E-BUSINESS AND DOT.COM DRIVEN TRANSFORMATION– A COMPARISON OF AUSTRALIAN AND INDIAN EXPERIENCES IN THE TELECOM SECTOR

CHANDANA R. UNNITHAN[1] and PAULA M. C. SWATMAN[2]
[1]*Deakin University, School of Information Systems, Faculty of Business and Law,Melbourne, Australia*
[2] *Deakin University, School of Information Systems, Faculty of Business and Law,Melbourne, Australia AND University of Koblenz, Institute of Management, Faculty of Informatics, Koblenz, Germany*

Abstract: The global telecommunications sector has been transforming rapidly as a result of deregulation; privatisation; competition from smaller telcos due to their ability to list on NASDAQ index; convergence of media and communication sectors; and driven by rapid uptake of Internet-related activities. Like many businesses, telcos expected to increase market capitalisation through dot.com floats, perceived broadly as a measure of profitability. Despite the recent spate of dot.com crashes, telcos have been actively promoting dot.coms, and even developing electronic markets. Our exploratory study investigates this phenomenon, studying the eBusiness-driven transformation, taking into account the move towards new technologies such as broadband delivery. The paper describes our qualitative, document-based investigation of the Australian and Indian telecom sectors, together with a preliminary quantitative analysis of the impact of dot.coms on market capitalisation within the sector. We have applied the theory of Transaction Cost Economics to the quantitative analysis to explain the reduction of costs through dot.com floats. Further, by applying theories of telecoms liberalisation, such as neo-liberal and alternative accounts (Bagchi, 2000); theories of adoption such as innovation-diffusion (Roger, 1995) and catch-up, forge-ahead, fall-behind theory (Abramovitz, 1986) to the synthesised findings, we have derived cross-economy perspectives in the eBusiness driven growth of the telecoms sector. The paper provides practical assistance to telcos and policy makers in the economies reviewed and have the potential to contribute to academic research in eBusiness and telecommunications more generally.

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: 10.1007/978-0-387-35692-1_36

K. V. Andersen et al. (eds.), *Seeking Success in E-Business*

1. INTRODUCTION

Corporate involvement in Internet-based activities and content provision on the Web is increasing, and appears to be becoming compulsory in infrastructure sectors such as telecommunications (Berryman *et al*, 1998). Pitroda (1993) suggests that telecommunications is a powerful force for economic development, necessary to co-ordinate development activities, conduct business and operate markets. Cyranek and Bhatnagar (1992) observe that telecommunications is essential for providing access to market information and transactions globally.

In this paper, we study the drivers for change in the evolution of the telecommunications sector. We then look at the opportunities and challenges offered by new technologies, which support and promote eBusiness – both generally and in two disparate economies, Australia and India. These findings are further synthesised from a broad review of the telecoms industry and from a quantitative analysis, making use of market capitalisation as a measure of profitability for telcos. Finally, we have applied three popular economic theories to the findings to gain further insights into our findings.

2. METHODOLOGY

This paper is part of an ongoing research project into eCommerce diffusion within the banking and telecoms sectors, which seeks to identify the effectiveness of dot.coms as an indicator of eBusiness diffusion and success on a sector-by-sector basis. The study takes a positivist approach, where social realities are viewed as a complex of causal relations between events – themselves depicted as an emerging patchwork of relations between variables (Blaikie, 1993).

A brief historical trend analysis of the telecoms industry in Australia and India, using document analysis, has revealed major drivers and barriers for the rapid transition of this sector and for the uptake of new technologies such as broadband. Neuman (1997) suggests that document analysis is the systematic analysis of a particular topic, using news media, annual reports, employment records, unpublished and published articles, white papers, industry and consultancy reports, etc. In a field as diverse and as rapidly-growing as the telecoms industry, such an approach enables researchers to gather a wide variety of data and to grasp the essence of a market quickly and effectively.

The document analysis was augmented by a quantitative analysis, using the least squares method, which tested dot.com viability for telcos. Dot.coms are regarded by telcos as a channel for increasing market capitalisation –

broadly perceived as a measure of profitability. To test this general view, a preliminary analysis was conducted on three major telcos over a two-year period, in the two economies. We then applied transaction cost theory (Williamson and Winter, 1993; Pant and Hsu, 1996) to the results to provide a more in-depth explanation than was possible from the statistics alone.

Subsequently, the dominant (or neo-liberal) and alternative theories of telecom liberalisation (Bagchi, 2000); as well as two well-known theories relating to the uptake of technological innovation – innovation-diffusion theory (Roger, 1995) which classifies the adoption patterns in a society from innovators to laggards, and the catch-up, forge-ahead, fall-behind hypothesis (Abramovitz, 1989) which explores why certain economies *catch-up* while others *forge ahead* or *fall behind*, were applied to the synthesised results to gain a social perspective on the phenomena identified.

The combination of these quantitative and qualitative methods (see, for example, Gable 1994; Mingers and Brocklesby 1997; or Pinsonneault and Krämer 1993 for a more thorough discussion of the benefits of combining qualitative and quantitative research methods) enabled us to gain a better understanding of the impact of new technologies/eBusiness to telcos in these disparate economies.

3. DRIVING FORCES IN TELECOMMUNICATIONS

To compete in the global market, exploiting the opportunities presented by innovation, businesses are increasingly putting pressure on governments worldwide to revise their policies, regulation and the structure of the telecoms sector (Jain, 2001). Quiggin (1998) notes that until the 1980s the telecoms industry was a publicly owned enterprise in most economies. The 1980s ushered in two critical changes – deregulation and the privatisation of telcos; and the build up of competition in the sector.

Bagchi (2000) identifies two competing theories about policy changes and liberalisation in the telecom sector – *the dominant (or neo-liberal) account, and the alternative account* (see also McDowell, 1997). The dominant account suggests that liberalisation is a set of policies which reduce social and political control over market forces, and over the building of production, exchange and property relations more closely, approximating those found in ideal competitive markets (Bagchi, 2000). Telecoms liberalisation, in other words, would allow increased use of market mechanisms to guide social, economic and political life, loosening State control. The application of this theory is underpinned by the fact that

telecommunications are becoming integrated into economic structure and the global environment far more broadly, through participation in international treaties such as the Global Agreement on Tariffs and Trade (GATT) and the International Telecommunications Union (ITU); and through the convergence of technologies (McDowell, 1997).

By contrast, the *alternative theory* argues that the historical process of liberalisation in the telecoms sector was linked to a number of distinct national and international issues and processes. This theory portrays the liberalisation of the telecoms sector as a case of the First World winning over the interests of Third World states (McDowell, 1997; Bagchi, 2000). Westland and Clarke (1999) suggest that with the development of new technologies, customers are demanding innovative communication products, which keep pace with rapid transitions in technology. Many authors (Uehara 1990; Glynn 1992; Kima and Yoon 1992; Ladlaw 1994) comment that the impact of restructuring in many countries has been to encourage telcos to become more responsive to business and consumer needs, evolving continuously to remain competitive. Developed countries, in particular, have recognised the need for a responsive, business-focussed, technologically innovative telecoms sector for the growth of the economy (Jain, 2001).

4. EBUSINESS OPPORTUNITIES & CHALLENGES

Mandel and Hof (2001) suggest that the promise of the Internet is dependent on both the widespread introduction of broadband telecommunications delivery to the home, and on the development of high-speed wireless telecommunications[4]. These technologies will not only enable effective business and personal communications from any location, but will enable always-on access and effective work practices from home as well as from networked office environments.

For cellular operators, wireless Internet access represents considerable revenue potential, as shown by the success of Japan's digital telecom industry (Yamada, 2000). In May 2000, Yamada (2000) reported in Industry Standard that 20,000 subscribers join the net every day. However, with the delay in introducing UMTS and other third generation standards and products (NTIA, 2000) most telcos, particularly those which have paid high

[4] In August 2000 there were 570 million mobile users. It is estimated that by 2002/3 there will be one billion subscribers and 1.6 billion by 2010. Penetration rates (users in % of the population) in Europe are expected to reach 80% in 2005 (Barnett/Hodges/ Wilshire). Thus, there will be almost universal coverage within Europe. Even on a global scale penetration rates are forecast to be over 30% in 2005 (UMTS-Forum 2000).

prices for third generation licences, are feeling the financial pressure of supporting existing services and this is slowing the rollout of broadband. There is an increasing likelihood that a number of small telecom providers may fall by the wayside, as may subscriber growth in second and third-tier markets (Pelline, 1996; Deloitte, 2001). It is already clear that charges for high-speed Internet access products such as ADSL (Asynchronous Digital Subscriber Line) are increasing in a number of countries (Harrison *et al*, 1998) resulting in a decrease in consumer numbers, and the overall profitability of telcos (Michael *et al.*, 2001).

Pastore (2001) points to significant consumer interest in obtaining multiple communications services (local, long distance, cable TV, cellular, paging, Internet and high speed access) from a single provider (convenience, single billing, integration, etc). Nonetheless, in many economies smaller telcos have managed to create effective competition in niche markets, often providing services such as cheap international or Internet access by purchasing and rebundling from the larger providers, (for example, Primus Telecom in Australia, Satyam Infoway in India) and have managed to float on the stock exchange, spurring the growth of the entire sector.

4.1 The Australian Telecoms Experience

Australia's National Office of the Information Economy suggests that eCommerce is having a remarkable impact on the communications industry. Telecommunications carriers have an obvious role to play in providing the communication lines and bandwidth to make network access and ultimately eCommerce possible (NOIE, 2000c).

Holmes (2000) notes that in 1989 the independent telecommunications regulator AUSTEL was created to develop increased service competition, private networks and value added network services (VANS). The former PTT monopoly, at that time comprising Telecom Australia and the Overseas Telecommunications Corporation (OTC), was corporatised and partially privatised taking the name Telstra (Quiggin 1998; Holmes 2000). New entrants to the Australian marketplace resulted in a fixed-network duopoly between Telstra and Optus (a Cable & Wireless dominated conglomerate); as well as a mobile oligopoly between Telstra, Optus and the then British-owned Vodafone. In 1997 the country was opened further to competition with open network competition permitted. Competition and technical regulation were provided through the ACCC (Australian Competition and Consumer Commission) and the ACA (Australian Consumer Authority), which offered consumer and competitive safeguards.

According to Holmes (2000) the costs and benefits of deregulation included the clearing of transaction costs, maximising self-regulation or co-regulation, cost recovery through regulatory charges and relatively non-intrusive regulation. Massive demand growth from 15% annually for voice to 150% for Internet subscription, new investment of US$5 billion, improved efficiency of operators, improved customer focus and service levels, continuous price reductions with costs falling and far more limited margins for service providers, were some other cost benefits (Holmes, 2000). Evans and Bonugli (2001) estimated the Australian telecommunications market to be worth A$27 billion in 1998. Orange, the flagship brand of Hutchinson Telecoms, listed on the Australian stock exchange in August 1999, and received licenses for a unique wire-free service which combined local loop with mobile telephony, covering certain metropolitan areas (Orange, 2001).

Australia has significant advantages from the point of view of telcos, including access to state-of-the-art telecommunications infrastructure, and a highly educated, very technophilic population. In addition to Telstra, which manufactures hardware and provides a solid and significant telecommunications infrastructure, most of the major telecom manufacturers including Ericsson, Nokia, Siemens, etc. have established a presence within Australia. Fels (2001) suggests that the rollout of new telecommunications and infrastructure in Australia has been one of the most important drivers of new competitive forces in the market. The new technologies of broadband and wireless communications are being used to provide comprehensive service packages to household consumers, including pay-television, telecommunications, data and Internet services, and a range of business-to-business applications.

Fels (2001) also suggests that broadband infrastructure is of particular importance to the future of digital services. The potential to utilise the existing copper telephony network, which already passes every Australian house, to provide high speed Internet access opens the possibility of achieving high levels of broadband penetration via services such as ADSL. Telstyle (2001b) estimates the number of DSL connections in Australia will grow to 200,000 by mid 2002 from 59,000 in 2001. Optus was a leader in alternative access with DSL, offering new levels of flexibility. Fels notes, however, that the rate and ultimate extent of such services will depend on the price charged for such services and on demand. Australia has already seen the impact of overly high pricing for new telecommunications services, when ISDN was priced so high that only a very few businesses took it up – with the result that this technology, which is almost a standard for European households, is effectively not used in Australia (Moon, 1999).

The current hot issues for Australian telcos include broadband IP and Internet connections; local loop bundling; competitive provisioning of

universal services in uneconomic areas, convergence and the impact on broadcasting, telecom, and information service markets; and the three year audit of telecoms regulation under the 1997 legislation (Holmes, 2000). Clear legislative objectives of continuing user benefit through competition at all levels of the market, and consolidation of the competition is required in the telecoms sector (Legard, 2001).

Eastham (2001a, 2001b) suggests that online marketplaces represent a significant eBusiness opportunity for telcos in Australia, both to provide higher value services over simple voice and data connections, and to draw them closer to customers. He argues that the main benefits of joining an eMarketplace are reduction in transaction costs for buyers and suppliers; the opportunity for suppliers to find new buyers; and for buyers to find cheaper suppliers. The major telcos in Australia, Telstra and Optus, have already entered the eMarketplace arena (Eastham, 2001a). However, two of the major Telstra-enabled eMarketplaces closed down i.e. mySAP.com (a joint venture with German enterprise software developer SAP[5]) and TBX (an e-marketplace for SMEs) following the dot.com meltdown, taking the company out of the online marketplace race against its main rival, Optus (Eastham, 2001a). Optus has continued to provide eMarketplaces with its Marketsite, a business-to-business trading service. Initially, the company was targeting large corporations but, with the launch of Marketsite, has moved into the SME sector, because 300 buyers and suppliers happened to be SMEs (Eastham, 2001b). Boston Consulting Group research reports suggest that there are 250 eMarketplaces operating in Australia, and that by 2002 there will be 53 (Eastham, 2001b).

Colquhoun (2001a) suggests that the real future for telcos lies in understanding customer requirements and in a willingness to customise service levels, supported by agreements and penalties for non-delivery. The author points to Macquarie Corporate Communications, an Australian telco with a dedicated focus on the corporate market. It is moving away from the traditional voice market with the help of DSL to provide a wider suite of services and is offering tiered levels of service, from entry level to business and first class. Colquhoun (2001a) argues that this kind of initiative will take telcos up the value chain into the area of IT and managed services. The Australian Telecommunications Industry reports suggest that the major telcos are still 80% reliant on the voice market, which is declining rapidly (i.e. from revenues of 13% in 2000 to 3% in 2001) (Colquhoun, 2001a). Therefore, more telcos are considering the provision of business services, enabled by eBusiness.

[5] Note that mySAP.com continues to operate outside Australia

Eastham (2001b) suggests that telcos in Australia need to consider whether they should move away from their core competencies. However, there seems to be little choice for telcos other than following market trends, consolidating and re-engineering themselves for competition. As Budde Communication suggests, those that survive will integrate IT offerings with broadband, to form true business partnerships with consumers (Colquhoun, 2001a).

4.2 The Indian Telecoms Experience

Many developing countries have noted the constraint of a state monopoly in telecoms as standing in the way of spurring internal growth and competing in an increasingly global economy (Jain, 2001). Even though it is a century since telecommunications emerged, developing nations such as India still do not share the benefits of a universally distributed telecom service (Maxwell, 2000). Granting monopolies in the sector to create a barrier to market entry is most common in emerging economies. Jain (2001) notes that the process of introducing new telecoms reforms and structures is complex in a country like India. Maxwell (2000) adds that with the advent of Internet telephony, there is a serious threat to the national telecoms providers. Emerging economies are trapped between the need to attract private capital to upgrade their telecoms network and the conflicting desire to develop their strategic goals – both of which require significant funds.

The Indian telecoms sector was wholly under government ownership until 1984, and was characterised by under-investment, outdated equipment and growth below the potential of the market (Jain, 2001; India Infoline, 2001; Sinha, 1997, Dhar, 2001). The Post and Telegraph was separated from the sector in 1985 to form the Department of Telecoms or DOT (Jain, 2001; India Infoline, 2001; Sinha, 1997). Subsequently, DOT set up two public sector corporations, Mahanagar Telephone Nigam Limited (MTNL) and Videsh Sanchar Nigam Limited (VSNL).

While MTNL took over the operation, maintenance and development of telecom services in the metropolitan areas of Mumbai and New Delhi, VSNL was set up to plan, operate, develop and accelerate international telecom services in India (Jain, 2001; India Infoline, 2001; Sinha, 1997). MTNL enjoyed a monopoly position in the two metropolitan cities, until recently; but VSNL was given a monopoly over all international access to India through its gateways (India Infoline, 2001). The Indian government created these corporate organisations in order to allow greater decision-making autonomy and flexibility. However, realising that major decision making including policy formulation and that regulation of the sector remained with DOT, the government created a new organisation named the

Telecom Commission, with representatives from many government departments including electronics and finance (Jain, 2001; Dhar, 2001). In 1997, a separate regulatory body, the Telecom Regulatory Authority of India (TRAI) was formed by an act of Parliament, with the main function of finalising toll rates and settling disputes between the main players (India Infoline, 2001; Bagchi 2001). However, TRAI was not given regulatory authority over DOT, and the telecoms sector itself still remained under the control of DOT.

Following the National Telecom Policy of 1994, the government announced private participation in basic and cellular services. The country was divided into 20 'circles' and one private operator was allowed to compete with the DOT in each of these circles. However, DOT was to give the licenses to operators with a fee. This was the major flaw – DOT was able to drive out much of the competition with heavy license fees and tariffs (Bagchi, 2001). This led to the announcement of the National Telecom Policy of 1999, taking into account the convergence and existing anomalies in the sector (Bagchi, 2001).

Jhunjunwala and Ramamurthy (2001) argue that telecoms sector revenues are basically boosted by Internet connections. The introduction of private ISPs has contributed greatly to this momentum. Following the National Telecom Policy of 1999, 70 ISPs have become operational in India. The government also allowed several ISPs to set up international gateways to the Internet, bypassing the VSNL monopolised gateway (Bagchi, 2001) In addition to opening up international telephony, the government also decided to end VSNL's monopoly, two years before the WTO-set deadline of 2004.

Jhunjhunwala (2001) argues that the availability of telecoms equipment and technology is crucial for the development of the sector in a developing country. To build research and develop technology suited to Indian climatic conditions, the Centre for Development of Telematics, an autonomous organisation, was set up in the early 1980s (Jain, 2001). CDOT was able to champion the idea of technology for the masses, with rural automatic exchanges designed specifically for Indian climatic conditions. Many regional areas including villages, small towns and B class cities were connected and public telephone booths became part of Indian society. An indigenously developed technology, adaptable for Indian conditions, was successful and, by end of the year 2000, 10 million of the 20 million lines installed in India were using CDOT exchanges (Jain, 2001).

However, as Jain (2001) points out, DOT had a detrimental impact on the success of CDOT exchanges by not accepting this technology until some time during the early 1990s, pushing indigenous manufacturers into financial difficulties. At the same time, multinationals used this policy to their

advantage, by raising the price of imported exchanges. The success of CDOT did, however, help the government in negotiating cheaper prices for other imported exchanges in the following years (Jhunjunwala, 2001).

Several technological changes made it imperative for the government to view IT, telecoms and broadcasting legislation in a coherent and convergent manner, which led to the drafting of the Information, Communications and Entertainment Bill (Jain, 2001). In 2000, the Communication Bill 2000 had the objective of facilitating the development of a national infrastructure for an informed society. This Act of Parliament will establish a licensing framework for carriage and content of information in the converging areas of television, broadcasting, data communications, multimedia and other technologies. The Bill aims at creating a super regulator for the broadcasting and telecoms industries (Bagchi, 2001).

India only has an approximate tele-density of only 2 fixed lines per 100 persons (India Infoline, 2001), as compared to Australia's tele-density of 1 fixed line per 1.5 persons (Worldroom, 2002). However, telephone penetration is not dependant on phone ownership. As in many developed countries, private space in houses is not abundant, and phones tend to be shared. In many interior areas, public call offices or telephone booths tend to be used (Jain, 2001). The socio-economic changes within the country spurred by the Internet have seen the emergence of cyber cafes and computer institutes all over the country. Interestingly, this development has been accentuated by the growing need for technology education within the country, essentially facilitated by the growing software industry. Although telephones may not have reached every home, cyber cafes are in great demand.

The Indian telecoms sector is considered one of the fastest growing in the world, growing at an average of more than 20% over the last 4 years. It is expected to witness rapid growth in cellular, radio-paging, value-added services, Internet and global communication by satellite (GMPCS) services. The government is currently undertaking several regulatory and policy initiatives, making India an ideal environment for foreign direct investment (investindia, 2001). In July 2001, CIOL (2001c) reported that the telecoms sector in India is attracting foreign direct investment, despite the bureaucratic hurdles. The new regulatory policy does not seem to have constrained this flow of funds. While 44% of these investments were for cellular mobile services, 27% was aimed at telecoms companies which manufacture telephone equipment. With the entry of national long distance providers, domestic investments in the sector have also remained steady.

In November 2001, a Reuters report in CIOL (2001b) claimed that the Indian mobile telephone market had over five million subscribers and, according to ABN Amro, this is expected to reach 34.1 million by March

2006. Over the single year of 2000, the market grew by more than 90%. It is estimated that the number will cross 25 million in 2005 and rise to 77 million by 2010. ABN Amro expects the market to expand at 57% CAGR[6] for the next 5 years. In contrast, India's fixed line business, which had 32.4 million lines at the end of March 2001, is expected to grow at only 15% CAGR, to touch 66.5 million lines by March 2006. ABN Amro further predicts growth in the pre-paid segment, increasing the number of subscribers. However, it is still Mumbai and New Delhi, which are leading the increase in subscriber numbers (CIOL, 2001b).

The broadband market in India is expected to soar (CIOL, 2001a). As India has the highest cable penetration percentage of 46.8% among low telephone penetration countries (Nagaraj, 2001), the market for broadband is very active (CIOL, 2001a). However, according to IDC although cable is widespread across the country, the existing broadband infrastructure is not suitable for two-way communication and the price of upgrading this technology is very high. Despite these problems, there is a drive for cable modems, particularly by work-at-home households and Internet users. Future expansion of the data-over-cable market is expected to be driven by increased Internet use and development of compelling image/video rich applications and IP telephony services (CIOL, 2001a).

The DSL market is expected to grow, but is still plagued by distance limitations, regulation issues, installation and provisioning challenges, competition from other broadband technologies, cable modems on the residential area, fixed wireless and other high-speed technologies from the business market (CIOL, 2001a). Fixed Wireless Access (FWA)[7] is becoming attractive, as it allows competitive providers to bypass the local loop generally controlled by incumbent carriers. FWA is also well suited for rural and regional installations. Satellite is still an unexplored broadband access technology, which has immense potential for a country as large as India. IDC has estimated direct access subscribers will reach 2.1 million in 2005 with a CAGR of 114% (CIOL, 2001a).

Major telcos such as MTNL and VSNL have recognised the fact that eCommerce is a key to their future success, with private competition arriving at an increasing rate. MTNL, for example, has put in place several IT systems such as CSMS (Customer Support Management System), FRS (Fault Repair System), DQ (Directory Enquiry), FMS (Financial

[6] Compounded Annual Growth Rate.

[7] Fixed wireless access is the use of wireless technology to replace copper to connect subscribers to the telephone network (Trinkwon, 1996).

Management System), IVRS (Interactive Voice Response System) and accounting and billing systems. Projects for Dataware housing, call centres, e-commerce billing mediation, new IT policy consultancy projects are also in the pipeline (MTNL, 2001) VSNL plans to open more international gateways, satellite and cable communications. Currently, it offers many services online to individuals and business consumers. In February 2001, Tata – India's biggest and most trusted conglomerate won 25% stake in this telco (Menon, 2002). This strategic move and the subsequent global networks, which these moves imply, are bound to take VSNL further into eBusiness success. However, eCommerce revenues are still nascent and unpredictable for the sector.

5. DOT.COM VIABILITY - AN ANALYSIS

The document analysis provided in the preceding sections of this paper, while providing a foundation for research into the sector, lacks generalisability. To understand whether dot.com floats had any effect on the growth of market capitalisation for telcos in Australia and India, we conducted a statistical analysis using the least squares method. Three significant telcos from each economy were selected for this analysis, on the basis of their comparability, size and visibility in the economy.

The model estimated is:

$$\mathbf{SIZE}_{it} = \beta_{0i} + \mathbf{DA}\ \beta_{1i} + \beta_{2i}\ \mathbf{Trend} + \beta_{3i}\ \mathbf{DA\ Trend} + \varepsilon_{it} \quad \mathbf{(4.1)}$$

where $\mathbf{Size}_{it}$ is the market capitalisation of the telecoms organisation **i** in period **t** ; **Trend** is a linear time period (which increments each period); **DA** is a dummy variable which takes the value of **0** before the organisation floated a dot.com and **1** after the company floated a dot.com; β_{0i} , β_{1i} , β_{2i}, β_{3i} are unknown company-specific parameters to be estimated; and ε_{it} is assumed to be $N(0,\sigma^2{}_i)$.

The results of analysing the telecoms sector sample are reported in Table 1.1. The selected organisations within each economy are given in the first column. The table reports least squares parameter estimates, **P** values in parenthesis and the last column provides adjusted $\mathbf{R}^2$ β_{1i} reports the immediate change in market capitalisation following dot.com float, β_{2i} reports the trend growth in market capitalisation before the dot.com float and β_{3i} reports the trend growth after the dot.com float.

Company/Economy	β_{2i}	B_{1i}	β_{3i}	R2(Adjusted R^2)
ONETEL/Australia	18.501 (0.877)	-4597.954 (0.078)	166.625 (0.177)	0.875
TELSTRA/Australia	2753.446 (0.424)	33228.24 (0.645)	-733.295 (0.831)	0.726
OPTUS/Australia	1374.988 (0.000)	89801.90 (0.000)	-3653.930 (0.000)	0.439
Satyam/India	304.699 (0.747)	-242478.0 (0.000)	8478.399 (0.000)	0.741
VSNL/India	-1076.258 (0.133)	-165801.1 (0.000)	5855.64 (0.000)	0.520
MTNL/India	131.491 (0.000)	-228922.5 (0.000)	8074.456 (0.000)	0.753

Table 1. Results of telecoms sector organisations' analysis

The p value of β_{2i} (the rate of market capitalisation growth before floating the dot.com) was indicated as statistically significant for only one organisation out of the three investigated, per economy. For Australia, the range of $\beta_{2i\ was}$ between 18.501 and 2753.446. However, only Optus with the β_{2i} value of 1374.988 had a significant p value of 0.000. Similarly, for India, the β_{2i} values ranged between 131.491 and -1076.258, and only MTNL indicated a significant β_{2i} of 131.491 with a p value of 0.000.

From these disparate results, it appears that floating a dot.com entity was rather insignificant or negative for Australian telcos, but was indicated small but positive growth levels for Indian telcos. It seems possible that telcos in Australia are driven by the 'long term' benefits which have not yet shown up, while Indian telcos are capitalising on the 'new economy aura' of telecommunications created by the media. It is intriguing that, despite these disparate results, and the apparently low impact on market capitalisation, telcos in both economies still seem keen on floating dot.coms and developing this channel. We explore this insight, applying the transaction cost theory to these results, in the next section.

5.1 Transaction Cost Theory – Application to Telcos

Transaction Cost Theory (Pant and Hsu, 1996) suggested that 4 types of transaction costs could be reduced through web-based business: bounded rationality, opportunism, market uncertainty, and asset specificity.

Bounded rationality refers to the fact that human beings have limited information storage, retrieval and processing capacity, adding to transaction costs. Web based businesses can use the global facilities of information storage, retrieval through powerful search engines, and accessibility across the organisation and virtual linkages to other organisations, extending the value chain, without incurring additional costs. While the Indian telcos seem to be enthusiastic about eliminating the expensive systems by imbibing the Internet based new technologies and systems, Australian telcos have taken the further step of migrating to the Web, which initially is not cost-effective. However, the telcos seem to be enthusiastic about a network effect[8] within a technophilic population, which will in the longer term reduce their transaction costs.

Opportunism refers to the way in which information is distorted when reaching the consumer. It is becoming essential to become 'net certified' or transparent to enable evaluation and feedback by consumers on the Web. Driven by the growth of 'informed customers' in India and the demands of the younger generation, telcos in both economies are using the dot.com channel as a profitable, yet low transaction-cost venture.

Market uncertainty is a transaction cost involved in market research. With globalisation and increasing reach of products and services in the telecom sector, tools such as online surveys are not only reducing costs, but are also empowering the consumer through 'design your own' options. The uneven, high population volume in India and the long distances in Australia - both attract high transaction costs in the area of market research. The telcos can reduce their costs in this area, in the longer-term, by making use of web-based technology.

Asset specificity is a transaction cost associated with the Web, which is changing the business scenario from competition to collaboration. The move is towards standardisation, through systems such as Web Based EDI and, which reduces overall transaction costs for all collaborators within a supply chain. In both economies, telcos are moving towards collaborative networks through online ventures to reduce transaction costs.

Although floating a dot.com entity may or may not have benefited the telcos significantly, the integration of online services through dot.com floats

[8] Network effect refers to the phenomenon in which the value of any product or service increases with the number of users adapting it.

is bound to help them remain profitable in today's volatile, and competitive marketplace. Clearly, there is an opportunity for progressive telcos to benefit from using online ventures to promote and offer their services.

6. CROSS-ECONOMY PERSPECTIVES

In this section, we have synthesised the document based investigation and the quantitative analysis by applying various theories, deriving a cross-economy perspective to the telecoms sector.

The application of the *neo-liberal* account to the Australian and Indian contexts would suggest that both countries, to a certain extent, had to increasingly become a part of the global integration of telecoms through participation in GATT and international institutions such as the International Telecommunications Union. In addition, with the increasing convergence of technology, policy liberalisation has become imperative. From the *alternative theory* perspective, the opening up of the telecoms sector and the introduction of foreign capital investments have been part of India's response to general World Bank structural adjustments and First World interests have played a significant role in precipitating a large mass market in India (Mody, 1995).

The experiences of these two countries suggest that government policy; deregulation and demand are critical for growth in the telecoms sector. Having gone through the process of de-regulation in the 1990s, and with technology convergence adding a further dimension to the alternatives available, the hold of government over the telecoms sector is loosening. Interestingly, this formerly bureaucratic sector seems to have benefited to a large extent from IT/eBusiness diffusion, which is reflected in the convergence bills proclaimed in both countries studied. In Australia, Telstra (still majority-owned by the State) has more or less controlled competition through license fees and restricted entry to competition in critical areas. Similarly, in India, DOT has more or less controlled the sector, restricting entry through high license fees and union-supported influence on government policy. It has been market forces, rather than government fiat, which has introduced effective competition to these two megalithic organisations.

The well-researched *innovation-diffusion* theory of Rogers (1995), extended lately by many authors (Sonnenwald et al 2001, Agarwal et al, 1998; Sellitto 2001) classifies adoption patterns within social groups into innovators, early adopters, early majority, late majority and laggards. *Innovators* are classified as highly venturesome, mobile, daring and risk

taking, usually found in societies, which are able to absorb unprofitable innovations and apply highly complex technical knowledge with a higher degree of uncertainty. *Early adopters* are upwardly mobile, successful opinion leaders who form role models in any society. *Early majority* are deliberate before adopting an innovation although they are keen to be active in the uptake of new technology, while the *late majority* are cautious and respond only to necessity. *Laggards* are usually isolated, suspicious of innovation, and have limited resources.

Applying these variables to the Australian telecoms scenario, the society is more or less spread between *innovators, early adopters* and the *early majority*. This technophilic mindset, spurred also by the demands of the upwardly mobile younger generation, has enabled telcos to further experiment with eBusiness ventures. There is more or less early/rapid adoption of telecoms innovations in Australia. The country is also able to absorb unprofitable ventures and is a test-bed for many innovative telecoms services (for example, Orange One). By contrast, the Indian telecoms scenario indicates more a picture of *late majority to laggards,* if the statistics are any indication. The society has had limited resources to absorb unprofitable innovations and the majority of the population has historically responded only with caution and economic necessity. Interestingly, the growing upper-middle class, characterised by the computer professionals, is increasingly driving the diffusion of technological innovation. Many of these professionals are non-residents willing to invest in innovative telco ventures, as they are seen as progressive icons for the economy. The increasing popularity of mobile phones in metropolitan cities, broadband and DSL seems to indicate this move.

This analysis may be further augmented and explained through the *catch-up, forge ahead, fall behind theory*, developed by Abramovitz (1986), which argues that some economies try to catch-up with others, others fall behind, and yet others forge ahead as a result of the attitude of the population in general. Telcos in developed economies such as Australia are finding it harder to migrate their population to ever-renewed technology variations. Although technophilic and rapid adopters of new technology, the population is sceptical of the 'media hype' surrounding telcos, which are typically classified as 'new economy' ventures. The decline in dot.com stocks, especially telcos, has further added to this scepticism. To forge ahead and keep up with their counterparts, telcos in Australia need not only to innovate consistently, but also to be visibly cost-effective for the consumer.

Developing economies such as India, by comparison, are plagued by weak infrastructure, especially in terms of telecommunications. However, unlike Australia, telcos are viewed as 'new economy' icons by the rapidly growing upper-middle-class professionals, driven by the *catch-up* attitude.

These role models are pressuring the government to develop new initiatives, for a faster, more innovative, yet more cost-effective spread of telecoms services country-wide, harnessing the power of eBusiness. In a bid to *catch-up* with developed economies, the government has, in turn, become responsive to this demand. However, the legacy of bureaucratic government ownership still casts a shadow on the sector, slowing its progress.

7. CONCLUSIONS

Clearly, despite the threats of new entrants and technologies, there is enormous opportunity for dynamic telcos to capitalise on the opportunities offered by eBusiness. This paper has highlighted the importance of technology infrastructure, together with population size and distribution, as well as the general attitude towards innovation and adoption in the growth of telcos.

Australia, a high-technology country with a well-developed infrastructure, has been able to take advantage of many of the current telecommunications advances, but is hampered by a saturated market, a small population (which makes it difficult to support a large number of telcos), and a very expensive, geographically wide-spread rural sector. India, by contrast, has a huge population, which is much more evenly spread geographically (despite the dominance of two very large cities), but is hampered by the slow spread of technological infrastructure and a strongly bureaucratic development style.

In these very disparate economies, the growth of the telecommunications sectors has proceeded in a surprisingly similar manner – although the two countries have reacted differently to the dot.com floats by telcos. Our statistical analysis indicates the Australian share purchasers have not responded positively to this development – possibly seeing the telecoms sector as a less attractive vehicle for quick share profits. Indian purchasers, by contrast, have shown more enthusiasm for telcos floating dot.coms, with a resultant increase in market capitalisation, although this increase is still marginal. The application of innovation-diffusion and catch-up theory appears to suggest that India may be able to by-pass its weak infrastructure developments, harnessing the power of eBusiness and with the support of the growing 'catch-up' attitude of the public. Ironically, Australia may actually be suffering from its wealth of existing infrastructure and scepticism concerning telcos by the public as it attempts to take up the wireless/broadband challenge of the 21st century.

Clearly, these results can only be considered preliminary in nature. We plan to extend our analyses to other countries to test the tentative explanations suggested here. One particularly interesting comparison will be with the Accession countries of the former Eastern bloc, such as Poland, Hungary, the Czech Republic, etc. – many of which have also decided to by-pass the creation of wide-spread fixed telephone networks. Their decision to move directly into wireless telephone networks will provide a fascinating comparison with India's experience.

REFERENCES

Abramovitz, Moses (1989) Catching-up, forging ahead and falling behind, *Thinking about growth and other essays on economic growth and welfare*, Cambridge University Press, USA

Agarwal R, Ahuja M, Carter PE, Gans M (1998) Early and late adopters of IT Innovations: Extensions to Innovation Diffusion theory, Florida State University Working Paper.

Anderson, Chris (2000) The future of telecommunications, Address to SA Great-South Australian Business Forum, 13th July 2000. Available [online] http://www.cwo.com.au/content/1,1463,87,00.html. Accessed on 6th December 2001.

Bagchi (2000) Telecommunications Reform and the State in India: The contradiction of Private Control and Government corporartion, Center for Advanced Study of India, CASI Occasional Paper #13, December Available [online] http://www.sas.upenn.edu/casi/reports/Bagchipaper120000.pdf. Accessed on June 10th, 2001.

Berryman K, Harrington L., Layton-Rodin D, Rerolle V(1998) Electronic commerce: Three emerging strategies, *McKinsey Quarterly*, no.1 pages 152-159

Blaikie (1993) Approaches to Social Enquiry, Blackwell Publishing, UK

CIOL (2001a) Broadband market to touch Rs.66 crore by 2005:IDC, CIOL Bureau, October 23, 2001. Available [online] http://www.ciol.com/content/news/repts/101102312.asp?nl=ctd-Oct231 Accessed on 24th October 2001.

CIOL (2001b) Cellular market will be 34 m by 2006, Reuters, November 26th. Available [online] http://www.ciol.com/content/news/repts/101112606.asp?nl=ctd-112601 Accessed 0n 27th November 2001.

CIOL (2001c) Telecoms Sector attracts FDI despite bureaucratic hurdles, Cyber News Service, July 27th. Available [online] http://www.ciol.com/content/news/repts/101072716.asp?nl=ctd-July27. Accessed on 30th July 2001.

Colquhoun, Lachlan (2001a) Telecommunications: Telcos won't take the plunge, BOL Australia, Available [online] http://www.bolweb.com/magarticle.asp?doc_id=13509

Cyranek G and Bhatnagar SC (1992) *Technology Transfer for Development: The Prospects and Limits of Information Technology*, Tata McGraw-Hill, New Delhi

DCITA (2001) The Department of Communications, Information Technology and the Arts, Home Page. Available [online] http://www.dcita.gov.au Accessed on 21st February 2002.

Deloitte (2001) Telecommunications in Australia: Wireless, but with strings attached. Available [online] http://www.deloitte.com/internet/items/friendly.asp?id=341&frames=no. Accessed on 25th October 2001.

Dhar, Surindher (2001) Indian Telecommunication Liberalisation and Development, A report, Essar Comvision Limited, India.

Eastham, Jaime (2001a) Telecommunications: Telcos seel e-market solutions, BOL Australia. Available [online] http://www.bolweb.com/magarticle.asp?doc_id=13506. Accessed on 26th September 2001.

Eastham, Jaime (2001b) Telecommunications: Telcos seel e-market solutions, BOL Australia. Available [online] http://www.bolweb.com/magarticle.asp?REL_DOC_ID=25726. Accessed on 26th September 2001.

Eastham, Jaime (2001c) Telecommunications: Telcos seel e-market solutions, BOL Australia. Available [online] http://www.bolweb.com/magarticle.asp?REL_DOC_ID=257267 Accessed on 26th September 2001.

Evans and Bonugli (2001) The future of business in electronic age, Telstyle Pty Ltd, AAPT Connexus Magazine, 4Q98, Available [online] www.telstyle.com.au/other/aapt_business_a.htm. Accessed on 18th October 2001.

Fels, Allan (2001) Regulation and the future of the telecoms industry, Australian Telecoms Cisco Lecture Series,26th March 2001, Sydney, Available [online] http://www.accc.gov.au/speeches/2001/Australian_Telecoms_Cisco_Lecture_Series.htm. Accessed on 6th December 2001.

Gable, G., "Integrating Case Study and Survey Research Methods: An Example in Information Systems," European Journal of Information Systems, (3:2), 1994, pp. 112-126.

Glynn (1992) The Telecoms Review, India Infrastructure Report.

Harrison, J, Fifi E, Pereira F, Worthington R (1998) ADSL Prospects and Possibilities, Centrefor Telecomsmunication Management, Report prepared for ADSL Forum, Available [online] http://www.adsl.com/store/mrp_exec_summary.html, Accessed on 21st February 2002

Holmes, Jim (2000) Telecommunications deregulation: Lessons from the Australian Experience, *Ovum*. Available [online] http://www.ovum.com Accessed on 5th December 2001.

India Infoline (2001) Telecoms, Indian Telecoms Industries Sector Report Available [online] http://www.indiainfoline.com/sect/tesp/ch01.html Accessed on 7th December 2001.

Jain, Rekha (2001) The Telecoms Sector, *India Infrastructure Report 2001*, IIM Ahmedabad, Available [online] http://www.iimahd.ernet.in/ctps/iir8.pdf Accessed on 7th, December 2001.

Jhunjunwala Aand Ramamurthy B(2001) Enabling Telecoms and Internet Connectivity in Small Towns and Rural India, India Infrastructure Report 2001.

Kima and Yoon (1992) cited in Jain (2001) The Telecoms Sector, A Review of Indian Telecoms Sector, Indian Infrastructure Report.

Ladlaw (1994) cited in Jain (2001) The Telecoms Sector, A Review of Indian Telecoms Sector, Indian Infrastructure Report

Legard, David (2001) OneTel's Failure hits Australian Telecoms Competition, IDG, May 31st. Available [online] http://www.idg.net/ec?external=1&content_source_id=200&remote_addr=&doc_id=5506 Accessed on 5th December 2001.

Lucent (1999a) OneTel signs AUD$430 M contract with Lucent Technologies to build GSM1800 network in Melbourne, Adelaide and Perth, Lucent Technologies, September 30th. Available [online] http://www.lucent.com/press/0999/990930.cob.html Accessed on 5th December 2001.

Mandel MJ and Hof RD (2001) The rethinking of the Internet, Dataquest DQ-BW E-Biz Section, Available [online] http://dqindia.ciol.commakemainsection.asp/01060101.asp. Accessed on 4th July 2001.

Maxwell, Christine (2000) Global trends that will impact universal access to information resources, Submitted to UNESCO, July 15th.

McDowell, Stephen D (1997) Globalisation, Liberalisation and Policy Change: A political economy of India's Communications Sector, St Martin's Press Inc, New York.

Menon (2002) India's privatisation: standing on the crossroads, CIOL, February 4th. Available [online] http://www.ciol.com/content/news/repts/102020414.asp?nl=ctd-020402 Accessed on 5th February, 2002.

Michael DC, Sutherland G, Lang NS (2001) Digital Dragons – How Asia Pacific's Large Companies can generate value from consumer eBusiness, *The Boston Consulting Group*, July Available [online] http://www.bcg.com Accessed on September 17th 2001.

Mingers, J. & Brocklesby, J. (1997). Multimethodology: Towards a Framework for Mixing Methodologies. OMEGA, International Journal of Management Science, 489-509.

Mody, Bella (1995) State Consolidation through liberalisation of telecoms, Journal of Communication, 45(4).

Moon, Olaf (1999) Bandwith requirements for the Australian Training and Education Sector, Chapter 7, eDna Online publication, Available [online] http://www.edna.edu.au/showpage.html?file=%2Fpublications%2Fbandwidth%2F6restraints.html

MTNL (2001) Company Research Report – MTNL, Available [online] http://profiles.wisi.com/profiles/scripts/corpinfo2.asp?cusip=C35662570 Accessed on 9th July 2001.

Nagaraj, Sudha (2001) India to post 49.5% growth in Internet users, *The Economic Times*, June 27th. Available [online] http://www.economictimes.com/today/27tech01.htm. Accessed on 4th July 2001.

Neuman William L(1997) *Social research methods : qualitative and quantitative approaches*, Allyn and Bacon, Boston

NOIE (2000c*) eCommerce beyond 2000*, Commonwealth of Australia Available [online] http://www.noie.gov.au/beyond2000 Accessed on June 2, 2000.

NTIA (2000) The Council of Economic Advisors - The Economic Impact of Third-Generation Wireless Technology, Available [online] http://www.ntia.doc.gov/ntiahome/threeg/ceareportoct2000.pdf, Accessed on 21st February 2002

Optus (2001) Speeches: The future of telecommunications, Chris Anderson, CEO, Available [online] http://www.cwo.com.au/content/1,1463,87,00.html Accessed on 5th December 2001.

Orange (2001) Company Profile Available [online] http://www.orange.net.au/aboutus/company.htm Accessed on 5th December 2001.

Pastore (2001) Consumers Prefer Local Telco for Bundling, Available [online] http://cyberatlas.internet.com/big_picture/hardware/article/0,,5921_899271,00.html Accessed September 27th, 2001

Pelline, Jeff (1996) Say goodbye to small ISPs, CNET News.com, Available [online] http://news.com.com/2100-1023-222758.html?legacy=cnet Accessed on 21st February 2002

Pinsonneault, A. & Kraemer, K.L. (1993). Survey Research Methodology in Management Information Systems: An Assessment. Journal of Management Information Systems, 75.

Pitroda, Saumen (1993) Development, Democracy, and the Village Telephone, *Harvard Business Review*, November-December, page 66-79

Quiggin (1998) The Premature burial of natural monopoly: Telecomsmunication reform in Australia, Agenda 5(4), 427D440.

Rogers E (1995) *Diffusion of Innovations*, The Free Press, NY.

Sellitto, C (2001) Developing an Ecommerce Best Practice Model for Victorian Wineries: An Agenda for Research, RMIT Working Paper.

Sinha, Sidharth (1997) The Risks of Financing Telecoms Projects, Indian Institute of Management, Ahmedabad, Vikalpa: The Journal of Decision Makers, Volume 22, no.3, July-September, pp 1- 15. Available [online] http://www.iimahd.ernet.in/vikalpa/past/v022n03.htm#ab5 Accessed on January 4th, 2001.

Sonnenwald DH, Maglaughlin KL, Whitton MC (2001) Using Innovation theory to guide Collaborative Technology Innovation: Work in Progress, IEEE 10th International Workshop on enabling technologies: Infrastructure for Collaborative Enterprises, USA.

Telstyle (2001a) Sidebar: The local telephony market. Available [online] http://www.telestyle.com.au/feature/local_call_sidebar_a.htm. Accessed on 18th October 2001.

Telstyle (2001b) DSL market growing rapidly in Australia, Newbytes Asia, October 10th. Available [online] http://www.nua.com/surveys/index.cgi?f=VS&art_id=905357281&rel=true. Accessed on 18th October 2001.

Trinkwon, David (1996) Technology of Fixed Wireless Access, Seminar presentation, Columbia University, Available [online] http://www.citi.columbia.edu/wireless/!citi_fw.htm, Accessed on 21st February 2002.

Uehara (1990) cited in Jain (2001) Review of Indian Telecoms Sector, The Telecoms Sector Report.

UMTS Forum (2000) Enabling UMTS/Third Generation Services and Applications, Report No. 11, October 2000 Available [online] http://www.umts-forum.org/reports.html, Accessed on 21st February 2002

Westland JC and Clarke T H K (1999) *Global electronic commerce – theory and case studies*, The MIT Press, Massachusetts.

Williamson O. E. & Winter S.G. (eds.), (1993), *The Nature of the Firm: Origins, Evolution and Development*, Oxford University Press, N.Y.

Worldroom (2002) Teledensity, Australia Available [online] http://www.worldroom.com/pages/wrnsyd/fastfacts/syd_fastfacts.phtml Accessed on 21st February 2002.

Yamada, M M (2000) Web Cell Phones a Ringing Success in Japan, The Industry Standard, Available [online] http://www.thestandard.com/article/display/0,1151,15377,00.html, Accessed on 21st February 2002