INTRODUCTION There are various components of the total costs of transport: (1) the costs of infrastructure; (2) costs incurred by transport operators; (3) costs borne directly by users (e.g., time and inconvenience costs); and (4) costs borne by society generally (such as pollution and environmental impacts). The primary focus of this chapter is on the second category – the costs incurred by transport operating companies – and on the fundamental economic concept of a transport cost function and how to estimate it, that is, the challenge of empirical measurement of the costs of outputs that are complex and diverse. Characteristics of the other cost components are reviewed in Quinet and Vickerman (2004, Chapters 4 and 5) and the chapter by Berechman et al. While the focus here is on the costs incurred by operators (item 2 above), there may be interrelationships with other cost components. For example, in the case of railways, some or all infrastructure is supplied by transport operators, and there are interrelationships between infrastructure and operating decisions, for example, the quality of infrastructure can reduce operating costs, and/or operating practices such as speed and size of load can affect infrastructure costs. There can also be a connection between transport operator costs and collective user costs such as waiting times (item 3 above). Nonetheless, operators do attempt to optimize production and costs of whatever they are responsible for and, therefore, it is valid to focus on the theory...