Chapter

Introductory Chapter: High-Speed Railways (HSR)

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1. High-speed railways

High-speed railways (HSR) are defined as an intercity passenger transportation system that is time-competitive with air and/or auto on a door-to-door basis. The main reason for considering the implementation of rapid transportation systems is higher speed, which can easily equate to shorter travel time. The rapid expansion of transportation industries worldwide, including railways, and the never-ending desire to reduce travel time have highlighted the need to resort to the advanced transit systems. Conventional railway systems have been modified to make them travel at much higher speeds. People have always demanded reduction in travel time for many good reasons such as trade, leisure, etc. This has forced rapid expansion of transportation industries worldwide, including railways. Consequently, high-speed transit systems have been introduced in many countries. These systems are manufactured based on advanced engineering methods and technologies. Rapid transit systems must fulfill the major elements of the transport politics. The main aims consist in the increase of speed in the transportation corridors, flexibility, environmental acceptance, ride comfort, stresses (noise, pollutions, and vibrancies), etc. Mobility and transportation infrastructure guarantee a high grade of freedom and quality for the citizens, for their work, and leisure time. Infrastructure is an important location factor in the regional and global sense. It strongly influences the development of the society and the growth of the national economies. The mobility of individuals is impossible without an equivalent volume of traffic and

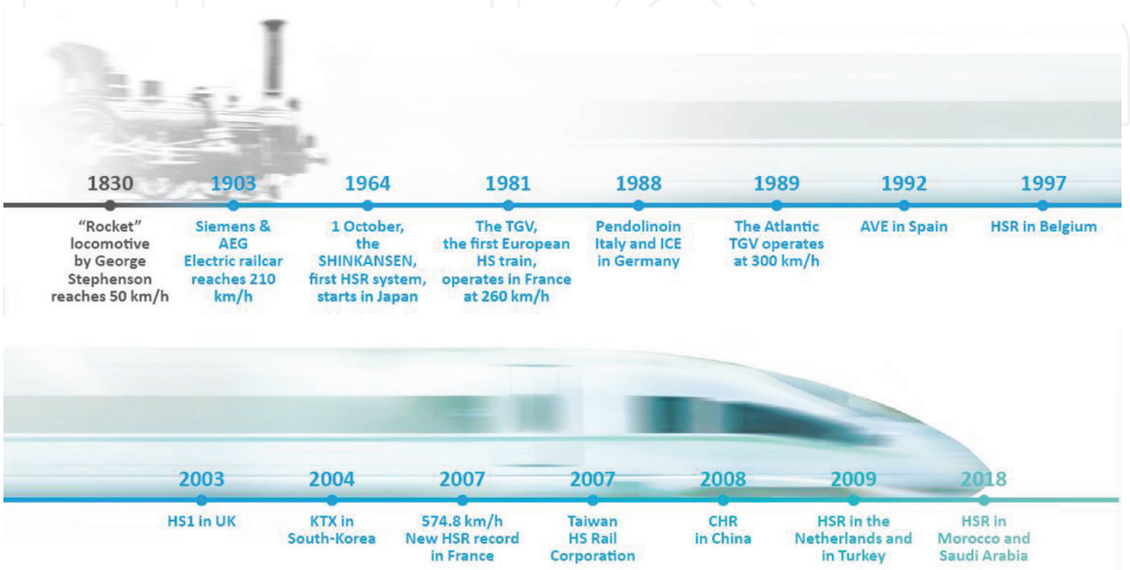

Figure 1.
History of high-speed rail (HSR).

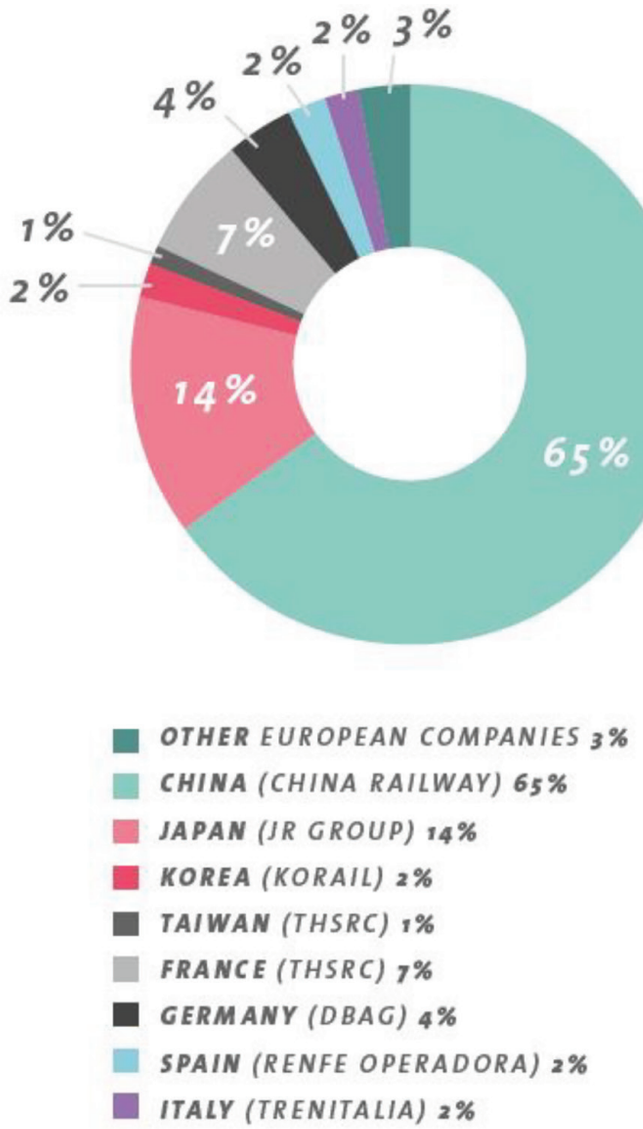

Figure 2.
HSR market shares in 2016 (PASSENGERS.KILOMETER).

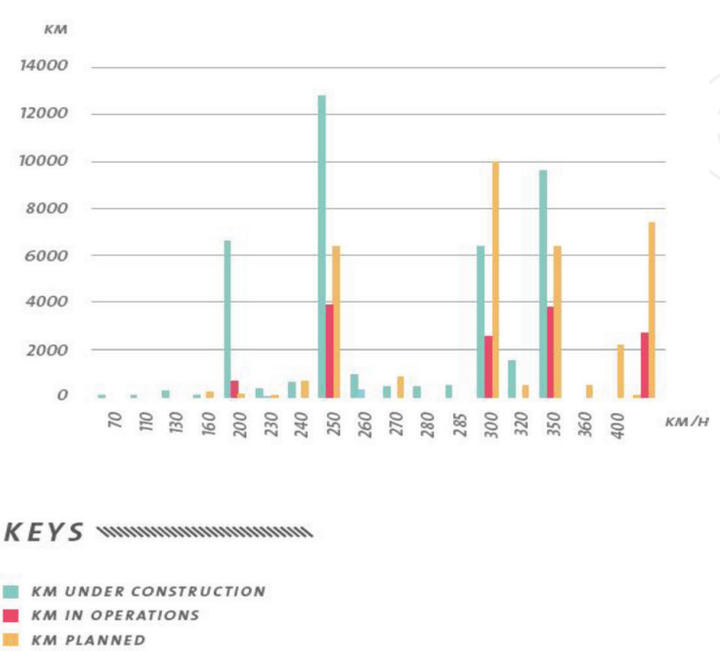

Figure 3.
High-speed rail network.

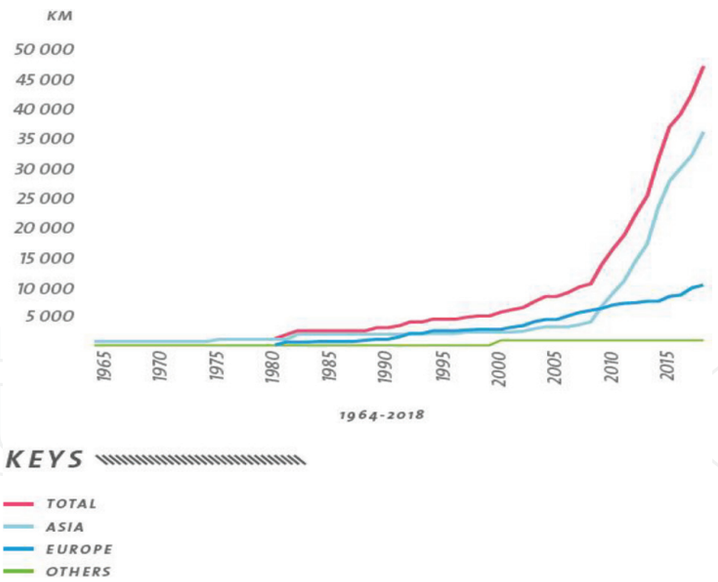

Figure 4.
High-speed rail network length.

transportation infrastructure. Urban developments lead to a considerable increase of the road and an increase of stresses for the people and environment. The public transportation policy must be faced up to this challenge and act appropriately in time. A major vision is the development of HSR, which can relocate certain parts of the road and air traffic to these systems and to enhance growth of congested urban areas and coalescence of the area. Examples of HSR include the French Train à Grand Vitesse (TGV), the Japanese Shinkansen, the German Intercity Express (ICE), the Spanish AVE, etc. [1–17] (**Figures 1–4**).

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