Globalization of Railways: The Asian Perspective

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Prologue

The Author has thrown light on the importance of rail-based transportation systems in the emerging global scenario, particularly in the Asian region.

An approach to derive the benefits of globalization has been emphasized. With regional cooperation surfacing among the nations, transportation seems to be the most vital issue for expansion of economic activities. Further, multimodal transport and globalization are now getting increasingly inter-linked.

Backdrop

Railways were, earlier, one of the most significant transport modes to revolutionalise the expansion of industrialization. Further, though the global market of transportation of goods has now become a trillion dollar industry, the share of railways is about one percent only.

In order to maximize the advantages and minimize the negative effects of globalization and growing interdependence, it is imperative for developing countries and economies in transition in Asia and Pacific region to integrate into the world trading system without getting further marginalized. There is an urgent need to develop adequate road, rail and inland water transport infrastructure and to build up intermodal transport in order to extend the integration process into the hinterlands. The proposed Asian Highway and the Trans-Asian Railway networks demonstrate the commitment of member countries to work towards an integrated surface transport system, linking countries in the ESCAP region with each
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other, and providing transport corridors to Europe. But progress has been slow considering the magnitude of the challenges posed by rapid globalization.

As the world becomes smaller and transportation routes longer, the International Union of Railways (UIC) has started taking steps at a global level to promote rail transport, with a vision for Asia, so as to meet the challenges of mobility and sustainable development.

One of the cornerstones of European railway policy was open access to infrastructure. Consequently, UIC’s global development programme focuses on efficiency of railways in development of the transnational freight corridors, safety and interoperability, and publicising rail’s environmental credentials.

**UIC’s Objectives**

UIC’s main objectives focus on facilitating exchange of best practises among members for setting up prescribed standards, developing new businesses across the globe, and improving economic performances of the railways. It is also edged towards achieving interoperability and creating new world standards for railways including common standards with other modes. UIC has also planned to develop centres of excellence for the technological upliftment and management practices through modern techniques, with safety as one of the prime concerns.

**UIC Globally**

In 2007, six UIC Regional Assemblies (Asia, Africa, Europe, Middle East, North America, Oceania and South America) were founded to respond to the regional needs of its members.

Today, UIC is active in global projects, which are of potential benefit to all UIC members, and in various regional projects concerning the rail subjects like technology and research, infrastructure, planning and sustainable development, passenger, freight, high-speed, etc.

**World Trade and Transport**

With the growth of international trade and the globalization of production, international transportation systems have been under increasing pressures to support additional demands in volumes and distances carried. This could not have occurred without considerable technical improvements facilitating transport of increasing volumes of freight and passengers; and this too with greater efficiency and at higher speeds. Also, containerization has contributed in a large measure to this growing mobility of freight.

Transport business associated with physical movement of goods in international trade is now a ‘trillion dollar industry’. This creates a “US$ 3 billion per day” business, of which railway’s share is around one per cent.
However, with the rapid growth of transportation requirement in the coming decades and the population explosion, rail transport which is more energy efficient, is expected to register much larger capacity augmentation compared to other modes of transport.

**Asian Railway Scenario**

The total Asian railway network is 3,50,000 km, which is 31% of the world’s rail network. About 65% of the Asian network is in China, India and Russia.

The countries which have large railway systems are China, India, Japan, Russia and Kazakhstan. Most of these countries are also Members of the UIC. Further, about 90% of the total passenger transportation work is produced in China, India, Japan and Russia. (Table 1)

**Table 1**

<table>
<thead>
<tr>
<th>Country</th>
<th>Share</th>
<th>Acc.share</th>
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</thead>
<tbody>
<tr>
<td>China</td>
<td>44.8%</td>
<td>44.8%</td>
</tr>
<tr>
<td>Russia</td>
<td>40.2%</td>
<td>85.0%</td>
</tr>
<tr>
<td>India</td>
<td>8.8%</td>
<td>93.8%</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>3.7%</td>
<td>97.5%</td>
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<tr>
<td>Japan</td>
<td>0.5%</td>
<td>98.0%</td>
</tr>
<tr>
<td>Iran</td>
<td>0.4%</td>
<td>98.4%</td>
</tr>
<tr>
<td>Mongolia</td>
<td>0.3%</td>
<td>98.7%</td>
</tr>
<tr>
<td>Korea, South</td>
<td>0.2%</td>
<td>98.9%</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.2%</td>
<td>99.1%</td>
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<tr>
<td>Azerbaijan</td>
<td>0.2%</td>
<td>99.3%</td>
</tr>
<tr>
<td>Georgia</td>
<td>0.1%</td>
<td>99.4%</td>
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</tbody>
</table>

Further, 97% of the total freight transportation is produced in China, Russia, India and Kazakhstan. (Table 2)

**Table 2**

<table>
<thead>
<tr>
<th>Country</th>
<th>Share</th>
<th>Acc.share</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>32.5%</td>
<td>32.5%</td>
</tr>
<tr>
<td>India</td>
<td>30.9%</td>
<td>63.4%</td>
</tr>
<tr>
<td>Japan</td>
<td>20.6%</td>
<td>84.0%</td>
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<td>Russia</td>
<td>8.8%</td>
<td>92.8%</td>
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<tr>
<td>Korea, South</td>
<td>1.5%</td>
<td>94.3%</td>
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<td>Pakistan</td>
<td>1.3%</td>
<td>95.6%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.8%</td>
<td>96.4%</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>0.6%</td>
<td>97.0%</td>
</tr>
<tr>
<td>Iran</td>
<td>0.6%</td>
<td>97.6%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>0.5%</td>
<td>98.1%</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.5%</td>
<td>98.6%</td>
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</tbody>
</table>

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Energy: The Asian Perspective

By 2030, Asia is expected to become the largest energy consuming region of the world; about 37% of the global consumption. At present, railway transport counts for 2.4% consumption of energy connected to transport. Freight transports consumes around 79% of the railway’s oil consumption. (Graph 1) This is estimated to increase to about 83% by 2030. However, Asia’s demand for oil will be more than three times than the region’s production capability. A stable supply and oil security is, therefore, of considerable importance for the railways.

Population Growth and Passenger Transport

There is a close correlation between population growth and passenger transport. About 4 billion people live in the 35 railway countries of Asia. By 2025 the additional estimated 750 million inhabitants of Asia will require passenger transport. (Graph 2). Interestingly, nearly all of the population increase that will take place in the region will be absorbed by the urban areas. (Graph 3)
Environmental Impact

With rising energy costs and limited resources, there will be a need for a transportation mode which is more fuel efficient. In this rail transport has an edge over other modes since it consumes comparatively lesser fuel per unit of transport compared to other modes of transportation. Further, Rail can use electrical energy also, unlike road vehicles which basically use petroleum fuels.

Indian Railways have been the prime movers to the nation and have the distinction of being one of the largest railway systems in the world under a single management. Railways being the more energy efficient mode of transport are ideally suited for movement of bulk commodities and for long distance travel. As compared to road transport, the railways have a number of intrinsic advantages. Railways are nine times more energy efficient, four times more efficient in land use and, significantly superior from the standpoint of environment impact. Railways contribute considerably in the growth and development of the nation.

Developing nations usually follow the growth models of the developed countries. However, the growing need to conserve energy and resources, and to provide safe, clean and affordable transport for sustainable development, newer techniques, which are innovative and cost-effective, will be required.

A new mode of transport, Maglev, can be an option for energy efficiency. Unlike autos, trucks, and airplanes, Maglev does not use oil, but instead consumes electricity, which can be produced by coal-fired, nuclear, hydro, fusion, wind, or solar power plants (the most efficient source now being nuclear).

Maglev vehicles cause little pollution. When they consume electricity, no carbon dioxide is emitted. Even if they use electricity from coal or natural-gas-fired power plants, the resulting CO₂ emission is much less than that from autos, trucks, and airplanes, because of Maglev’s very high energy-efficiency.
Maglev has additional environmental benefits. Maglev vehicles are much quieter than autos, trucks, and airplanes, which is particularly important for urban and suburban areas. Moreover, because Maglev uses unobtrusive narrow-beam elevated guideways, its footprint on the land is much smaller than that of highways, and railroad tracks, etc.

Urbanisation and Development

As mentioned earlier, increase in population will lead to increased urbanization. This will increase the demand for effective transportation systems that not only provide the basic services but also transcend the frontiers of development.

The estimations of GDP in 2025 show an accelerated growth. Almost all Asian countries are projected to grow rapidly. (Graph 4) With these developments future transport is also expected to show a commensurate growth and infrastructure requirements will have to be enhanced suitably. (Graph 5)
Demand for Infrastructure

There will be a demand for improvement in quality. To match the GDP growth by 2025, the railway network has to be more than double and, if we look at EU-25 average track density, the railway network has to increase 5-6 times. (Graph 6)

India and China: Emerging Rail Freight Corridors

India and China are the fastest growing economies of the world. (Graph 7) Since South-East Asia is also one of the rapidly expanding regions of the world, Intra-Asia trade is expected to grow rapidly too. This projected growth would indicate improved market conditions for a future China-India Land Bridge, which will operate between the growing hinterland origins and market destinations. This will stimulate an increasing Intra-Asian trade and long term potential to develop rail-linked services between South-East Asia and the China-India Land Bridge.

China has concentrated on transportation projects, including a US$ 2 billion China-to-Southeast Asia rail development plan, plus construction of telecommunications and power-
transmission links. India’s commitment to develop transport networks – in particular, the East-West Corridor and the Trans-Asian Highway – is a significant feature. The Asian Highway Project is expected to link Singapore with New Delhi via Kuala Lumpur, Ho Chi Minh City, Phnom Penh, Bangkok, Vientiane, Chiang Mai, Yangon, Mandalay, Tamu, Dhaka and Kolkata. India has already completed work on the 150-kilometer road from Tamu to Kalemyo in Myanmar. This would ultimately form part of the more ambitious Eurasian Land Bridge spanning the continents. Its Southern Eurasian corridor runs from Europe to China via the Indian subcontinent and would create a continuous railway link in addition to the land connection. With China helping in the execution of the project in Myanmar, the final step would be to build a railroad line from Myitkyina northward to the Indian border, linking to the railway network at Dibrugarh, Assam.

It, therefore, makes sense for India and China to marry their ideas and initiatives in working towards the goals of regional economic growth and development that would change the lives of a large chunk of the world’s population. These fast growing Asian dragons would be a force to be reckoned with in the near future.

Opportunities and Challenges

There is a growing acceptance that rail has an increasing importance in the national and international movement of goods and people. A number of factors favour a greater role of rail transport particularly in Asia. (i) Twelve of the 30 landlocked countries of the world are located on the Asian continent with the nearest ports often several thousands of kilometres away, (ii) the distances linking the main origin and destination, both domestically and internationally, are of a scale for which railways are economically justified, (iii) the reliance on ports to connect national economies to the world’s markets with the need to clear hinterland of port areas quickly to avoid congestion, especially in the context of growing containerization and the development of intermodal transport, (iv) a number of countries are major exporters of mineral resources in the logistic of which rail transport plays a crucial role, (v) the continuing surge in the volumes of goods being exchanged, and (vi) the recognition of rail as an environment-friendly and safe mode of transport.

The next challenge is to move towards joint operationalisation of the corridors in a coordinated manner at financial, operational and commercial levels. Institutional and technical bottlenecks have to be identified and specific remedial measures have to be defined and implemented. The development of common information technology systems has to be given proper attention as well as the development of efficient access to ports and inland container depots. In the longer term, corridor-based organizations with the authority to act on behalf of their constitutive railway administrations in areas such as service-definition, tariff-setting and marketing as well as the possibility of bulk-selling trainload-based capacity to private sector, need to be considered. The development of joint border stations to implement a “one-stop-shop” concept, under which all rail and non-rail operations by the relevant administrations of two neighbouring countries are performed at one single location, would also be a step towards greater operational efficiency.
Labour costs in India are among the lowest in the world while the highest (25 times of those in India) are in the three European Union countries of Belgium, Sweden and Germany.

Urbanisation will generate enormous amount of employment leading to rise in GDP growth. With the growth in population and urbanization, the demand for increase in transportation will occur. Increase in demand for transportation will give rise to manufacturing units. The most reliable and energy efficient mode being the railways there is a need to undertake mechanized and modern techniques with private participation of companies so as to accelerate growth.

Magnetic Levitation Transport

Maglev is a completely new mode of transport that will join the ship, the wheel, and the airplane as a mainstay in moving people and goods throughout the world. Maglev has unique advantages over these earlier modes of transport and could radically transform society and the world economy in the 21st Century. Compared to ships and wheeled vehicles – autos, trucks, and trains – it moves passengers and freight at much higher speed and lower cost, using less energy. Compared to airplanes, which travel at similar speeds, Maglev moves passengers and freight at much lower cost, and in much greater volumes.

It is expected to be cheaper, faster and energy-efficient. A Maglev guideway can be developed to be capable of transporting tens of thousands of passengers per day along with thousands of piggyback trucks and automobiles. Maglev operating costs are expected to be considerably lower than the conventional transport in the long-term scenario.

Of course, this needs to be promoted according to the market player’s specific requirements and affordability.

Conclusion

Transport accounts for approximately 25 per cent of global carbon dioxide (CO2) emissions, and it is the sector with the highest growth in emissions, and the second largest contributor overall (after electricity and heat-supply sector). Railways and their energy efficiency are crucial to reducing greenhouse gas emissions.

Transport needs far more attention in tackling climate change. UIC is offering IPCC full support in targeting transport and how to create sustainable transport solutions. We need transport, and thus we need smart and sustainable mobility, achieved through sustainable transport systems – in all countries. Social and environmental aspects need to be built into cost-benefit analyses and decision-making. Our consumption patterns and needs have to reconsidered in order to provide smarter resource solutions for the next generations.
And in this, Railways offer the most energy efficient performance both on a passenger-km and tonne-km basis. Incidentally, a shift of 3% from road to rail transport corresponds to 10% decrease in GHG emissions.

Moving from road to rail is a key to achieving the Kyoto Protocol targets and beyond and, at the same time, is a sustainable global transport policy for the future.

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Like the wind which carries one ship east and another west, the law of autosuggestion will lift you up or pull you down, according to the way you set your sails of thought.

– Napoleon Hill

Going the extra mile is a habit and a way of life.

– Napoleon Hill