i.e., contrasting functionality),
- (3) Efficiency (i.e., demand and supply enhancement),
- (4) Component’s dependency (i.e., ability to operate separately),
- (5) Strength (i.e., ability to resist an event),
- (6) Stakeholder’s collaboration (i.e., information and resource sharing among different entities of the system),
- (7) Adaptability (i.e., flexibility in the system),
- (8) Mobility performance (reaching destinations within a fixed time),
- (9) Safety performance (i.e., less fatal), and
- (10) The ability to recover quickly (i.e., rapid restoration) (Ahmed, S., and Dey, K., 2020).

Now we can build this resilient mobility and logistics system in our own network by following some basic themes (The Resilience Shift 2020):

- At first, robustness is necessary to withstand hazard events, with the help of accurate data we can forecast and mitigate potential challenges in the future.
- Then redundancy with the spare capacity to accommodate disruption and helps to provide alternative routes for the mobility and logistics system.
- Next comes the flexibility to facilitate systems to change, evolve, and adapt to dynamic circumstances as of the situation we are facing now.
- Then responsiveness is needed to support data exchange allowing commuters to make more precise and informed decisions in any situation.
- Finally, coordination of systems is a must to facilitate consistent decision-making aligned to the desired outcomes which are needed.

Energy and Environment Protection, Efficient Freight Transportation, Infrastructure development are the most important topics for creating resilient mobility and logistics systems in the future.

V. PASSENGER TRAVEL AND FUTURE MOBILITY TRENDS

COVID-19 as a global pandemic has created a far-reaching impact on our mind, lifestyle, and living. It is not limited to any sector. In the case of resilient mobility and logistics systems, we have to analyze the key changes happening or predicted in passenger travel and future mobility trends. Some of them are described below (Audenhove, F. J. V., Rominger, G et. al, 2020):

Global:

- There might be a growth in Passenger demand
- Socio-economic inequality is a key factor

- E-commerce and other online marketing are on demand
- Transformation in City Topology is also a considerable factor

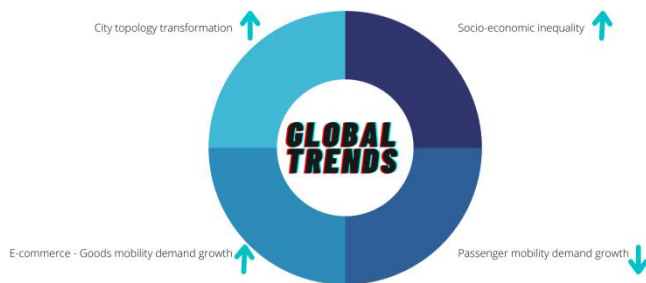


Figure 06(1): Impact of Covid on affected urban mobility trends.

Behavioral:

- Working from home trend
- A flexible working hour and working in comfort
- Travel safety consciousness in mind
- Healthier mobility and lifestyle in a change
- Re-spacing and rescheduling of trip patterns in future

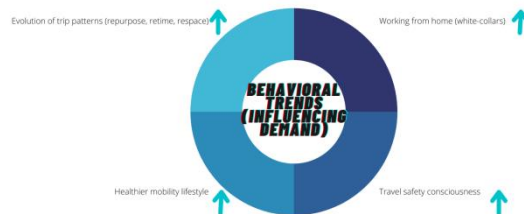


Figure 06(2): Impact of Covid on affected urban mobility trends.

Technology:

- Digitalization of offerings and works
- Acceptance of new forms of mobility as part of the transportation system
- Market consolidation of private mobility and logistics systems players
- Intelligent transport, mobility, and logistics systems

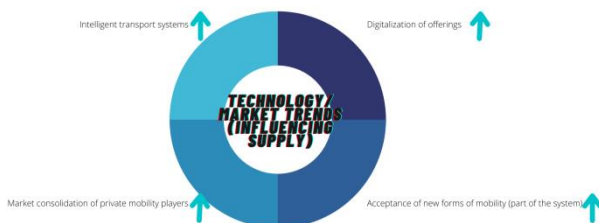


Figure 06(3): Impact of Covid on affected urban mobility trends.

VI. IMPACT OF COVID-19 ON GDP GROWTH RATE

According to the International Monetary Fund (IMF), while the real GDP growth of Bangladesh (Figure 07) remained consistently within 7-8% in the last 5 years, it is projected to decelerate to 3.8% in 2020 driven by falling readymade garment exports, contraction in foreign remittances, lower private investment growth and wider disruptions due to COVID-19. But we also need to be careful about the wide variance in the estimates of various financial institutions. The IMF predicts 3.8% GDP growth of Bangladesh in the current year (2021~2022), the World Bank’s prediction is 1.6%, ADB at 4.5%, and BBS at 5.24%. I want to mention that BBS predicts a rebound of our GDP growth at 8.2% in the 2020-21 financial year. Though the latest IMF report also indicates that it is expected to rebound close to 8% in the next 2-3 years but nothing will come automatically unless proper steps are taken by all concerned.

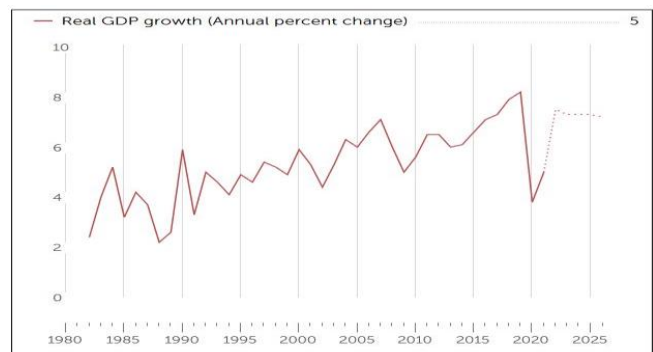


Figure 07: Real GDP Growth [Source: International Monetary Fund (IMF), 2020]

VII. TRANSPORTATION SAFETY

Moving cargo from one area to another, one country to another, or even one continent to another is a complex job consisting of multiple barriers, gateways, and legal restrictions throughout the process. We are taught many important lessons from this pandemic about redesigning an imperfect system, including changes to make global cargo transport networks more predictable and safer for us and others as well. It has also shown the importance of modernizing the border clearance process and implementing agreements to help promote economic recovery. Governments and international organizations should engage with the private sector to keep the flow of goods across borders faster and be prepared for the future or any other disruptions.

VIII. BANGLADESH – CO₂ EMISSIONS FROM TRANSPORT

Fossil CO₂ emissions from transport have been shown in Figure 08 and Table 06 below. It is found that in 2019, CO₂ emissions from transport for Bangladesh were 12 metric tons. We can see that, CO₂ emissions from the transport of Bangladesh increased from 0 metric tons in 1970 to 12 metric tons in 2019, growing at an average annual rate of 9.29%, which is a very alarming sign for us (Knoema, 2021).

Efficient and resilient mobility and logistics system connects people with economic development opportunities, moves goods faster and services better and in an improved manner, and gives access to essential services of better healthcare and education. Different countries invest about USD 1.4-2.1 trillion per year in total for transport infrastructure to meet the demand for mobility and connectivity around the world. The current scenario of transport shows Greenhouse gas (GHG) emissions from transport is about 23% of energy-associated emissions and is predicted to rise to 33% by 2050 (Knoema, 2021). We must work together to reduce transport-related GHG emissions and create resilient mobility and logistics systems for a better future.

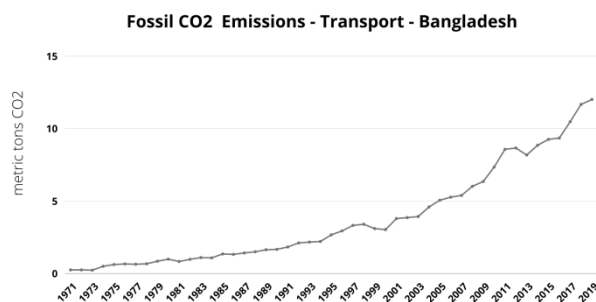


Figure 08: Bangladesh - CO2 emissions from transport [Source: Global GHG and CO2 Emissions]

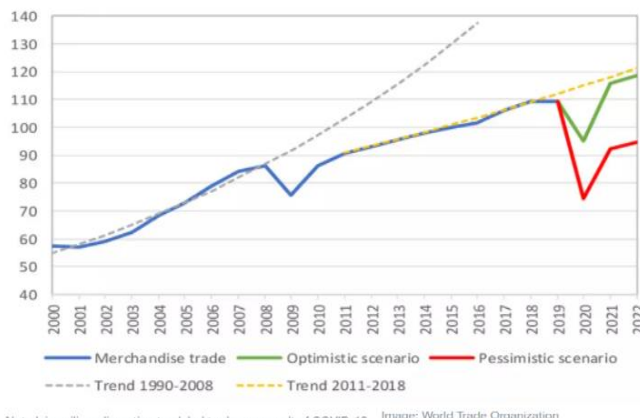
Table 06: Bangladesh – CO₂ emissions from transport

1	2	3
Date	Value	Change, %
2019	12.01	2.93%
2018	11.67	11.43%
2017	10.47	12.01%
2016	9.35	0.99%
2015	9.26	4.66%
2014	8.85	8.12%
2013	8.18	-5.53%
2012	8.66	1.06%
2011	8.57	16.52%
2010	7.35	15.78%
2009	6.35	5.45%
2008	6.02	

IX. TRANSPORTATION SYSTEM PERFORMANCE

Though the express delivery industry has proven resilient during the pandemic, it was not smooth sailing. Future policies for global supply chains, mobility, and logistics systems have to be more durable. Stakeholders and governments should work together to create a more efficient and resilient logistics system worthy of the collective challenges faced by the world now and in the future, including the challenges to the delivery of vaccines, and to help the world truly recover from the COVID-19 pandemic or any other disasters. According to World Trade Organization

(WTO), from the chart below (Figure 09) how the growth of global trade is disrupted because of the COVID-19 pandemic and for that both optimistic scenario and pessimistic scenario of merchandise trade shows the dramatic downfall.



Not plain sailing: disruption to global trade as a result of COVID-19 Image: World Trade Organization

Figure 09: Disruption to global trade as a result of COVID-19 [Source: World Trade Organization (WTO)]

X. RESILIENCE IN TRANSPORT AND LOGISTICS (MCKINSEY ANALYSIS)

During an experimental research McKinsey & Company analyzed the performance of around 1000 large and publicly traded companies through the 2007-2008 global recession. There they identified a subgroup of “resilient” organizations that outperformed their peers by a significant margin over the period. The performance of these companies overall dropped less during the recession and improved faster during the ensuing economic recovery. By 2017, resilient companies had delivered a cumulative total return to shareholders that was more than 150 percent higher than their non-resilient counterparts (Arora, S., Bohm, W., et al., 2020). Among the logistics and transportation players in the study, the gap was almost 267 percent (Arora, S., Bohm, W., et al., 2020). From this scenario we can surely assume the importance of resilience in any sector specially the transportation and logistics sector.

Resilient T&L players outperformed competitors throughout the last economic cycle.

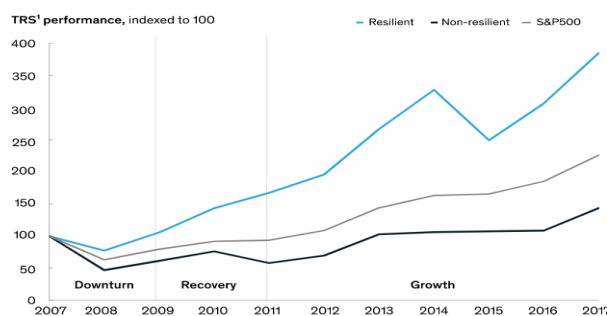


Figure 10: Resilience T & L players outperformed competitors throughout the last economic cycle [Source: CP Analytics; McKinsey Analysis, 2020]

*TRS=Total return to shareholders

*T&L=Transportation & Logistics

XI. PROPOSED SOLUTIONS

Apart from the above analysis of transportation, storage and logistics system, the following solutions are being proposed:

- Ensure that cargo airlines can build out efficient global networks and transport critical shipments faster. This is possible by removing constraints on air cargo movements and costly red tape which cause delays by creating inefficiencies and putting economic penalties on businesses.
- International gateways should use the right technology such as electronic records, e-payment, and digital risk management processes.
- Incorporate progressive regulations that help to transport life-saving shipments faster and reduce physical contact at border crossings.
- Stakeholders from every corner of the world are looking for a modern logistics system that will help to mitigate the current challenges we are facing now.
- Resilience in transport and logistics systems helps resilient companies move faster than others, selling off businesses and cutting costs through improvements to operational effectiveness.
- By applying data and advanced analytic methods such as machine learning, artificial intelligence, and robotics a broad range of workforce-management tasks such as demand forecasting, capacity planning, recruitment, daily scheduling, and task allocation and performance management can easily be accomplished.
- The development of robust modeling, simulation, and analytics help to tackle complex network-optimization problems through identifying bottlenecks, evaluating multiple alternative configurations, and rapidly stress-test the designs against a wide range of scenarios.
- In the maritime and inland waterway transportation (IWT) adjustment of feeder connections is mandatory. There should be a review of port calls with low yield and replacement of expensive transshipment cargo with more attractive alternative cargo. By using advanced analytics that shows the expected revenue loss, cost savings, and potential revenue-recovery probabilities for each possible intervention across all ship systems and cargo flows authorities can make the proper changes.
- Transport modes should be more sustainable with green alternatives and the exact incentives put in place to keep the pace of the transition. There should be zero-emission cars, cities must be climate neutral, developing high-speed rail traffic, and carbon-neutral travel. Automated mobility and use of artificial intelligence (AI) and robotics should be deployed on a large scale. Technologies must be developed to invent zero-emission marine vessels, zero-emission large aircraft, a fully operational, multimodal Transport Network for sustainable and smart transport with high-speed connectivity.
- Develop a unified long-term mobility vision. They should implement system-level regulation, adopt system-level execution planning and revise the mobility funding equation. So, there should be a unified mobility management model.
- Governments and other public and private organizations should collaborate on technology development and implementation. They should also collaborate on innovative business models and promote innovation schemes, competitions, and projects.
- Governments and other public and private organizations should drive the latest technology innovations, including increased demand, supply chain complexity, longer and shorter supply chains, multi-leg shipments, rapid-fire replenishment, final mile, and the overall trend of urbanization.
- Governments and other public and private organizations should implement smart mobility to enhance both the protection and performance of transportation, balanced with improved environmental sustainability

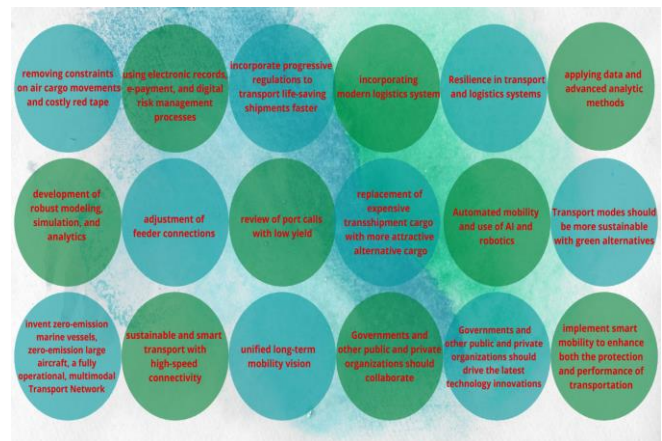


Figure 11: Proposed solutions overview diagram [Developed by Authors]

XII. CONCLUSIONS

The study concludes that efficient management and effective utilization of mobility and logistics systems and making it more resilient may help promote Bangladesh into a developed country even before the stipulated time. However, there are scopes for further research to make a detailed account of the prospects of 'Resilient Mobility and Logistics Systems' in the development of the Bangladeshi Economy. Bangladesh has enormous potential to enrich its economy with a sustainable and resilient transportation system. So, it is time to focus on resilient mobility and logistics systems for a better Bangladesh. Our government should also go ahead with government and non-government joint investments to develop a unified long-term mobility vision. If Bangladesh can utilize its resources and implement system-level regulation, adopt system-level execution planning and revise the mobility funding equation then it can achieve the desired goal.

However, there are too many challenges, also, which might appear as hindrances to it. So, the prospect of implementation of 'Resilient Mobility and Logistics Systems' is a daunting prospect.

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