4.1 Short- and long-term goals of ITS development in Asia and the Pacific

According to an ESCAP\textsuperscript{161} analysis, the Asia-Pacific region can benefit from ITS in four main areas – safety, mobility, congestion and environment. ITS can increase road safety, the seamlessness and convenience of transport, while reducing its environmental impact through enhanced efficiency of transport systems. The socio-economic objectives of transport systems including ITS are depicted in figure 4.1.

\textsuperscript{161} ESCAP, Policy Framework for the Use and Deployment of Intelligent Transport Systems in Asia and the Pacific (Bangkok, 2017).
As discussed in the previous chapters, countries in the Asia-Pacific region have great differences in the level of social and economic development. In particular, each country is facing different issues in the transport sector.

In this sense, it is desirable that each country develops ITS solutions to respond to their major issues; at the same time, improvement of relevant infrastructure and systems to support ITS roll-outs should be carried out. In the long-term perspective, the ultimate goal of adopting ITS in this region is to build a favourable environment, in which the users have streamlined ITS services across countries and borders, and solve transport issues, thereby attaining sustainable transport systems. The gap in ITS development among countries in the region needs to be reduced to attain such long-term objectives (figure 4.1).

It is obvious from chapters 2 and 3 that regulatory support is crucial to enhancing the development and operation of ITS. To achieve the short- and long-term goals of ITS, first and foremost ITS regulatory frameworks should be introduced at an appropriate time. In a practice, the regulatory framework should be prepared for ongoing or upcoming ITS services as a short-term goal, leading to the eventual extension to all ITS fields as a long-term goal.

These short- and long-term goals cover four main areas – safety, mobility, congestion and environment (figure 4.2).

- **Safety** – The highest priority in the short term is to reduce the number of crashes and other incidents using ITS technologies. As there are many countries in the Asia-Pacific region with high casualty rates, the enhancement of ITS systems and services can help to reduce these rates. According to the World Health Organization’s report on road safety in 2015, countries in the region need to improve their ITS regulatory frameworks to address the issue of traffic crashes. For example, Cambodia, Thailand, Indonesia, and Vietnam have high rates of traffic casualties, and the implementation of ITS technologies can help to reduce these rates.

162 In Cambodia (3.0 per cent), Thailand (3.0 per cent), Indonesia (2.9-3.1 per cent), and Vietnam (2.9 per cent) in estimated GDP lost due to traffic crashes, according a report released by the World Health Organization in 2015, “Global status report on road safety 2015”. Available at https://www.who.int/violence_injury_prevention/road_safety_status/2015/en/.
Short- and long-term goals in four major areas

<table>
<thead>
<tr>
<th>Short-term objectives</th>
<th>Long-term objectives</th>
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<tr>
<td><strong>Safety</strong></td>
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<tr>
<td>Low frequencies of crashes and incidents</td>
<td>Reduced potential causes for crashes and incidents</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
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<tr>
<td>Better accessibility and connectivity</td>
<td>Fully user-oriented seamless, convenient and comfortable mobility services</td>
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<tr>
<td><strong>Congestion</strong></td>
<td></td>
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<tr>
<td>Convenient public transport services / efficient transport management and operations</td>
<td>Zero-congested transport services and traffic operation</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Improved emissions from the transport sector</td>
<td>Clean energy source for environmentally-friendly transport services</td>
</tr>
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</table>

**ITS regulatory frameworks**
- Better integration for current and future ITS technologies
- More efficient and effective ITS development and operation

Establishment of regulations related to ITS at the national level
Development of ITS regulatory frameworks at the Asia-Pacific level

of safety is urgently required. It is not only developing countries but also many developed countries that need to maintain a high level of traffic safety with low casualty rates. In this regard, reducing major causes of crashes and other incidents that undermine safety will be a long-term objective.

- **Mobility** – It is true that some areas in less developed as well as developing countries still lack of transport services, which leads to significantly low levels of accessibility to education and job opportunities. Even developed countries with ageing or decreasing populations may experience limited accessibility in some areas as a result of the termination of transport services with low profits. In this regard, providing better accessibility and improved connectivity by ITS to those areas is the mobility objective in the short-term. Under the premise of stable fundamental mobility, the long-term objective would be the establishment of fully user-oriented mobility services for seamless, convenient and comfortable transport by maximizing the concept of smart mobility.

- **Congestion** – From the short-term perspective, improving efficiency in transport management and operations, and the modal shift to public transport by ITS would be the practical solution to relieving traffic congestion. Traffic flow optimization by traffic management centres and the provision of real-time bus information or on-demand transport services in given areas would contribute to reducing traffic congestion in an effective way. In the long term, advanced ITS technologies, such as integrated traffic management systems for smart cities, C-ITS, CVs and AVs, would benefit users in terms of zero congestion of transport services and traffic operations.

- **Environment** – Reducing air pollutants including greenhouse gas (GHG) emissions by the transport sector would be the short-term objective. ITS technologies to help optimize traffic management and operations, reduce traffic congestion and increase the
modal shift would contribute to attaining the short-term objective. Switching to environmentally-friendly vehicles, such as electric or hydrogen vehicles, would require some time and effort, thus making it the long-term objective. In the environmental scheme, the goal of ITS is highly relevant to those of mobility and congestion in the areas mentioned above; therefore, comprehensive consideration is required in long-term goal setting.

4.1.1 ITS regulatory frameworks
Given the fact that ITS regulatory frameworks can contribute to achieving two specific objectives – more efficient and effective ITS development and operation, and better integration with current and future ITS technologies (as covered in chapters 2 and 3) – ITS regulatory frameworks will also directly and indirectly contribute to achieving short- and long-term objectives in the four above-mentioned areas by providing specific ITS solutions. However, as the analysis in chapter 2 shows, not all Asia-Pacific region countries have regulations for ITS, and there are gaps in the development of such regulations. In this regard, establishing regulations related to ITS at the national level would be the short-term objective, while developing regulatory frameworks for ITS at the regional level would be the long-term objective.

4.2 Prioritization of ITS applications in Asia and the Pacific
Given the fact that regulations related to ITS should reflect the level of ITS services currently in use by countries in the Asia-Pacific region, prioritizing ITS applications would be beneficial in identifying feasible policy recommendations for ITS regulatory frameworks. Because of the different stages of ITS development and operation among countries in this region, it is difficult to prioritize ITS services by each country. Instead, three groups can be categorized according to the priority levels of attaining objectives at this moment in the four areas of safety, mobility, congestion and environment (figure 4.3).

- **Group A.** The countries in this group have already benefited from ITS in achieving the majority of short-term objectives and have been developing ITS technologies to attain the long-term objectives. Many investments in ITS have already been made in these countries based on national ITS plans or strategies. In addition, some efforts to establish regulations related to ITS or to amend existing regulations to support ITS development have already been observed in these countries. Given that traditional ITS technologies have already become mature in this group of countries and that they are now looking towards new advanced ITS

- **Group B.** The countries in this group are trying to catch up with the advancement of ITS and to increase investments in this area. Some short-term objectives have either been achieved to some degree or have started to be addressed. Because the countries in this group have implemented ITS projects in silos, only a few long-term objectives are under consideration. Weak ITS plans or strategies at the national level are to be found in this group, and regulations related to ITS may not exist or only be part of existing regulations. In comparison to Group A, the countries in this group may experience heavier traffic congestion, more serious safety issues, and higher growth rates of their populations and economies. At the same time, the level of ITS development with necessary policy support is not mature yet. As the number of personal vehicles and motorcycles per capita is increased in these countries, ITS applications with a focus on traffic management and operations should be pursued. Some examples of ITS applications are advanced traffic management centres (including advanced traffic management systems, advanced

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163 The GDP growth rate of developing countries in Asia in 2015 was 6.6 per cent, while the overall figure for all Asian countries was 5.7 per cent, according to the International Monetary Fund World Economic Outlook Database. Available at https://www.imf.org/external/pubs/ft/weo/2017/02/weodata/download.aspx.
traveller information systems and advanced public transport systems), mobile-based ITS and smart mobility.

- **Group C.** The countries in this group are aware of the importance of ITS, but only a small amount of investment has been injected so far. The countries in this group should define the directions or strategies they require for achieving the short-term objective with the focus on the urgent issues currently faced. Due to the lack of proper transport services, social and economic growth in these countries may be delayed to some degree. In these countries efforts to set up or amend regulations for ITS have not been properly made. The countries in this group with low ITS development show high population growth rates and rising income levels. A rapid increase in the range of personal transport modes is also expected with high casualty rates caused by crashes.\(^{164}\) As social and economic growth may be hindered in those countries still suffering from the lack of basic transport services and the relevant fundamental infrastructure, the introduction of basic ITS applications and some emerging advanced ITS applications relevant to mobility services and safety needs to be pursued on a preferential basis. Some examples of such ITS applications are traffic management centres (including basic traffic control and monitoring systems, and basic public transport information systems), mobile-based ITS and smart mobility.

\(^{164}\) Approximately 316,000 road traffic deaths occur each year in the South-East Asia region, accounting for around 25 per cent of the world total each year, according to the World Health Organization report, *Road safety in the South-East Asia Region 2015*. Available at https://apps.who.int/iris/bitstream/handle/10665/249151/SEAR%20Regional%20Fact%20sheet%20on%20Road%20Safety%20FINAL.pdf?sequence=1&isAllowed=y.