Digital commerce:

During the past year, the euphoria over the promise of digital commerce[1] seems to have subsided. A significant amount of scepticism about the potential for electronic commerce to increase productivity and raise the level of economic activity has emerged.

The media, over this period, has referred to the flux in the e-commerce world as the shift from "dot-coms" ❯ ❯

[1] I use the terms digital commerce, electronic commerce or e-commerce interchangeably. The basic idea is that commercial activity is facilitated through digital technology; hence the term "digital commerce".

where is it taking us?

by Ananth Srinivasan

>> to "dot-gones" and "dot-nots". Many start-up companies have not survived the changing economic landscape over the year.

The scepticism has largely been fuelled by the inability of highly publicised organisations engaged in electronic commerce to show

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convincing bottom-line proof of their financial viability. An absence of profitability, however, has gone hand in hand with an increasing volume of activity.

The often-heard comment about the company Amazon (www.amazon.com), the online seller of books, music and, more recently, a wider range of products, is that it has yet to turn a profit. But that is countered with the argument that both the volume of sales and investment in technology infrastructure are increasing to make Amazon's long-term outlook attractive.

This apparent paradox has to be considered in a broad context that examines the true nature and potential of digital commerce.

The following questions help frame the important issues that need thought and discussion:

- To what extent is the uncertainty faced by e-commerce organisations a function of a general downturn in the economy and, therefore, a phenomenon that is shared with "old economy" organisations?
- Are the changes experienced in the e-commerce world simply symptomatic of a shake-out that is inevitable in any new economic sector where successful models of business activity percolate to the top and show that they are indeed viable?
- Is the scepticism about the dot-com phenomenon really driven by an emphasis on short-term financial measures of performance as opposed to a true assessment of its potential over the long term?
- Must an e-commerce firm demonstrate profitability now in order to show that it is viable and sustainable over the long term?

In order to deal with these questions, we need to understand the fundamental ideas that underlie the e-commerce phenomenon in order

to appreciate its potential. In this essay, I trace the conceptual underpinnings that have shaped the digital commerce phenomenon with a view to showing that it is here to stay.

A good understanding of where we are coming from will help us realistically assess where we are headed. By separating issues that are of primary interest to short-term investors from those that examine the underlying nature of digital commerce, we will then be able to appreciate the fundamental economic transformations that will occur over the next several years.

THE TERRAIN

Information and communication technologies have radically affected us in a macro sense at the level of entire economies and in a micro sense at the level of individuals. Entire industries that deal fundamentally with the provision of information have been transformed by the technology.

The financial services industry is a heavy user of information technology (IT) with its dependence on complex models to structure investment decisions against the backdrop of huge and rapidly changing volumes of financial data. At the retail end, bank customers expect that they can use the technology to perform everyday transactions.

The publishing industry is experiencing new models of distribution, from newspapers to popular fiction (as evidenced by the recent example of Stephen King's novel being published on the internet).

New models of education, training and learning are being developed for the dissemination of knowledge.

While IT has been used to facilitate the functioning of organisations for several years,

its adoption in all aspects of commercial activity from identifying a need to completing a transaction is what defines digital commerce.

The term "new economy" has been used to refer to those sectors of the economy that are information-based and technology-intensive. It is somewhat misleading to assume that the new economy refers only to companies that focus on high (computer-related) technologies, i.e. those involved in the production of computer-related products and services. Such a narrow definition of the term ignores the impact that IT can have on very traditional industries.

Take the example of the New Zealand farming industry. This is an industry that has existed for many decades and hardly one that people would refer to as "high-tech". Yet it is an example of a traditional industry that is leveraging information technology in order to significantly and positively impact productivity.

Fencepost (www.fencepost.co.nz) is an internet-enabled technology that caters to the needs of the dairy, wool, horticultural and livestock industries by providing market price information, news and support of agricultural purchases. It will utilise the conceptual power of digital commerce implemented through sophisticated information technology to link a number of participants in a very traditional industry.

Such activity must be considered as part of the "new economy" because it would not exist were it not for the facilitating power of IT.

The point is that the new economy is a combination of new and radically transformed economic activities. Any measurements that we make about how much "new economy" activity is taking place must take this into consideration.

The fundamental capability that is brought to the fore with electronic commerce is the timely, relevant and efficient exchange of information.
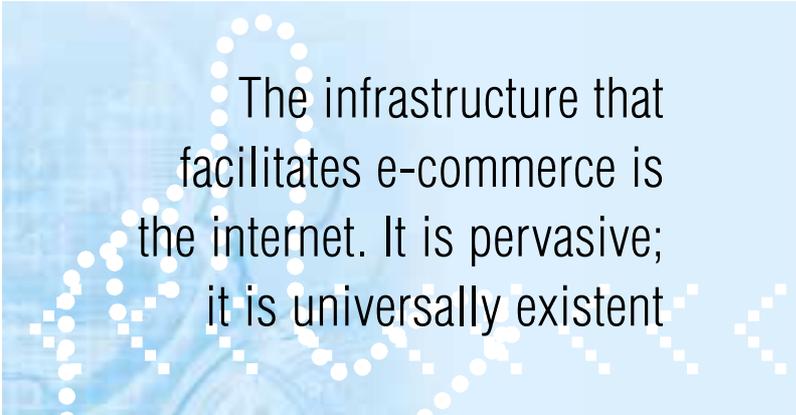
For example, consider the issue of product pricing. Timely information in this context

refers to the ability to introduce dynamic product pricing in the commercial activity involved. The particular price of the product at any point in time is variable; however, it is also accessible to the potential customer through the e-commerce framework. If the technological infrastructure is in place, the search for and the provision of information is efficiently facilitated.

This is the basic premise on which electronic commerce is built. In order for this to happen, it is assumed that the parties participating in the economic exchange can use an infrastructure which is widely deployed, well understood and accepted, and easily accessible.

The infrastructure that facilitates e-commerce is the internet. It is pervasive; it is universally existent.

Further, the standards that govern the basic manner by which the internet operates are well established and participants of this

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infrastructure basically understand these terms. International standards bodies constantly strive to establish widely applicable norms by which the infrastructure is deployed.

By virtue of its nature, internet technology enables repositories of information to be accessible at all times ("24 by 7 availability") and the standardisation of technology allows the universal definition of these repositories and their consequent access to take place.

Finally, it is important to point out that the traditional trade-off between providing information to a large number of interested ▶

Tailoring the information according to
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meant an increase in the cost of dissemination

parties and making it relevant to each recipient is something that the technology helps overcome. For an excellent discussion on this issue, see Evans and Wurster (1997).

A fundamental aspect of commercial activity is the communication of specific details about the product or service that is offered to potential customers. Mass communication media has the advantage of reaching a large number of such potential customers. But what is being compromised is the relevance of the information to the recipient. Tailoring the information according to the needs of the individual has traditionally meant an increase in the cost of dissemination.
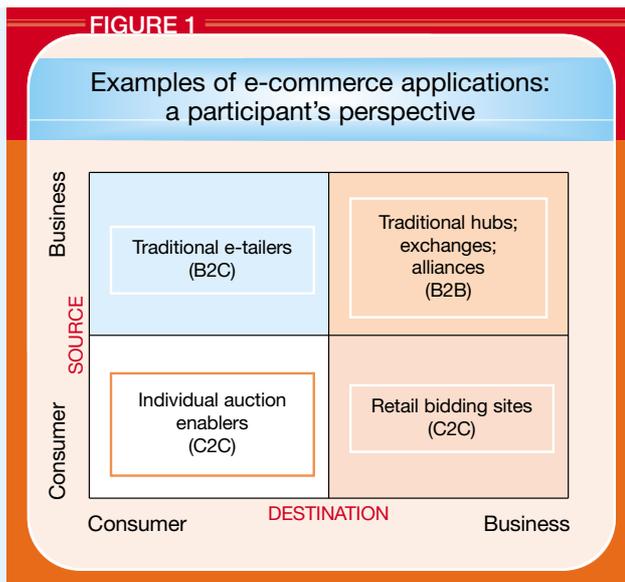
The use of information technology has enabled this trade-off to be neutralised to a large extent. It is relatively straightforward to automate the process of tailoring a message according to the profile of a recipient and thereby providing content with a high degree of relevance.

At the same time, the internet as a medium provides the ability to reach a number of recipients that far exceeds any other medium of mass communication. The major technical enablers of digital commerce are, therefore, (a) a standardised and widely available technological infrastructure; (b) constant availability; and (c) the ability to provide relevant information to a large number of recipients.

EXAMPLES OF E-COMMERCE

Perhaps a useful way to begin conceptualising the scope of e-commerce is to look at examples of current organisations and applications in the area and to cast them in a meaningful framework.

Figure 1 shows a matrix identifying the sources and destinations of e-commerce transactions. Following the dominant classification in use, commercial transactions occur between individual consumers and businesses. This leads to the following four variants to describe e-commerce activity:

Business-to-consumer

This is often referred to as B2C e-commerce and is the most widely discussed example of the phenomenon. The idea is that the source (provider) of the goods or services is an enterprise (a business) and the destination (recipient) of those goods or services is an individual consumer.

For example, when an individual purchases a book or a music CD from Amazon, this is a B2C e-commerce transaction that flows from a business enterprise (Amazon) to an individual customer (the purchaser). Air New Zealand

FIGURE 1

Examples of e-commerce applications:
a participant's perspective

Traditional e-tailers
(B2C)

Traditional hubs;
exchanges;
alliances
(B2B)

Individual auction
enablers
(C2C)

Retail bidding sites
(C2C)

SOURCE — Business / Consumer

DESTINATION — Consumer / Business

(www.airnewzealand.co.nz) allows an individual to book and purchase an airline ticket through its website. The ASB Bank (www.asb.co.nz) allows a banking customer to transact banking business through a website. Individuals may purchase grocery items by searching for and ordering them by accessing Woolworth's website (www.woolworths.co.nz). All of these are examples of business-to-consumer e-commerce.

The term e-tailers is often used to refer to retail merchants who offer their products to customers through an e-commerce infrastructure. This is represented in the upper left quadrant of **Figure 1**.

Business-to-business

This is often referred to as B2B e-commerce. Although one does not encounter discussions of this type of activity in the popular media, in terms of the level of economic activity it exceeds B2C activity by a factor of 10 to one.

Both the provider of the goods or services and the recipient are business enterprises. There are many variations of how this may be executed. In some cases, a single enterprise might establish an application in order to deal with all of its suppliers (also businesses) through the e-commerce infrastructure. General Motors established TransXchange to facilitate commercial activity between itself and all its large suppliers. The exchange is also a facility to allow commercial interaction among GM's suppliers. Later, TransXchange evolved into a multi-firm auto industry exchange called Covisint.

In New Zealand, a consortium of organisations consisting of Microsoft, Telecom and EDS have established a facility called eSolutions (www.esolutions.co.nz) that offers a variety of services encapsulating the joint expertise of the three organisations through an e-commerce framework to other businesses.

Aeroxchange (www.aeroxchange.com) is an international exchange that provides an e-commerce facility to enable suppliers of airline parts and services to provide them

to a consortium of international airlines.

While the above examples are different from each other in terms of how commercial activity is facilitated, the common thread is the fact that both the provider and recipient of the product or service are businesses.

This activity is captured in the top right quadrant of **Figure 1**.

Consumer-to-consumer

This is referred to as C2C e-commerce. While this type of activity may not be as widely discussed as the first two, some highly successful examples exist. In this case, both the provider and recipient of the goods or service are individuals. An organisation merely facilitates through an e-commerce site, the meeting of the two parties with the potential of consummating a commercial transaction.

> The term e-tailers is often used to refer to retail merchants who offer their products to customers through an e-commerce infrastructure

The most well-known example of this type of e-commerce is eBay, the auction enabler where individuals may put up items for auction and other individuals may bid for them. The role of the organisation is to facilitate such interaction between individual consumers.

This activity is represented in the bottom left quadrant of **Figure 1**.

Consumer-to-business

This is referred to as C2B e-commerce. Initial attempts at implementing this type of activity were enthusiastically received in the marketplace of ideas. However, the more well-known ▶

organisations adopting this type of activity have since fallen on hard times.

The main idea here is that the flow of transaction is from the individual consumer to a business enterprise. While on the surface this may sound improbable, an example will help clarify the nature of the activity. Priceline (www.priceline.com) is an organisation that allows an individual to offer a price for a variety of products such as an airline ticket, a hotel room or a rental car. During the gasoline crisis last year, it also allowed individuals in the US to offer a price for a certain amount of gasoline. The organisation then attempts to find a provider of that product at the offered price.

Hence the transaction originates from the individual who uses the e-commerce facility to make an offer. The transaction is completed when the offer is accepted and the product is delivered by an organisation.

This activity is represented in the bottom right quadrant of **Figure 1**.

Another useful way to think about e-commerce examples is to address the fundamental question of what one wants to achieve through the deployment of this technology.
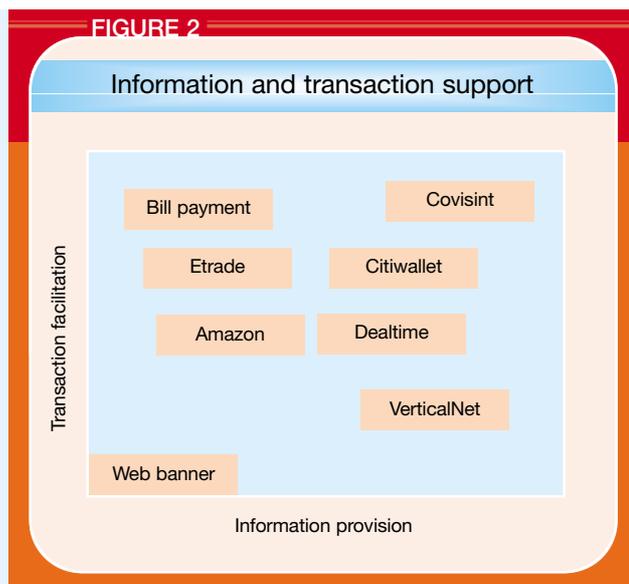
Two aspects of a commercial transaction need to be supported if e-commerce deployment is to be truly successful. The first is the provision of relevant information to the recipient of the transaction. Commercial activity commences with the search for information on the part of the purchaser. The more efficient this search is, the better the decision made by the purchaser. Therefore, successful e-commerce applications must facilitate the provision of relevant information in an efficient and timely manner.

The second aspect is that of facilitating the completion of the transaction itself. This includes both the delivery of the product or service and the handling of the settlement for the purchase. In the case of products that are digitisable (e.g. software, data, information), this is relatively easier to accomplish than for products that are not (e.g. a television).

All transactions consist of a settlement phase, however, where payment is made for the purchase. Successful e-commerce applications must facilitate as much of the transaction as possible.

Using this framework, **Figure 2** locates a number of examples of e-commerce on a graph that captures the extent to which the two aspects of information provision and transaction facilitation are captured.

Consider a simple web banner that advertises a product on a web page.

FIGURE 2

Information and transaction support

Transaction facilitation

Bill payment

Covisint

Etrade

Citiwallet

Amazon

Dealtime

VerticalNet

Web banner

Information provision

This is a source of advertising revenue for many e-commerce content providers such as Yahoo! (www.yahoo.com). Typically, the banner is a link to the site of the merchant offering the product itself, but offers little else.

The richness of the information provided by such an application is minimal – it merely advertises the presence of the product in much the same way as a newspaper advertisement.

Further, beyond providing a pathway to another site, a transaction involving the purchase of the goods is not facilitated. That requires additional activity on the part of the potential purchaser. Hence, the web banner as an application shows up on the bottom left of the matrix with a low rating on both dimensions.

If we consider an application such as Amazon, however, a wider range of information is provided to the purchaser. Further, the application facilitates a transaction by allowing payment options and delivery details to be specified. Hence it is located slightly to the right of and above the web banner application.

To run through the other applications shown in the figure:

- Etrade (www.etrade.com) is an online trading facility that allows an individual to trade financial instruments. Individuals open an account with the organisation that then enables them to engage in trading securities.

- Bill payment applications enable an individual to settle payment for purchases made. Many banks offer this as a service of their e-commerce facility. The purchase itself is made outside the scope of the application. It is the payment aspect of the transaction alone that is supported.

- VerticalNet (www.verticalnet.com) is an organisation that caters to the needs of participants in specific industry sectors (called "verticals"). The application organises information in a variety of verticals such as healthcare, energy, public sector, etc, which

then allows participants in these verticals to obtain the best information they can about their requirements and potential suppliers who operate in the same vertical.

- Dealtime (www.dealtime.com) is a shopping broker that provides price and seller information from a variety of sources, once the purchaser has identified what particular item is being sought. The information provided can then be used to select the "best" seller (based on price, delivery time, reputation, etc) in order to complete the transaction.

- Citiwallet (www.citiwallet.com) is a facility offered by Citibank that enables individuals to purchase from a wide range of products and complete the transaction at the same time by making the settlement for the purchase at the site. This is in contrast to providing, say, credit card information that then necessitates the settlement of the purchase to take place externally.

> Typically, a web banner is a link to the site of the merchant offering the product itself, but offers little else
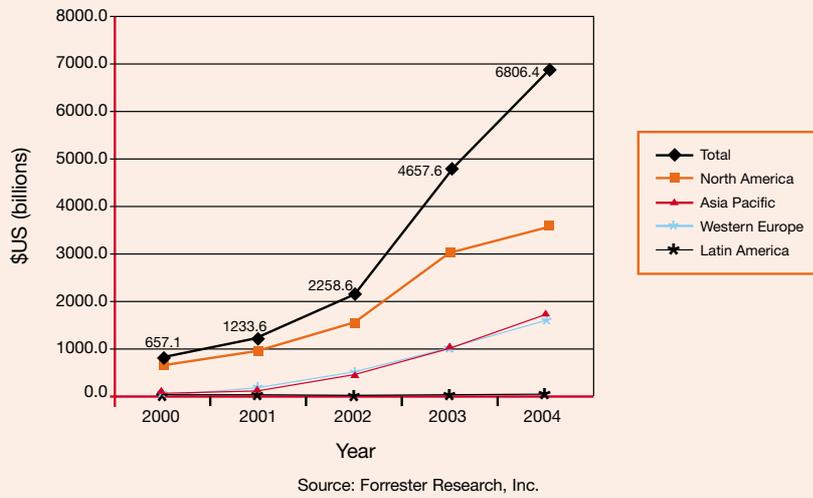
- Covisint (www.covisint.com) is the facility mentioned earlier launched by General Motors and its partners in the automotive industry that provides a facility for exchanging information and completing transactions according to specifications between itself and any of its suppliers or among a set of suppliers.

It is a useful exercise to identify particular applications and locate them in the matrices shown in **Figures 1** and **2**. It will clarify some basic assumptions that underlie e-commerce examples and will enable a better appreciation of what applications do and what they are capable of. ▶

FIGURE 3

E-commerce revenue forecast

Source: Forrester Research, Inc.

TRENDS AND STATISTICS

While it is clear that the level of e-commerce activity has been growing at a significant rate over the past few years, the forecasts for the rate of growth are quite revealing.

Figure 3 is a graph that shows growth forecasts broken down by various regions of the world. While these forecasts are generated by one research organisation, namely Forrester Research, Inc., the numbers that are generated by other respected research institutions show a similar pattern.

Some interesting observations can be made from the graph. The anticipated rate of growth is exponential. The total worldwide amount of e-commerce activity is expected to reach almost $US7 trillion by 2004. A significant proportion of this activity (about 50 per cent) is in the North American region (US, Canada and Mexico).

It is interesting to note, however, that the Asia-Pacific region forecast for the year 2004 is about 50 per cent of the North American region. Japan accounts for about half of this forecast while Australia accounts for about an eighth (amounting to approximately $US200 billion).

Considering that New Zealand's GDP has averaged in the range of 15 per cent of Australia's over the past few years, the implication for the absolute numbers involved here are significant.

The Asia-Pacific region is expected to track the level of activity in Western Europe closely. The Latin American and African regions forecasts are less than three per cent of the total activity forecast for 2004. This points to issues of infrastructure and accessibility that will take a longer time frame to resolve in these regions if they are to fully participate in this phenomenon and reap the associated economic rewards.

While these numbers are impressive, it should be pointed out that the forecasts represent less than 10 per cent of all economic activity in 2004. There will be a lot of non-e-commerce going on!

Exemplary organisations that have been the leaders of e-commerce principles such as Cisco and Dell attribute more than 50 per cent of their sales to the deployment of this technology. While it is true that these are examples of high-technology firms that operate in industries where there is a natural inclination toward such activity, the lessons that can be learnt from them cannot be dismissed in the light of the implications of the forecasts discussed earlier.

The final, yet crucial point to be made in this section relates to the comparison between different types of e-commerce. Again, according to Forrester Research, Inc. statistics, the ratio of B2C e-commerce to B2B e-commerce in the year 2004 is expected to be

about one-to-14 worldwide (about one-to-13 in the Asia-Pacific region and one-to-16 in the North American region).

It is clear that the most value will be generated through B2B e-commerce. The implications for investment in the technology at the level of national economies are significant.

In the next section, we will examine B2B e-commerce more closely to get a better sense of what the variations are for deployment of the technology.

VARIATIONS IN B2B E-COMMERCE[2]

With B2B e-commerce being the dominant economic variation of the phenomenon measured in terms of dollar impact, it is useful to examine the various methods and models employed to deliver this concept.

B2B e-commerce can be classified into four broad categories based on the driving forces that motivate the design. Each category in turn may adopt one or more pricing mechanisms in order to generate revenue. Particular combinations of the drivers and the pricing mechanisms lead to many specific deployment instances of B2B e-commerce.

The four common variations based on the underlying drivers as identified by Morgan Stanley Dean Witter Research (2000) are:

- Buyer-driven models
- Supplier-driven models
- Distributors/market makers
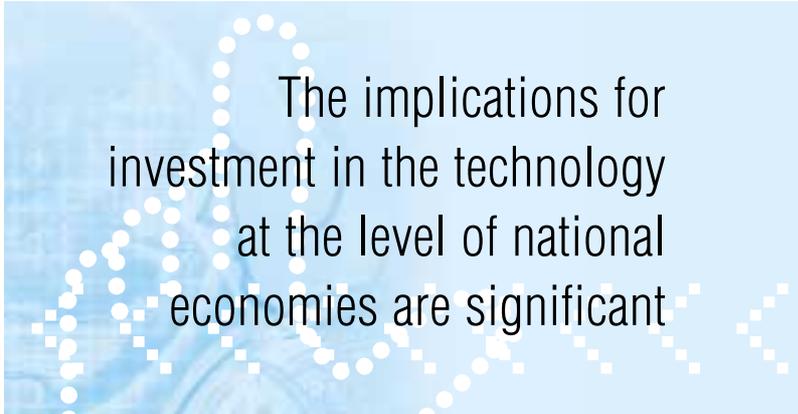- Content aggregators.

Buyer-driven models

Large buyers may establish their own e-marketplace in order to manage the procurement process more efficiently, lower administration costs and reduce maverick buying (Kalakota and Robinson, 1999).

An e-marketplace may be either private or public. When the buyer-managed e-marketplace is private, the content is

hosted and managed by the buyer within the organisation. When the buyer-driven e-marketplace is public, the content is placed in a separate venture as to attract other buyers in the same industry.

An example of the buyer-driven model is the Covisint system managed by GM/Ford/Daimler/Chrysler. In this context, companies form alliances with business partners in order to aggregate their purchasing power. These business partners collaborate and procure as a single large buyer. Suppliers are invited to bid for the purchase orders posted by the alliance.

A recent example of such a model in New Zealand involves the public school system. The School Trustees Association, teaming up with Oracle as the technology provider, announced the development of a procurement portal for New Zealand schools. The model works well when there is little differentiation among sought products involving a consortium of buyers.

> The implications for investment in the technology at the level of national economies are significant

In this example, all schools need basic school supplies that have very little variation in terms of product attributes. This allows them to form a buying block and leverage e-commerce technology to deal with a variety of suppliers.

Supplier-driven models

The most common B2B model is the supplier-driven model (Turban, Lee, King and Chung, 1999). Many manufacturer-driven electronic stores belong to this category. This model resembles the conventional commercial ▶

[2]This section is based on the work done by Wong (2001).

environment setting where transactions are conducted in shops, which are managed by suppliers.

Producers with dominant market share or proprietary products are most suitable for this model (Morgan Stanley Dean Witter, 2000). This model is also suitable for suppliers that serve a large number of small and fragmented buyers.

A successful example of the supplier-driven model is the networking giant, Cisco. In 1998, Cisco crossed the $US1 billion mark in the sale of routers, switches and other networking equipment to business customers through the internet. Cisco estimates that putting its selling applications online saves the company approximately 18 per cent of total operating costs (Turban, et al, 1999).

Distributors/market makers

There are multiple suppliers and multiple buyers involved in the distributors/market makers model. In this model, the exchange can be managed by one of the buyers or one of the sellers. It can even be managed by a third-party firm. The firm, which manages the exchange, plays the role as a distributor. The participating firms pay transaction fees to the distributor, which provides the order matching services.

Traditional deployment instances of this concept are referred to as exchanges whose intent is to create a marketplace to bring buyers and sellers together. This could be isolated to a single industry sector (a "vertical").

Examples of such exchanges exist in the steel industry (e-Steel [www.esteel.com]) and paper industry (PaperExchange [www.paperexchange.com]). The example of VerticalNet described earlier caters to multiple industry sectors (verticals). The degree to which transactions themselves are facilitated, however, may vary from the single vertical examples.

In New Zealand, the eSolutions group consisting of Microsoft, Telecom and EDS has deployed an exchange model called BusinessXchange which allows members to transact business through the exchange across a wide variety of industries. The cross-industry model is sometimes referred to as a horizontal exchange to emphasise the fact that it is not restricted to a single vertical.

In all of these examples, the obvious benefit is one of leveraging the technology to create an efficient electronic market that is responsive to the needs of efficient search for product information followed by the consummation of consequent transactions.

Content aggregators

Research indicates that more than 60 per cent of suppliers maintain their catalogues on paper, while 40 per cent of suppliers have electronic catalogues (Morgan Stanley Dean Witter, 2000). The most well-known content aggregator models are those that operate primarily in the B2C sector using a portal as the e-commerce model.

The basic need served by a content aggregator is that it provides information drawn from a variety of sources and packaged in one place. The individual does not have to go through the process of "aggregating" the required information.

This model has been most successful in the news and current events arena. Yahoo!, for example, has built its success on aggregating content of various sorts.

The content aggregation model has also been successful in catering to particular special interest groups. In New Zealand, sites such as Nzoom (www.nzoom.co.nz) have utilised the

model and targeted New Zealanders regardless of where they are. Rediff (www.rediff.com) is another example – it aggregates content of interest to the Indian community. This model has been successfully deployed in the B2B context as the portal b2btoday.com.

The opportunity for the content aggregation model in the case of B2B e-commerce is vast. A good example of a technology provider to enable this variety of application is the Michigan-based company called Polyphasic. The company develops software that enables the maintenance of complex data-intensive web applications that are critical for the success of content aggregators.

The useful function that could be served by this model is the standardisation of product specifications in a particular industry. Technologies that are increasingly used in e-commerce applications are forcing the definition of such industry-wide norms.

This is evidenced by the approach taken by the XML language standards groups that seek shared ontologies in industry sectors.

Several pricing and revenue models make the above variations feasible. The basic benefit derived from these applications is the ability to deliver dynamic pricing through a variety of mechanisms such as auctions, negotiations, tenders, etc.

The variations are served through a multiplicity of revenue models that include membership, subscription, commissions and advertising.

ISSUES OF MEASUREMENT

One of the most difficult aspects of e-commerce is to know in a precise manner, how much of it is going on. The forecasts referred to earlier provide us with some dollar-based figures about the level of activity, but getting precise numbers at any degree of detail is almost an intractable problem.

The approach that is commonly taken here is to use appropriately defined proxies that would indicate how much e-commerce activity

is actually going on. The New Zealand Institute for the Study of Competition and Regulation produced a report last year entitled "State of e-New Zealand" (de Boer, Evans and Howell, 2000). In an attempt to get a sense of the penetration of the technology in New Zealand, the types of proxy measures that they used were:

- Number of internet hosts per 1000 inhabitants
- Number of secure web servers per one million inhabitants
- Number of domain name registrations
- Internet access charges

By comparing such figures with a number of other countries, we get a good idea of the uptake of e-commerce relevant technologies vis-à-vis the countries we wish to benchmark against. While this is a good first step in that it helps us broadly structure the policy agenda for how to utilise the technology, the measures need to be sharpened if we are to execute policy at a national level.

Morgan Stanley Dean Witter (2001) have taken a different approach to measurement by proxy to get a good sense of the rate of growth of internet usage. They have developed what they term an "ecosystem" of internet users and usage based on publicly available metrics used by leading firms operating in the high-technology sector. The metrics include such things as:

- Global unique visitors to Yahoo!
- Number of local area network ports sold by Cisco
- Number of advertisements served by DoubleClick
- Total value of sales at eBay

By specifically focusing on metrics tied to essential, high-profile companies, the claim is that the proxies are more accurate indicators of specific internet volume.

A more detailed framework for understanding the state of the internet economy has been developed by the University of Texas (www.internetindicators.com). It uses a ▶

component-based approach to identify specific layers that make up internet activity. These are termed "Internet Economy Indicators" and are used to generate measures and forecasts about revenues and jobs. Specifically, the layers are comprised of the following:

- The Internet Infrastructure Layer that consists of companies that help create the infrastructure essential for the conduct of e-commerce. These include manufacturers of relevant hardware and internet service providers.

- The Internet Applications Layer that consists of companies that make it possible to utilise the infrastructure to deliver applications. This includes software, consulting and database-enabled web applications.

- The Internet Intermediary Layer that consists of companies that use an electronic marketplace to bring buyers and sellers together in the context of commercial transactions. These include exchanges, portals, content aggregators, etc.

- The Internet Commerce Layer that consists of companies such as airlines, computer manufacturers and online book sellers that engage in providing goods and services to customers.

By conceptualising the structure of the internet-driven economy in this fashion, they are able to gather data through surveys and by scanning public documents on specific measures such as number of jobs and revenues.

This approach is gaining a significant amount of publicity in terms of its ability to present a true picture of what is happening in the digital economy. Current statistics on various measures of the digital economy are maintained at the website mentioned earlier.

While the basic message about projected growth is the same as the forecasts mentioned earlier, the lesson from this exercise is that sophisticated measurement approaches are essential if we are to design policy for internet usage and deployment.

CONCLUSION

The popular media tends to talk about the heady days of e-commerce as if it were a brief shining moment in the past. But any radical change in society will have its short-term upheavals. This is exactly what is going on with the e-commerce phenomenon.

While interest groups that focus on short-term financial measures have reason to be anxious about e-commerce, it is clear that in the long run, the way in which we engage in commercial enterprise will be radically transformed by information technology. It is therefore incumbent on us to clearly understand the phenomenon and think about how we as a society can be prepared to fully leverage its benefits.

REFERENCES

De Boer, D. B., Evans, L., & Howell, B. (2000). *The State of e-New Zealand,* New Zealand Institute for the Study of Competition and Regulation, Inc, http://www.iscr.org.nz/research/

Evans, P. B., and Wurster, T. S. (1997). *Strategy and the New Economics of Information,* Harvard Business Review, September-October, 1997, pp 71-82.

Forrester Research, Inc (2000). Forrester Findings, www.forrester.com

Kalakota, R., & Robinson, M. (1999). *e-Business: Roadmap for Success,* Addison-Wesley, Massachusetts.

Morgan Stanley Dean Witter Internet Research (2001). *The Internet User/Usage Ecosystem Framework,* http://www.msdw.com/techresearch/index.html.

Morgan Stanley Dean Witter Internet Research (2000). *Collaborative Commerce,* http://www.msdw.com/techresearch/index.html.

Sculley, A. B., and Woods, W.W.A. (1999). *B2B Exchanges*, ISI Publications, www.isipublications.com

Turban, E., Lee, J., King, D., & Chung, H.M. (1999). *Electronic Commerce: A Managerial Perspective,* Prentice Hall Upper Saddle River, New Jersey.

Wong, Winnie (2001). *Business-to-Business E-Commerce,* Unpublished Honours Essay, Department of Management Science and Information Systems, University of Auckland, Auckland.

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The Digital Commerce Centre
at the University of Auckland Business School

The University of Auckland Business School will establish a Digital Commerce Centre this year. The Centre will drive research and curricular activity across the School in all areas related to Digital Commerce. One of its important objectives will be to establish strong links with the business community and policy-makers in order to shape a research-led, relevant agenda. The Centre will work with the business community in defining and executing research projects. It will also serve as a clearing house for information about digital commerce. The Digital Commerce Centre will be directed by Professor Ananth Srinivasan and Dr Margo Buchanan-Oliver.

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