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Transport in the 2030 Agenda for Sustainable Development

Transport and the Sustainable Development Goals

Summary

The Sustainable Development Goals (SDGs), adopted by the United Nations pursuant to General Assembly resolution 70/1 of 25 September 2015, present a general framework for development until 2030. Transport is not a stand-alone goal under the 17 SDGs but its issues are evident across several SDGs, because they are relevant to many economic and social activities and play a key role in development.

This report presents the SDGs related to transport issues and examines the mutual effects between transport systems and several SDGs in the Arab countries. It also reviews the so-called “systems approach” as a comprehensive conceptual framework for analysing transport aspect and issues, which highlights the interrelationships between the components of a transport system’s general environment, the elements of this system and the outcomes of its work. The document further sets out general principles for incorporating the SDGs in transport strategies on the basis of the 2030 Agenda for Sustainable Development.

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I. INTRODUCTION

1. The United Nations adopted the 17 Sustainable Development Goals (SDGs) pursuant to General Assembly resolution 70/1 of 25 September 2015.¹ They officially came into effect on 1 January 2016. The SDGs present a general framework for development until 2030.
2. Transport is not a stand-alone goal under the SDGs, but its issues directly and indirectly affect eight SDGs and influences the others in some way, given its key role in meeting economic and social needs.²
3. The present document aims to provide a preliminary conception on the incorporation of SDGs in transport-related strategies, with a view to discussing it at the seventeenth session of the Committee on Transport and Logistics as a conceptual framework for presenting countries' various experiences in this field.
4. The document presents the systems approach as a comprehensive conceptual framework for considering interrelated transport issues, given that it gives a comprehensive perspective of transport issues that takes into account the common impact of transport system component and the surrounding environment in all its dimensions: geographical, socioeconomic, legislative, administrative, technological and political.
5. It focuses on eight SDGs because of their direct and indirect linkages to transport systems. It extensively considers the features of transport systems, starting from its functions within an inclusive environment with all the above dimensions, and its links to the SDGs.
6. The document also sets out a number of general principles to employ the SDGs in tackling issues related to the transport sector in Arab countries.

II. SYSTEMS APPROACH AS A CONCEPTUAL FRAMEWORK FOR TRANSPORT

7. The systems approach is considered as the most appropriate conceptual framework for understanding the transport sector, with its multiple levels and complex interrelationships between its components, given its importance in achieving numerous social and economic activities.
8. The systems approach was developed by the Austrian biologist Ludwig von Bertalanffy as a general approach to understanding complex phenomena consisting of interrelated elements, so as to depict the system as a specific entity with set functions within its environment.³
9. Applications for the systems approach were developed following several consecutive intellectual contributions,⁴ resulting in a better understanding of the transport sector. Reichman's multilevel schematic representation is considered the clearest conceptual framework for representing a transport system and its internal and external interrelations (figure 1).⁵

¹ Available from www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/.

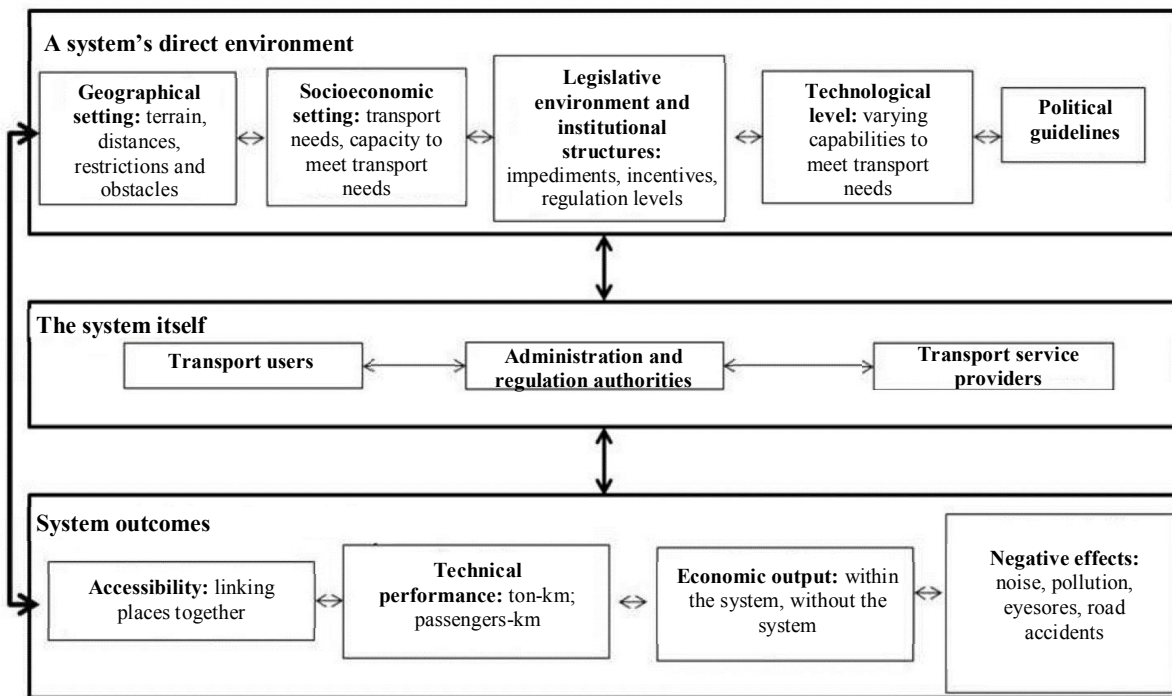
² United Nations (2015). Transport for Sustainable Development: The Case of Inland Transport. New York - Geneva, p. 196.

³ Bertalanffy L. V. (1968). General System Theory. New York; George Braziller. Théorie Générale des Systèmes. Paris. Dunod.

⁴ Frybourg 1974, Manheim 1977, Chadwick 1978, Reichman 1983, Genton 1985, Dupuy 1988, Ortuzar and Willumsen 1994, Banister and Berechman 2000, Banks 2002, Khisty and Lall 2003, Lowe 2005, Baluch 2006.

⁵ Reichman S. (1983). Les Transports: Servitudes ou Liberté. PUF, Paris.

Figure 1. Reichman’s schematic representation of a transport system



10. The schematic representation in figure 1 shows starts from the direct environment of any transport system, and includes several components that determine the transport system’s features through the nature of the resources available for it to complete its functions and the restrictions and obstacles that impede its performance.

11. The principal direct environment component is the natural geographical setting, which determines the nature of the distances that must be crossed using various transport methods, and the areas of land that can be allocated to transport infrastructure, and the terrain and natural barriers facing the movement of people and goods, such as seas, rivers, lakes, valleys, mountains and deserts. These natural features vary between and within countries. The geographical setting determines the capabilities for conducting transport activities, according to various natural resources provided by the geographical setting.

12. Reichman considers the social and economic setting to be the second most important element to determine transport needs, which vary between countries according to gross domestic product (GDP), GDP per capita, the nature and strength of economic activities and their concentration in the agricultural or industrial sector. Population pyramids and social growth rates create major differences in transport needs between countries.

13. The legislative environment and the institutional structure constitute the third element of the direct environment components. This element provides that capacity to regulate the system’s performance, influences the challenges raised by market forces, and determines the incentives for developing the system and improve its services.

14. A transport sector is affected by a country’s technology level, which highlights differences between developed countries that have high-yielding technological capabilities to implement and manage the infrastructure of various transport facilities, such as tunnels, bridges and intelligent transportation systems, on the one hand, and developing countries that that have not reached the required levels of technological

development or whose development priorities prohibit them from benefiting from such productive technologies, on the other.

15. Reichman also shows the effect of political orientations in a country on patterns to tackle transport issues, which are affected by the prioritization of social and economic aspects and prevailing economic trends, such as complete or partial economic liberalization or tightening protectionist measures to achieve specific development goals in the medium and long term.

16. After reviewing the elements of a system's direct environment and their effects on determining transport needs, and the challenges and obstacles facing their fulfilment, Reichman considers the three elements that constitute a transport system: passengers, carriers, and administration and regulation authorities. Passengers are the principal element in any transport system. They are the people who require transport to undertake social and economic activities or to move all types of goods for exchange in society. In general, passengers wish to be transported at a time of their choosing, at the greatest speed, for the lowest cost, in the highest security and comfort, and for the least effort possible. Transport services are usually offered by carriers using available infrastructure and facilities, to secure the greatest possible profit. Under this framework, the required quality of transport services is not achieved in most cases by simply relying on market competition. As such, administration and regulation authorities are needed to ensure a balance between the opposing interests of passengers and carriers, by determining transport specifications and standards that guarantee the numerous conditions of comfort, safety and security, and by developing a set definition of transport in various cases, especially those related to the transport of passengers within cities.

17. After explaining the elements that constitute the transport system, figure 1 shows the system outcomes in four categories: three of them are positive outcomes and one is a negative outcome.

18. The first positive outcome of a transport system is linking different places through the system's accessibility, which represents its essence and principal function. Linking places ensures social communication and economic exchange, which people invariably cannot live without. Transport systems link between places using infrastructure known as networks, which are lines that intersect at points. These lines represent streets within cities and roads between cities, railway lines that intersect at various stations, airlines for civil aviation, and maritime shipping lines especially containerization. In addition to the connections between the points in a network through its various lines, some points link between various transport methods: airports connect roads to airlines; multi-modal transport terminals at seaports link maritime transport to road transport via roads or railways; and the vital connections through train stations between railway transport and road transport using peripheral roads to take people and goods to their final destination, and vice versa.

19. Linking places through transport systems results in traffic flows through the various section of a transport network, which Reichman calls "technical performance". It is measured by kilometres for passengers and goods (million passenger-km and million tons-km). The volume of traffic on network sections increases with time, in line with population and economic growth. When traffic flows reach a certain level of the network sections' design capacity, they result in traffic jams throughout the day all week, causing a drop in user comfort and a waste of their time. This calls for a capacity increase by improving the efficiency of existing sections and building new sections, within geographically imposed restrictions on land use for transport networks. Good long-term planning provides suitable solutions to continue meeting increasing transport needs in network sections, by balancing between the expected development of these needs, available resources, and various restrictions on land use.

20. The third positive outcome of transport system performance relates to economic production. Economic activities increase added value and GDP, either within the transport sector from carrier economic activity or through the transport sector's contribution to achieving other economic activities, such as agriculture and industry. These activities cannot be completed without the transport sector, especially the transport of agricultural goods that are ready for consumption and raw materials for factories, and the transport of manufactured goods to various outlets.

21. In addition to the three positive outcomes of the transport sector, varied transport activities cause several nuisances with negative effects on public health and the environment. A principal detrimental effect is road accidents, which cause the death of around 1.2 million people annually worldwide, in addition to numerous injuries that affect around 50 million other people.⁶ A second negative side effect of transport is the environmental pollution it causes, especially air pollution from emissions from the near-total dependence on fossil fuel derivatives (petrol and gas). Sound pollution is the third factor, resulting from road traffic in cities and around motorways. The fourth negative impact is the eyesores in public places caused by some transport infrastructure, such as large road bridges and railway overpasses within a city.

22. The schematic representation in figure 1 highlights the relationships between the various elements of the system, the mutual effects between the system and its environment, and the role of these relationships and effects in determining the development features of the system. The following paragraphs set out illustrative examples.

23. There are reciprocal effects between the elements that constitute a transport system's direct environment. The geographical setting, with its natural resources, affects social and economic growth in a country in numerous ways and, in turn, impacts the maturity of the legislative environment and institutional structure. The temporary nature of these circumstances, which can change overtime through internal or external factors, such as significant changes in climate, large agricultural epidemics that have historically resulted in mass migration to more inhabitable places, and the resulting comprehensive changes in social and demographic structures. However, technology plays a significant role in strengthening human control over nature at all levels. Traditional geographic barriers, such as rivers and seas, have been overcome through maritime innovations, whose technological progress has transformed traditional obstacles into channels for maritime transport, which remains the cheapest transport mode for large volumes and is not influenced by the element of time. History is littered with examples of the role played by innovation and progress in the fundamental transformations of transport systems, causing sustainable changes in the nature of human life and economic activities, such as the invention of the wheel, oar, sail, compass, steam engine diesel engine, containers, global positioning systems and the package of technological innovations accompanying the current information and communications revolution. Political will is likely to play a role in developing transport systems, by taking critical decisions to strengthen infrastructure, seaports, logistical terminals, or formulating strategical policies with proactive visions that open new horizons in the field of transport and positively impact economic activities within a society, such as legislative and institutional reforms that facilitate new and innovative activities.

24. While the form and performance of a transport system depend on direct environmental factors, the mutual effects between a transport system's elements determine the nature of its performance and outcomes within a set period. It is necessary to differentiate between the effects of the environment on the system, which can be direct and swift, and the effects of the system on the environment, whose manifestation is usually delayed for several years. Continual progress in transport systems is apparent in the move from stability to instability. This move can happen gradually or through progressive leaps that represent key junctures in long-term progress. These leaps mirror changes in the interim balances of system-regulating factors, which could result from the establishment of new infrastructure, such as a railway line between two areas, or the implementation of a new transport mode following a technological development, such as high-speed trains, or a legislative amendment allowing the private sector to enter the aviation industry, for example. A transport system transformation can be caused by an increase in a system's negative effects, as the need to counteract them. These include the tragic death toll from road accidents or the grave long-term effects on the atmosphere of steady increases in carbon dioxide emissions, and their resulting economic losses worldwide.

⁶ World Health Organization (WHO) (2015). Global Status Report on Road Safety 2015. Geneva. WHO Document Production Services, p. vii.

III. SUSTAINABLE DEVELOPMENT GOALS RELATED TO TRANSPORT ISSUES

25. According to the 1986 United Nations Declaration on the Right to Development, development is “an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized”.

26. The definition of sustainable development is taken from the 1987 report by the United Nations World Commission on Environment and Development: sustainable development meets the needs of current generations without affecting future generations’ capacity to meet their needs.

27. The comprehensive definition of development, under its general framework, is in line with the conceptual framework of transport systems as set out in the previous section, which notes the need to take all reciprocal effects between the environment and the system and its outcomes into consideration when tackling transport challenges and developing necessary development plans.

28. The United Nations adopted the 17 SDGs pursuant to General Assembly resolution 70/1 of 25 September 2015. They officially came into effect on 1 January 2016.

29. Although the SDGs are not legally binding, countries are expected to take ownership and develop national frameworks for their achievement. Countries are therefore primarily responsible for following and reviewing progress, by gathering easily accessible qualitative data when needed to conduct national analyses that facilitate follow-up and review processes at the regional and global levels.

30. The 2030 Agenda for Sustainable Development sets out 17 SDGs, eight of which directly or indirectly address transport issues, as follows:⁷

Goal 3: Ensure healthy lives and promote well-being for all at all ages. Target 3.6 aims to halve the number of global deaths and injuries from road traffic accidents by 2020, in line with the Brasilia Declaration issued at the Second Global High-Level Conference on Road Safety, held by the United Nations on 18 and 19 November 2015 under the Global Plan for the Decade of Action for Road Safety 2011-2020.

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. Target 7.2 aims to increase substantially the share of renewable energy in the global energy mix by 2030. Target 7.3 seeks to enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology by 2030. Both targets directly affect the transport sector given its high energy consumption at the local, national and global levels.

Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all. This Goal’s targets apply to the transport sector given its direct and indirect contribution to economic growth (target 8.1), to providing employment opportunities through employment-intensive investments of workers in small and medium enterprises (target 8.3), and to promote sustainable tourism (target 8.9).

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. Transport infrastructure is a key component of a country’s overall infrastructure, generally requiring natural monopoly to ensure peace economics. Transport plays an obvious role in achieving target 9.1 on developing quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. Investment in transport services, such as taxis, minibuses, passenger buses and freight lorries, is a cornerstone of medium-sized projects called for in target 9.3 to increase their integration into value chains and markets. Target 9.4 aims to upgrade infrastructure by 2030.

⁷ Available from www.un.org/sustainabledevelopment/.

Goal 10: Reduce inequality within and among countries. Transport plays a vital role in achieving this Goal through target 10.2 on empowering and promoting the social, economic and political inclusion of all by 2030, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status. Such inclusion is not possible without empowering all citizens to adequately travel to school and work or to participate in social and political activities.

Goal 11: Make cities inclusive, safe, resilient and sustainable. Target 11.2 clearly states the need to provide access to safe, affordable, accessible and sustainable transport systems for all by 2030, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

Goal 13: Take urgent action to combat climate change and its impacts. Target 13.2 notes the need to integrate climate change measures into national policies, strategies and planning. A large portion of these measures are linked to reducing transport emissions within and around urban areas.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources. Sea transport is addressed in target 14.1 on preventing and significantly reducing marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution by 2025. Sea transport is considered a principal source of marine pollution in general and as a result of shipwrecks, especially when boats sink close to the shore.

IV. MUTUAL EFFECTS BETWEEN TRANSPORT AND THE SUSTAINABLE DEVELOPMENT GOALS IN ARAB COUNTRIES

31. Achieving sustainable development requires transforming the 2030 Agenda for Sustainable Development into a tool for national planning and action so as to achieve the SDGs through the following:⁸

- (a) Understanding the Agenda and its long-term vision;
- (b) Determining goals related to it;
- (c) Reproducing it in the form of national development plans.

32. In late 2015, the United Nations published a special report on transport and sustainable development, focusing on transport within countries, including water transport.⁹ The report identifies the following six features of internal transport that ensure sustainable transport:

- (a) Accessibility;
- (b) Affordability;
- (c) Technical performance;
- (d) Economic production;
- (e) Transport safety;
- (f) Energy use and effects on the environment.

33. The report also covers the relationship between these features and five SDGs reviewed in the section above (Goals 3, 7, 9, 11 and 13), and sets out some indicators for measuring the targets related to the implementation of these Goals.¹⁰

34. Using the conceptual framework for a comprehensive transport system presented above, the present study extensively considers the key features of a transport's systems performance in general, taking into

⁸ الإسكوا، 2016، تحويل عالماً: خطة التنمية المستدامة لعام 2030 - من الاتساق المفهومي إلى التنفيذ التشاركي، المنتدى العربي للتنمية المستدامة، عمان، 29-30 أيار/مايو 2016.

⁹ United Nations (2015). Transport for Sustainable Development: The Case of Inland Transport. New York- Geneva. P. 255.

¹⁰ Ibid, p. 195.

account the broad understanding of ‘transport system’ to include all modes (road, sea and air) and levels (international, national, regional and urban-rural). The study also examines the relationship between these features and the above-mentioned eight SDGs, and proposes some indicators to clarify the role of transport from an SDG perspective.

A. ACCESSIBILITY

35. Accessibility is a key feature of a transport system, achieved through network linkages between different places via sets of lines represented by streets, roads, railway lines, airlines and shipping lines, which intersect at points known as hubs (railway stations, airports or ports). Accessibility increases when transport costs between points decrease.¹¹ Accessibility is linked to SDGs 9, 10 and 11. Progress in their achievement can be measured using the following indicators:

- (a) The concentration of public roads and railway lines compared with a country’s size and population;
- (b) Road network coverage in populated areas, by measuring number of populated areas and their population in area no farther than 10km from a roadway;¹²
- (c) Within cities: the number of people who live no farther than 0.5km from a public transport terminal with buses passing every 20 minutes or less;¹³
- (d) External passenger connections: number of international airports in a country and the number of routes with regular flights (at least once a week);
- (e) External connections for goods: the Linear Shipping Connectivity Index, or the efficiency and reliability of border crossings by measuring how long containers remain in a port and how long lorries and goods wait at border crossings as a percentage of the overall journey time. In general, progress in accessibility can be measured using the Logistic Performance Index.

36. Challenges facing sustainable transport from an accessibility perspective is the establishment of various transport networks in an integrated manner, to ensure the best possible coverage within a country, in line with current and forecast population distributions, to ensure balanced development between all areas in a country. However, there is a limited area of land that can be allocated to transport networks, given the need to use land for other activities, such as housing, agriculture and industry.

B. AFFORDABILITY

37. Affordability is people and societies’ financial capacity to adequately use transport services without affecting their ability to meet their other needs, such as food, housing, education and health.¹⁴ Affordability can be measured using the following indicators:

- (a) Distribution of carriers (one carrier for every 1,000 people) and passenger vehicles as a percentage of the total number of vehicles;
- (b) Expenditure on transport as a percentage of total household expenditure;
- (c) Daily usage rate of various passenger vehicle by persons and households.

¹¹ Khisty C. J., Lall B.K. (2003). *Transportation Engineering: An Introduction*. Prentice Hall, New Jersey. P. 68.

¹² Quinet E. (1990). *Analyse Economique des Transport*. PUF, Paris. P. 249.

¹³ United Nations, 2015, p. 195.

¹⁴ *Ibid*, p. 63.

38. Affordability is closely linked to income levels and transport costs.¹⁵ Affordability is related to SDGs 9, 10 and 11. The most prominent challenge in this area is the availability of infrastructure to facilitate public transport, focusing on work-related transport, without transport costs surpassing a given percentage of individual and household income, especially among underprivileged social groups.

C. TECHNICAL PERFORMANCE

39. The technical performance of transport systems is measured by the annual number of people who travel using various methods of public transport (passengers-km), and the volume of goods transported annually (ton-km).

40. Technical performance is linked to SDGs 7, 9 and 11. The challenge in this area is to manage increased demand for passenger and goods transport, in line with economic and social growth, without increasing the undesired effects of this growth on the transport system, such as increased fossil fuel consumption and air pollution. The most effective solution is to establish public transport modes that use renewable sources of energy.

41. The Dutch researcher S. Oppe claims that annual changes in the total number of kilometres travelled by transport vehicles in a country can be represented using a logistic growth curve (S-shaped curve). The same curve is used to explain changes in the distribution of household goods in society. After a period of swift increases in the number of kilometres travelled, the rate begins to slow reaching a satiation level in the number of kilometres travelled by transport vehicles. Oppe states that the satiation level and the year it is reached vary between countries, according to geographical, economic and demographic features, noting that an increase in the length and spread of traffic jams are indicators that a country is nearing its satiation point in terms of the number of kilometres travelled by transport vehicles.¹⁶

D. ECONOMIC PRODUCTION

42. The transport sector results in economic production and significantly contributes to a country's GDP. Transport costs are included in the final price of an agricultural or manufactured product, in accordance with the series of transport processes necessary for its production and transfer to outlets. In many cases, transport and logistics cost margins determine a product's competitive advantages in domestic and global markets. The scientific literature states that investment in transport infrastructure stimulates overall economic growth at the national level, and achieves economic development in areas benefiting from this infrastructure, without identifying specific growth levels as a result of investments in transport.¹⁷ The literature also shows that this effect is relatively weaker in developed countries with mature transport networks, compared with least developed countries that lack infrastructure for various transport networks.¹⁸

43. The economic and social effects of transport can be measured using the following indicators:

- (a) The contribution of transport to GDP;
- (b) Increase in GDP following investments in transport. There is generally a delay in the appearance of this increase, and its relative impact varies between developing countries and those with mature transport networks;
- (c) The number of workers employed directly or indirectly in the transport sector.

¹⁵ Ibid, p. 76.

¹⁶ Oppe S. (1989). *Macroscopic Models for Traffic and Traffic Safety. Accidents Analysis and Prevention*. Vol. 21, No. 3, pp. 225-232.

¹⁷ Banister D., Berechman J. (2000). *Transport Investment and Economic Development*. UCL Press, Taylor & Francis Group. P. 20.

¹⁸ Ibid, p. 23.

44. The contribution of transport to GDP relates to SDGs 8, 9 and 10. The greatest challenge lies in securing an effective contribution to GDP, while ensuring that this contribution does not surpass a set level that would make transport costs a development burden. There is an optimal level of transport contributions to GDP in any economy, varying between countries in line with spatial and temporal conditions. Surpassing this optimal level results in the transport sector losing its efficiency. The transport sector's economic contribution reduces inequality within and between countries. Future transport infrastructure contributes to launching new economic activities and new channels for economic exchange between countries. Rail connections between the eastern Mediterranean and Gulf countries via Jordan, and between Maghreb and sub-Saharan countries might launch rock and sand industries, with the capacity of transporting products by rail then by sea to Europe. It may also promote the production of agricultural crops and related products on coastal agricultural land, which can be efficiently and affordably transported to countries with weak agriculture.

E. TRANSPORT SAFETY

45. The principal negative aspect of transport systems is accidents that lead to fatalities and injuries of varying degrees, some of which can result in permanent disabilities and material damage to private property.

46. Although accidents happen in all transport modes without exception (land, air and sea), special focus is given to road accidents given the large number of victims compared with other modes (over 1.2 million deaths and 5 million injuries annually).¹⁹

47. Road safety can be measured using the following indicators:

- (a) Total number of deaths and injuries from road accidents;
- (b) Number of deaths for every 100,000 persons;
- (c) Number of deaths for every million kilometres travelled using road vehicles.

48. Road safety is linked to SDGs 3 and 11. The key challenge lies in halving the number of fatalities and injuries from road accidents by 2020, by implementing the measures set out in the following five areas under the Global Plan for the Decade of Action for Road Safety 2011-2020 prepared by the World Health Organization.²⁰

- (a) Road safety management;
- (b) Safer roads and mobility;
- (c) Safer vehicles;
- (d) Safer road users;
- (e) Post crash response.

F. EFFECTS ON THE ENVIRONMENT

49. Transport systems threaten global energy sources given its huge energy consumption. The transport sector constituted 27.9 per cent of total energy consumption worldwide in 2012, and 55 per cent of all liquid energy in the same year. Consumption is expected to increase in the future.²¹

50. The transport sector heavily relies on unrenovable energy from fossil fuels (oil derivatives). It therefore greatly contributes to the spread of air polluting emissions, such as carbon dioxide, nitrogen and sulphur, as well as nefarious gases.

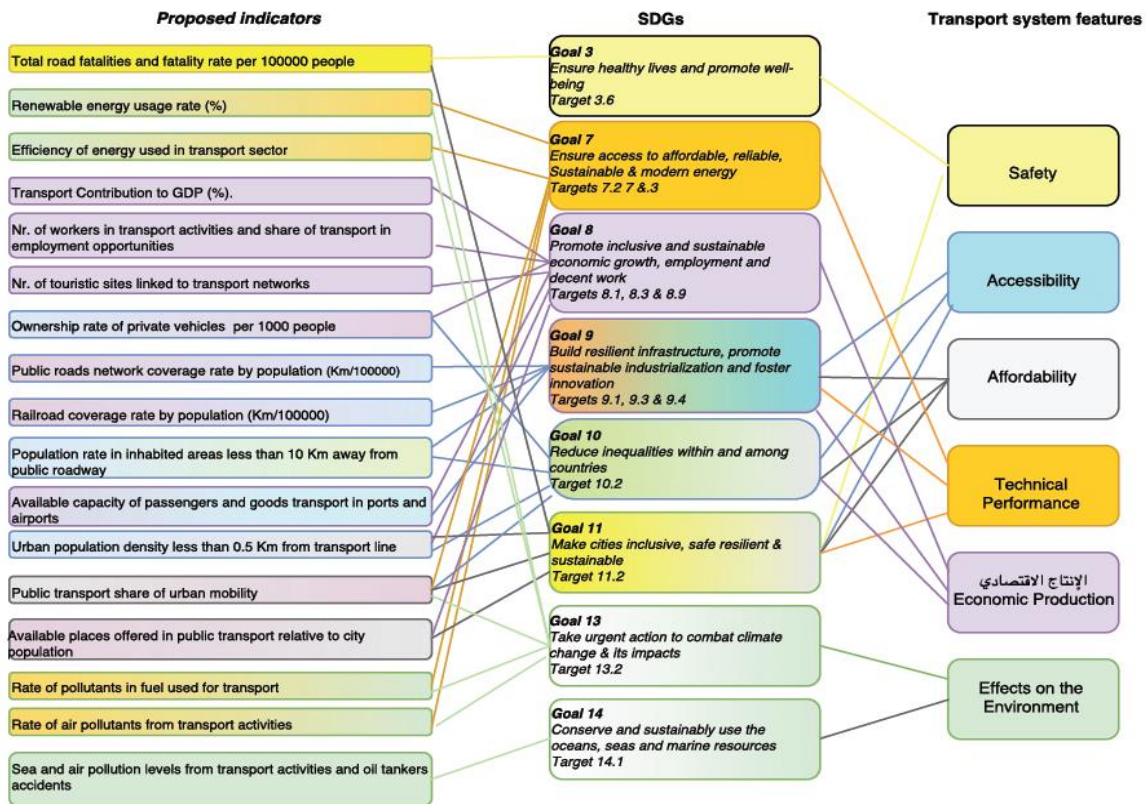
¹⁹ World Health Organization, 2015.

²⁰ World Health Organization (2011). Global Plan for the Decade of Action for Road Safety 2011-2020, p. 11.

²¹ United Nations, 2015, p. 139.

51. The effects of transport on energy and the environment can be measured using the following indicators:
- (a) The amount of unrenueable energy used annually by various transport modes;
 - (b) The level of polluting components in the fuels used to power vehicles;
 - (c) The level of various gaseous pollutants emitted from vehicle engines;
 - (d) The level of oil pollutants leaked from oil carriers and ship engines, and the coastal pollution levels caused by ship accidents.
52. Sudden environmental changes, such as torrential rains and floods, affect transport infrastructure and facilities, causing severe damage that may temporality or permanently disrupt transport services.
53. The effects of transport systems on the environment are linked to SDGs 13 and 14. The main challenge lies in continuing transport activities related to economic and social development, while reducing their negative impact to the minimum. This can be achieved through various methods for improving energy efficiency in the transport of goods and passengers, by encouraging the use of public transport, especially in cities, promoting the use of intelligent transport systems, increasing the role of transport modes powered by renewable energy, such as solar and wind power, and improving the efficiency and energy output of transport engines.
54. Figure 2 the complex relationships between the features of transport system performance, the SDGs and indicators that combine these features and the SDGs.

Figure 2. Relationships between the features of a transport system, SDGs and measurement indicators



V. GENERAL PRINCIPLES FOR INCORPORATING THE SUSTAINABLE DEVELOPMENT GOALS IN TRANSPORT STRATEGIES

55. The conceptual framework for transport systems shows the extent to which a transport system is affected by the five components of its environment: geographical, socioeconomical, legislative and institutional, technological, and political. Given the large disparity in the features of these five components between Arab countries, no standardized tailor-made approach exists for addressing the SDGs, including those related to transport. Addressing the SDGs is affected by the interim conditions of a country, linked to its interim development priorities and the nature of resources available to achieve these priorities.

56. As such, the first step of authorities responsible for developing and managing various transport systems to achieve the SDGs must be to closely analyse the components of the system's environment, the process that led to it, and the key features of its performance: accessibility, affordability, technical performance, economic production, transport safety, and the effects on the environment.

57. Following this close analysis, the traditional approach to planning should be adopted, with the temporal and spatial dimensions set out in figure 3.

Figure 3. Spatial and temporal dimensions of traditional transport planning

Temporal Dimensions of planning			Spatial Dimensions of planning	
مدى بعيد Long Term سنة (15-10)	مدى متوسط Medium Term سنة (5-3)	مدى قصير Short Term سنة (1-صفر)		
				National وطني
				Regional جهوي
			Local محلي	

58. Successful planning goes hand in hand with formulating development visions, in the form of long-term strategies, from which interim plans can be drawn that are implemented in the medium term, which, in turn, are distributed over short-term action plans impended using annual investment budgets. These strategies and plans are guided by development policies, using the general principles of decision-making, and present a general framework for selecting and evaluating proposals and activities.

59. Consequently, a country can direct transport development strategies and plans in accordance with the priorities highlighted in the detailed analysis of the current situation and of transport's role in achieving economic and social development goals. The SDGs are incorporated into the strategic and interim goals, in line with country specificities and extant development visions.

60. To ensure the greatest degree of success for these policies, strategies and plans, it is necessary to start from the following rules and principles.

A. COMPREHENSIVENESS

61. The conceptual framework of transport systems gives a comprehensive view of the mutual effects between the system's components, outcomes and direct environment.

62. Departing from the principle that "all is affected by all" set out by the conceptual framework allows for the development of hypotheses on the causal relationships between agreed transport infrastructure developments and accompanying administrative and regulative policies and the outcomes of these developments in the short, medium and long terms.

63. This comprehensive view highlights the positive and negative effects of the changes underway on all the actors involved in completing the system's functions, forecasts the potential attitudes of these actors, and identifies suitable solution for comprehensively dealing with them, without overlooking any of them.

B. INTEGRATION

64. After understanding the contribution of the numerous actors to completing transport functions, and adopting a comprehensive view in dealing with the system, it is then possible to achieve integration between the numerous functions performed by various transport modes and apply multi-modal transport principles. Developing a comprehensive view of the economic, social and environmental role of the transport system enhances the benefits gained from the relative features of each mode in performing parts of an overall function in a way that ensures maximum efficiency and effectiveness in the use of available resources, and minimum negative environmental effects.

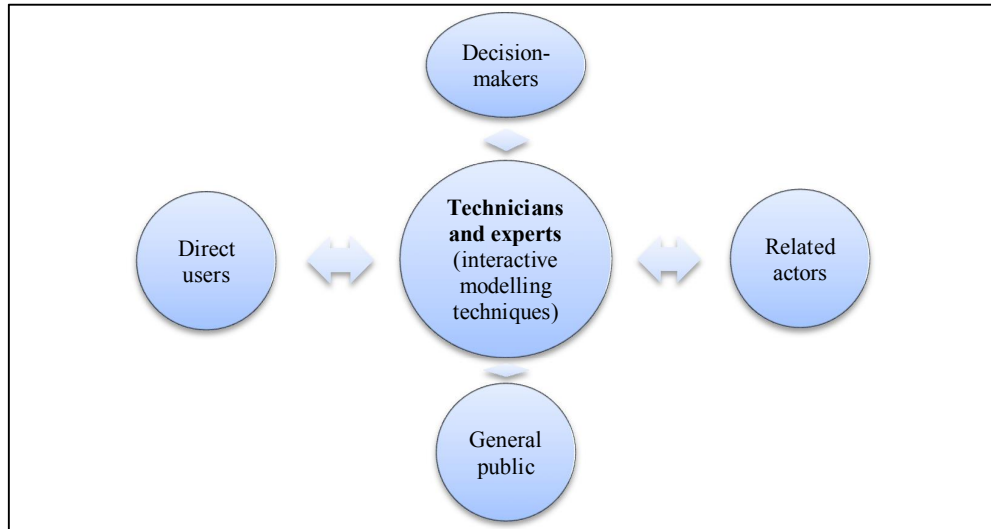
C. COHERENCE

65. Coherence entails the achievement of harmony in dealing with transport issues between visions, policies, strategies and action plans, at all levels of transport functions (international, national, regional and local). Coherence is also required between long-term goals and policies, strategies and actions plans prepared to achieve these goals, and between a transport system, national specificities and comprehensive development strategies.²² The conceptual framework provides an appropriate foundation for achieving coherence, by incorporating all factors related to the transport system, by clarifying the reciprocal relationships and effects between them, and by developing outcomes derived from the system's performance in their multistage temporal framework.

D. CONCERTATION

66. Concertation when developing policies, strategies and plans is a fundamental condition for ensuring that transport strategies and plans achieve the SDGs. Figure 4 shows the directions of concertation relationships in formulating policies, strategies and plans.

²² ESCWA, 2016.

Figure 4. Necessary concertation relationships when developing policies, strategies and plans

67. Technicians and experts specializing in transport planning play a pivotal role in the planning process, given their knowledge and skills in using dialogue modelling software that shows the expected outcomes of various choices and alternatives. This work is completed within an interactive dialogue framework with direct users, related actors (transport service providers) and representatives of the general public.

68. The participation of all stakeholders since the initial stages ensures their credibility with regard to the development of policies and strategies and the integration of all energies and resources for their full implementation.

VI. CONCLUSIONS

69. The 2030 Agenda for Sustainable development and its 17 SDGs constitutes the general framework guiding countries in developing their plans for economic and social development for the period 2016-2030.

70. Transport is not a stand-alone goal under the Agenda. However, the linkages between transport and economic and social activities mean that many of its issues cut across the SDGs. At least eight SDGs overlap in their targets and indicators with transport activities at all levels (air, sea, land, urban and rural).

71. The conceptual framework highlights the reciprocal effects between the components of a transport system's environment and the elements of the system itself and its performance feature, with a view to considering these relationships when incorporating the SDGS in future planning processes to develop transport systems in Arab countries. Such efforts can only succeed within a flexible concertation framework, in which transport planning experts play a key role in offering proposals to decision-makers, in consultation with system users, related actors and the general public.
