

The Internet: A Business Decision

John Lamp BSc GradDipSc(IT) BComp(Hons) CD MACS*

SUMMARY

The Internet is widely touted as the technological marvel of the 1990s, and writers in the popular press insist that all businesses should be making immediate plans to exploit this new medium. When questioned a little more closely, however, their expectations of what businesses can achieve by this, tend to degenerate into positive sounding generalities and technical jargon which provides no help for a person trying to discover what meaningful advantages the use of the Internet can offer their business.

In this paper, a description of the Internet is offered, and significant activities which can be enabled by use of the Internet's services are examined. Weaknesses of the Internet are also noted, and current developments such as Internet II are described. Business can make use of the Internet, however, such a decision should be made on a commercial, rather than a technical analysis.

1. INTRODUCTION

The Internet grew from an experiment by the US Department of Defence Advanced Research Projects Administration, originally called ARPAnet in 1968 [1]. The aim of the project was to create a network which could remain functional in the event of nuclear attack. From this small beginning, the Internet was gradually extended into academic institutions, and from there into community and commercial domains.

Since then, the Internet has expanded and established gateways between a number of networks with a similar function, so that it should properly be called a meta-network – a network of networks. The basis for joining a network to the Internet is agreement to abide by the Internet standards which have been established through the *Request for Comments* process. In June 1996, it was estimated [2] that there were approximately:

- 94 thousand interconnected networks
- 23 million users worldwide
- 110 countries with full connectivity
- 154 countries connected with e-mail only
- over 9.5 million host computers

At the same time as the extent of geographical coverage of the Internet has grown, so too have the number of applications on the Internet. Most services on the Internet were originally character based, but the main Internet service in use, the World Wide Web uses browsers, most of which are based on a graphical user interface, and make extensive use of graphics, mostly still but increasingly animated or movies, and sound.

This rapid development resulted in the take up of the full available capacity of the Internet. Critical linkages have been expanded and duplicated, but the demand for multimedia over the Internet has lead to moves for the development of a broad band network which would be optimised for these more network intensive applications. The US government has recently announced seeding funding [3] for this development which, no doubt influenced by the Hollywood hype which surrounds much of this industry, has been named by them Internet II.

* John Lamp is a Lecturer in the Department of Information Systems at the University of Tasmania, Hobart TAS

In the following sections of this paper, I will outline uses to which the Internet can be put under three headings; technical integration, as an information resource, and for electronic commerce. Future directions for the development of the Internet will also be discussed. A glossary of terms is also included.

2. THE INTERNET AS A DEVICE FOR TECHNICAL INTEGRATION

When all is said and done, the Internet is a computer network. It may well be the largest one around, but in the current infatuation with its use as an information resource, the fact that all the usual telemetry can be passed over it is often overlooked.

In the building services area, there is increasing use of electronic controls, either replacing mechanical or electro-mechanical devices, or reporting on operational aspects of the machinery installed at a particular site. Some manufacturers, such as TA Australasia and Siebe Environmental Controls, have taken the next step by developing products which are either using industry standard PCs as controllers, or providing standard networking connections such as Ethernet.

Any system, which can provide this connectivity to a local area network, can be set up to provide this telemetry over the Internet. Even equipment which was not originally so designed, may be able to be modified to provide digital telemetry. This latter approach has been exploited in some rather off beat experiments - at Carnegie Mellon University in the USA, they have connected a Coke machine to the Internet, and it now provides a graphical display of the beverages available, and their temperature, to any person who accesses the machine.

It would be possible to develop network protocols which would allow installed equipment to report on their operation, signal conditions which have deviated from normal, and provide all this usual information to service centres outside the installation site. Previously, such implementations were the domain of large organisations who could afford the dedicated cabling - now they are within the reach of any organisation which can afford an Internet connection. International organisations can even provide 24 hour service without the need for shift workers. (see below, 4.4)

The ability to deliver real time telemetry off-site opens the way for the use of more sophisticated expert systems and control software in a cost effective manner, as each service centre could be monitoring many sites. Customer service personnel would be able to see how a system is operating and provide more meaningful information even from the vaguest and most technologically naive customer on their first call. Remote re-configuration of the system may also be possible, allowing immediate solution of some problems.

It would also be possible to download and start updated control software remotely.

This all highlights one major weakness of the Internet. The Internet was designed as an experiment involving trusted systems. Accordingly, security and authentication were not high on the list of priorities in the development of the Internet. This is being addressed and has improved dramatically as the Internet has become more popular. Most recent application protocols contain sophisticated security which operates in addition to the base protocols. I would suggest that it would be essential to have strong secure protocols in the control of building services. The destructive potential of a rogue control program, both physically and to the commercial reputation of the equipment manufacturer or provider would be devastating.

3. THE INTERNET AS AN INFORMATION RESOURCE

The scope of the information available on the Internet can be summed up in the following quote:

It is safe to say that at least 99% of the available data [on the Internet] is of no interest to at least 99% of the users. [4]

The problem of finding the remaining one percent which is of interest, is compounded by the fact that, unlike a library, there is no overall information management scheme for the Internet. The best analogy for information management on the Internet is to imagine a large library which has been hit by an earthquake. All the information is still there, but working out where it is, is a major problem.

In order to make sense of the chaotic environment, some basic knowledge of the services available on the Internet is necessary.

3.1. The Older Services

The earliest services used for information retrieval on the Internet were telnet and ftp. Telnet allowed a user to connect to a remote computer and access programs and data held on that computer. Ftp is the basic file transfer protocol which allows the transferring of files between computers. Anonymous ftp allows users to access certain parts of computer, without a password, to retrieve files. Anonymous ftp is still a very common means of obtaining programs and data files.

Both these services required significant computer expertise. A major advance was the development of the gopher service at the University of Michigan, which used a text menu system for navigation, and hid the network technical details behind these more user friendly menus. (Figure 1)

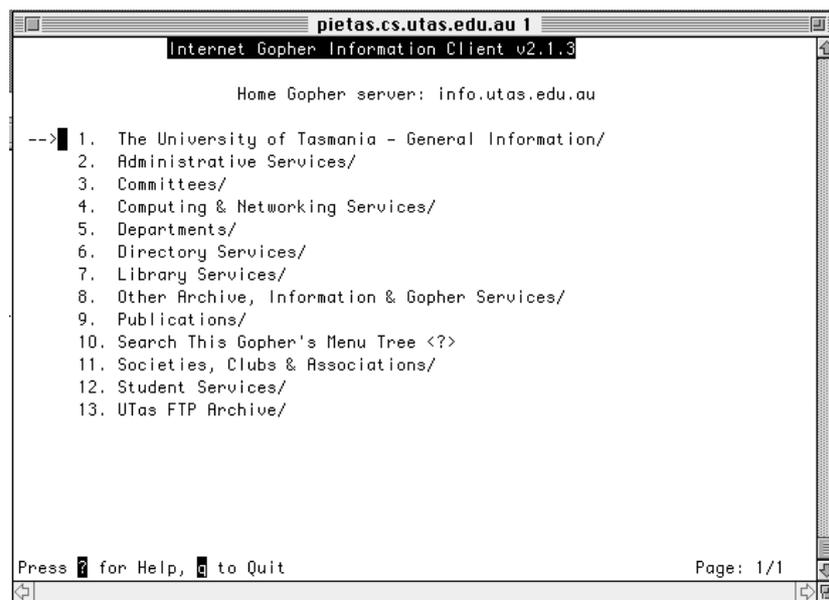


Figure 1 A Gopher menu

3.2. The World Wide Web

The World Wide Web (WWW) began as a way of providing networked access to manuals at the CERN in 1989. By 1991 it had escaped, and in 1993 NCSA brought out Mosaic – the first of the graphical browsers [5]. The major significant change was the use of the hypertext – links from anywhere in a document to other items, places or functions. Navigation is by pointing at a link and clicking on it. This simple, yet powerful means of navigation combined with a modern graphical user interface, and the ability to run on most desktop systems resulted in an explosion in use of the WWW. It has become so popular that it has, in the minds of many users, become synonymous with the Internet.

Since its introduction, the capabilities of the WWW have been continuously expanded to include sound, video, animation and secure communications.



Figure 2 A World Wide Web page

3.3. Locating Information on the Internet

O what a tangled WWWeb we weave,
When we hyperlink retrieve [6]

A number of services have developed on the Internet to assist with the location of information, and its retrieval. Most of these are service specific, such as Archie, which indexes information on ftp sites, and veronica and jughead which index gopher sites. The dominance of the WWW over the older services has led to the dominance of indexing services based on WWW capabilities. These fall into two main areas; subject indexes, and web crawlers.

Subject indexes, such as Yahoo, are structured around a hierarchical index, with lateral links as necessary and exploit the hypertextual nature of the WWW to allow the hierarchy to be searched from any point in the hierarchy.

Web crawlers, such as Alta Vista, use software agents to follow hypertext links and build a database of every word and link in each page they encounter.

AltaVista gives you access to the largest Web index: 30 million pages found on 275,600 servers, and four million articles from 14,000 Usenet news groups. It is accessed over 21 million times per weekday. [7]

It is worth spending some time learning about the operation of these various indexes and search engines, as they are vital to penetrating the chaos of information on the Internet. With practice sophisticated queries can be submitted, resulting in more precise locating of information.

Neither of these approaches to indexing is completely successful, and a number of schemes, such as network information brokers, are the subject of current research and evaluation. Information management is one of the biggest challenges on the Internet.

3.4. Useful Internet sites

The Internet sites in Table 1 may be of use as a starting point for your searching or provide relevant examples of what is out there.

Table 1
Useful Internet Sites

Alta Vista's Australian site	http://www.altavista.yellowpages.com.au/
Yahoo Subject Index	http://www.yahoo.com/
Yahoo Engineering Index	http://www.yahoo.com/Science/Engineering/
F.E.T.A. Links	http://www.feta.co.uk/fetalink.html
British Flue and Chimney Manufacturers Association	http://www.feta.co.uk/bfcma.html
Building Services Corporation	http://www.fl.asn.au/nsw_society/ljsj/cat0068.html
UNSW Air Conditioning Policy	http://www.unsw.edu.au/UNSW/poldoc/aircon.htm
CIBSE Virtual Conference	http://www.virtual-conference.com/cibse97/

There seems to be a reasonable number of Internet sites dealing with issues of interest to your organisation. The coverage is still uneven, and there seems little organisation and cross connection between sites. This could be an opportunity for AIRAH, should you establish a WWW presence.

4. THE INTERNET AS A VEHICLE FOR ELECTRONIC COMMERCE

Electronic commerce (EC) is an evolving concept and is interpreted by different people in different ways. I choose to interpret EC as "the buying and selling of information, products and services via computer networks and the support for any kind of business transactions over a digital infrastructure" [8]. EC predates the Internet, but was virtually the exclusive province of large organisations which could afford private networks, or to use the services of a Value Added Network (VAN). The worlds largest value transactions are presently carried out using EC – international banking transactions [9]. The development of the Internet has made EC something which many small or medium sized enterprise (SME) can now consider.

4.1. A Promotional Tool

The most common use of the Internet by businesses is for the promotion of their products or services. While many of the standard promotional techniques apply to using the Internet, it must be remembered that this is a different medium with morés of its own. Inappropriate use will attract negative attention. Unlike newspapers or broadcast media, on the Internet you must attract people. Informative sites, and sites which change regularly attract return visitors and inclusion on indexes.

4.2. A Sales Channel

Taking orders over the Internet is an obvious next step. A key issue here is the matter of authenticating the origin of the order. This was not one of the strong points in the original Internet design, but most of the recent protocols now provide secure authentication. Integration of this method of making sales can be loose, with the electronic orders being printed off, and then entering the normal paper based process for filling orders, or the process can be tightly integrated, where the order is accepted electronically and the paper chase is circumvented.

4.3. A Customer Service Tool

Many organisations are using the Internet to provide after sales customer service. Routine information on equipment upgrades, recalls or modifications can be made

available, either to all persons accessing your site, or through some form of privileged access. It would also be possible to handle simple fault queries through a specialised expert system which could then pass the query to a human if it were unable to handle the problem unaided. Making technical manuals available in this way can be a significant cost saving, and at the client's end eliminates the problem of lost manuals or amendments. It would be possible to make manuals available to customers without net access via CDROM. This can have other advantages – the paper required for manuals on a new US Navy destroyer caused it to sink four inches lower in the water [10].

4.4. A Time Machine

One of the more unusual uses of the Internet is to exploit the planet's time zone differences. Cisco Systems provides 24 hour per day 7 day per week service response, without any employee working outside the normal 9 to 5 working pattern. They have seven response centres around the planet, which handle service related calls during their daytime working hours. Some insurance companies are now doing the same thing. This has some implications for staffing – Cisco's Sydney site can handle queries in 10 different languages.

The convergence of data and telecommunications allows for both voice and traditional computer communications to be re-routed to these sites as the daylight time zone changes. Businesses which provide this sort of support can obtain significant cost savings in this manner.

4.5. Virtual Conferences & Exhibitions

All of the above examples of electronic commerce have as their implicit theme, the bringing together of individuals and organisations using data communications for a particular purpose. As with most conferences, virtual conferences combine both passive (posters, exhibitions, displays) and active (workshops, tutorials, discussions) elements. This is an area which is under rapid development, and the active aspects in particular are improving. This development is vitally dependent on input from participants, and I would strongly recommend investigating the CIBSE virtual conference, the web location for which can be found in Table 1 above.

5. THE FUTURE

The Internet grew from an experiment in the rarefied atmosphere of a US Defence Department project. The aims of that project were completely unrelated to the demands of a planetwide network to serve as a general communications network, and as a platform for secure electronic commerce. The nature of the traffic which has been carried for most of the life of the Internet has largely been small character oriented messages, where timeliness was not a significant issue. Today the public wants video on demand, real time audio and other services which are not effectively delivered over the present narrow band design of the Internet.

For some time now, there have been research programmes in Australia and overseas working on developing the next generation of the Internet – a broad band system with the necessary authentication and privacy measures built in from the physical layer upwards. This was given a massive boost in October with the announcement of funding of \$100 million by the Clinton-Gore administration in the US [3].

These developments will make the use of the Internet easier and more secure, and faster in response. The nature of the services available will also change to take advantage of these technical developments, and make today's web browsers look and feel primitive.

6. CONCLUSIONS

The rapid public and corporate acceptance of the uses and potential of the Internet would seem to indicate that the concept of a public digital network is here to stay, and that it must become a factor in the business planning of most organisations, in particular small and medium sized enterprises. This is an opportunity which has previously been out of reach for most SMEs for financial reasons.

It is vitally important to remember that the decision to move onto the Internet is first and foremost a business decision as are all decisions about the adoption of a particular method of doing business. In the building services area, there are a number of key players already on the Internet in some form. Careful planning and gaining an understanding of the Internet and the threats and opportunities it offers are essential to successfully making the transition. I have included, as an appendix, 129 questions to ask of your business to help guide your thinking as you explore this new frontier.

Information systems professionals can help you with both this business analysis, and an outline of the technical solutions which can assist you in making the transition.

7. NOMENCLATURE

E-mail	(Electronic Mail) – Messages, usually text, sent from one person to another via computer. E-mail can also be sent automatically to a large number of addresses (Mailing List) [11]
Gateway	The technical meaning is a hardware or software set-up that translates between two dissimilar protocols, for example Prodigy has a gateway that translates between its internal, proprietary e-mail format and Internet e-mail format. [11]
Request For Comments	The name of the result and the process for creating a standard on the Internet . New standards are proposed and published on line, as a “Request For Comments”. The Internet Engineering Task Force is a consensus-building body that facilitates discussion, and eventually a new standard is established, but the reference number/name for the standard retains the acronym “RFC”, e.g. the official standard for e-mail is RFC 822. [11]

8. REFERENCES

1. Libicki MC: *Information Technology Standards: quest for the common byte*, Butterworth-Heineman, p 252, (1995)
2. Caronne M: Internet: “Where it is and Where it is going”, *Electronic Commerce for Trade Efficiency and Effectiveness – Proceedings of the Ninth International Conference on EDI-IOS*, Bled Slovenia, pp 588 - 596, (1996).
3. United States Information Service (USIS): *On New Internet Initiative* [Online] Available Email: Hassan Bin Hassan <paocoord@po.pacific.net.sg>, 16 Oct 1996, Email to usis-super@spice.com (1996)
4. Bowman CM, Danzig PB, Manber U & Schwartz MF: “Scalable Internet Resource Discovery: Research Problem and Approaches”, *Comm of the ACM*, 37, 8, Aug ‘94. (1994)
5. Cailliau R: *What is WWW?* CERN [Online] Available URL:

<http://www.cern.ch/CERN/WorldWideWeb/RCTalk/First.html>

- 6 Fitch K: *ANNOUNCE: CSIRO Web Server* [Online] Available: [news:comp.infosystems.www](http://news.comp.infosystems.www) Message ID: fit106.769999176@its.csiro.au (1994)
- 7 Digital Electronic Corporation: *Alta Vista Homepage* [Online] Available URL: <http://www.altavista.digital.com/> (1996)
- 8 Bloch M, Pigneur Y and Segev A: "Leveraging Electronic Commerce for Competitive Advantage: a Business Value framework", *Electronic Commerce for Trade Efficiency and Effectiveness – Proceedings of the Ninth International Conference on EDI-IOS*, Bled Slovenia, pp 91 - 112 (1996)
- 9 Kling R: "Hopes and Horrors: Technological Utopianism and Anti-Utopianism in Narratives of Computerization" in Kling R (ed): *Computerization and Controversy: Value Conflicts and Social Choices* Academic Press, USA (1996)
- 10 McCubbrey DJ: "CALs: Commerce At Light Speed", *Electronic Commerce for Trade Efficiency and Effectiveness – Proceedings of the Ninth International Conference on EDI-IOS*, Bled Slovenia, pp 539 - 546
- 11 Internet Literary Consultants: *Glossary of Internet Terms*, [Online] Available URL: <http://netspace.net.au/~elthamc/newuser/glossary.html>, (1996)
- 12 Keeves R, and Dell D: "Internet Tips and Techniques", Fischer L *New Tools for New Times: Electronic Commerce* Future Strategies Inc, USA (1996)

9. APPENDIX

129 Essential Questions on Using the Internet

(adapted from [12])

The Internet and online services

- 1 What are the key outcomes you want from your online services?
- 2 When do you want to achieve these outcomes?
- 3 Do you have your own Internet business Domain Name?
(you@yourbusinessname.com.au)

Your current business

- 4 What business are you in?
- 5 What business do your customers think you are in?
- 6 What are your core products and services?
- 7 How well are they known locally and globally?
- 8 What are the three main benefits your customers receive from using your products or services?

Your community

- 9 How do you define the primary community to which your target markets also belong?
- 10 To what other secondary communities do your target markets also belong?
- 11 Where do these communities go on the Internet?
- 12 What discussion groups are already on the Internet for these communities?

Curiosity

- 13 What are the main areas of curiosity in your target markets?
- 14 How has that changed in the past three years?
- 15 How is it likely to change in the next two years?

Industry "problems"

- 16 What are the three biggest communications problems and the three biggest marketing problems in your industry?
- 17 Excluding the Internet, how could you solve them today?
- 18 From your *customers'* point of view, what would they think are the three biggest problems in your industry?
- 19 How might the Internet help you solve these problems?

Your target market

- 20 Who is your target market?
- 21 What is the size of your target market locally?
- 22 What percentage of that local target market do you currently reach?
- 23 What is the size of your target market globally?
- 24 What percentage of that global target market do you currently reach?

- 25 How many of your target market are currently on the Internet?
- 26 Where does your target market go on the Internet?
- 27 What are their primary interests?

Your niche

- 28 What is the one sentence you use to define what makes your business so special?
- 29 What is your niche today?
- 30 What is the *most* profitable niche in your industry?
- 31 What is the *least* profitable niche in your industry?
- 32 Which niches will make the most money for you in the future?
- 33 Which niches will provide the most excitement for you in the future?
- 34 How will businesses in your industry look to your customers in five years?

Growth plans

- 35 In what areas, regions or countries are you currently operating?
- 36 Excluding the use of the Internet, into which areas or regions are you considering expanding?
- 37 How does the Internet affect your growth plans?

Opportunities

- 38 Excluding the Internet, what are the most exciting business opportunities opening up in your industry?
- 39 Can you list ten new business opportunities the Internet may open up for your business or your industry?
- 40 Which ones (if any) can you develop better than your competitors can?
- 41 Which of today's "obvious" opportunities may not be worth getting in to?

Your Obsolescence

- 42 What sort of businesses in your industry have become obsolete in the last ten years?
- 43 Which businesses do you think may become obsolete in the next five years?
- 44 How can you plan to make yourself obsolete before your competitors make you obsolete?

Your information

- 45 What information about your products or services do you currently provide for your new customers?
- 46 What information about your products or services do you currently provide for your *existing* customers?
- 47 What information about your products or services do you currently provide for your staff?
- 48 What questions are raised frequently about your business, your industry; your products or services?
- 49 What unique information do you have that is valuable?

- 50 What information would your customers think so valuable that they would be prepared to pay for?

Your added value

- 51 How do you define and describe the extra value that your business adds to your customer's business?
- 52 How would your customers describe the added value that they receive from you?
- 53 If you could give your customers more value, what extra might they want from you?

Your long term strategy

- 54 What is your long term strategy for Internet and online marketing?
- 55 How will this strategy fit in to the rest of your business?
- 56 How will online marketing change your industry in the future?

Research

- 57 What research have you conducted on your customers' needs, wants and preferences?
- 58 What research would you like to conduct?
- 59 Who will conduct this research? How?
- 60 What research can be conducted online on the Internet?

Your competitors

- 61 Excluding those on the Internet, who are your current competitors?
- 62 What could they do online?
- 63 What local businesses are already set up online and will become your competitors? (Analyse separately your local; national; regional and global competitors)
- 64 What are they not doing well?

SWOT analysis

- 65 What are your strengths, weaknesses, opportunities and threats?
- 66 SWOT your business
- 67 SWOT your current competitors' businesses
- 68 SWOT your current online competitors' businesses

Benchmarks

- 69 Who is doing what well?
- 70 How can you measure their success?
- 71 What can you adapt or adopt from them?
- 72 Which benchmarks are important to your success - and which are critical?

Alliances

- 73 What type of businesses or communities are complementary to yours?
- 74 What ten types of businesses or industries would make the best strategic alliances for you to develop on the Internet?
- 75 What strategic alliances do you already have in place?
- 76 Will new alliances on the Internet jeopardise any existing alliances?

Your Internet site

- 77 What can you do to provide the most value for *potential* clients?
- 78 What can you do to provide the most value for *existing* clients?
- 79 How can you make your site compelling and habit-forming for visitors?
- 80 How could you use different multimedia in your site?
- 81 Will you start links to existing discussion groups or will you start your own?
- 82 Will you build a database for email followup?
- 83 How will you encourage visitors to give you their email addresses?
- 84 What type of survey information might be valuable to you?
- 85 What other useful and valuable interactive tools, programs and devices could be incorporated into your site?
- 86 Are there areas on your site for which you could restrict access by a password?

How will you get paid?

- 87 Does your site have to generate sales for you in order to be judged "successful"?
- 88 How will sales be made?
- 89 How will you deliver the product or service to your customers?
- 90 Would you like your customers to use Credit cards in online transactions with you?
- 91 Do you propose to allow customers to use Digital Cash (an online currency)?
- 92 Can you create an online club with a regular membership fee?
- 93 Can you sell COD (cash on delivery)?

Your implementation strategy

- 94 Have you clearly defined the operational structure for your online business?
- 95 How can you establish your online business in strategic stages?
- 96 What stages will make sense for you, your customers, your staff, other stakeholders?

Your expertise

- 97 What expertise do you need to make your online business happen?
- 98 How much can you learn to do yourself?

Using the Internet

- 99 Are you using a commercial grade ISP with easy access and fast connections?
- 100 Are you using email yet?
- 101 If so, which email package?
- 102 Do you have the ability to automate replies to your email?
- 103 Which World Wide Web browser are you using?

Do you have support from your team?

- 104 Who is the champion for the development of online business in your organisation?
- 105 Whose support is critical?

Finance

- 106 What budget have you allocated for the development of this new business?
- 107 Over what time period do you want to see a return on investment?

Your time

- 108 How much of your time will your online business take to manage?
- 109 Who else can help you from within your organisation?

Outside help

- 110 What outside help will you need?
- 111 How can you make sure you are not getting marketing advice from a computer programmer who is inexperienced in marketing and business management?

Training

- 112 Which of your staff will be involved in the service?
- 113 What training will you and your staff need?

Promoting the new service

- 114 How do you effectively let people know about you and what you have to offer?
- 115 What traditional media will you use?
- 116 How will you incorporate details of your Internet service into your existing brochures and company sales information?

Follow up strategies

- 117 How will you follow up enquiries you receive?
- 118 How will you handle the variable levels of demand?
- 119 How much of the followup can be automated?

Relationship building strategies

- 120 How will you use the service to maintain and build strong relationships with your existing customer base?
- 121 How will you use the Internet to build a preference for you, your brand names, your reputation and your company's goodwill?

Results

- 122 What are the top five results you want your Internet service/business to provide for you?
- 123 How will you measure your results in the short term and in the long term?
- 124 How can your customers measure the success of your site?
- 125 How might your competitors measure the success of your site?

Continuous improvement

- 126 How can your staff be involved in the continuous improvement process?
- 127 How can you get your customers to help you continuously improve your service?
- 128 How much of the continuous improvement process can you automate?
- 129 What do you need to do today to plan ahead for two, five and ten years time?