Preface

Several advantages of broadband for both the public and private sector organisations have been outlined and discussed in many previous studies. These benefits include cost savings, efficiency and competitiveness (Lee et al, 2003; Oh et al, 2003; Sawyer et al, 2003). Furthermore, high uptake of broadband is perceived to play a vital role in the growth and development of the emerging internet-based applications including electronic commerce, electronic government, and electronic health. It promises several societal benefits including telecommuting (Suomi & Pekkola, 1998), which in turn offers benefits in many ways such as contributing to flexibility of lifestyle for individuals, permitting space savings for organisations, and helping to decrease carbon footprints by reducing travelling between the home and the workplace (Dwivedi et al, 2010). Broadband allows implementation of telemedicine-enabled health service delivery, particularly for older people and for dispersed populations located in remote areas. Another societal use of the technology is support for e-Learning and distant learning. e-Learning both complements face-to-face classroom education with computer-aided teaching (so-called *blended learning*) and enables those who are unable to attend a formal educational environment (e.g., people in remote areas) to learn and gain knowledge by accessing online resources through an internet connection (distance learning). Many governments have realised the potential of broadband technologies and have made available an increasing number of government services for citizens to access online (Dwivedi et al, 2010).

Considering the aforementioned benefits, governments in a number of countries, including South Korea, Japan, Hong Kong, Sweden, Australia, Canada, the UK and the USA, have made large investments in developing a broadband infrastructure to deliver high-speed internet access to end users, including household consumers and Small and Medium Enterprises (OECD, 2001; Oh et al, 2003; Sawyer et al, 2003). Despite the early efforts by the governments of several countries, its demand has not increased in line with expectations (Dwivedi et al, 2010). In order to accelerate the growth momentum further, recently some of these broadband pioneers have rejuvenated their efforts to provide broadband access to all citizens. For example, the USA has formulated the 'National Broadband Plan' (FCC, 2009[1]). Similarly, the Australian Prime Minister has announced plans to build Australia's new national broadband network that will aim to reach 90% of Australian households at a cost of $US30 billion (Radio Australia News[2]). Such initiatives indicate that the development, deployment and diffusion of broadband infrastructure and technologies require continued and long-term planning and strategic thinking (Dwivedi et al, 2010).

Since broadband internet has the potential to profoundly impact science, business and society – and transform almost every aspect of everyday life – it is appropriate and timely to understand the deployment and adoption of broadband technologies (Dwivedi et al, 2008). Numerous researchers around the world have realised the importance of studying this area and have focused upon accumulating relevant knowledge of it. Broadband research has been prolific for a phenomenon that is quite young. However, an analysis of the current literature on broadband suggests that the available body of knowledge is frag-

mented with some studies looking at adoption or usage patterns, and others at the impact of broadband on existing or new internet applications (Dwivedi et al, 2008). Recognising this as an opportunity to contribute to the emerging research on broadband, IGI Global has published an authored book (Dwivedi, 2007) on *Consumer Adoption and Usage of Broadband* and a two-volume handbook (Dwivedi et al, 2008) titled *Handbook of Research on Global Diffusion of Broadband Data Transmission*. These two publications made initial efforts in synthesising existing research results in order to offer an overall picture and comprehensive understanding of exploratory issues related to the deployment, diffusion, adoption, usage and impact of broadband technology from a global perspective. However, the issues, problems and suggested solutions reported in these two IGI publications may have evolved, which may suggest a need for fresh thinking and strategies to advance the knowledge and practice in this area.

In line with the aim of the previous two publications (Dwivedi, 2007; Dwivedi et al, 2008) to access the latest research and provide an outlet to researchers in the field of broadband, the editor decided to launch this book where researchers with varied geographical, educational and cultural backgrounds assist in providing the necessary coverage of possible research issues within the area. Hence the primary objective of this edited volume was to assemble as much research coverage as possible related to the recent policy- and practice-oriented advances regarding deployment, diffusion, adoption, use and impact on emerging applications from studies conducted in various geographical settings. Additionally the book helps the reader to understand the differences in the adoption of broadband in different countries and examine comparative policy issues at national and international levels.

In order to provide the most balanced coverage of concepts and issues related to the selected topics of this book, researchers from around the world were asked to submit proposals describing their planned coverage and the contribution of such coverage to the book. All proposals were carefully reviewed by the editor in light of their suitability, the researcher's records of similar work in the area of the proposed topics, and the best proposal for topics with multiple proposals. The goal was to assemble the preeminent studies into broadband from all over the world to contribute entries to the book. Upon the receipt of full entry submissions, each submission was forwarded to at least two expert external reviewers on a double-blind peer review basis. Only submissions with strong and favourable reviews were chosen as entries for this book. As a result, this book includes 16 entries highlighting aspects of deployment, diffusion, adoption and use of broadband in various geographical settings. All entries were written by knowledgeable, distinguished scholars from many prominent research institutions around the world.

The extended and comprehensive coverage of broadband research in this distinctive book will contribute towards theory, practice and policy. The theoretical contribution of this collection of studies is that it synthesises the appropriate literature in order to enhance knowledge of broadband deployment, diffusion, adoption, usage and impact from the global perspective. In line with previous publications (Dwivedi, 2007; Dwivedi et al, 2008) this book contributes to theories and models from different areas such as Information Systems, Management, Marketing, Economics and other Social Sciences disciplines. Considering the relatively slow, heterogeneous and stagnant adoption of broadband, it can be learnt that the policy makers and providers of the innovation – in this case the telecommunications industry – hold a specific interest in the findings of this book. Policy makers in various countries, mainly from the developing world, are currently investigating how to increase the diffusion of broadband within their own countries, and so information on other countries' experiences could prove useful. Additionally, the telecommunications industry is interested in determining how to improve their current strategies. Therefore, for both policy and practice, this book offers an understanding of the broadband diffusion strategies at both macro and micro levels. Understanding the usage and impact of broadband will be helpful for

content-developing organisations to integrate compelling content with new generation broadband, as well as for broadband service providers seeking to improve their services.

In order to cater to the information needs of a diverse spectrum of readers and at the same time to effectively present this global but complex topic, this book is structured into four sections, with each section including a number of chapters. A brief description of each section and chapter is provided below.

Section 1, titled "*Country Analysis and National Policies*," examines both the factors and policies shaping broadband deployment and diffusion in various countries including Greece, Japan, New Zealand, South Africa, and The United States of America. A number of pertinent factors and issues including national policy, market competition, structural changes, regulatory challenges, and socio-cultural perspective were discussed within this section. A brief account of the seven chapters included in this section is provided below.

Chapter 1, titled "*Still in Pursuit of the Fast Lane: The Crawl to Broadband Freedom*," by Justin Henley Beneke begins by asserting that South Africa may be renowned for its natural attractions, warm climate and fine wine, but certainly not for high quality broadband. The country has fallen behind its international peers – in both developing and developed markets – in the race to rollout internet connectivity. In fact, even within the African continent, it is neither a leader nor progressive in comparison to its North African counterparts. This chapter aims to provide a chronology of the major developments in the provision of broadband internet services in South Africa, as well as touching on the challenges faced in bringing this phenomenon into the mainstream. Reasons for the lack of diffusion and adoption of such services point to the high-end user costs of the service, a limited geographical footprint of both fixed-line and mobile broadband infrastructure, as well as a lack of computer literacy and understanding of what broadband is able to offer. The chapter continues to look at possible solutions including introducing a greater degree of competition into the market to facilitate downward pressure on prices, provisioning further international bandwidth through undersea fibre optic cables, and the unbundling of the local loop, to further this objective.

Chapter 2, titled "*Strategic Interaction under Asymmetric Regulation: the Case of New Zealand*," by Bronwyn Howell aims to examine the specific consequences of the asymmetric tariff obligations and ensuing strategic interaction amongst sector participants on sector development – namely the effect of universal service retail prices and the allocation of the ensuing costs in determining the ongoing regulatory agenda; the role of a 'free local calling' obligation on the evolution of New Zealand's broadband market; and the consequent application of further asymmetric legislative obligations on the incumbent to address apparent 'problems' for which the asymmetric tariffs and rivals' strategic choices provide more credible explanations than the incumbent's exertion of its dominant position.

Chapter 3, titled "*Examining the Influence of Government Policy on Broadband Internet Access: the Case of China*," is authored by Qiuyan Fan. The primary goal of this chapter is to examine how various policy factors interplay to affect broadband deployment and performance in the case of China. The findings from this chapter suggest that the Chinese approach to broadband development has not produced desirable results due to several factors. The most important factor is the lack of a detailed national broadband plan with clearly states goals, performance targets and action plans for implementation. China's regulatory arrangement and approaches to regulating the broadband industry have failed to establish an effective and competitive market and to drive high levels of broadband performance, investment and innovation.

Chapter 4 of this section is co-authored by John B. Meisel, John C. Navin and Timothy S. Sullivan and discusses the Federal Communication Commission's National Broadband Plan. The American Recovery and Reinvestment Act of 2009 charged the US Federal Communications Commission (FCC) to develop

and deliver to Congress a national broadband plan by February 17, 2010. The FCC formally commenced the process of developing the plan by issuing a Notice of Inquiry (NOI) on April 8, 2009. The NOI identified broadband issues and critical questions and asked stakeholders to respond to these issues and questions with data and analysis. The purpose of this chapter is to analyse the written documents generated by stakeholders' responses concerning the specific issues of open networks and competition and to make recommendations to the FCC in its formulation of federal policy as to the position that makes the most economic sense on these issues. The chapter suggests that many of the arguments and concerns of stakeholders are dependent upon predictions regarding the competitiveness of ISP markets. Based on the discussion made within the chapter it predicts with confidence that technological innovations are likely to make many legal arguments (on all sides) obsolete in the near future.

Chapter 5 focuses on broadband and structural separation from the perspective of transaction cost economics authored by Hidenori Fuke. Conduct regulation and structural separation are often discussed in industrial organisation studies as options to prevent the abuse of market power by vertically integrated firms toward the downstream market. Both the structural separation of NTT and conduct regulation have been discussed in the Japanese telecommunications industry since the introduction of competition in 1985 and the issue is still being discussed, although the industry is going through a transition from POTS (Plain Old Telephone Service) to the broadband internet. Past discussions have been inclined toward elimination of the harmful effects of vertical integration. However, there is a benefit of vertical integration in the sense that it will promote the efficient administration of the firm concerned. This chapter presents a new contention that it is important to employ a balanced analysis of costs and benefits of vertical integration based on transaction cost theory. Structural separation in the broadband market entails significant transaction costs between a carrier with access facilities and firms offering broadband services by renting these facilities as input. These kinds of transaction cost are comparatively negligible in POTS. The chapter attempts to make clear that the balance analysis of the costs and benefits of structural separation has become more important in broadband than in POTS, based on the actual differences in network structure.

The last chapter (Chapter 6) of this section compares mobile phones with other ICTs and presents the case of Greece and its adoption of mobile phones from a socio-cultural perspective. This chapter is authored by Panayiota Tsatsou. The chapter explores mobile phones and how they have been received in juxtaposition with the Internet and in close association with the socio-cultural contexts of life. By examining the Greek case and its particularities, the chapter provides some sense of why different Information and Communication Technologies (ICTs), such as mobile phones and the Internet, might be received and adopted differently by people living in the same socio-cultural context (at the national level). In the case of Greece, statistical and historical data confirm the contrasting receptions of mobile phones and the Internet but there is a lack of empirical evidence to explain the exceptionally high adoption rates of mobile phones in the country. Thus, the chapter reports on original empirical evidence obtained in elite actors' interviews and focus groups of ordinary people to explain the contrasting ways that mobile phones and the Internet have been received in the country. On the basis of the empirical findings, the chapter suggests that certain socio-cultural contexts, such as that of Greece, favour mobile phones more than the Internet, thus making mobile telephony a distinctive case of ICT.

Section 2, titled "*Cross-Country Analysis and Global Perspectives on Policies and Strategies,*" examines and compares policies, strategies and best practices in relation to broadband deployment, diffusion, adoption, and usage in various countries. A brief account of the three chapters included in this section is provided below.

Elizabeth Fife and Francis Pereira contributed Chapter 7 on the effectiveness of Government policies in broadband deployment in Singapore, Hong Kong SAR and South Korea. While the potential economic and social benefits of broadband internet use are significant, adoption levels vary greatly between countries around the world. Many governments, particularly those in Southeast Asia, have adopted aggressive policies to deploy broadband networks and to encourage the use of applications. Governments are motivated to promote broadband adoption in order to realise both economic and social benefits. This chapter argues that the generally higher levels of broadband adoption rates witnessed in many Asian economies is attributable in part to the aggressive policies pursued by these governments. There is some evidence to suggest that these governmental policies have been successful in achieving their stated goals.

The three Greek authors, namely Christos Bouras, Apostolos Gkamas and Thrasyvoulos Tsiatsos, co-authored Chapter 8, titled "*Best Practices and Strategies for Broadband Deployment: Lessons Learned from Around the World.*" This chapter begins by asserting that broadband deployment is a necessity nowadays. It could help each country, municipality and region to grow and offer better quality of life to the citizens. Today, the emphasis on the development of broadband networks is on fixed Fibre to the Home solutions. The lessons learned from countries that are leaders in broadband penetration and Fibre to the Home deployment could prove very useful for under-served communities, regions and countries where the broadband penetration is low. Therefore, this chapter summarises the lessons learned from implementing (a) country-wide strategies formulated at the national level, and (b) local strategies formulated by the municipalities. Concerning the role of national and local governments, it should be noted that nowadays it is very urgent in terms of the involvement of government in the development of broadband infrastructure. Proposed noteworthy remarkable cases are Japan, South Korea and Singapore.

The last chapter (Chapter 9) of Section 2, titled "*The European Research and Education Networks: Ensuring Europe's Leadership in e-Science,*" is co-authored by Navonil Mustafee and Simon JE Taylor. This chapter begins by asserting that e-Science is the future of Science. It necessitates the use of powerful computing resources, massive data sets, remote instruments, scientific/visualisation software and expertise that are distributed around the world. e-Infrastructures refer to the underlying computing technologies that facilitate e-Science. To weave these distributed resources into a cohesive entity, and thereby enabling such large-scale science to be conducted in highly distributed environments, needs the utilisation of high-speed communication networks. The European Research and Education Networks provide the connectivity required to ensure Europe's leadership in e-Science. These networks not only provide the communication resources required to conduct e-Science, but they also offer high-speed internet access to universities and educational institutes to facilitate teaching and learning. The objective of this chapter is to inform the readers of the organisation of the underlying European networks that are used by millions of researchers, academics and students. The importance of these networks is highlighted by presenting six e-Science and e-Infrastructure projects that are being funded by the European Commission.

Section 3 examines the impact and social consequences of broadband diffusion. The chapters included in this section provide an in-depth discussion on the impact of broadband on societal issues such as digital divide, rural development and emergence of new societal forms. A brief account of the four chapters included in this section is provided below.

The opening chapter (Chapter 10) of this section was contributed by Peter Stenberg and Mitchell Morehart and attempts to build an understanding of U.S. rural-urban differences in broadband internet adoption and use. The chapter begins by asserting that the Internet has become embedded in the U.S. economy over the past 15 years. During this period, access to and use of the Internet has increased for

all regions of the United States, most types of households and work places, and all income groups. This chapter explores how access to technologies may affect household online activity patterns and addresses some of the aspects that differentiate urban and rural household use of the Internet. Rural households are less likely than urban households to have broadband internet access but this varies regionally across the country. The results suggest that broadband internet access is no longer perceived as a luxury but as a necessity, and that there is pent-up demand for broadband internet access in rural areas.

Chapter 11 is titled "*Information Communication Technology (ICT) for Rural Women's Life in Bangladeshi Villages*" and is co-authored by four authors, namely Md. Mahfuz Ashraf, Helena Grunfeld, Syeda Rownak Afza and Bushra Tahseen Malik. The chapter begins by recognising that Information Communication Technology (ICT) has the potential to contribute to development, especially in rural areas of developing countries. But the mechanisms through which ICT can be combined with development agendas and an understanding of the actual development process and impacts of ICT are less well understood or properly defined in the academic literature. This research is an attempt to contribute to understanding this process by analysing the impact of two ICT initiatives in Bangladesh, aimed at improving the lives of rural women. An interpretive approach in the qualitative research tradition was adopted to identify emergent themes in this study. Findings presented in this chapter indicate that these ICT projects have significantly improved the socio-economic opportunities of many women. This paper will be useful for those academics, practitioners and policymakers who wish to enhance their understanding of ICT projects in rural areas of developing countries.

Justin Henley Beneke contributed Chapter 12, titled "*The Application of Social Network Websites as a Marketing Platform to the Youth: An Emerging Market Perspective.*" The chapter begins by stating that social networking is often touted as being a prominent application responsible for driving the adoption of residential broadband services. The growth of social networks is phenomenal – in many cases more than doubling in size on an annual basis. This study considers how social networking may be utilised for commercial purposes to spread word-of-mouth communication. The chapter therefore considers the characteristics of young adult social network users and how they behave and interact with other users on such platforms, as well as the manner in which marketers can make the most of this platform without experiencing a consumer backlash. The research suggests that if a symbiotic relationship does exist between broadband proliferation and the adoption of social networking, both have a vested interest in each other's continued success.

The last chapter (Chapter 13) of Section 3 titled "*Consumer Usage of Broadband Internet Services: An Analysis of the Case of Portugal*" co-authored by Janice Hauge, Mark Jamison and Mircea Marcu. The chapter aims to analyse the intensity and patterns of use of fixed and mobile broadband consumers in Portugal. If usage across types of consumers is similar after controlling individual characteristics identified to be important drivers of adoption, then it is more likely that consumers will view mobile and fixed broadband as somewhat substitutable. Such a result is important for studies of broadband impacts; specifically, for discerning whether mobile broadband services will have a similar level of impact upon social and economic development as fixed broadband services have had. The results presented in this chapter indicate that broadband uses are similar across fixed and mobile users, suggesting that the technologies are somewhat substitutable from customers' perspectives and raising the possibility of limited differential effects on innovation and other social goals. Results of interest include the characteristics of internet users by technology, and differences of usage patterns reflected by individual characteristics.

Section 4, titled "*Technological Advances and its Impact on Emerging Applications*," explores the advances in the area of broadband technologies and examines the impact of broadband on emerging ICT

applications and business models. The chapters included in this section provide in-depth discussion on the evolution of broadband technologies and their impact on the delivery of entertainment services to consumers and citizens.

The opening chapter (Chapter 14) of the last section is contributed by Banani Nandi and Ganesh K. Subramaniam. This chapter is titled "*Evolution in Broadband Technology and Future of Wireless Broadband*." It begins by asserting that in the past two decades, the availability of worldwide high speed internet networks together with progressive deployment and adoption of broadband connections to the Internet has significantly enhanced the ability to transmit video, audio and voice through the same channel with high performance. In addition to that, since the beginning of this millennium, there has been a rapid growth in diffusion of wireless broadband. In this respect, mobile broadband is gaining popularity lately in both developing as well as developed countries. The main reason for this growth in wireless broadband lies in its ability to serve remote areas at a relatively lower cost than landline and its potential to transmit information seamlessly from anywhere in the world. The purpose of this chapter is to examine this changing diffusion behaviour of fixed versus mobile broadband technology and highlight the future possible path of adoption for these technologies by users around the world.

Nabyla Daidj and Pierre Vialle co-authored Chapter 15 on the strategic moves related to broadband diffusion on the French VoD and TV market. The chapter begins by asserting that the launch of triple-play services, including IPTV, can be considered as a "critical event" that has had a strong structural impact on the market. This paper analyses the evolution of the VoD supply in France, and in particular the effect of the launch of IPTV systems. Firstly, the launch of attractive triple-play offers has induced a strong development of the French broadband internet access market, which in turn has resulted in the entry of numerous players in the VoD market. Secondly, the adoption of an IPTV system has changed the competitive and strategic positioning of main players in the VoD value chain, thus inducing or amplifying strategic moves along this value chain. In particular, the chapter shows how the diffusion of IPTV systems has induced a switch from complementary convergence to competitive convergence.

Finally, Chapter 16 is titled "*Media Platform Competition: The Displacement Effect of IPTV on Cable TV in Taiwan*" by Yu-li Liu & Wen-yi Hsu. The chapter begins by outlining three major TV platforms (terrestrial TV, cable TV, and IPTV) in the context of Taiwan. When faced with various TV platforms, the consumers in Taiwan will be able to choose from many broadcasts. When a new medium emerges, there are always concerns for its displacement effects on existing media. Many studies have explored the displacement effects of newly-emerging media, and have come up with a variety of sometimes conflicting findings. This chapter aims to analyse the media platform competition, namely, the displacement effect of IPTV on cable TV. The research methods used include a literature review and a telephone survey. With regard to the telephone survey, 612 of CHT's IPTV users were selected systematically based on the name lists provided by the service provider. In this study, while the platform displacement effect of IPTV on cable TV is clear, the statistics reveal a different result for the time displacement effect.

As reflected by the brief accounts of the 16 chapters presented above, this book provides a comprehensive coverage of broadband deployment, diffusion, adoption, usage and policies as they have been realised by research in many countries around the world. Therefore, the editor believes that this book will provide a positive contribution to the area of Information Systems in general and, more specifically, to the adoption and diffusion of broadband.

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ENDNOTES

[1]   http://www.broadband.gov/
[2]   http://www.radioaustralianews.net.au/stories/200904/2538028.htm