Unwired Australia Pty Limited

Submission in response to

The Department of Broadband, Communications and the Digital Economy

Consultation Paper on

Digital Economy Future Directions

February 2009

1. Introduction

This submission is made by Unwired Australia Pty Ltd in response to the Department of Broadband, Communications and the Digital Economy Digital Economy Future Directions Consultation Paper (the **Paper).** Unwired is pleased to support the Government in its endeavour to promote Australia's further development as a Digital Economy, and was pleased to contribute to the Minister's forum in September.

The Paper identifies that the *Future Directions* paper will "describe the nature of the digital economy, the benefits it offers and include a series of case studies with examples of Australians using the internet in innovative ways. It will also describe the respective roles of government, industry and other stakeholders in maximising these benefits and opportunities from the Australian Government's existing commitments to facilitate the digital economy."

As a wireless internet provider Unwired is particularly attuned to the significance of wireless applications in the Digital Economy. The connectivity target isn't 6 million premises, or 20 million people but 100 million or more devices. This level of connectivity will require the deployment of 4G wireless networks, and Government needs to pay particular attention to both the support it can give to promote, and any barriers to, the deployment of these networks.

The challenges to achieving the benefits of a Digital Economy and therefore requirements for action will be elucidated further in this submission.

Unwired notes the restrictions noted in the Paper on the ability of the consultation to canvas issues to do with the NBN and internet filtering. However, both of these are significant to the strands of connectivity and confidence and will be touched on in this submission.

This submission will address each of the sections of the consultation paper; however they will be approached in a slightly different order than the way they appeared in the Paper. Responses to the questions posed in the Paper are included in Attachment 4. The submission is structured as follows;

Section 2 will discuss the concept of the Digital Economy, including the opportunities and threats it poses and questions relating to markers of success and measurement. An attachment to this section will also very briefly deal with issues relating to the environment.

Section 3 will make high level recommendations for actions that can be taken by the Australian Government to progress the Digital Economy transformation.

Section 4 will discuss aspects of capabilities essential to a Digital Economy. This will include network capability, human resource capability and the regulatory framework.

Section 5 will discuss the issues of consumer and business confidence and security.

Section 6 concludes the paper, highlighting the importance of 4G wireless services, and commenting on the structure of the telecommunications industry.

2. Understanding the Digital Economy

2.1. Defining the Digital Economy

The Paper states;

> *The ''digital economy' refers to the global network of economic and social activities enabled by ICTs, particularly the internet. It includes commercial transactions, personal dialogue, information, entertainment and delivery of services. The term is often used interchangeably with 'internet economy' and 'information society'.*

This definition suggests that the Digital Economy is in some way a subset of the economy, that some activities can be described as belonging to it while others aren't. This interpretation seems to be supported by the tender released by the Government in June 2008 to measure the "sectoral behaviour" of the digital economy.[1] This contrasts with the approach to ICTs as "general purpose technologies" (GPTs) where the interest is not just in the productivity improvement but in the ways the technology transforms the economy.

The consideration of ICTs as a GPT is discussed in more detail in Attachment 1. This brief discussion suggests that the definition of the Digital Economy being used is too restrictive and should perhaps be;

> *The "digital economy" refers to the transformation of economic and social transactions, organisation and relations enabled by the combined use of information processing and telecommunications technologies, such as the Internet and mobile communications. It includes commercial transactions, personal dialogue, and machine-to-machine communications for the delivery of information, entertainment and services. The term includes concepts referred to as 'internet economy' and 'information society'.*

Mobile communications are a critical element of the transformation, and the facilitation of wireless data communications in coming months and years will mirror the transformation in voice communications of recent years. The facilitation of the development of 4G wireless data networks is central to the success of the digital economy.

2.2. Consequences of the Digital Economy

The consequences of the digital economy involve the construction of the marketplace in the world of the Internet, and the impact of the Digital Economy on the geographic organisation of the economy.

The first observation is that, like previous communication technologies, the internet has been hailed as an inherently positive, decentralizing, and democratic force; this utopian tendency has been called "the Jeffersonian syndrome."[2]

The utopian view of the economic promise of the Internet has been described as "a new world of low-friction low-overhead capitalism, in which market information will be plentiful and

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[1] "Digital economy benchmarking at the sectorial (sic) level" ATM ID DCON//08/28 27 June 2008. www.tenders.gov.au. See also "Govt to quiz 'sectoral behaviour' of digital economy' *ZDNet Australia* 30 June 2008 www.zdnet.com.au

[2] Francois Bar, John Richards and Christine Sandvig "The Jeffersonian Syndrome: The Predictable Misperception of the Internet's Boon to Commerce, Politics, and Community" Available at http://www-rcf.usc.edu/~fbar/Publications/jeffersonian-syndrome.PDF

transaction costs low."[3]. These early expectations rested on three key assumptions; low entry barriers, decreased roles for intermediaries, and lower transaction costs.

The reality of the net has been that while initial entry barriers are low, because of network externalities and economies of scale in infrastructure, we are seeing increasing concentration and large players, rather than a multitude of small players. Intermediation did not disappear, simply new intermediaries emerged and old intermediaries adapted; for example, home buyers and sellers don't transact directly, though they may use on-line real estate sites.

Finally, while the technology of the Internet can be used to reduce "friction" it can also create it by embedded customer details within the site.

At the same time the Internet has been thought to promote a geographic decentralization. The crucial role of wireless communication enabled by 4G networks to the development of the digital economy highlights this issue. The physical location of a transaction is being and will continue to be decentralized.

It is noteworthy that the Internet also promotes a new centralization. However in the information age, the critical asset is no longer a physical one; it is access to highly skilled labour, most particularly the scientists, engineers, and other professionals who dominate the new economy.[4]

These consequences of the Digital Economy are explored more fully in Attachment 2, along with some comments on environmental matters.

2.3. Measuring success

The determination of measures of success needs to be framed in the context of the objective set. The Paper started with the statement;

> *The Australian Government is seeking to increase the effective use of networked information and communication technologies (ICTs), especially the internet, by consumers and all businesses to drive higher productivity growth and community participation in the digital economy.*

A key measure of the Governments success in achieving this goal will be its success in promoting the delivery of national high speed internet connectivity in the shortest possible time. This will be best achieved by Government support for a robust national backbone and 4G wireless networks connecting devices, people, businesses and communities.

But the paper went on to describe the outcome of the consultations as;

> *The Future Directions paper will describe the nature of the digital economy, the benefit it offers Australians and include a series of case studies with examples of Australians using the internet in innovative ways. It will also describe the respective roles of government, industry and other stakeholders in maximising these benefits and opportunities from the Australian Government's existing commitments to facilitate the digital economy. This consultation paper will inform that part of the Future Directions paper that outlines the roadmap for Government and industry to maximise Australia's online participation.*

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[3] Bill Gates *The Road Ahead* Viking Penguin 1995 P. 158

[4] Joel Kotkin *The new geography: How the digital revolution is reshaping the American landscape.* Random House 2000

There is an extent to which success will only be measured by standard macro-economic indicators. As discussed above the Digital Economy is not a subset of the whole economy, nor is it an optional choice for the development of the overall economy. The Digital Economy is the transformation of the economy (in all countries) enabled by the use of ICTs; consequently success is measured by overall economic success. The measurement of success is discussed further in Attachment 1.

3. Progressing the Digital Economy Transformation

While the underlying premise of this submission is that the Digital Economy is a transformation of the economy that will occur as a consequence of the adoption of new technologies, that should not be interpreted as their being no role for Government in the transformation.

Indeed, Unwired believes the extent of the transformation to the Digital Economy needs to be recognised in all parts of public policy. As an infrastructure provider, Unwired naturally focuses on the role of Government in promoting the establishment of the infrastructure necessary to enable this transformation. The establishment of national broadband access is the subject of major Government activity and investment, as it should be. The establishment of the necessary infrastructure cannot be regarded as having been achieved, however without the establishment of the connectivity capability essential for the full development of the digital economy, connectivity only possible via 4G wireless networks.

Additionally, the assumption that the adoption of ICT across the economy is a significant driver of productivity improvement suggests that the transformation should be at the centre of macro-economic policy. There are contentions in economic growth theory about the role of technological change. Unwired believes that there should be a linkage between the assumptions of macroeconomic policy and the monitoring of the transformation to a Digital Economy.

Additional matters relevant to this topic are discussed further in Attachment 2 under the heading Administration of DE Issues, and Information Sharing.

Further, the Digital Economy is of sufficient importance to be managed by a Cabinet sub-committee of the relevant ministers. These ministers would appear to be the Minister for Broadband, Communications and the Digital Economy, Minister for Education, Employment and Training, the Minister for Social Inclusion (conveniently the same as the education minister), the Treasurer, the Finance Minister (because of his AGIMO responsibility), the Minister for Infrastructure, etc, the Minister for Industry, etc and from outside Cabinet the Minister for mall Business.

4. Capability for the Digital Economy

If we accept a proposition that the "Digital Economy" isn't a part of the economy, but instead refers to the total transformation of the economy, the question is validly asked what essential capabilities are necessary to capitalise on that transformation. First and foremost must be connectivity, and an analysis of connectivity immediately highlights the centrality of wireless connectivity as deliverable by 4G networks.

Capability is often constrained or limited to discussion of the human resource requirements, and then specifically discussion of certain IT or engineering professionals. In this discussion there are three elements that will be grouped under capability; connectivity, developing skills, and regulatory frameworks. These are actually related areas, as we shall see, and the discussion here is meant to highlight the need to take a multi-dimensional view of capability.

4.1. Connectivity

The discussion of connectivity in the DE usually collapses very rapidly into a discussion of "broadband penetration", and in a more sophisticated environment to "true broadband penetration". The dividing line between the two can be anywhere from 2 to 10, 12 or even 100 Mbps.

However this view of connectivity misses out on two questions; "connecting what?" and "connecting to whom?" The DE is a world in which everything talks to everything else. It is not conceivable that a full DE will evolve without IPv6, and a sanguine view that the economy will adopt IPv6 when business requires it ignores a whole host of issues about economic power. It might not be in the interests of those who control the most IPv4 address space to relinquish the control this gives them. It has long been recognised in the circuit switched voice world that left to their own devices incumbent telcos would manipulate the use of the numbering space to disadvantage competitors.

The further significance of the Digital Economy being as much about the connection of people or premises is that connectivity of necessity must include wireless components as well as wireline (such as FttN) components.

The connectivity target for Australia should not be 6 million premises, or even 20 million people but 100 million or more devices. This level of connectivity will require the deployment of 4G wireless networks, and Government needs to pay particular attention to any barriers to the deployment of these networks.

The Department of Broadband, Communications and the Digital Economy is currently preparing advice on the future of fifteen year spectrum licences. Department advice is that there will be further consultation on these issues in early 2009. Additional investment in networks will be facilitated by clarity on the future of these licences.

The world of everything connected doesn't mean all those connections require large band width. Smart metering for energy management is a very low throughput application, with a large number of connection points. However, the low bandwidth applications might require the highest network priority. An example of this is voice. The ability to provide end-to-end quality of service is therefore also important. 4G wireless networks have this capability.

While there has been a guideline established for static IP QoS interconnection in Australia,[5] the document notes that there is no process for dynamic QoS on a session-by-session basis. The guideline goes on "the assumption of growing IP bandwidth in access and core networks mean that these dynamic methods may not be required for some services (e.g. voice), but may become more important for bandwidth-intensive applications (e.g. video-on-demand)."

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[5] Communications Alliance *Industry Guideline G632:2007: Quality of Service parameters for networks using the Internet Protocol* Sydney. 2007

However, that assumption is quite possibly unjustified. Prufer and Jahn have described the *capacity paradox* of Internet backbone economics; "advanced IP-services depend on excess capacity that, in turn, erodes networks' profit potential."[6]

In the United States the issue of the capacity paradox is currently being addressed by initiatives that have resulted in a debate about "net neutrality". The Information Technology and Innovation Foundation believes that only implementing effective QoS can be the solution to this problem. In particular they note that building more bandwidth does not eliminate the need for network management, and that metered pricing and usage caps alone will not solve problems of network congestion.[7]

"Connectivity" therefore encompasses a lot more than the physical transport infrastructure, in particular it includes aspects of the numbering, naming and addressing regime, and it also includes the rules for interconnection and the means of providing quality of service.

These requirements pose questions about the adequacy of the regulatory framework that are not posed in the Paper. The direct question of whether the regulatory regime is, or is not, impeding investment (or inadequately encouraging it) should also be posed. However, we should acknowledge that the implementation of the regulatory regime has fundamentally failed in its original objective of encouraging the use of self-regulation in the area of access regulation. On one reading of the framework the intention of the regime was that the self-regulatory forum together with the negotiate-arbitrate models should have produced a sequence of pseudo-market outcomes that would evolve into a functioning wholesale market.

The only contending views on how regulation should be amended are a view from Telstra quoting their Global Access Partners taskforce seeking a significant contraction in the discretionary powers of the ACCC[8], and a view from Optus and others that the regime should be strengthened with the ACCC acting as a perpetual price-setter standing between access seekers and access providers.[9] Against these two views the ACCC has been pursuing a set of inconsistent policies under the rubric of the "ladder of investment" in pursuit of infrastructure based competition, irrespective of the economic efficiency of the outcome.[10]

4.2. Developing skills

The second general area of capability relates to the skills base in the economy. Ultimately this is a two-fold issue. The first is the skills base required by users to take advantage of developments in the Digital Economy. The second is the skills base required to make developments in the Digital Economy. These matters are addressed in Attachment 3.

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[6] Jens Prufer and Eric Jahn "Dark clouds over the Internet?" *Telecommunications Policy* 31 (2007) pp 144-154 at P. 150

[7] Georg Ou *Managing Broadband Networks: A Policymaker's Guide* The Information Technology and Innovation Foundation. December 2008.

[8] David Quilty *Unwired: Regulation holds back competition and investment* Telstra's Now We Are Talking website 21 January 2009. Available at http://www.nowwearetalking.com.au/news/unwired-regulation-holds-back-competition-and-investment-030 NWAT

[9] "You need to let the ACCC set the pricing. It's not for us or Telstra to set the price," Maha Krishnapillai quoted in "Optus says vital to get the price right for broadband" *The Age* 18 July 2008

[10] Unwired Australia *Submission in response to Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking- Draft Decision November 2008 and Draft MTAS Pricing Principles Determination November 2008*. Available from the ACCC website.

5. Confidence in the Digital Economy

Much is said about confidence in the Digital Economy. It is perceived by most that a consequence of the open approach to developing the standards of the Internet, and the multitude of players that the Internet inherently suffers from security weaknesses and is generally unsafe.

These concerns are probably overstated. The majority of fraudulent activity still relies on versions of trickery or the behaviour of individuals in not taking the kinds of protection in cyber-space that they conduct in the real world.

Internet security could be improved by a coherent approach to security matters by ISPs globally. This would include greater oversight of the location of illegal or deceptive activities, and active moves to isolate providers who do not take appropriate security action. This, for example, already occurs in same cases of SPAM and some sites known to distribute malware.

There are, however, a number of disincentives to a single continuous strategy. The first is that the very largest providers who could make a difference are more comfortable making their own environment safe. Why make the Internet safe rather than their brand? The second is that many providers are ultimately receiving revenue from somebody for the relevant traffic. And finally the smaller providers who might benefit most do not have the resources to organise the global co-operation, or have been founded by the kind of "pioneers" who continue to share libertarian cyberspace fantasies.

Finally Unwired notes that protection from unwanted content is of concern to consumers. Unwired encourages the Government to undertake a range of public consultations with industry and consumers on strategies that could continually improve consumers ability to have confidence in their on-line experience.

6. Conclusion

The Digital Economy transformation is extensive and pervasive. It has the potential to continue to reshape markets in significant ways. The Australian Government needs to incorporate its understanding of this transformation into all aspects of its decision making.

A key dimension of the Digital Economy is that it is one in which everything is connected to everything else. Facilitating this "hyper-connectivity" creates new challenges for policy makers. 4G wireless networks are critical to this future. Infrastructure regulation, support and investment decisions made by Government should be directed at facilitation the rapid deployment of these networks, and spectrum policy needs to ensure that network operators can secure the certainty over future access to spectrum they need to make network investments.

It should also be clearly understood that the structure of the telecommunications industry is not conducive to the kinds of co-operation that might be common in other sectors. The Government response to this should be a more active engagement with industry participants in general.

ATTACHMENT 1

Definition of the Digital Economy.

The Paper states;

> *The ''digital economy' refers to the global network of economic and social activities enabled by ICTs, particularly the internet. It includes commercial transactions, personal dialogue, information, entertainment and delivery of services. The term is often used interchangeably with 'internet economy' and 'information society'.*

This definition suggests that the Digital Economy is in some way a subset of the economy, that some activities can be described as belonging to it while others aren't. This interpretation seems to be supported by the tender released by the Government in June 2008 to measure the "sectoral behaviour" of the digital economy.[11] This contrasts with the approach to ICTs as "general purpose technologies" where the interest is not just in the productivity improvement but in the ways the technology transforms the economy.

Cohen *et al* note that what they call the IT revolution has resulted in rapid change, but distinguish this from other changes like air transport in the 1960s or the automobile in the 1920s as "the revolutionary potential lies within the tools that information technology provides to *all* economic sectors."[12]

They go on to describe the "new economy" as a transformative era, with three intertwined themes of technology development, innovations in organisation and practice and the rapid speed and extent of the changes unfolding. In this theme they note that "it is already becoming impossible to talk about an 'Internet economy' per se. Soon there will be no slice of the economy that can be carved out and assigned to the Internet."[13]

The other issue is that of defining the technologies that are particularly of interest. The shorthand of ICT is often used, but it tends to result in a focus on the hardware or software of the technologies themselves, and often a "computer-centric" view. The instantiation of the technologies to "the Internet" goes some way to ameliorate this, but that term inadvertently excludes activities that occur over private networks or other protocols.

The important feature that needs to be captured is the use of both information processing and telecommunications technology, and their co-joint production and operation captured in the recent past by the term "convergence".

Cohen *et al* provide an interesting account of the evolution of the combined power of data processing and communications. They trace the evolution from computers as giant calculators (e.g. defence in computing air defence strategies), to computers as giant data stores (e.g. census data), then with the earliest data networks delivering access to these data stores to remote

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[11] "Digital economy benchmarking at the sectorial (sic) level" ATM ID DCON//08/28 27 June 2008. www.tenders.gov.au. See also "Govt to quiz 'sectoral behaviour' of digital economy' *ZDNet Australia* 30 June 2008 www.zdnet.com.au

[12] Stephen Cohen, Bradford Delong, Steve Weber and John Zysman "Tools: The Drivers of E-Commerce" in BRIE-IGCC E-conomy Project *Tracking a Transformation: e-commerce and the terms of competition in industries.* The Brookings Institution 2001. Washington. At P. 4.

[13] *Ibid.* P.14

locations (e.g. airline reservation systems), and then as "what-if" machines with the development of desktop computers (Visicalc for the Apple II).

They go on to identify how the next stage of development has seen computers "burrowed inside" conventional products to become embedded systems and "connected outside" to create a global network (as in the world wide web).[14] This is a world beyond connectivity of premises or people to connectivity of devices.

They conclude;

> *The e-commerce transformation represents a series of remarkable opportunities for business, governments, and other organisations to remake themselves, re-create what it is that they can do, and reconstruct their relationships with customers, citizens, and constituents. It is also a remarkable opportunity for social scientists. This is not a separate research domain for a small specialised group of observers interested in business evolution and the politics of technological change. It is not simply a productivity phenomenon (of greater or lesser magnitude). It is a social, economic, organisational, legal and political phenomenon all at once*[15].

From this brief discussion it appears that the definition of the Digital Economy being used is too restrictive and should perhaps be;

> *The "digital economy" refers to the transformation of economic and social transactions, organisation and relations enabled by the combined use of information processing and telecommunications technologies, such as the Internet and mobile communications. It includes commercial transactions, personal dialogue, and machine-to-machine communications for the delivery of information, entertainment and services. The term includes concepts referred to as 'internet economy' and 'information society'.*

Measuring success

For example, is success only measured by overall growth (efficiency) or does the distribution of the outcomes (equity) also matter. Other factors influence the economy, so the question is whether it is possible to measure the Digital Economy effects separately from other effects. This latter question is potentially open to investigation through various econometric techniques if sufficiently reliable data sets are available.

One way to estimate success is by developing a factor model and measuring each of the factors of success. As an example, developing a business plan one forecasts sales volumes and average values of sales to determine revenue.

Examples of these kinds of models are the Digital Opportunity Index developed by the ITU,[16] the New Economy Index prepared for the Information Technology and Innovation Foundation in the

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[14] Ibid Pp 5-13.
[15] Ibid P. 23
[16] International Telecommunications Union *World Information Society Report 2007 Beyond WSIS* ITU Geneva 2007 Available at www.itu.int/wsis.

USA[17] or the Connectivity Scorecard 2009 prepared by LECG for Nokia Seimans.[18] The first of these creates an index and ranking for countries, the second creates an index and ranking for US states, and the last is an inter-country comparison of "connectivity" but incorporates a range of usage statistics. Such models are usually best for cross geography comparison, but can be developed as single geography time series. Typically they rely on "expert estimates" of the relative importance of different measures without particular validation.

The Digital Opportunity Index claims to measure opportunity, infrastructure and utilisation, though each is a mix of penetrations, tariffs and usage for fixed telephones, mobiles and internet connections. The New Economy Index has five categories; knowledge jobs (various employment and education attainment stats), globalisation (export orientation and foreign investment), economic dynamism (number of fast growing companies, degree of job churning and value of IPOs), transformation to a digital economy (percentage online, number of domain name registrations, technology in schools, and use of IT by government, health care and farmers.), and technological innovation capacity (R&D investment, number of patents issued, venture capital activity, and green energy).

Developing some domestic indexes would be useful, however these kinds of measures typically only focus on the "success" of the Digital Economy. Some of the other effects may be negative, such as increased levels of market concentration across industries.

The Paper had a separate section on measuring the Digital Economy. The measurement needs to be related to success. As discussed above a DE index of some kind would be useful.

The Paper listed three recent Australian efforts in the general area. None of these is, however, particularly apposite or relevant. *Interactive Australia 2009* was entirely about measuring the games sector. The *AIMIA Digital Services Index 2008* did not provide anything other than various sectoral break-ups. The AIG report *High Speed to Broadband* was merely a CEO survey. This provided data such as "almost 40% of organisations do not know their internet access speed", which doesn't really tell us more than that the person filling in the survey didn't know (or couldn't be bothered finding out).

On the more general question of which datasets should be collected, the Paper listed a set of existing datasets but didn't itself explore the usefulness of any of these. It would seem more useful to determine the structure of an index based on a factor model and then analysing the availability of appropriate datasets than merely ask about datasets.

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[17] Robert D. Atkinson and Scott Andes *The 2008 State New Economy Index: Benchmarking Economic Transformation in the States*. The Information Technology and Innovation Foundation. Washington. 2008. Available at http://www.itif.org/index.php?id=200

[18] Leonard Waverman and Kalyan Dasgupta *Connectivity Scorecard 2009* Available at http://www.connectivityscorecard.org/

ATTACHMENT 2

Market and Geographic Consequences of the Digital Economy

Before considering the consequences of the digital economy, it is worthwhile to further understand the construction of the marketplace in the world of the Internet. The first observation is that, like previous communication technologies, the internet has been hailed as an inherently positive, decentralizing, and democratic force; this utopian tendency has been called by Bar *et al* as "the Jeffersonian syndrome."[19]

The utopian view of the economic promise of the Internet was captured by Bill Gates as "a new world of low-friction low-overhead capitalism, in which market information will be plentiful and transaction costs low."[20] By 2001 Bar was identifying an "economic reality has emerged that diverges substantially from these predictions"[21] He notes that these early expectations rested on three key assumptions; low entry barriers, decreased roles for intermediaries, and lower transaction costs.

The reality of the net has been that while initial entry barriers are low, because of network externalities and economies of scale in infrastructure, we are seeing increasing concentration and large players, rather than a multitude of small players. Intermediation did not disappear, simply new intermediaries emerged and old intermediaries adapted; for example, home buyers and sellers don't transact directly, though they may use on-line real estate sites. Finally, while the technology of the Internet can be used to reduce "friction" it can also create it by embedded customer details within the site.

Bar offers a map to describe the evolving e-commerce marketplace; this is reproduced below as Figure 1. This maps commercial activities at four different levels against four different kinds of transactions. The levels are communications infrastructure, the marketplace itself (think of the difference between a traditional produce market, a stock exchange, or strip retail), the transaction and payment activities and the delivery of the product.

It is clear from this how a focus on e-commerce could easily be diverted by a consideration of the changes occurring only in the communications infrastructure – what is the traditional field of "supply chain automation". It is also possible to see how a "net-aided commerce" model could see a focus only on the marketplace communication and on the e-payments system exclusively. Finally it is possible to see how consideration can be diverted to only "direct e-commerce" and things like music and movie downloads.

But the truly interesting area is the area of the "electronic marketplace" which is relevant to both conventional and electronic goods. Bar explains the concept of the architecture of the marketplace by analogy to an old European market square: the square has space that limits the

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[19] Francois Bar, John Richards and Christine Sandvig "The Jeffersonian Syndrome: The Predictable Misperception of the Internet's Boon to Commerce, Politics, and Community" Available at http://www-rcf.usc.edu/~fbar/Publications/jeffersonian-syndrome.PDF

[20] Bill Gates *The Road Ahead* Viking Penguin 1995 P. 158

[21] Francois Bar "The Construction of Marketplace Architecture" in BRIE-IGCC E-conomy Project *Tracking a Transformation: e-commerce and the terms of competition in industries.* The Brookings Institution 2001. Washington. Pp 27-50.

numbers of sellers, where you are in the space effects traffic flow, and the space has gates that can keep buyers and sellers out. Electronic marketplaces have similar architectures

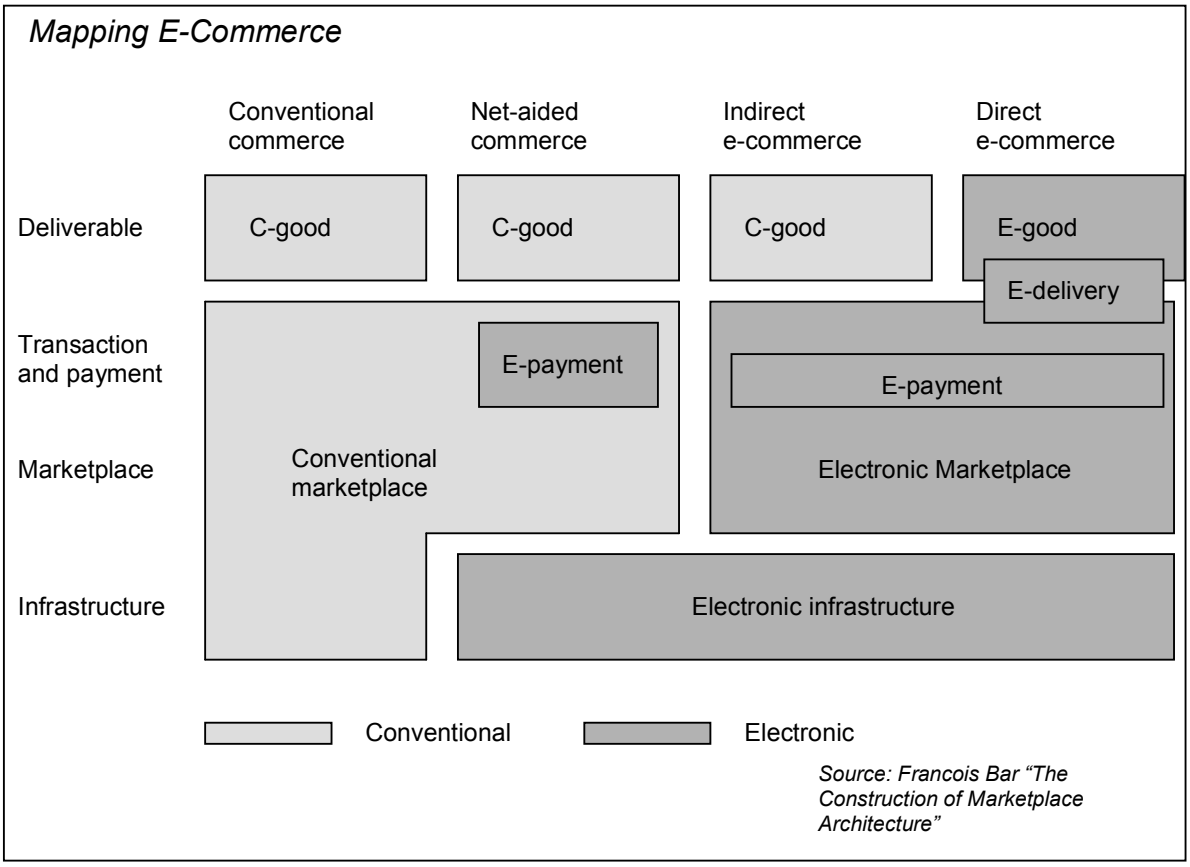

Figure 1 Mapping E-commerce

As Bar identified earlier in his article, the architecture of the electronic marketplaces that have been evolving is vastly different from the expectation of an open and free marketplace as expected by the optimists.

E-commerce facilitates both hierarchical and market forms of organisation. One consequence is that electronic marketplaces seem to be even more dominated by single players than traditional marketplaces. At the same time contract forms of employment are facilitated (as the work effort of the individual can be more easily measured and tied to compensation), changing the political relationship between "labour" and "capital".

There is a long list of other economic and social impacts that should inform a Government Future Directions paper, and they will not all be considered here.[22] However, one specific area that has been flagged by the Paper is the much vaunted topic of teleworking, and the related

[22] A good survey is provided in Sushil K. Sharma "Socio-Economic Impacts and Influences of E-Commerce in a Digital Economy" in Harbhajan S. Kehal and Varinder P. Singh *Digital Economy:Impacts, Influences and Challenges* Idea Group Publishing 2004 Available at http://www.ilahas.com/pabs/Business%20and%20Management/Digital%20Economy%20-%20Impacts,%20Influences%20And%20Challenges%20-%202005.pdf

theory that the consequence of ICTs is that people can do their job anywhere. While this has been included in the Paper as an environmental proposal (a saving in transport), it is based on the assumption that ICTs are essentially a decentralising influence.

The unfortunate reality is the reverse, when people can choose to do their job anywhere they are more likely to choose to do it in big cities. In 1977 Gottman noted;

> *The telephone has for some time been at the heart of a debate about the design of the modern city. The basic question under consideration is whether in the present evolution toward an information society, the gathering of people in cities is still necessary.*[23]

Gottman goes on to note that most students of office location recognise the telephone as the main factor which allowed geographical separation between office work and other stages of business it administered. Once freed from the constraint of being located with other facilities, office work gathered in lage concentrations in special areas with services catering to the needs of office workers. As Gottman notes, ironically,

> *The major urban message the telephone carries is still the same as the first call of Bell to Watson: "I want to see you".*[24]

It is true that the distance/cost relationship of telephony promoted some of this consolidation, and that the declining distance dependent features of pricing can affect this trend. However, absent regulatory intervention cost reflective pricing will emphasise the relative communications density of a route rather than the distance. Hence the cost of communicating between large centres remains cheaper creating an incentive to concentrate in these centres.

Kotkin in his more detailed analysis of the geographical implications of these new technologies notes that;

> *In the past, people and companies located to be close to physical assets, such as ocean ports, rivers, and coal or iron deposits. Access to cheap, often unskilled, labour was often critical….Today in the information age, the critical asset is no longer a physical one; it is access to highly skilled labour, most particularly the scientists, engineers, and other professionals who dominate the new economy.*[25]

Kotkin invents four new terms to represent the new geography; nerdistan, Valhalla, midopolis and boutique city. While these represent the American landscape which considers an urban area like Sydney to actually be about twenty cities, some of the principles are the same. "Nerdistan" represents the kind of community required to attract and retain the information workers, a modern, clean, safe and culturally diverse city. While the new technologies facilitate adopting a country lifestyle, people don't just choose to locate anywhere. Kotkin calls those areas that bring together the communications and the lifestyle that will attract working people "Valhallas".

It is important that these geographic consequences be well understood and that Digital Economy strategy be based on a "grounded" view of the effects, what could in some quarters be called an "evidence based policy".

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[23] Jean Gottman "Megalopilis and Antipolis: The Telephone and the Structure of the City" in Ithiel de Sola Pool (ed) *The Social Impact of the Telephone* MIT Press 1977 P303.
[24] *Ibid* P.312
[25] Joel Kotkin *The new geography: How the digital revolution is reshaping the American landscape.* Random House 2000

Energy efficiency

On the important question of energy efficiency of data centres a useful program would be the development of a national database for efficiency benchmarking. The simplest version of this would be for data centres to record their output (such as number of instructions processed) and their input (energy consumed). Users can then get their result benchmarked against the data set.

Finally, it is becoming increasingly common for households to have many devices that operate at low DC voltages, including PCs, mobile phones, printers, modems, routers and sound systems – and now often lights. The typical deployment sees each of these accompanied with its own transformer which results in heat loss at least. It would seem that the medium term future should see the deployment of a low voltage DC circuit in houses alongside the 240V AC (which is ideal for large lights and motors). The lower voltage DC would also seem to be more readily suited to local generation and storage than 240V (solar or wind plus battery). The longer term may require the evolution of some global standards but the opportunities in this area should be explored.

Administration of DE issues, and information sharing

The development of the payment system is also important. As the Reserve Bank noted in 2006;

> *In Australia, the format of messages in the electronic payment system used for many business-to-business payment, the direct entry system, has remained largely unchanged since the 1970s. It allows only 18 characters for users to add their own supplementary information after critical details, such as account numbers and the payment value, are included.*[26]

This contrasts with a variety of developments in other jurisdictions where the financial transaction can be "bundled" with the documentary transaction. There has been no further development of the payments system in Australia.

This, in part, reflects the fact that there has been no consistency in administration of the Digital Economy issues in Australia. This could be because of a failure of policy makers and their advisers to understand the issue, or it could reflect a systemic failure of agencies to deal with matters co-operatively. In the business sector the latter is frequently railed against under the rubric of the need to break down the silos.

An example of the stop-start approach to Digital Economy issues was the formation, then disbanding of the National Office of the Information Economy. This was followed by the structural changes in 2007 that formally entered Digital Economy into the broader communications portfolio but also moved responsibility of the IT industry and the digital content industry.

The multi-portfolio nature of Digital Economy issues is revealed in the inclusion in the Paper of a discussion of the uses and provision of Public Sector Information. This is somewhat reminiscent of the Whitlam Government initiative of creating the Australian Government

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[26] Philip Lowe, Reserve Bank of Australia. Presentation to Australian Bankers' Association and Australian Payments Clearing Association Forum on Payment Systems Evolution: Where to From Here? *Payment Systems Development and Architecture: Some Background* 27 September 2006 Available at http://www.rba.gov.au/Speeches/2006/sp_ag_270906_paper.pdf

Publishing Service and opening a series of retail outlets. It is interesting to note that the closure of the shops and resorting to various outsourced distribution suppliers was one of the latter acts of NOIE.

Unwired does not propose to respond to the detail of the questions on the value and use of Public Sector Information. We do, however, note that the definition needs to be clearly understood and that PSI includes commercial information provided to Government. Unwired generally believes that well informed markets perform better than under-informed markets, and that participants in industry often claim confidentiality for information because of their concern about effective markets more than anything else.

A recent example was the suggestion by a spokesman for the Minister that the coverage obtained by the Optus 3G network as "commercially sensitive", whereas one would have normally thought that this was information that constituted an attribute of the product and therefore consumers were entitled to know.[27]

[27] Andrew Colley "Regional broadband grants face cuts" *The Australian* 16 January 2009 Available at http://www.australianit.news.com.au/story/0,25197,24920990-15306,00.html

ATTACHMENT 3

Capability for the Digital Economy

Developing skills

The second general area of capability relates to the skills base in the economy. Ultimately this is a two-fold issue. The first is the skills base required by users to take advantage of developments in the Digital Economy. The second is the skills base required to make developments in the Digital Economy.

The first of these is often referred to in short hand as "digital literacy", and applies at the consumer (or end-user) level as well as within corporations who need to make decisions to adopt new processes and procedures (e.g. supply chain automation, on-line trading, on-line support). The second of these is less frequently discussed.

The ICT industry actively pursues strategies to improve digital literacy as this constitutes what is known in the trade as primary demand management. However, marketing budgets are usually more focussed on trying to influence choice of supplier, rather than educating the user on why they should make a choice in the first instance.

Industries which actively co-operate in primary demand management tend to be relatively stable with little entry and exit and comprised of a relatively small stable of established players. An example would be the campaigns that television networks jointly sponsor to promote advertising on television.[28] The telecommunications industry is the complete opposite of this; it is an industry with few barriers to entry and an avowed policy intent to create greater effective competition. There is little to no incentive for the major market participants to engage in joint primary demand management activities.

The recent Telstra Productivity Indicator is an example of the tendency of this industry to pursue these strategies as one off isolated activities. The website promoting the indicator notes;

> *Amongst other significant findings it is clear that:*
>
> 1. *Even though improving productivity ranks equal second in business importance for these decision makers less than half can actually measure productivity or have clear productivity improvement targets;*
> 2. *Investment in ICT does drive measurable productivity improvements. However, across all organisations, only 30% of companies actually measure the benefits with a high degree of accuracy.*

However, this exercise is primarily about the promotion of Telstra rather than the promotion of end-user understanding.

The skills shortages in specific ICT skills (which can affect both the capacity of firms to adopt existing developments or firms to make new developments) looks to be primarily one that is derivative from the excessive adoption of market metaphors in relation to labour. Discussion of the labour market and talent identification has resulted in an under-investment in in-house

[28] Think TV is a campaign sponsored by Free TV Australia. See their website at http://www.thinktv.com.au/

training in many sectors of the economy. The addition of skills based migration has facilitated the ability for organisations to further ignore human resources development and instead acquire expertise from the (offshore) market.

In the area of making new developments in the Digital Economy, the focus on skills development needs to extend well beyond the fairly narrow ICT skill base. Leading innovative economies excel in not just applied sciences and trades, but also in fundamental sciences. This includes not just the physical sciences, but also the business sciences of economics and human behaviour. The trend towards ever more graduates in business with qualifications in (ac)counting and marketing is no substitute for the decline in teaching and research in economics. The fact that there is no established school teaching or researching in the fields of institutional economics or behavioural economics reflects on the poor state of economic education to feed the kinds of thinking required to understand new market models.

However, Unwired also believes that the current framework of endless fractured targeted programs aimed at specific skills weaknesses is as dysfunctional as is the process of allocating the bulk of Australia's research funding through a single centralised program. These processes result in reinforcing existing paradigms and are the enemy of innovation.

Innovative firms like Unwired, which has developed its core capability in wireless networks and in particular its ubowireless network optimisation tools, receive little or no recognition or contribution for their effort.

It appears to Unwired that measures to promote research and development, training and education in general will result in improved development of the relevant skills. Ultimately this agenda is little different to that espoused by the Review of the National Innovation System[29]. Initiatives that increased tax concessions for R&D of all kinds, that increased research funding to Universities, that provided income tax credit for employer sponsored training and education, that released the centralised control of research funding would all be valid contributors.

Underlying all the discussion of the Digital Economy is an underlying tension between a group of people who see the net as changing everything, and a group of people who seek to defend existing models.

As Cohen et al neatly summarised;

> *Libertarian fantasies of cyberspace as a policy-free zone are (thankfully) a thing of the past. The question now is what kind of governance and from where? Clearly a set of existing rules is not easily adapted to this new environment. To govern the e-conomy will mean updating old understandings, rules and bargains all at once.*[30]

The Paper has asked some specific questions about one small component of these, the field of copyright and related content rules. Unwired believes the answers to these questions are more extensive than the scope of questions in the Paper.

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[29] Review of the National Innovation System *Venturous Australia* 2008. Available at http://www.innovation.gov.au/innovationreview/Pages/home.aspx

[30] Cohen et al, *op cit* pp 23-24

ATTACHMENT 4

Responses to Consultation Paper Questions

Answers to questions for industry and other stakeholders about the environment

What, steps, if any, should Government take to promote the greater adoption of teleworking and videoconferencing? What impact do Operational Health and Safety laws have on the uptake of teleworking and videoconferencing in your industry?

The adoption of teleworking and videoconferencing will not have a dramatic effect on environmental factors, and efforts towards making transport energy efficient (e.g. public transport over cars) are likely to have a greater impact than promotion of remote working. The geographic impacts of telematics are far more extensive than the consideration of teleworking.

To the extent that OH&S laws have an effect the most significant change would be the moves already underway to standardise these laws across Australia to facilitate interstate teleworking and easier workplace policy development.

The Government has already committed to review and propose regulation for e-waste and has taken steps to promote smart technology to manage scare resources. Are there additional steps Government can take on these issues? What additional steps can industry take in relation to these issues?

One part of the ICT industry deserves specific recognition in the e-waste field, and that is the mobile sector and their Mobile Muster campaigns. Recycling of other e-waste is made hard by the fact that the user has to pay to have the waste received, and it is not possible to do this at convenient locations.

An essential first step is the creation of accessible disposal points, either in conjunction with state based waste disposal systems or as separate facilities. It is not realistic to rely upon retail points to recover the bulkier IT items, this only works for the relatively smaller mobile devices.

While AMTA has been moderately successful in securing voluntary levies from industry to fund recycling, such a program is a classic economic example of a "public good" (non-rival, non-excludable). This suggests that it should be funded from taxation revenue. There is not, however, any greater logic in raising a specific tax on the IT industry than there is to raise a tax on the food industry for the waste generated in that industry being recovered.

Answers to questions for industry and other stakeholders about measuring success

What markers of success can government, industry and other stakeholders establish?

As discussed above measurement of the Digital Economy probably needs to be built around some kind of factor model that incorporates variables that measure the dimensions of connectivity, content, capability and confidence. Some can be hard data and some survey data. Ideally Australia would participate in an index developed across one of the international bodies it is a member of (e.g. APEC, OECD, ITU). Alternatively the focus

can be exclusively on time-series data including data that is already available from historic periods.

A final and interesting approach could be to develop the index in conjunction with the establishment of the new committees under Regional Development Australia. This would provide geographic comparative data at a level below States (and hence of greater comparability). The index would need to be carefully designed to ensure that it measured the extent of the transformation and not under-value the productive value of the other activities undertaken in the areas.[31]

How will we know when we have maximised the potential of Australia's participation in the digital economy?

Unfortunately, we can't, just as we can't know whether we have maximised the productive capacity of the workforce or of land. An indicator would be when new initiatives start having negligible impact, but that could just be the choice of the wrong initiative.

A market fundamentalist would perhaps argue that the way you know when you've maximised anything is once you have government out of the way and that therefore markets have worked to optimise production. A more reasoned theorist would know that there are externalities, such as the externality in education (education is thought to have a higher social value than the private value to the student, hence the subsidy).

But a really good indicator would be when academics and commentators use Australia as an example of how to "do it right".

Answers to questions for industry and other stakeholder on measuring the digital economy

What, if any, additional datasets should government collect to improve the benchmarking of Australia's digital economy?

The answer has been partly delivered above.

However from an industry perspective it would be more accurate and reliable data on penetration and usage. There is a welter of information gathered through the ABS, ACCC and ACMA as well as the Department, but an absence of standard definitions and other limitations means that national pictures are hard to develop and are often out of date.

A related consideration is the desirability of government information gathering to move away from surveys or summary statistics to an actual count. But as an example the NBN tenderer should be required to provide to the government each six months a file listing all the addresses to which a service is being provided and the capability of that service. In modern terms this is not a big file and then can be used to generate more accurate statistics (even correlation at CCD level to education etc, or mapping, as per the above, to Regional Development Australia committee areas).

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[31] The Hon Anthony Albanese, Minister for Infrastructure, Transport, Regional Development and Local Government, Ministerial Statement "Regional Development Australia" 20 March 2008. Available at http://www.infrastructure.gov.au/regional/publications/pdf/Regional_Development_Australia_min_stmt_final_version_20Mar08.pdf

Survey data is more useful to capture "behaviour" – e.g. in the last week did you use a computer connected to the internet in your work? If so was it supplied by yourself, employer, third party?, etc.

What do you consider are the key digital economy indicators?

The first is connectivity, the second is usage by volume, and the third is usage by purpose. Next come capability measures which include expenditure on ICT hardware and services, and education levels.

What additional industry sources of data exist which provide background on digital economy metrics?

How long is a piece of string? This is the world of ICT, and almost anything can be measured and reported on. But I am not aware of any industry based data that is accurate and not already reported on as above.

What additional research and data work could industry or data collection organisations undertake to assist in measuring Australia's digital economy?

The short answer is lots. The more thoughtful answer is to build our own "factor model" of activities that drive the digital economy and then determine how to measure these.

Do you have views on the adequacy of the existing data sets or suggestions as to how they might be improved?

Yes. But I think you really want to know what those views are rather than whether I have any. The most important suggestions are projects with the telecommunications providers to standardise definitions of "service in operation" etc and the second is to gather census data rather than summary data.

The second is to not be frightened of asking industry for more data so long as the approach is to take a good time developing the requirements and being committed to gathering it over a long time. The cost to industry is in developing a process (system) to capture data the first time, repetition is relatively easy. Having one big data requirement to meet the needs of all agencies (ACMA, ACCC, DBCDE etc) is better than a number of different ones.

Questions for industry and other stakeholders on developing knowledge and skills base

What can industry and other stakeholders do to assist the Government's existing efforts to develop the digital and media literacy skills of Australians?

The telecommunications industry, and indeed many of the related ICT industries, does not have the industry conditions that are pre-requisites to joint market education campaigns. However, there does not seem to be any direct evidence that the digital and media literacy skills are particularly deficient.

Would specific offline measures to inform business and local industry groups about online offerings assist in developing e-business?

Unlikely.

How can industry assist in promoting the attractiveness of ICT related degrees?

Industry will promote the attractiveness of these degrees if industry can't fill the void by hiring migrants, and if industry gets tax incentives for providing graduates with post qualification training and experience.

What core set of digital economy skills can be incorporated into non ICT-related degrees?

All non-ICT related degrees already require students to make full use of IT resources.

Will industry work with Government through the Productivity Places Program and Innovation and Business Skills Australia to improve the curriculum of current training courses?

How well any industry will work with Government on programs like these is determined by similar characteristics to primary demand co-operation. If the industry structure is such that leading players think they can consult with Government alone, that is what will occur.

How can we better match supply and demand for skilled ICT workers?

Unfortunately, skilled ICT workers work in a relatively volatile area of the economy, which results in fairly wild swings in demand. Further, the phrase masks the fact that there are a very large number of subsets to "skilled ICT workers". Programs that facilitate the retraining of staff rather than the churning of staff will do more to fix the demand/supply matching problem than anything else. That comes down to making internal training of staff attractive.

However, the comments of Kotkin referred to above are relevant. In the information age the critical asset is access to highly skilled labour. While Say's Law (demand will follow supply) is not usually supported by economists there is some relevance in the Digital Economy.

What measures did industry find successful in boosting staff, ICT and e-business skills?

Unwired can only talk of its own experience, which is to learn by doing.

Questions for industry and other stakeholders on regulation

(Unwired offers no answers to these questions)

Should the existing copyright safe harbour scheme for carriage service providers be broadened?

Does Australia's copyright law unreasonably inhibit the operation of basic and important internet services? If so, what are the nature of such problems and practical consequences? How should these be overcome?

Is there non-copyright legislation that is directly relevant to digital economy businesses that create uncertainty or barriers?

Questions for industry and other stakeholders on confidence

What more can industry and other stakeholders do to address concerns about consumer privacy and online safety?

The discussion above indicates the reasons why effective industry co-operation may be unlikely.

What more can be done to increase trust and confidence in online transactions?

Trust is usually earned, not promoted. It is interesting to note that the bulk of the SME concerns were not about trust, but were about the cost of implementation, and the thought that an online environment shifted bargaining weight to the consumer.

What is needed to address the SME concerns identified above?

The most significant security concern was listed as "people able to hack into your computer system." Promotion of stronger tools is probably one means of addressing this. However, underlying this there is probably a perception that the firm is better protected through insurance and law enforcement for physical theft or damage than cyber theft or damage. A program to work with the States to ensure a level of visibility of policing resources, and a discussion with the insurance industry is probably most important.

Ultimately, however, this is a question that would be best explored by and with small businesses. These are businesses that typically are under-resourced in their government relations activities. A program to fund an organisation representing small business (for example, COSBOA or ATUG) to investigate and report on this issue would be a good initiative.

Are there possible barriers preventing a strong online retail experience in Australia? What can industry and other stakeholders do to address these?

The biggest barrier to a strong on-line retail experience in Australia is competition and network effects (or demand side economies of scale). On-line stores are typically global, so, as an example, Australian on-line book retailing competes with Amazon. In turn Amazon's scale results in anybody referring to a book online usually helpfully providing a link to the book on the Amazon site.

The primary action needed here is for Government to understand the nature and scope of this transformation. This is a classical example of how the Digital Economy is not just a new way of doing existing transactions, but is instead a way that the underlying assumptions of economic organisation are changing.

What is the experience of business-to-business e-commerce in Australian supply chains? Are companies (large and small) saving money because they are now making electronic transactions? What are the barriers to take-up? Are international companies benefiting from e-commerce transactions with consumers and with other businesses?

(Unwired has no comment to make)

What evidence shows the possible barriers preventing greater online content offerings? What can be done to address these?

Unwired remains concerned that the ACCC's 2003 report on the emerging market structures has not been adequately addressed.[32] The opportunity for participants with market power in connectivity to leverage that power to gain an advantage in the offering of exclusive content remains the single most likely market development.

Questions for industry and other stakeholders on PSI

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[32] Australian Competition and Consumer Commission *Emerging market structures in the communications sector* June 2003. Available at http://www.accc.gov.au/content/index.phtml/itemId/324108

(Unwired offers no answers to these questions)

What categories of Public Sector Information (PSI) are most useful to industry and other stakeholders to enable innovation and promote the digital economy?

What are priority issues that will facilitate the use of PSI?

If PSI is made open access, what are the best formats to enable and promote use and reuse?

If PSI is made open access, what licensing terms would best facilitate and promote its use and reuse?

Should licensing terms distinguish between commercial uses and non-commercial uses and reuses?

Are there other examples of innovative, online uses of PSI?

Is there any additional economic modelling or other evidence to show the benefit to Australia from open access of PSI?