

## CHAPTER 2

### A SURVEY OF LITERATURE IN THE INTERNET INDUSTRY: FOCUS ON INTERCONNECTION

The volume of work devoted to the field of Internet Economics is overwhelming. But research in this area, especially those related to interconnection in Malaysia, is rather limited with most of the research output stem from the consultative works initiated by the Malaysian Communications and Multimedia Commission.

Mackie-Mason and Varian (1993), Bailey (1995b) and McKnight and Bailey (1997) introduce us to the growing field of Internet economics and explore issues encompassing technology, economics and policy surrounding the Internet. Mackie-Mason and Varian (1993) describe the history, technology and costs of the Internet while McKnight and Bailey (1997) attempted to bring research on Internet engineering and economics together.

Studies on Internet interconnection have been well documented but except for consultation papers prepared by Malaysian Communications and Multimedia Commission (MCMC), there is hardly any studies done in the case of Malaysia. Even so, these consultation papers very often lump the network industries together, in tandem with the envisaged convergence of the industry. While the consultative papers focused on specific aspects of the communications industry, Mohamed (2000) presents a detailed

discussion of the new regulatory framework on the “converged” communications industry.

Kende (2000) examines the interconnection arrangements that enable Internet users around the globe to communicate with each other. Interconnection agreements between IBPs are reached through commercial negotiations in a “handshake” environment, under two different arrangements: peering or transit. Bailey (1995a), on the other hand, explores Internet interconnection architectures and identified three of them, namely the bilateral agreement, cooperative agreement, and third party administrator. While all are technically feasible, there are economic reasons for some companies to prefer one architecture over another. Based on incomplete contract theory coupled with the ability of resale for interconnection, he concluded that bilateral agreements may be best for large Internet network providers while cooperative agreements may work best for smaller network providers. Third party administrators may exist, but the ability for the connected networks to resell their service, along with the ability for the administrator to act opportunistically, will deter this type of interconnection agreement.

In the Internet pricing aspect, Bailey and McKnight (1997) proposed a variety of approaches to Internet pricing, including flat-rate, tiered, and usage-sensitive, as well as approaches at the infrastructure level for network interconnection. Bailey (1995b) explores the issue of usage sensitive pricing versus flat-fee pricing as applied to the Internet while Bailey and McKnight (1997) discussed many reasons why the Internet has accepted flat rate pricing and not usage-sensitive pricing.

Sarkar (1997) argued that it is imperative to “develop a pricing system that would serve to effectively ration bandwidth” and a regulatory solution is needed to implement an Internet pricing system. Mackie-Mason and Varian (1993, 1995) recommended a “smart” market for pricing Internet congestion. This dynamic bidding system would price data packets almost instantaneously according to network congestion at the time of use.

DeGraba (2000) utilised a model in which the sender and receiver enjoy equal benefits from any given message exchange and the networks to which both of them subscribe have equal marginal costs, and concluded that the bill and keep arrangement is efficient. Hermalin and Katz (2001) argued that socially optimal interconnection charge is independent of the “direction” of a message and the optimal retail prices depend solely on the sum of the marginal costs of exchanging a message across the two networks and not the specific costs of individual networks.

According to Kende (2000), the interconnection policies that have evolved in place of industry-specific regulations in order to determine the impact of these policies on the markets for Internet services. He demonstrates how, in the absence of a dominant backbone, market forces encourage interconnection between backbones and thereby protect consumers from any anti-competitive behavior on the part of backbone providers. He concludes that there is currently no evidence that the interconnection agreements between international carriers result from anti-competitive actions on the part of any

backbones; therefore, the market for Internet backbone services is best governed by commercial interactions between private participants.