

**Robin Mansell, Ingrid Schenk and W. Edward Steinmueller**  
*Net compatible: virtual communities,  
intelligent agents and trust service  
provision for electronic commerce*

## Report

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# **Net Compatible**

**Virtual Communities,  
Intelligent Agents and  
Trust Service Provision  
for Electronic Commerce**

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**15 December 1998**

**Prepared for  
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## **Executive Summary \***

The continuing flood of new users of the Internet's World Wide Web services is provoking financial service and other companies to thoroughly assess their business prospects in this 'electronic environment'. Financial service companies are actively involved in identifying the opportunities for transforming their existing ways of doing business to make them 'net compatible'. These companies are interested in defining new services and attracting new customers, but they are finding many new challenges in joining with their customers in the electronic environment.

This report provides a detailed analysis of three major institutions that are the building blocks for defining how companies are likely to participate in business-customer Electronic Commerce:

Virtual Communities	The sites where users interact with one another, gather information, and participate in Electronic Commerce.
Intelligent Agents	The range of tools, techniques and associated services that allow users to 'navigate' in the vast ocean of information that the World Wide Web offers.
Trust Services	Services for authenticating the identities of transacting parties; reducing the risk that one or the other party can repudiate their participation; maintaining data integrity; and, ensuring that the privacy of the parties is upheld.

The development of each of these institutions is influenced by conflicting efforts. On the one hand, for each institution there is an effort to develop common universal standards. On the other hand, service providers are keen to develop differentiated offerings that will allow them to attract and retain user communities. Sustained interest of users provides a basis for service providers to earn advertising and other types of revenue. Assessing the contest between universal standards or a 'common infrastructure model' and differentiated service offerings or a 'competing services model' is the principal objective of this report.

The 'common infrastructure model' offers a variety of benefits for customers and some service providers. The service providers most interested in the 'common infrastructure model' are those that would prefer a predictable and stable platform for offering their Electronic Commerce services. These providers include most financial service companies. However, our analysis of trends in the development of each of these institutions indicates that evolutionary processes strongly favour the 'competing services model'. This confronts financial service companies with difficult and complex choices about how services are offered and to whom.

The electronic environment is not a straightforward translation of ordinary social relationships into another context. It creates many new challenges that will be met only by companies that fully appreciate the characteristics of this new medium of communication and exchange. A central difference between the ordinary social world and the social world of the electronic

environment is in how trust is established between users and service providers. Customers must trust the institutions of virtual communities, intelligent agents, and trust services if they are to make use of them, particularly if these institutions are to be used for Electronic Commerce. Discovering and interpreting the experience of service providers involved in each of these institutions was our main research task. Our results are based on an extensive programme of interviews in the United Kingdom, the United States, and Canada during 1998.<sup>1</sup>

Methods for building and sustaining trust were a central theme in our research. Our analysis, however, is not confined to this theme. We examined the business models and rationales that are supporting investment and service differentiation for each of the institutions. We found that gaining and maintaining trust is a key element, but that other social, technical and economic issues are critically important in shaping how these institutions are developing.

The following summarises some of our key research results for each of the institutions:

### **Virtual Communities**

‘Virtual communities’ are specific locales in the World Wide Web that have been designed to attract a particular audience, not only for a single ‘viewing’ or for a single purpose, but repeatedly and for a variety of purposes.

The World Wide Web allows users to view information content and interact with each other to pursue their needs and interests. The expansion in the number of World Wide Web users is making it increasingly representative of society. Society is made up of an enormous variety of social groupings, most of which are formed through voluntary association.

Virtual communities are the ‘electronic environment’ equivalent of voluntary associations in other parts of society. Unlike other social groupings, however, virtual communities may be much more fluid in membership and may draw together people who might have difficulty in finding one another or interacting in other parts of society.

Service providers seeking to establish virtual communities face challenges very similar to customer-oriented businesses. What will attract new customers to a community? How can persistent relationships be established after the first contact?

The experience of virtual community service providers indicates that:

- No single package of services or techniques exists for building a virtual community;
- User co-involvement in the production of content is essential;
- Interaction between users, rather than only with the service provider, is essential; and
- Virtual communities create social norms and customs that are conservative (they resist change).



The providers of virtual community services are finding that they must limit their efforts to control user interactions in order to build trust and 'co-ownership' of the community. From the viewpoint of most non-electronic businesses where little provision is made for customers to identify or interact with one another, this is highly unusual. Although important exceptions exist for some types of sophisticated product markets (e.g. personal computer user groups), the maintenance of customer relationships ordinarily is viewed by businesses as a function that they perform on a one-to-one basis with individual customers.

When customers interact with one another, issues of control and reputation become important concerns for business. The absence of, or very light, control required for building a popular virtual community can raise serious liability problems both with respect to one's own company and with respect to third parties. These problems can only be mitigated by building trust between the community members and the businesses. To facilitate building trust, virtual communities increasingly are using methods by which the reputations of individuals and businesses can be established and maintained. While the 'society' of the virtual community can be disrupted or challenged by individuals, trust allows order to be restored and anti-social behaviour to be rejected.

Virtual communities provide unusually rich opportunities for businesses to find highly stratified groups of people who are united by common interests. Marketing efforts to 'find' and 'target' such people often can be prohibitively expensive. Tailoring services and messages for such communities is both a major opportunity and challenge for financial service providers.

Virtual communities are conservative (they resist change) and require unusually creative efforts by businesses interested in 'joining' the community's life. Market relationships in virtual communities are relatively undeveloped. The economy of such communities is marked by the institution of the *gift exchange* in which the persistence of exchange is sustained by the value that each of the transacting parties finds in the gift. Adapting this practice to achieve commercial objectives and building upon it to achieve commercial goals are key challenges for companies wishing to build business-customer Electronic Commerce.

The promotion of virtual communities occurs in the real world as well as in the electronic environment. Large virtual communities are investing to develop brand and image recognition in the 'real world' as well as in the electronic environment. Business opportunities and risks exist in establishing affiliations with these new brands and images. The extent of brand recognition of some of these new institutions is remarkably high, even among individuals who are not (yet) active participants in the electronic environment. Financial service companies and other businesses will develop increasing interest in affiliating their brands with those of successful communities.

Individual users participate in several virtual communities to allow them to meet their diverse needs and interests. It is likely, therefore, that the number of virtual communities will continue to proliferate. At the same time, however, some virtual communities are likely to become very large and to offer methods of forming 'neighbourhoods'. The growth of communities and their neighbourhoods is important for deciding where to establish business 'points of presence' in the electronic environment.

The variety of virtual communities presents difficult problems for financial service companies. If financial institutions are to engage in virtual community development themselves, they must provide users with a range of services or 'experiences' comparable to those the user would find in other virtual community environments. At the other extreme, the interaction between a financial institution and a customer may be as specialised and impersonal as it is with an Automated Teller Machine. It is not known where along this continuum that users will expect financial institutions to locate.

### **Intelligent Agents**

Intelligent agents are software systems for capturing and processing information about individual users that may serve user or 'second party' interests or both. Intelligent agents may anticipate user needs, desires, or actions and then may either act on behalf of the user to accomplish an action or suggest 'shortcuts' to the user for carrying out an action. When used to serve 'second party' interests, intelligent agents may gather information about the user and make it available to others for purposes such as selective marketing or software and service design.

The use of intelligent agent technology to develop new services opens opportunities for directing advertising and image promotion messages toward people who will value this information. Unlike virtual communities, services building upon intelligent agents may be based primarily upon individual user interactions with the service provider rather than with other users.

Business use of intelligent agents raises important social issues related to the 'breach of trust' that may occur if users believe that inappropriate use is being made of the information gathered about their behaviour or elicited from them through their use of these tools. These breaches of trust may negatively affect individual service providers or the use of Electronic Commerce more generally. Users resist efforts to 'extract' information about their preferences and interests. They may be willing, however, to *co-invest* in providing such information if they perceive a benefit from co-operating. Businesses that employ intelligent agents must preserve trust and deliver value that makes it worthwhile for the user to use the intelligent agent.

The focus of our attention in the area of intelligent agents was on portal services.

Portals are points of entry to the electronic environment that aid users in searching for information and navigating to its location, and they may directly provide information content.

The experience of portal providers indicates that:

- Human vision and effort matter most in deriving a contribution from intelligent agents rather than the technical quality of the agent tools that are used;
- 'User profiling' by portal providers is used primarily to enhance the 'quality of experience' and the relevancy of the products and services for the user of the portal rather than to generate revenues through the sale of user profiles; and
- Portal providers appear to be self-regulating to prevent 'breaches of trust'.

Some portal providers are extending their market reach by establishing affiliate programmes in which more specialised or 'local' service providers can incorporate portal services or identify with popular portals. These efforts are similar to the larger virtual community efforts to build brand and image. Portal services are akin to media companies and, in the past two years, significant gains in audience for particular portals have been achieved through merger activities.

Financial institutions face substantial challenges in achieving a presence in portal environments. Portal providers seek advertising and other content that will improve the quality of the user experience in using the portal. This suggests that financial service companies will need to offer advertising that has 'content value'. The ability of portal providers to offer detailed marketing information to companies including financial institutions is limited by their focus on the use of user profiling for improving the attractiveness of the portal service. This focus limits the type and nature of information gathered about users. This limit is set even tighter by self-regulation and legislative provisions for such services. Therefore, financial institutions should not expect that portal providers and other intelligent agent techniques will offer them a substantial advance in developing marketing-related information in the near to medium term.

### **Trust Service Provision**

Trust service providers offer services that support the contractual elements of Electronic Commerce transactions for both buyers and sellers. In technical terms, trust service providers are expected to perform the functions of: authenticating the identities of transacting parties; reducing the risk that one or the other party can repudiate their participation; maintaining data integrity; and ensuring that the privacy of the parties is upheld.
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Trust service provision traditionally is a major function of financial service companies. It is important to assess whether they will be able to provide these services effectively in the electronic environment. A keen interest in trust service provision exists in both the private and public sectors because it is regarded as a key element in promoting the growth of Electronic Commerce, (principally, but not only, in facilitating electronic payments and in supporting secure messaging).

Historically, trust service provision has been highly controversial because of government interests in cryptographic techniques that are used to provide these services. Today, there is a growing international consensus that it is possible to separate encryption issues related to customer identification from those of message encryption. This consensus should allow forward progress in establishing new and in building existing trust services.

The experience of companies engaged in the trust service market indicates that:

- Trust service providers will seek to distinguish between customers by creditworthiness in order to offer various 'tiers' of assurance and permission;
- Trust services remain very difficult for users to understand, and

- Private sector players in the United Kingdom believe that the government is attempting to move too rapidly to establish a market structure for trust service provision.

Existing providers of trust services believe that they have an advantage in registering users for use of trust services because they already have contact with these users in the non-electronic environment. Whether users can make the connection between the trust elements of financial services with which they are familiar and those required in the electronic environment is unclear.

There is substantial controversy about trust services because private sector interests in preserving the variety of service offerings are in opposition to the public authorities' preference for a common endorsed standard for the key elements of these services. It is unclear whether private sector initiatives will be any more effective in overcoming the problems of user familiarisation or trust than those of the public authorities. Private concerns about government leadership in this area is especially acute in the area of digital signatures. It is widely believed that government proposals to grant digital signatures the same legal standing as hand written signatures are premature developments.

The uncertainties of the market are encouraging trust service providers to focus on business-business services rather than business-customer services with the expectation of transferring experience from one market to the other. There is little evidence, however, to support the view that this transfer will be straightforward.

Developments in the trust services market are particularly problematic for financial service companies. Financial service companies are faced with the prospect of becoming 'locked-into' particular communities of users of proprietary standards or to a common standard endorsed by the government. It is possible that neither approach to standards will become the preferred method of achieving trust in services. There does not appear to be a straightforward solution to the conflicting interests operating in this market. It is likely that further experience and competition will be necessary before a universal standard emerges or can be effectively endorsed.

## **Conclusion**

The institutions examined in this report are central to the evolution of the social communities that will support Electronic Commerce in the coming years. A fundamental result of our research is that these institutions are likely to produce a proliferating array of differentiated services. For financial service and other companies, these developments raise important issues of affiliation and choice that are unlikely to go away. Pro-active involvement in the evolution of these new social institutions is likely to produce a stronger position of competitive advantage than is waiting by the sidelines.

# **Main Report**

## Section 1: Preface

Three ‘nascent’ institutions are emerging in the World Wide Web (WWW) and Internet environment, hereafter referred to as the ‘electronic environment’.<sup>2</sup> These institutions are virtual communities, intelligent agents, and trust service providers. Our investigation of these institutions was designed demonstrate how their evolution is affecting financial service company market opportunities and constraints. Each of these institutions is being built through technical and social innovations. Each is in a nascent phase of development with considerable room for alteration as experience accumulates. The path of development that these institutions follow as they mature will influence the future of Electronic Commerce and financial services.

The results of our investigation are based on an extensive programme of interviews in the United Kingdom, the United States and Canada during 1998. This report summarises three types of research results. The *first set* of results uses the development of the three institutions as indicators of which of two alternative ‘scenarios’ is likely for the future development of Internet business-customer services. The focus is on those of direct relevance to financial service companies. We show that ‘trust’ is a central, but not the only factor influencing which scenario prevails for the development of the Internet and related services.

The *second set* of results is the identification of a set of concepts or principles that is driving the social and economic processes of institutional maturation. These concepts and principles relate first to the construction of trust. They concern issues such as the extent to which ‘trust’ gained in one context of interactions unrelated to Electronic Commerce, will extend into Electronic Commerce environments. Second, concepts and principles are developed that apply to the process of maturation of the emerging institutions. Some of these are derived from theory and common sense. For example, ‘voluntarism is an inadequate business model for sustaining a reliable and high-quality network presence’. Others are empirically derived. For example, ‘co-participation in the development of content by producers and users is an important characteristic of WWW sites that persistently attract users’.

The *third set* of results concerns the specific strategies and viewpoints of participants in each of the three institutions. The rapid pace of change in the electronic environment means that the specific views of participants may change before this report reaches its audience. However, the participant views also reflect the lessons of experience. We believe that there is a significant set of ‘core’ participant beliefs which provides a sound foundation for the results reported in this study.

The report opens (Section 2) with an overview of a scenario framework for understanding future developments and for organising the detailed case studies of each institution. The current state of play is summarised and two alternative scenarios are developed. The implications of these two scenarios for the business strategies of financial service companies (and, in some cases, other participants) are examined. The processes driving these scenarios are examined in the following sections of the report: virtual communities (Section 3), intelligent agents (Section 4) and trust service providers (Section 5).

Significant trends and key messages are highlighted at the beginning of each section along with a discussion of their implications for the scenarios. The concepts and principles that emerged from our analysis are presented and explained. Appendices identify the companies interviewed, provide a glossary of key technical terms, and provide the references cited in the report.

## **Section 2: Electronic Environment Scenarios**

Financial service companies are confronting the phenomenon of 'Internet time', a process of extremely rapid change as new users and services flood into the electronic environment. The directions of these changes have important implications for financial service company service offerings. Our first priority was to analyse the evidence and logic favouring one course of development over another. In our view, recent developments are leading toward a scenario that we call the 'competing services model'. In this model, financial service companies will have to make choices between the alternative institutions that could support their Electronic Commerce offerings.

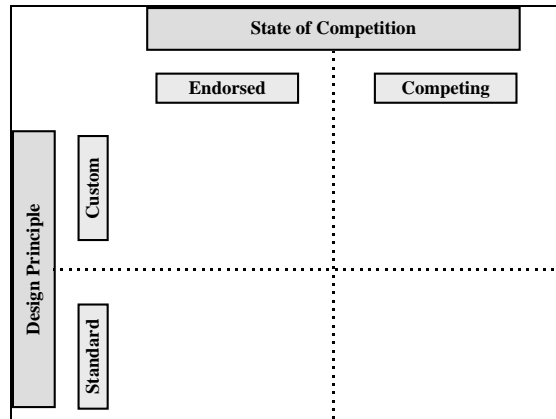
The 'competing services model' suggests a more uncertain and complex world than the second scenario which we call the 'common infrastructure model'. In this second, less likely, model, there is widespread acceptance of common standards and institutions. Financial service companies would have more certain and straightforward 'platforms' for their offerings. The reasons for our conclusion are as important as the conclusions themselves. If the reasons for concluding that the 'competing service model' is favoured are understood, any changes with the passage of time in the evidence described in this report can be evaluated for their impact on the emergence of the alternative models. We believe it is important to re-assess periodically the conclusions of this report in the light of on-going developments. The assessments offered here should be examined after six months of 'calendar' time, a short time by investment standards, but a long time in the life of the Internet.

### **The Framework for Analysis**

Two important axes of change are affecting the development of Internet institutions. The first axis is the 'design principle' employed by service providers (including both financial service and other more technology-oriented Internet service companies) to create new Internet institutions. The second axis is the state of competition among these services providers. This axis indicates the extent of competition among new alternative Internet institutions. Figure 1 illustrates the possibilities:

Figure 1 Intent and Outcome for New Internet Institutions

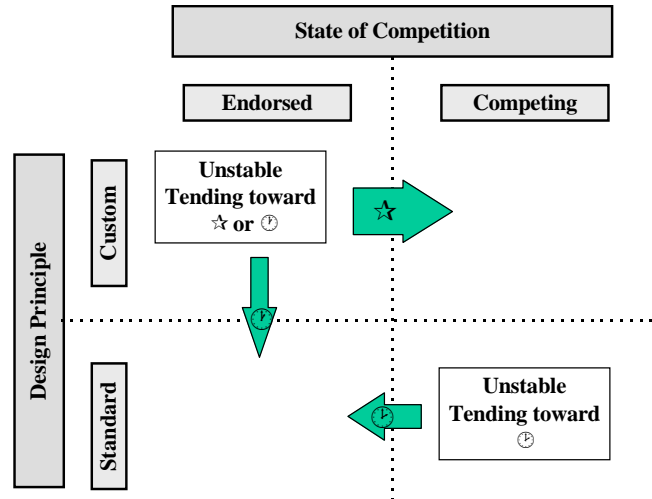




With respect to the design principle axis, service providers may seek to develop a new institution that will become a universal and commonly endorsed standard for the Internet. If they are successful, that institution will be located in the lower left quadrant of Figure 1. The design of this kind of institution has to be endorsed broadly by the user community and other service providers must either fail to offer an alternative, or fail to win acceptance for their alternative, from the user community.<sup>3</sup> If service providers offer alternatives and they are accepted, the result will be a proliferation of competing standards. In this case, the new institutions would be located in the lower right quadrant of Figure 1. This occurs because standards that *could* have been universally endorsed, fail to be endorsed and become competing standards. This is an unstable outcome. A slight advantage in favour of one of the competing standards is likely to be amplified into widespread endorsement and to produce an endorsed standard institution (in the lower left quadrant).

However, service providers may recognise that differences in user needs and interests dictate a different design principle, that of customisation. In this case, the service provider recognises from the outset that competition is likely. The provider seeks to attract a particular user community to the institution it is attempting to establish. The service provider may fully expect that other service providers will offer alternative institutions addressing other real or imagined user needs and interests. It is, nonetheless, possible that this kind of ‘custom’ institution will be broadly endorsed by users and become a universal solution (an institution in the lower left quadrant).

Figure 2 Tendencies in the Interaction Between Design Principles and Competition

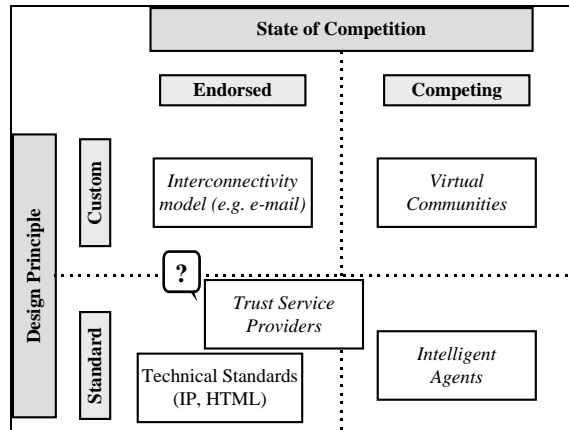


A more likely possibility is that ‘custom’ institutions retain distinct characteristics. They achieve some degree of mutual accommodation through the construction of bridges or gateways that allow them to be ‘interconnected’. In this case, in the upper left hand quadrant of Figure 1, there is an endorsement of a cluster of interconnected, but partially customised, institutions (rather than a universal standard). Such mutual accommodation is unstable. It is likely to be resolved in one of two ways. The institution may become a standard despite the fact that it was designed according to the custom design principle. The most likely possibility, however, is that competing service providers will further differentiate the institution they are sponsoring. In this case, fully competitive, alternative custom institutions are offered (the upper right hand quadrant of Figure 1). A position in either the upper left or lower right quadrant of Figure 1 is unstable. Thus, the lower left or upper right quadrants are the regions in which institutions are most likely to be located as a result of the interaction between the design principles (standardisation and customisation) and the competitive process. This is illustrated in Figure 2 above.

### **The Current State of Play**

We now turn to the current state of play of some of the key institutions including those that are the subject of this report. Figure 3 illustrates the current position of these institutions.

Figure 3. The Current State of Play



The technical institutions concerned with basic connectivity and some broadly-based services such as e-mail have achieved widespread acceptance or ‘endorsement’. They are located to the left of Figure 3. Illustrative examples are the technical standards used for connecting to the Internet and World Wide Web (respectively, the Internet Protocol (IP) and HyperText Mark-up Language (HTML)).<sup>4</sup>

Simple text e-mails organised around the Simple Mail Transfer Protocol (SMTP) technical standards have been widely accepted. However, e-mail communications are best represented as an interconnected set of services. This is because SMTP allows users to ‘attach’ messages, some of which other users will find indecipherable because they do not have the appropriate application to ‘decode’ the contents of the message. Thus, the institution of e-mail (which includes both simple text messages and ‘attachments’) is an example of an endorsed (in widespread use) custom institution. As noted, this is an unstable position. The most likely direction for future change is further differentiation of file formats ‘attached’ to e-mails which implies movement toward the upper right quadrant of Figure 3. Somewhat less likely is the development of a common application for accessing attachments (independent of the application used to create the attachment), in which case e-mail will move toward a location in the lower left portion of Figure 3.<sup>5</sup>

The three institutions examined in this report are also depicted in Figure 3.

In the case of *virtual community* institutions, although there are some common standards, many alternatives already exist (see Section 3 of this report). It is likely that these alternatives will continue to compete due to several factors including the diversity of user needs. Virtual communities are good examples of the ‘competing services model’ outcome.

*Intelligent agents* such as ‘search engines’ have the potential to become a universal standard with broad endorsement. So far this has not happened. Instead, several approaches to ‘intelligent agents’ are vying for ‘audience’ as discussed in Section 4. This is an unstable position as suggested by the disproportionate market share of Yahoo! Yahoo!’s success indicates the possibility of the emergence of a common standard in the ‘search engine’ type of intelligent agent. It is important to note that this movement is almost entirely based upon patterns of user endorsement. There is little doubt that specialised ‘search engine’ applications will continue to

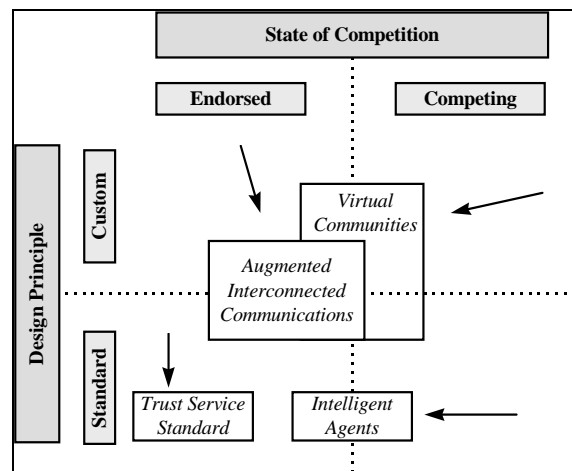
exist. The business model supporting the operation of specialised service providers will need to change if trends toward growing endorsement of the Yahoo! common standard continue.

It is somewhat less clear where *trust service provision*, a younger and more controversial institution than the other two, should be located. Developments in trust service provision are a major issue in our analysis (see Section 5). At present, there is some optimism that an endorsed standard will emerge based upon government or private sector initiatives. If such alternatives fail, we should expect movement toward further customisation of this institution. This could lead to the location of such institutions in the upper right quadrant of Figure 3.

### Alternative Scenarios

We have used the framework developed from considering the interaction between design principles and the state of competition to organise the evidence from interviews and industry observation. This framework provides a basis for examining two emerging scenarios for the evolution of Electronic Commerce in the electronic environment. The first of these scenarios, the 'common infrastructure model', is pictured in Figure 4.

Figure 4. The Common Infrastructure Model (Scenario)

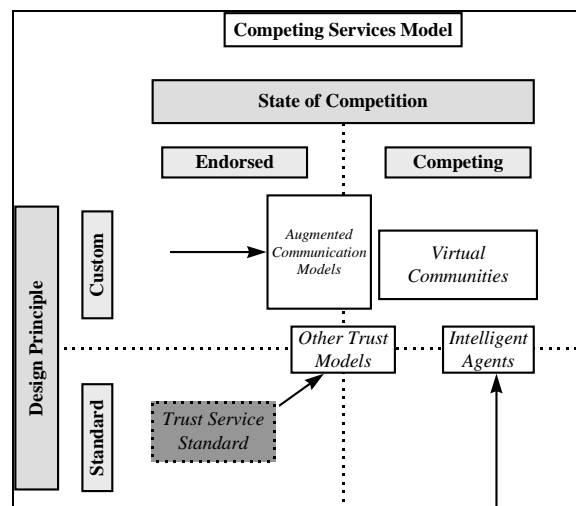


In this scenario, there is a broad endorsement of common institutions as standards for the conduct of Electronic Commerce. Trust services are standardised around a single model. Broad endorsement of a common standard for intelligent agents leads to a strong position of a few (or a single) approaches to intelligent agent-based services such as portals. The advantages of interconnectivity lead to a broader acceptance of standards for message communication and the development of some universal standards beyond SMTP. Even in the area of virtual communities, the advantages of common standards offer advantages. For example, one possible common standard is the creation of 'virtual identities' that would allow an individual to be recognised across different virtual communities. Such a standard would allow individuals to accumulate reputation, credit worthiness and other attributes that could be recognised outside their local virtual community, while preserving their privacy.

This scenario has numerous advantages for financial service companies that are attempting to build Electronic Commerce. The most important is a reduction in the number of ‘platforms,’ or configurations of institutions, that companies have to evaluate and maintain to provide services. The simplifications offered by this model are also important in reducing user confusion and uncertainty about how to interact with service providers in conducting Electronic Commerce. It is not surprising that there are frequent statements in the trade press and in government policy forums about the desirability of this kind of model.

The alternative scenario, the ‘competing services model’ is shown in Figure 5. It appears to be the more likely outcome of the interaction between design principles and competition in the electronic environment.

Figure 5. The Competing Services Model (Scenario)



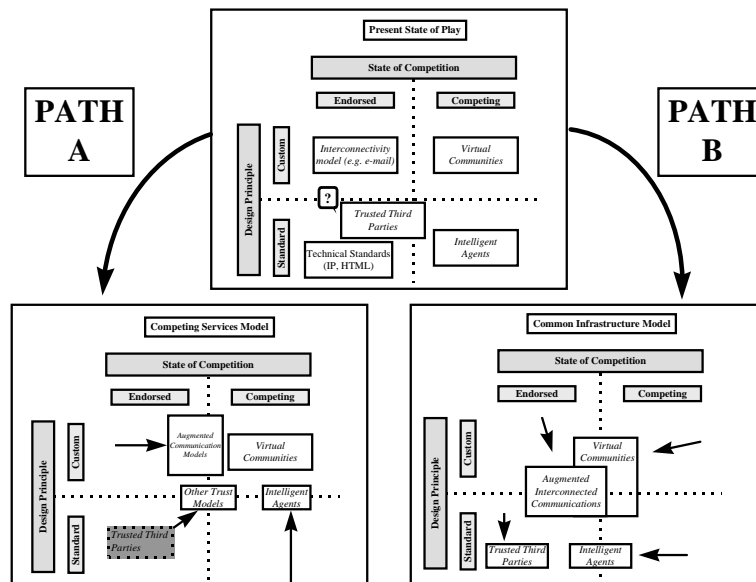
The driving force favouring the ‘competing services model’ is the quest for variety. Variety is not an end in itself but a means to cater to diverse user needs. The enormous flexibility allowed by information and communication technologies to deliver customised services is both a benefit and a cost in the development of institutions. As a benefit, it provides the opportunity to tailor services according to individual preferences and capabilities. For example, novice users can be treated differently than ‘power’ users. The possibilities for differentiation are seemingly endless. At the centre of these developments is the process of creating virtual communities in which people are able to conduct their business or pursue their interests in different ways. It is true, for example, that mechanisms for preserving a common ‘identity’ of users across different virtual communities are desirable for some purposes. However, users may wish to accommodate their diverse interests by adopting different personae and affiliations, each tailored to their interests and each displayed in a different context.

The ‘competing services model’ scenario is consistent with a belief that the Internet represents a kind of ‘frontier’ anarchistic community where the history of respected institutions offers little advantage. This belief has little validity for serious analysis of the evolution of the Internet. This is because there are clear advantages for many service providers and users in a more systematic integration of services under common standards. Even if the early users of the Internet were

over-represented by those with anti-establishment sympathies, the flood of new users is making the Internet more representative of the general population. Government policy, the interests of large users, and the interests of many service providers, all support the growth of common standards. For all these reasons, the ‘common infrastructure model’ scenario is a credible alternative to the ‘competing services model’ scenario.

In our research, we took the view that each of these two scenarios is a possible path of evolution for the institutions of virtual communities, intelligent agents and trust service provision. The evidence from interviews was that the ‘competing services model’ is the path of most likely development. This is Path ‘A’ in Figure 6. The following sections of this report explain why the results of our research support this conclusion.

Figure 6. Summary: The Two Scenarios Considered in this Report



Path B in Figure 6 shows the alternative ‘common infrastructure model’. As Electronic Commerce markets develop it is very likely that public authorities will move to put some elements of the common infrastructure in place. As they do so, this will influence the choices taken by those promoting developments in line with Path A. In the short and medium term, our results suggest that Path A initiatives will predominate.

The interactions between the two pathways will need to be assessed as the business-customer Electronic Commerce market matures. It is likely that those promoting the two alternative models will learn from each others’ successes and failures and adapt their behaviour accordingly. Success is likely for companies best prepared to undertake continuous re-assessments of their practices in the light of their customers’ changing preferences and capabilities.

### Section 3: Virtual Communities

*'Commerce and community are intertwined, it is difficult to separate the two.'* (Electric Communities, August 1998)

*'... creating communities is a failing strategy.'* (eBay, July 1998)

#### Preface

Some institutions are, and probably must be, designed in a customised way to reflect the diverse needs of users and the capabilities of producers. A generic example of a custom designed institution is a 'popular' Website. Few generalisations can be made about a 'popular' Website simply by examining it, other than about its technical design principles, the general characteristics of its content, and, where disclosed, the extent of its popularity (as measured by 'hits' or 'minutes of user connection'). However, a richer set of observations and understandings can be developed for 'virtual communities'.

'Virtual communities' are specific locales in the World Wide Web that have been designed to attract a particular audience, not only for a single 'viewing' or for a single purpose, but repeatedly and for a variety of purposes. <sup>6</sup>
--

A central feature in the construction of virtual communities is the elicitation of trust from members. In the first instance, users may grant trust based upon relatively simple principles such as 'it helps me get on with my work more effectively' or 'it's fun'. As a user's relationships with the provider of the virtual community environment and other users evolve, however, a more complex set of expectations is likely to develop. The evolution of the virtual community is likely to depend upon a process of *co-involvement* for the establishment of trust.

Virtual communities are a particularly important 'nascent' institution to examine because they parallel the motives of businesses with respect to customers. Businesses wish to repeatedly attract and interact with the same users. They would also like the audience to grow over time. Persistent interaction can indicate a level of interest that will support other business-consumer relationships including commercial exchanges. The Internet introduces new interpretations of established marketing principles such as 'word-of-mouth advertising', 'product-as-image', 'product-as-lifestyle choice', and 'style leaders'. All of these terms relate to the social interaction between customers and suppliers. Since the Internet changes the form and content of interpersonal relationships, it follows that the social interactions underlying the customer interaction are undergoing change as well.

The 'place' of Electronic Commerce in virtual communities is undergoing rapid change. This section reports the results of our investigation of virtual community institutions. It focuses on the emerging characteristics of consumer-oriented electronic communities in both the public and private spheres. Special attention is given to how members initially choose to affiliate with

particular types of electronic communities and to factors that appear to sustain these relationships over time.

### **Key Messages of this Section**

- Virtual communities are relatively easy to ‘launch’ but far more difficult to sustain and develop.
- No single package of services or techniques exists for building a virtual community.
- Experience indicates that:
  - User co-involvement in the production of content is essential,
  - Interaction among users, rather than only with the service provider, is essential, and
  - Virtual communities create social norms and customs that are conservative (they resist change).
- The providers of virtual community environments must limit their efforts to control user interactions in order to build trust and ‘co-ownership’. The absence of control may raise serious liability problems.
- Virtual community members value the opportunity to accumulate reputation as individuals (even if their ‘real world’ identities remains private)
- An area of intense interest and experimentation is the ability to transfer accumulated reputation, or to achieve identity ‘portability’, across communities so that an identity can be recognised ‘non-locally’.
- Some virtual communities are developing methods for certifying individual identity that may support Electronic Commerce relationships and have an interest in this area due to perceived Electronic Commerce opportunities.
- The methods for users to achieve repudiation overlap with methods of ‘user profiling’ that can support stratification of users for purposes of advertising and marketing.
- The uncertainty of exchanges in virtual communities tends to support ‘gift exchange’ interactions in which offers and offerings are unconditional. In return, the conditional element in exchange relationships is whether it will be continued.
- Promotion of virtual communities occurs in the real world as well as in the electronic environment. Physical word-of-mouth can be as important, and even more important, than word-of-mouth communication through electronic interactions.



- Large virtual communities are investing to develop and promote brand and image recognition in the ‘real world’ as well as in the electronic environment.
- The participation of users in several virtual communities allows them to meet their diverse needs and interests. It is likely that the number of virtual communities will continue to proliferate. At the same time, some virtual communities are likely to become very large and to offer methods of forming ‘neighbourhoods’.

### **Implications of Key Messages for Scenarios and Financial Institutions**

Continued proliferation of user communities is expected. This indicates that the development of common standards and institutions is not likely in the short or medium term. Nevertheless, because these communities are differentiating themselves by service offerings, common standards and institutions are a more distant possibility. Offsetting these developments is the need for methods of establishing and transferring user identity and for capturing valuable information about individual needs and interests in order to craft better community services. Transferring user identity requires common standards. Capturing information may encourage the adoption of common standards due to concerns about privacy and the maintenance of user trust. On balance, these common standards are expected to favour the continued location of virtual communities in the ‘competing services’ quadrant of the scenario framework outlined in section 2 of this report.

The differentiation of virtual communities presents difficult problems for financial service companies. If financial institutions are to engage in virtual community development themselves, they must provide users with a range of services or ‘experiences’ comparable to those the user would find in other virtual community environments. At the other extreme, the interaction between a financial institution and a customer may be as specialised and impersonal as it is with an Automated Teller Machine. It is not known where along this continuum that users will expect financial institutions to locate.

Some virtual communities have become sufficiently large that it may be desirable for businesses to promote their ‘presence’ in these environments. At the same time, the conservative element of communities and their very different characteristics indicate that it may be necessary to tailor advertising and marketing messages to the ‘local’ contexts of virtual communities. This suggests that successful marketing and advertising campaigns for these users will need to be very complex.

### **Reasoning and Findings**

A key feature that distinguishes the Internet from earlier media for communication is its ability to support simultaneous or time-delayed interactions among a very large number of connected users. For example, individuals can ‘watch’ or ‘participate’ in dialogues between two individuals or exchanges between many individuals. These dialogues may appear to be occurring as the reader views the computer screen or they may have been ‘recorded’ previously. The social groupings or ‘virtual communities’ using these capabilities are, in the first instance, established based upon voluntary associations of people with shared interests or common purposes.<sup>7</sup> Just as in more traditional social contexts, ‘conversations’ that would occur in ‘meetings’ of various types might

lead to mutual interactions that range from business deals to proposals of marriage. As in non-electronic communities, the nature and extent of interpersonal interaction are influenced by how people perceive one another and the settings in which these interactions occur.

Virtual communities generally require relatively little investment to launch and attract the first members. The spectacular growth of on-line bulletin board systems during the 1980s has been reproduced and extended in the growth of 'personal web pages', many of which are devoted to interests that others may share. Some virtual communities are closed clubs (requiring passwords to access the home site of the club), while others are open to anyone who wishes to join. People may participate in many partly overlapping communities in their working and every day lives.

Commercial interest in virtual communities arises from their role in attracting large numbers of users who might become potential customers for electronic or non-electronic goods or services. It also arises from the fact that many specialised virtual communities serve to 'sort' or 'filter' users leading to a much finer stratification of consumers than could be achieved by ordinary market research or marketing techniques. Virtual community members are being asked to supply consumer feedback to suppliers of goods and services and their members are participating in on-line focus groups aimed at matching and tailoring the content of advertising messages to the particular interests of specific communities. Although Electronic Commerce may benefit considerably from the creation and maintenance of such communities, the role of Electronic Commerce in these communities may be subject to several important limitations:

Virtual communities involve interpersonal interactions among members and not only with the service provider. Consequently, the service provider may have limited control over user interactions including those that may be derogatory to the service provider or others.

Virtual communities develop social norms that may range from positive acceptance to active hostility to commercial interests.

In order to gauge the nature and extent of opportunities as well as the problems and limitations associated with virtual communities as 'nascent' institutions, we selected a sample of such communities for further examination.

### **Virtual Communities: An Empirical Examination**

The virtual communities examined in this case study encompass a mix of membership profiles and interactions between members. The sample includes communities that are 'closed' (selective) or 'open' (non-selective); some have a relatively long history and some are in the relatively early formative stages.

Our interest was in the processes that sustain and build larger social groupings. We sought the views of companies involved in the construction or maintenance of major virtual communities involving business-consumer and/or consumer-consumer network exchanges. Interviews were conducted with ten such organisations (see Table 1).<sup>8</sup>

Table 1. Companies Interviewed about Virtual Communities

Company Name	Description	Target Audience	Primary Revenue Stream
Auto-by-Tel	Referral service for new and used car sales	New and used car buyers, Dealerships	Dealer subscriptions
CitySearch, San Francisco	Local city guide	San Francisco residents	Banner advertising
eBay	On-line auction	Consumer-to-Consumer	Commissions
Electric Communities	On-line virtual worlds and games	User-to-User	Pay-per-use
Excite	Portal	Family and friends	Advertising and sponsor placement
Infoseek	Portal	User-to-User	Advertising and sponsor placement
RS Components	Manufacturing catalogue	Mid to large sized firms	Increased sales
Talkway (a UseNet version of Yahoo!)	Web-based gateway to UseNet groups	UseNet participants	Banner advertising
Tripod	On-line community	User-to-User	Affiliate programmes
Yahoo!	Portal	User-to-User	Advertising and sponsor placement

## **Virtual Community Development**

*'... Communities cannot be designed - only enabled'*. (Electric Communities, August 1998)

Making a bid to establish a virtual community is simple, but, as one interviewee observed, 'it is a bit like the film 'Field of Dreams' - if you build it they will come - the only problem is they may not stay'. Sharing a common interest that continues to evolve through time is essential for the growth and sustained existence of a virtual community. In our study, the virtual community providers shared a common belief that the content generated by these communities would provide a basis for developing commercial Electronic Commerce services.

### Chat Rooms

In some large virtual communities, chat rooms are a prominent feature.<sup>9</sup> The interviewees for this study regarded chat as the least effective service for community building. They perceived chat services as being of a transitory nature making it difficult for users to progress beyond this level of interaction. For commercial objectives, chat provided minimal information about content and member preferences thereby limiting the community provider's ability to analyse and target the user.

### Messaging Boards

Messaging boards were believed to incite somewhat more interesting conversations but tended to be based on static concepts. As a result, they required considerable management and input by the site owner.

### Home Pages

Home pages were regarded as the most valuable tool because they were believed to grow organically.

The virtual communities in our sample were organised around a specific vertical interest or product, local issues, or shared experiences. Firms supporting virtual communities used a variety of tools for creating and supporting virtual community services. These firms favoured any tool or technique that would support consistent and persistent interactions between virtual community members. They also expressed clear views about the relative efficacy of some of the available techniques.

### *Building the Social Context: Reputation and Reciprocity*

All the interviewees indicated that, although software and hardware technologies can facilitate community building, they are not the most important features. The Tripod representative went so far as to say that ‘the key technological focus is just to keep the servers up and running’.

A commonly expressed view by those interviewed was that community building was supported by mechanisms for ‘reputation building’ and ‘reciprocity’. A prerequisite for both is the ability of users to recognise one another in repeated visits to the electronic community.<sup>10</sup>

‘Reputation’ is built up from ‘scarce resources’ that are exchanged with other community members. For example, users with programming expertise are able to gain reputation in some virtual communities by sharing programming code. In many of the existing virtual communities, the virtual environment supporting reputation building is similar to a ‘gift exchange’ economy in which reciprocity underlies interactions among members.<sup>11</sup>

As a general issue, gift exchange economies may be seen as a substitute for barter or commercial exchange under conditions where it is very difficult to assess the value of what is being exchanged. Experience with the exchange process itself provides the mechanism by which reputation is built up and reciprocity is reinforced.<sup>12</sup> It is important to note that this sort of reputation building is interpersonal among members of the virtual community. It may not be extended easily to the social process of the community. Self-promotion and promotion of others’ reputations clearly are possible in parallel with gift exchanges.

Establishing the means for members of a virtual community to confer reputation on others is important for enhancing the value of reciprocity. All the interviewees for this study suggested that this means of building reciprocity is a key feature of the sites they are operating. The tools used to support this process included bulletin boards, buddy lists, gaming scoreboards, tokens, and directories.

At **eBay’s** consumer-consumer on-line auction, reputation is built up by allowing members to rate vendors (i.e. other consumers). In addition, users are encouraged to use eBay’s ‘Feedback Forum’ to comment on product quality and on whether payment and delivery occurred on time.

Reputation at **Tripod** is acquired on the basis of the quality of the web site that a participant creates. Reputation is measured in terms of the number of page views per day that a particular user site generates. Some of the top sites received over 50,000 page views per day.

Similar practices are also used in ‘closed’ membership environments and in virtual communities where user-to-user interaction is not the dominant mode of interaction.

**Auto-by-Tel** provides a 'test drive' section at its site whereby virtual community members may offer opinions, feedback and reviews of cars purchased and/or tested. Information about users' purchases (deal histories) as well as their search experiences are compiled in this 'opinion database' and can be accessed by other buyers in order to facilitate comparisons. Consumer choices, however, are based mainly on external sources of information such as independent product reviews, bank interest rates for loans, and car dealer information that are provided by Auto-by-Tel.

Sites such as **CitySearch** and other **portal firms** provide commentary on products in their editorial features.

**Talkway**, a firm that is seeking to become the Yahoo! of UseNet-based virtual communities asks users to label postings as 'spam', 'adult', 'flame', or 'thumbs up' to guide fellow users.

### *The Problem of Identity*

The interviewees regarded the development of an electronic environment whereby users could get in touch with other users as the biggest barrier for community development. Where feasible, technical applications were being introduced to automate and facilitate how users could find and identify other users with related interests, but major problems remain.<sup>13</sup> Users also require a means to assess and manage interactions with the varied profiles of other users. The ability to design this process of user-to-user interaction may be one of the greatest barriers facing those seeking to construct new virtual communities to support Electronic Commerce transactions.

In open communities, for example, it is common for members to have some control over the choice of persona they wish to assume in their interactions with other members. This element of user control is important in preserving user identity and in contributing to the 'freedom' of the environment. For example, a female may assume a male name, a child may claim to be technical expert, or users may 'act out' behaviours they would not normally exhibit in other contexts. The cues normally available in face-to-face social interaction are unavailable to virtual community members who rely on text and graphical images. New norms and cues for social interaction need to be established to support social interaction. The introduction of 'emoticons' in text-based environments such as ☺ to denote happiness and ☹ to denote sadness or anger are examples of cues used to provide the missing details of face-to-face interaction.

The consistency and characteristics of user identity appear to be important features for facilitating interaction among members of virtual communities. In an on-line environment it has been assumed that users will either behave 'in character' (synchronous behaviour) or 'out of character' (asynchronous behaviour) in relation to their chosen identity or persona. There is little empirical evidence to support this. An informal survey of an on-line gaming community conducted by Electric Communities attempted to test the relationship between identity and behaviour. The survey results demonstrated that the community members permeated the boundaries of both behaviour and identity. Although the projection of member identity and behaviour was fluid, the community continued to function successfully.

In principle, the identity of users would seem to be an important criterion in the assessment of the quality (or truthfulness) of content provided by users in a virtual community. However,

community interactions do not always occur directly between known users. In some communities, particularly where members are familiar with game environments, identity may be established through behaviour rather than names.

Some interviewees indicated variations in the extent to which virtual community members resemble their physical world identities. CitySearch had been surprised that most of its users were willing to disclose their identities. Some site operators gave users the option of anonymous interaction. As a result, communities such as eBay and Auto-by-Tel were concerned about how anonymous interactions might affect the commercial environment. This was particularly important for eBay since 75 per cent of its community membership is invisible to the site developer.

From the viewpoint of Electronic Commerce, there must be some mechanism for linking a person to a commercial transaction if problems of fraud and deception are to be avoided. This may be a serious problem, as virtual community operators expressed a concern that introducing new elements into an existing virtual community may disrupt the 'invisible' fabric of the community.

### **The Transition to Virtual Community Commerce Development**

*'Community is the result of commerce'. (eBay, July 1998)*

Both 'old' and 'new' virtual communities are facing the challenge of developing commercially viable web sites. Older firms such as Tripod are attempting to extend their traditional focus of being a 'publishing forum with bad quality control ... to one that supports communications'. 'Newer' firms engaged in building communities are focusing on attracting new members and sustaining a reliable business model. eBay, for example, is among the top six Internet sites in terms of Electronic Commerce revenues. While the site is being viewed by only four per cent of the potential Internet user population, the company's strategy is to concentrate on developing services that already have proven successful for the existing membership.

A major goal of all those interviewed was to establish a 'branded' pattern of interaction among virtual community members. A high level of interaction among members was expected to create a more permanent sense of community, which, in turn, would provide opportunities for the further development of relationships. Interviewees observed that creating a brand image for reliability and consistency through time was relatively easy when community membership is small. However, building a brand image becomes increasingly difficult as the membership grows. Getting all members connected to one another is very difficult because a system must be put in place for users to find each other. This system must also enable users to assess and manage interactions with the varied profiles of other users. Most virtual community site operators felt that this required the definition and maintenance of an identity system around which users could utilise reputation to acquire fame, fortune or friends.

## *Accumulating Fame, Fortune and Friends in Virtual Communities*

*'... an online community is more like a continuous party -- the right mix of people has to be there and someone has to keep supplying the hors d'oeuvres'. (New Media, 1997)*

Virtual community site providers compete to attract 'quality' user contributions. Market differentiation strategies are based upon the selection of the 'hors d'oeuvres' for the party atmosphere or the particular business model that is being implemented. Business models are concerned with generating inputs as well as feedback from other 'partygoers'. A Tripod interviewee said that 'now users are given free space/home pages ... later ... they need to find a way to pay people to do it ... no-one is dealing with this'.

Turning virtual communities into commercially viable communities for the site host is believed to require the generation of a primary revenue stream. Our interviewees argued that this means that the capability to 'rate' products and services must be incorporated within their services. The problems involved in generating and distributing 'quality' content were regarded as the main impediments to the commercial success of virtual communities. Additional problems included the need to treat the user as a supplier of valued information and the fact that members tend to resist the introduction of new commercial or other elements into their virtual communities.

To overcome these problems, firms were introducing business models based on the scarce resources of fame, fortune, and friends. The ability to accumulate and confer these resources was widely regarded as an incentive mechanism for user participation. In the context of the currently prevailing 'gift economy', each of these rewards follows from reputation. To the extent that the virtual community operators become suppliers of one or more of these resources, they may be able to receive compensation while, correspondingly, individual users may also be able to supply these resources.

The distribution of rewards among participants varies depending on the objective of the revenue model. A key feature of Tripod's Electronic Commerce strategy is the introduction of an affiliate programme that provides value for both commercial sponsors and users. For example, if a user incorporates a section on his or her home page to sell for CDNow (an online music retailer), that user will receive a percentage of any sale generated from that site. CDNow also benefits because it has acquired a new customer at a relatively low cost, will spend less on marketing, and potentially has a customer for life. Community developer, Tripod, receives a slotting fee for its efforts.

Not all community members necessarily receive payments or compensation in a form that can be translated into monetary value. Another possibility is for users to be 'validated' across different communities so that some portion of their reputations may be transported with them as they move between communities.

## *Identity and Reputation Systems*

The Barbie.com experience reported by one of the interviewees, Electric Communities, illustrates the problems in establishing identity that are facing virtual community operators. Barbie.com was developed by Disney to attract girls aged 8 to 12 years. As providers of children's products such as Barbie software, Disney wanted to maintain the integrity of the site by allowing girls to interact only with girls, thereby avoiding problems with paedophiles or other individuals who could negatively affect community life. The process chosen by Disney for authenticating identity required the virtual community operator to collect credit card details from parents who would authorise the identity of the children. The subsequent failure of this virtual community was attributed to the major barrier this authentication procedure presented to children desiring entry.

For commercial sites, the development of consistent themes for user personae influences how value is added to the services offered to virtual community members. One approach is for virtual community operators to develop the capability to extract intelligence about user preferences from the data generated by member interactions. An identification system combined with a reputation system may allow the operator to identify useful mixes of 'partygoers' for 'special invitations' and 'offers'; both of which are nascent forms of Electronic Commerce.

### *Electronic Word of Mouth and Branding Promotion*

The combination of identity systems with reputation establishes expectations between users and suppliers in a virtual community. These expectations are important for developing a sense of security and familiarity among community members. In an attempt to revive the Barbie.com community, Electric Communities sought to create an environment whereby each virtual community participant would 'invite' whomever she wished to play with to her Barbie house and street. This time, user authentication was based upon 'mapping' existing social networks into the electronic environment in order to bypass the insuperable problems that arose in authenticating identity by parental reference. Excite is also trying to retain the security and familiarity offered by this procedure by introducing a 'closed' community service as part of its portal offering. Community membership is to be established and extended by friends, families or existing closed user groups who already have established relationships.

'Invitations' by word-of-mouth are considered to be a powerful means of attracting new virtual community members. Most of the interviewees said that the majority of new participants at their sites were acquired by word-of-mouth in the physical world. For Auto-by-Tel US as well as eBay, nearly 40 per cent of new users were encouraged to participate and to join these sites by physical rather than electronic word-of-mouth contacts.

Those interviewed were using a variety of strategies for attracting new community members. eBay was using a combination of on-line and off-line marketing and the interviewee stated that 'off-line recognition [was] just as important as on-line recognition' in targeting consumers and supporting branding efforts. Yahoo!'s marketing in mid-1998 focused on the off-line environment and targeted users that would be coming on-line within 6 to 12 months. This experience is consistent with the results of a study by Opinion Research Corporation International in the United States which found that even people who do not use the Internet knew of the top seven major brands (i.e. AOL, Yahoo!, Netscape, Amazon.com, Priceline.com, Infoseek, and Excite, Inc.). In



addition, the study found that some 28.4 million Americans who were not using the Internet expected to come on-line within two years.

### *Trust Models and Liability*

Strategies for virtual community development may generate a version of the 'web of trust'-type model. In this model, the web-of-trust exists around the outside of the community and the only means to enter is through a 'reputation space', or personal invitation. In this more exclusive club, members must know each other and have established some way of recognising one another and/or have a means of exchanging information before joining. Building upon a 'core' of members recruited in this way, users can then take their reputations and hub together. That is, members from one community may be issued 'passports' transferring some of their reputation to other communities where they meet others and interact. Community participation may also extend at the boundary of communities to embrace new recruits.

Variations in community development strategies were clearly evident in observations provided by the community developer interviewees. The community builders at CitySearch were seeking to mirror and focus on local existing communities. A feature of community building at CitySearch is that on-line communities often develop around local issues that are externalised to others beyond the local group. Despite the local focus of CitySearch, its most popular communities at the time of the interview were those engaged in nation-wide discussions on the Ally McBeal television programme and the issues surrounding the Clinton-Lewinsky affair. Dynamic interactions between community members have refined the membership within these national groups resulting in local and regional perspectives and opinions.

The implications of a failure to address the characteristics of the 'reputation space' provided by virtual community site hosts are illustrated by the Yahoo! United Kingdom/Ireland site launch. Initially based on the American Yahoo! model, the operators soon found that provision of an attractive service required a national focus on the United Kingdom and Ireland. Cultural differences had to be acknowledged in the process of designing the content provided by the Yahoo! service. Auto-by-Tel UK was also faced with the need to develop a national service with substantial local representation of car dealers.

To support this process, the interviewees claimed that they did not play an 'authoritarian' role in defining the boundaries of their communities or their memberships. There were no tightly defined (or assigned) roles for users, and members were granted the independence of choosing with whom and how they wanted to interact. The interviewees suggested that their communities are self-defining, evolving, organic entities with the hierarchy of authority being defined by the users. Tripod and Electric Communities, two of the older site operators, suggested that to foster successful community development required three principle factors:

- a fluid membership to prevent schisms and failure,
- substantial adaptation, and
- maintenance.

Considerable human effort in the form of skill and vision was also deemed essential. In the past, many communities failed when community founders sought to resign their visionary roles and/or to create a new form of authority structure, whether hierarchical or peer-to-peer. These failures were attributed to the fact that the community simply had changed.

### *Potential Adverse Effects of Electronic Word-of-Mouth*

Viable virtual community models of trust are influenced by the way issues of liability are addressed. Moderated communities such as Yahoo! have been in the spotlight because of anonymous postings to a Yahoo! finance message board which led to a legal case brought by IteX Corporation which was based on the allegedly libellous postings. This threatened to weaken virtual community trust. Virtual community developers are looking for new ways to control and manage community development by distributing liability so that the site owner is not regarded as being responsible for managing new virtual relationships. In the view of site owners, members should take responsibility for their actions.

The aggregation of customers into communities eventually may influence the balance of power between consumers and producers. Improvements in the capacity of buyers to acquire high quality, timely information about goods and services in a market should, in theory, shift the relative power of buyers and sellers in favour of the buyer. In practice, however, the potential for substantial changes in consumer 'buyer power' is influenced by the particular characteristics of electronic communities and the kinds of communication patterns that are established between community members. Although consumers' abilities to interact as members of virtual communities are enhanced by the services provided by commercial community developers, there is no evidence at present to suggest that consumers are using these capabilities in a conscious effort to influence the structure and intensity of competition among suppliers.

Virtual community interactions also have raised retailer and financial service provider concerns about the negative impact of electronic word-of-mouth on their business prospects. During the present stage of virtual community development, however, the positive efforts to promote brand image simultaneously in on- and off-line communities suggest that off-line word-of-mouth communication remains as influential as electronic word-of-mouth. This is indicated by the efforts to promote brand image simultaneously in both on- and off-line communities.

### *Conservatism in Virtual Communities and Reputation Systems*

*'Tripod is like most dysfunctional suburbs ... we are trying to fix that'* (Interviewee)

The creation of a virtual community should not be regarded simply as an added feature of traditional commercial activity in physical markets. Just as members of traditional communities have the capacity to resist the introduction of new elements into their environments, so do virtual community members. Virtual community development is likely to be based on two-way information flows that establish reciprocity and enable members to trust the electronic market environment. Trust appears to be closely associated with the type of reputation system that site owners establish.

Reputation systems create opportunities for site owners to track, monitor and collate information about customer behaviour and preferences. In closed communities two way information flows occur mainly between site hosts, users and suppliers. In the case of open communities users interact within a 'reputation space'. Site owners interviewed for this study did not regard themselves as influencing the content of their sites. Instead, they argued that rating schemes and the product and service information inputs are organised and managed 'outside' the influence of hosts and any individual community member.

Differentiation among virtual communities developed for commercial gain appears to be based on the relationship between the community environment and user expectations. Branding strategies focus on setting the boundaries for the types of behaviour that members of a community will expect. This aspect seems to be essential for building trust. A trusting relationship for virtual community members seems to be established when a user identifies positively with a reputation system or with a rating scheme.

## **Conclusion**

Virtual community developers are learning to associate brands with different types and qualities of interaction in order to encourage a greater intensity of user participation in Electronic Commerce. Hardware and software applications enable community building but they seem to play a small role in shaping the virtual community member expectations and levels of interaction.

Systems designed to support identity verification and reputation appear to be very important to community development, whether based on software or organisational processes. The design of the site and its applications are also important features that influence the site operator's liability for content hosted at its site. When management skills elicit high levels of interaction within a virtual community, the result appears to be a correspondingly high level of information content generation and loyalty among the users.

## Section 4: Intelligent Agents, Intelligent Applications

*'Agents are massively overhyped. I am a big believer in human intelligence... Agents are not that important. Success comes down to hard work. The reason Yahoo! is ahead is because they invested in smart humans, not technology and software'* (Tripod, 14 August 1998).

### **Preface**

The subject of intelligent agents is usually treated simply as an area of technical innovation, but it is also an institutional issue involving important social issues. These issues cannot be ignored because they affect how users perceive their interactions with other institutions in the electronic environment.

Intelligent agents are software systems for capturing and processing information about individual users that may serve user or 'second party' interests or both. Intelligent agents may anticipate user needs, desires, or actions and then may either act on behalf of the user to accomplish an action or suggest 'shortcuts' to the user for carrying out an action. When used to serve 'second party' interests, intelligent agents may gather information about the user and make it available to others for purposes such as selective marketing or software and service design.

These issues are no less important when intelligent agents are 'transparent' or 'invisible' to the user because their existence and functioning can become the subject of mythology or an 'urban legend'.<sup>14</sup> The explicit identification and introduction of intelligent agents to the user raises important issues concerning the gap between expectations and reality. These include questions about the privacy of the exchange, about performance, and about whose interests are served by the intelligent agent. For example, will it mediate user interactions in ways that favour interests other than those of the user? The gaps may lead to breaches in trust between users and specific service providers or to a decline in the user's willingness to use the electronic environment at all.<sup>15</sup>

Considering intelligent agents as institutions raises issues of user 'co-involvement' similar to those with respect to virtual communities. As with virtual communities, greater involvement of users with particular modes of interaction and the expected features and performance of an institution, in this case intelligent agents, engages a process of 'trust construction' which requires active management. In this respect, users cannot be expected to be passive recipients of intelligent agent design changes or 'improvements', no matter how significant or 'obvious' from a technical viewpoint. From a business perspective, intelligent agents provide a means for 'individualising' services; their acceptance, however, involves important social processes involving the construction of trust.

### **Key Messages of this Section**

- The use of intelligent agents opens new opportunities for directing advertising and image promotion messages toward people who will value this information.

- Intelligent agent use creates new risks for ‘breach of trust’ with users that may negatively affect service providers and the use of Electronic Commerce more generally.
- Users resist efforts to ‘extract’ information about their preferences and interests. They may be willing to ‘co-invest’ in providing such information if they perceive a benefit from co-operating.
- Portals (points of entry to the electronic environment) are making use of intelligent agents, but most portal providers believe that it is human vision and effort that matter most in deriving a contribution from intelligent agents, rather than the technical quality of the tools that are used.
- The principle use of ‘user profiling’ by portal providers is to enhance the ‘quality of experience’ and the relevancy of the products and services for the user of the portal.
- Portal providers are making extensive use of ‘user profiling’ to provide customised and relevant searches and navigation as well as to augment advertising revenue via placements and banners. They believe, however, that being user-focused is essential to their survival and growth.
- Personalisation of services is believed to be yielding the most value in terms of revenue generation and in terms of meeting the needs of the user. Business models are developing for generating revenue that combine personalisation and the ability to monitor usage patterns. Advertising revenue is principally a by-product of achieving a popular portal.
- Portal providers are exercising substantial self-regulation in an effort to prevent ‘breaches of trust’, but legislative initiatives to protect user privacy are becoming more important.
- Yahoo! has achieved a very strong position in the portal market and some argue that its success is the result of investment in high quality employees rather than in technology.
- Portal providers are interested in enhancing users’ willingness to ‘stick’ to the portal provider’s services. This involves the promotion of brands and images in on- and off-line environments.
- One strategy to extend market reach for a portal provider is to establish an affiliate programme whereby more specialised or ‘local’ service providers can incorporate services or identify with popular portals.
- Significant gains in ‘audience’ for particular portals have been achieved through merger activities among providers during the past two years.
- Portal providers are finding it difficult to integrate commercial elements into their traditional products and services. Moves to increase the ‘personalisation’ of their services offer new possibilities for Electronic Commerce and new challenges for the preservation of user trust.



## **Implications of Key Messages for Scenarios and Financial Institutions**

Portal provision is currently the major domain of user-interaction with intelligent agents. Although Yahoo! has gained a substantial market position, the company does not believe its services will become a universal standard. The extent of imitation of many features of existing portals suggests that the portal market will continue to be based on competing services (including the use of search engines which is the main intelligent agent use in portal services).

Self-regulatory and legislative initiatives are influencing user profiling and this suggests the growth of common standards and institutions for user profiling. The focus is likely to be on the issue of user identification rather than on the nature of the information provided by users. Similar trends appear to be present in other uses of intelligent agents. There is substantial and active user resistance to methods such as 'cookies' that allow the passive 'extraction' of information about users.

The success of Yahoo!'s unique classification approach to the use of 'search engines' suggests that competing standards for completely automated search engines are unlikely to prevail. A move toward an 'endorse' and general-purpose automated approach to the process of searching for, and navigating to, information and services of interest to the user is unlikely. The likely outcome is that intelligent agents will move in the direction of the competing service quadrant of the scenario framework outlined in section 2 of this report.

Financial institutions face substantial challenges in achieving a presence in portal environments. Portal providers seek advertising and other content that will improve the quality of the user experience in using the portal. This suggests that financial service companies will need to offer advertising that has 'content value'. The ability of portal providers to offer detailed marketing information to companies, including financial institutions, is limited by the focus by these providers on the use of user profiling for improving the attractiveness of the portal service. This focus limits the type and nature of information gathered about users. This limit is set even tighter by self-regulation and legislative initiatives for such services. Financial institutions should not expect portal providers and other intelligent agent techniques to offer them a substantial advance in developing marketing-related information in the near to medium term.

## **Reasoning and Findings**

The use of intelligent agents for mediating and shaping the buying behaviour of consumers on the Internet is an area of growing commercial interest. Intelligent agents may be able to provide personalised and customised customer services and to 'learn' from users, either through passive monitoring of their behaviour or through active solicitation of user input.

Methods for designing intelligent agents as well as for the collection, processing and reuse of the information they are capable of generating are being improved at a rapid pace. This section of the report examines how 'producers', (those designing intelligent agent tools and the services that

employ intelligent agents), are approaching issues relating to customer acceptance of interaction with intelligent agents. The aim is twofold:

to explore whether user participation in intelligent agent interactions is perceived by producers as necessary for establishing and building user trust; and

to examine the risks associated with breaches of trust that may occur with the use of intelligent agents and electronic services, more generally.

The role of software agents in Electronic Commerce and their effects on consumer buying behaviour are expected to challenge traditional techniques and practices for providing customer services. These new software technologies may also become partial or complete substitutes for products and services offered by traditional retailing and other intermediary firms.

Despite the rapid technical development of intelligent agents, their widespread utilisation as integral parts of the electronic environment is still highly speculative. This is particularly so for the business-consumer electronic relationship. What has been achieved to date focuses on relatively limited elements of consumer buying behaviour. There also appears to be a need to achieve a balance between capturing information on user behaviour and actively soliciting user input. When information is simply captured, few insights are available about how and why users have made particular choices.

Active solicitation of user input imposes a cost on the users (their time). Designers of intelligent agents must be prepared to deliver functional services to compensate for the cost imposed on users. Taking full advantage of the potential of intelligent agents will require much more information about user behaviour, but, at the same time, the observation of user behaviour raises important issues in its own right.

A major question about the intelligent agent approach is whether simply by observing the user's behaviour in the limited electronic domain, a service provider can capture a useful range of behaviours. Observing user behaviour is a possibility in the case of virtual communities where a particular individual engages in persistent interactions. It is more problematic for service providers that only encounter a particular user sporadically. In these cases, the user must be identified and past behaviour must be linked to form a continuous record. In addition, user interactions with a single service provider have to provide meaningful data if the intelligent agent is to function. These issues present significant problems for intelligent agent designers.

From a technical viewpoint, a more attractive option is to 'capture' a wide range of user behaviour by achieving a 'panoptic' view of the user's electronic interactions. This may be achieved by 'instrumenting' user interactions either remotely or locally to observe their behaviours. When the point of observation is remote, the users' interactions with the electronic environment must be 'channelled' through an interface that allows their behaviours to be captured.

One means of doing this may be the 'portal' approach, but there are significant technical limitations in the current WWW environment including the ability of linked sites to break free of



the control of the portal. Local processing is an unattractive option at this stage in the development of intelligent agents. The reason is that this approach results in the independent action of the user's personal computer and leaves open the potential for breaches of trust arising from real or imagined misuse of the information by those receiving it.<sup>16</sup>

Several of the companies interviewed indicated that many users were refusing to accept 'cookies', a method for identifying repeat visits and other user behaviour. In addition, for captured data to be useful, it must be processed which means that communication costs may be imposed on the user when the intelligent agent reports to a remote processing site.<sup>17</sup>

These considerations indicate that the social issues surrounding the use of intelligent agents are connected intimately with technical issues. The surreptitious capture of information about users is likely to be either too limited to be of value either because of the difficulty of identifying and linking repeat visits of persistent users, or because of the relatively small number of such individuals. More 'panoptic' approaches require 'channelling' users through an interface that records their behaviour or 'instrumenting' their computer to report upon their activities. Both of these approaches require a high level of trust on the part of the user, ruling out surreptitious use of collected information.

'Portals' are the most well developed and extensive examples of the 'channelling' approach, and we selected them as the central focus of our investigation of this institution. Surreptitious 'instrumenting' of personal computers is achieved primarily through the practice of 'cookie' distribution. This aspect is not examined here except in so far as it was considered to be an issue by portal provider interviewees.

### **Intelligent Agents: An Empirical Examination of the Portal Provider Practices**

'Portal' services are based upon an interface that makes the 'personalisation' of interaction a virtue or benefit so that the user is willing to co-operate with the actions of intelligent agents.

The aim of the portal service provider is to become the 'default interface' for the user to the electronic environment. The service provider may function variously as:

- a **doorway**, gateway, or port of entry to the electronic environment offering a familiar point of departure and return;
- a **marquee** (e.g. leaders in style or lifestyle) which encourages affiliation to achieve the real or perceived benefits of association with shared values or interests;
- a **channel** (similar to the major television networks) offering familiar organisation and formatting of content relevant to the user; and
- a **programme** (e.g. Yahoo!'s audience is only slightly less than the 33.3 million American viewers of broadcast television) offering specific content in addition to that of the channel

(Source: *Business Week*)

The providers of 'portal services' face problems similar to those experienced by virtual community managers, that is, constructing a portal that will attract users. The principle problem is to convince users that it is worthwhile for them to return frequently and to engage in persistent interaction. The use of intelligent agents by portal providers is motivated primarily by the problem of encouraging persistent interaction. The use of agents is also motivated by the aim of analysing the information collected to provide a more relevant and personalised user experience so that users will continue to use the portal service.

With the provision of a wide range of products and services, portals are seeking to own the information databases as well as to access all the information flows. Intelligent agents support the efforts by portals to own all the content in a structured format. The intention is to develop new revenue streams based on the information collected from users. Portal service providers are taking some actions with respect to social issues that may prevent breaches of trust with users. Whether these actions will be sufficient to minimise breaches of trust and build Electronic Commerce markets is open to question.

Table 2 shows the 'portal' firms selected for interviews in this study. These firms provide Internet sites offering:

a default interface for intelligent agents to meet and interact with users according to a shared set of rules and guidelines;

large scale retail operations employing capture of user information; and

intelligent agent software or consulting services about such software.

Table 2. Intelligent Agent Interviewees

<b>Company</b>	<b>Description</b>	<b>Intelligent Agent(s) Used</b>	<b>Primary Revenue Stream</b>
Yahoo!	Portal	Inktomi (S), Jungle (C)	Advertising and merchant placement
Excite	Portal	MatchLogic (S), Jango (C), (NetBot) (C)	Advertising and merchant placement
Infoseek	Portal	Quando (C)	Advertising and merchant placement
Tripod	Virtual Community	WiseWire (S)	Affiliate programme
Netscape	Portal	Net Search and 'Smart Browsing' (S)	Advertising and merchant placement
RS Components	Manufacturing Catalogue	BroadVision (S)	Sales
eBay	Online Auction	N/A	Commissions
CitySearch	Local City Guide	N/A	Banner advertising
Auto-by-Tel	Referral Service for New and Used Cars	Proprietary	Dealer subscriptions
NetPerceptions	Software Developer	Not Applicable	Sales
BroadVision	Software Developer	Not Applicable	Sales

Note: N/A = 'not available'; C = Comparative Shopping; S = Search Engine

The sample of firms included three tiers of portal activity. Top tier portals began as search engines or directories such as Yahoo! and they include Excite, Infoseek and Netscape. Second tier portals are also virtual communities and include CitySearch, Tripod and eBay. Third tier sites are producer or service providers that encourage user interaction and include Auto-by-Tel and RS Components.<sup>18</sup>

### *Portal Characteristics*

The term 'portal' may be used very broadly to encompass other types of 'gateways' or 'starting point' functions. The editorial director of ZDNet Anchordesk has suggested that the more basic portals will evolve into hubs or home bases and 'headquarters' that serve as places to 'hang out' between forays.

Efforts to develop portals as channels or programmes are based upon promoting 'brand recognition'. One of our interviewees suggested that most portals are following the 'hub' (or home base) approach which depends on limited recall by users about alternative on-line sites. Attempts to impose structure on the vast Internet environment by user practices such as bookmarking appear to have a minimal influence on the 'hub' approach to brand positioning.

Although portals differ in their approaches, they share several common features. With varying degrees of sophistication, they provide a personalised interface based upon:

**A critical mass of content.** Portal sites are not simply aggregates of various products and services. They also attempt to achieve the quality of 'stickiness' by offering a variety of services that will engage users for protracted periods of time. Thus, there are incentives to move toward the functionality of the portal as a 'programme'.

**Commerce.** Most portal providers are experimenting with being an intermediary in directing users toward Electronic Commerce outlets such as superstores and on-line shopping. They are also developing affiliate programmes so that retailers can associate with the portal. Most sites do not want to become merchants themselves. They are debating how closely they need to emulate the traditional merchant role in order to provide the user with a 'personalised' experience.

**Community.** Most portals regard the creation of a community and the provision of technology to support it as a means of creating loyalty or commitment through repeated visits and persistent interaction. The emphasis on interactive communication varies by type of community and the users these communities seek to attract. As with virtual communities, some portal communities may be closed as in the Intranet applications of Excite (and their acquisition of Throw), while others may be consumer or interest focused.

Interviewees suggested that it is unclear whether portals simply provide sites that aggregate content or whether they are also taking on roles similar to traditional merchants or media companies. Most portals aim to provide a 'unique' consumer experience as the core component of their service. Successful portals are seen as those that combine profitability with increasing knowledge of their customer base. Although the historical origin of certain portals has influenced their development, current trends indicate a major shift toward the personalisation of services through the use of user profiling and the analysis of usage patterns.

## *Historical Development of Portals through Search Engines and Directories*

The majority of portal sites began as search engines (Yahoo! is a directory with additional search engine functions), city-guides, or single product firms. These sites have moved from providing a search or directory service to providing 'new media' content and, more recently, to offering a range of additional services, i.e. sweepstakes, on-line gaming, on-line auctions, free email, and specialised membership services.

Portals that originated as search engines or directories continue to vie with one another on the basis of the functionality of their search provision. However, better performance often requires that users master an increasingly sophisticated vocabulary of operations. As a result, diminishing returns may have begun to set in with regard to competition in the search engine service. Portal providers associated with these functions cannot abandon them and they must keep them up to date. An interviewee from Yahoo! suggested a relative decline in the importance of the search function and attributed equal importance to the search, directory and content services the company provides. However, future portal development may be linked to the personalisation of search services.

### Yahoo!'s Approach

Yahoo!'s very successful approach (in terms of usage) is based upon a unique approach to providing a structured cataloguing system for organising the WWW. Yahoo!'s directory is organised hierarchically starting from a root system that moves to deeper levels comprised of 14 key categories and 150,000 sub-categories. Using this directory does not require mastering a complex vocabulary. Yahoo! maintains that it is continuously developing the directory structure to make it more useful to users. To support the usability of the directory, human rather than automated cataloguing procedures, are used.

Search engines and directories cater to users who generate substantial traffic in recovering information on the network. As sites have developed, increasing usage has led to market segmentation. Rather than face the prospect of specialised directory services emerging to meet particular user needs, the large search engine and directory companies are seeking to use their experience with user requests for information to personalise their service offerings.

### *User Profiling*

With increased traffic flows and users, sites have begun to segment users into communities of interest by demographic category, by national and/or by regional interest. Most firms use a combination of technology and human input to categorise data. For example, Tripod, a community site, uses WiseWire to classify the home pages of its users and a staff of editors who use this information to build new concepts. This latter activity is regarded as being more important than the use of the WiseWire technology itself.

Excite relies on various software applications to collect and process data. For example, Match Logic is used to track, store and analyse bulk data. The company interviewee believed that this has enabled the Excite service to become 'smarter', more specialised and more personal. For those employing automatic techniques, an 'ideal' process was regarded as one where technical developments parallel and support the development of a trusting community of users. It is

believed that the procedures for the collection of consumer data and technical developments should move forward together. However, one interviewee indicated that this parallel process had not been put in place effectively and that the development of consumer relationships remained weak.

Intelligent agent applications are directly responsible only for a small fraction of the information collected and used by portal firms at present.<sup>19</sup> The skills needed to create a 'personalised' user experience are related to the way a database is constructed and its application. Intelligent applications, rather than agents, based on user profiling are viewed as being the core features needed to establish a personalised environment. As the General Manager of Infoseek put it, 'no technology can do this (create a user experience), it really is a systems approach'.

User or customer information is collected in two ways: through *active participation* and *passive techniques*. Active participation involves the use of registration pages and specific choices by users to customise features of their own home pages. Passive techniques involve the use of tracking, monitoring and cookies. Interviewees for this study stressed that most portal sites are limiting the use of cookies because of the backlash arising from privacy concerns.

#### *Active Participation: Registration, Personalisation and Customisation*

The introduction of tools for personalisation is an important feature of efforts to match portal services to specific user needs. 'Customised' home pages such as 'My Excite', 'My Yahoo!', and 'About Me' from eBay illustrate such efforts. To create a personal home page, users are required to provide personal information via registration and to select their preferences by clicking lists of what they want to see and do on-line. Users are also building their own home pages at these sites. The analysis of data from these active user interactions allows portal providers to initiate improved searches and to provide links to specific articles of interest to the user. For example, when users view their choices of stock quotations in real-time at Excite, Excite provides links to articles related to these choices.

Personalisation techniques are providing opportunities for users to enhance their control over what they view, but these techniques remain at an early development stage. According to David Sze, Vice President Programming of Excite, the intention is to 'make personalisation easier by letting Web surfers gradually reveal information instead of requiring them to fill out long forms', but it not clear how this will be done. For the portal site owner, personalisation is not achieved solely through the use of information provided by the user. It also requires the tracking and monitoring of users on the site as well as new ways of extracting 'intelligence' from the data collected. Both the construction of continuous records of user involvement and the development of the means to process the data to improve the user experience remain highly problematic for the site operator interviewees.

#### *Passive Data: Tracking and Monitoring*

The creation of a personalised interface for users requires dynamic tracking and monitoring as new data are collected, analysed and re-used. Data obtained from tracking and monitoring are the primary sources of market information utilised by the interviewees. To date, tracking and

monitoring have played important roles in achieving the development of portal product and service offerings. Site owners are highly selective of the types of information that they choose to collect. Not every link, click or word is analysed. Only potentially useful and unique information is selected. The reasons for this include the costs of data collection, storage and analysis.

User profiles are compiled in aggregate form using measures of pages viewed and browsing patterns are not tracked comprehensively. Interviewees insisted that they do not track and monitor at this level of granularity because it is not necessary to support the services portals are providing. Only patterns of activity that are relevant and 'interesting' from a content perspective are tracked. Interviewees also suggested that a 'panoptic' approach to user interaction is regarded as an inappropriate invasion of user privacy. According to Excite, 'doing search was easy, there were no worries about information acquired, there was no purchase history. Advertising was triggered by concept' and not by personal profiles.

### *Profiling and Privacy*

Each of the companies in our research sample was using different user profiling mechanisms. There was no generic standard or scheme for the type of information that they were seeking to capture. A nascent standard, the Open Profiling Standard (OPS) is gaining the support of leading firms such as Netscape, Microsoft, VeriSign, and FireFly. As portal sites expand, there are increasing concerns about the privacy implications of their searching, monitoring and analysis activities. Most company representatives interviewed for this study claimed to notify users of their information practices and policies.

Self-regulatory initiatives to protect on-line privacy have tended to focus on the provision of 'trust labels' in the form of logos. These can be displayed on websites and are available to accredited merchants who meet specific codes of conduct for privacy. These organisations are beginning to expand but the pioneers include TRUSTe in the United States established by the Electronic Frontier Foundation and Engage Technologies (Engage Logo); and in the United Kingdom, the Interactive Media in Retail Group (IMRG) with its own 'hallmark'. All these initiatives have occurred outside the scope of public sector data protection bodies.

The Platform for Privacy Preferences (P3P) organised by the World Wide Web Consortium is under construction and seeks to provide a platform where consumers can choose how much information they wish to supply as a result of explicit choices. Along similar lines, Firefly, owned by Microsoft, has developed the Firefly Passport, which acts as a trusted intermediary for personal information. After completing a detailed survey, consumers indicate how much of this information they want to release and to whom. None of these self-regulatory initiatives had significantly impacted on the market at the time of the interviews in 1998.

Complementing self-regulatory efforts, public initiatives are advancing. For example, the United States Federal Trade Commission released *Privacy Online: A Report to Congress* in June 1998 which assessed the on-line industry's self-regulatory efforts to protect consumer privacy. It was concluded that: 'industry's efforts to encourage voluntary adoption of the most basic fair information practices have fallen short of what is needed to protect consumers'.

Under the European Union legislation, member states are required to prohibit the transmission of names, addresses and other personal data to any country with regulations that fail to provide adequate data protection. In the United Kingdom, the European Union legislation is being implemented through a new Data Protection Act 1998 that will be brought into full force in early 1999 pending secondary legislation. The British government favours and encourages industry self-regulation, but there are on-going debates about the accountability of self-regulatory initiatives. Of particular concern for British-based business is cross-border data flows. Industry interviewees tended to regard a top-down approach to regulation as an impediment to their global business operations and as providing a false sense of security.

There are conflicting views on the part of European Commission representatives and their counterparts in the United States on the data protection issue. In response to the European Data Protection Directive, the United States announced an intention to establish a self-regulatory system similar to that introduced by the TRUSTe labels. The Department of Commerce in the United States is proposing principles for data security, individual access to information, and enforcement of the principles for Electronic Commerce, that are expected to assist American companies to satisfy European legislation, but, at the same time, permit them to continue many of their current data-gathering and sharing practices.

### **Current Business Models for Portal Providers**

*'Our competition is everyone at this stage. It's the Bay Guardian, Yahoo!, Luddism, anything that tries to attract the attention of users and provide content... It's pretty cool'. (CitySearch, July 1998).*

The evolution towards a more consumer and user-friendly software-based intelligent agent product is challenging the business models employed by portal firms. Initially, it was expected that success would depend on advertising revenues. However, site advertising remains unsophisticated and revenues are now being generated by selling 'prime real estate', targeted advertising, click throughs, sponsorships, and by the introduction of service charges as in the case of Netscape.

These changes in business models are regarded as a direct result of personalisation initiatives. All our interviewees indicated that personalisation of services was yielding the most value in terms of revenue generation and in terms of meeting the needs of the user. Several business models have been developed for generating revenue that combine personalisation and the ability to monitor usage patterns.

#### *Usage Patterns*

Usage patterns can be detected from the analysis of information about the way a user navigates around a site. Documentation of these patterns provides a means for site owners to claim advertising revenues for specific 'real estate' on the site. Most interviewees regard themselves as 'real estate agents' who organise users into neighbourhoods and build sustainable community services.

In order to maintain the active participation of the user (and to protect user rights), there are trade-offs between increasing user choice, increasing traffic flows, and exclusive placement of content. Most interviewees indicated that the analysis of customer usage patterns was critically important for integrating new elements into the site regardless of whether these elements were about commercial products, community information, or other content.



## *Navigational Modes*

The interviewees felt that the user could be guided or channelled within the site by using a well-designed navigation product. The need to create a consistent and reliable interface for the user was regarded as being particularly important. Easy and efficient navigation tends to attract and retain consumers. Home page design was regarded as an important feature of establishing the image and presentation of the site owner. The principal site design elements included:

- **Look and feel** (identifying the site with a 'trusted' broker);
- **Predictability** (consistent placement of columns and frames);
- **Structure** (number and pattern of links, amount of information a consumer needs to filter through to a satisfactory outcome); and
- **Organisation** (presentation of links on a page).

A survey of the top 10 web sites in August 1998 showed that in the preceding six months, most portal sites had redesigned their home pages to emulate the top portal brand leader, Yahoo! Until this time, sites had been designed around their core competencies rather than to convey a 'portal' image. For example, Tripod's design initially supported a variety of service features, interactive mini-applications, web-page hosting and other features. Its new design focuses on presenting a consistent 'portal' image and, to a lesser extent, on the content developed by Tripod members.

These changes are taking place because most interviewees felt that users do not want to learn how to navigate multiple interfaces to find what they want. They would rather 'stick' with what they are familiar with. Site operators believe that user familiarity with Yahoo!, for example, puts that company in a leadership position to define navigational and presentational standards. However, it is not yet clear how Yahoo! can use its position to commercial advantage given the ability of others to emulate its presentation style.

*Stickiness = Traffic + Commitment*

*'Once traffic is created, commitment will sell itself'. (eBay, July 1998)*

Collecting, analysing and reusing data require that users not only return to a site, but also that they 'stick' around to use the package of services on offer. 'Stickiness' is achieved by keeping numerous visitors engaged for long periods of time. It requires both the generation of traffic (some of which will stick) and tools to enhance commitment.

Media Metrix, a web measurement company, provides survey results of time spent logged onto particular sites as shown in Table 3 below.

Table 3. Top 5 'Stickiest' Web Sites, March 1998

1. Yahoo.com	(464 m. min.)
2. AOL.com	(189 m. min.)
3. eBay.com	(175 m. min.)
4. Excite.com	(143 m. min.)
5. GeoCities.com	(140 m. min.)

Source: Media Metrix cited in Hamilton (1998).

### *Generating Traffic by Merger*

A straightforward means of generating traffic is to buy out the competition (see Table 4). Technology and content partnerships, mergers and acquisitions have been employed to this end in recent years as indicated by the larger numbers of acquisitions as compared to initial public offerings. In addition, industry analysts believe that there is a 'window' of 60 days following the introduction of a new type of service or functionality before other portal competitors begin to imitate. During this time it may be possible to build market share.

Table 4. Financing the Net, Acquisitions and Initial Public Offerings

<b>Timing</b>	<b>Acquisitions</b>	<b>Initial Public Offerings</b>
1 <sup>st</sup> half 1996	7	16
2 <sup>nd</sup> half 1996	9	11
1 <sup>st</sup> half 1997	10	7
2 <sup>nd</sup> half 1997	17	9
1 <sup>st</sup> half 1998	32	16

Source: Thompson (1998).

### *Building Traffic Through Branding*

A second means of building stickiness is to build on brand image. All interviewees stressed that brand was the most important contributing factor to their success. Brand promotion was sometimes sought at the expense of reduced traffic. Unless there was an explicit need for co-branding, branding was intended to reflect user experience and lifestyles and was rarely tied to specific products or services. Brands were associated with 'fun', 'trust', consistency, reliability, innovativeness, leadership (technical), youthfulness, and generation indicators.

Particular branding strategies of portal firms appear to be linked to specific methods of discovering patterns of customer interaction in order to sell 'real estate' associated with the usage patterns of users with particular characteristics or interests.

### *Building Commitment: Commerce and Community*

A significant means of building commitment is to couple a portal with a virtual community. The acquisition of ViaWeb by Yahoo! is enabling the provision of commercial home pages for small and medium sized enterprises. This is a significant element of Yahoo!'s Electronic Commerce strategy. Success, according to Yahoo!'s Electronic Commerce manager, requires analysis of 'usage patterns to integrate commerce in the context of content, search, and directory'. Access to all home pages is important to track and monitor the information flows and to control features that are developed on the basis of the usage data analysis.

One interviewee indicated that Yahoo!'s acquisition of ViaWeb would provide access to all the content and information flows arising from the home pages of small and medium sized firms. The information collected from these sites would be integrated into the Yahoo! directory and would most likely be used to segment the Electronic Commerce market.

The acquisition of Throw (a community building service) by Excite is another example of how portal sites are building customer information from analysis of usage patterns. Throw enables community members to create a closed customised community. Throw provides a link between communities and vast pools of information, and it contributes to the personalisation of services by creating a wall around the users; an important factor for extending trust-based relationships. Excite is benefiting from this information and the introduction of new users by friends. It is also using this framework to leverage its 'spider' (an intelligent agent interrogating net sites rather than users) by gathering information leading to a better understanding of the process and content of communication between users.

### *Traffic Sharing and Affiliates*

Traffic sharing between portal firms is significant for revenue generation. Search providers pay other service providers for premier placements on their sites.<sup>20</sup> Traffic sharing and cross-placements offer users greater choice and influence how they are referred to particular sites. Recirculation, as this process is known, occurs when search results refer a user to sites within a portal's property or partnerships. Recirculation helps to ensure that search engines will direct users to sites that will contribute to revenues for retailers and other content site providers.

Other techniques used to generate revenues include the development of a system of affiliates as in the case of Tripod's community pages. Merchants pay affiliates for referrals through links or other arrangements that direct traffic to their sites. For example, e-toys pays 25 per cent of the sale price of its products to the referring affiliate. Amazon.com has 30,000 affiliates and shares anywhere from 5 to 15 per cent of its sales revenues.

### *Advertising/Merchant Placement*

Portal companies have adopted multiple approaches to the problem of managing their current primary revenue stream of advertising. The variety in their strategies provides insights into how these sites perceive themselves, their intermediary roles, and more importantly, how they are trying to develop a foundation for their services.

Most portal sites claimed that they take an independent position with respect to placement and revenue generation and that they are mainly concerned with the 'user experience'. By this, the interviewees appeared to mean that they focus on improving the user experience in order to maintain their audience. This perspective is important not only for maintaining the integrity of the service provided, but also for maintaining the competitiveness of the portal itself. Excite explained that 'it can only work one way (for the consumer) ... if we allow advertisers to buy results ... we won't be building or offering the biggest commerce product'.

The selling of real estate space and premier banner advertising is based on highly subjective decision making criteria decided upon by the portal. Primary data to support these decisions are generated from page views and navigation patterns. Interviewees also claimed that additional criteria are employed including the quality of the service offerings of merchants, site design and layout, and the perceived capability of the merchant to complete an exchange (or fulfilment). Interviewees observed that the criteria vary depending on the how a site is categorised. CDNow, for example, might appear under merchant and/or music categories.

Advertisers and sponsors do have some leeway to influence placements. If significant funds have been spent on an advertisement or to have a premier placement resulting in numerous page views and traffic, this experience is associated with placement rankings. The interviewee from Auto-by-Tel felt that this was both its biggest opportunity and a threat for its own commercial service development. Presently, Auto-by-Tel has a large marketing budget for advertising and placement on portals. The company's biggest fear is that, once major brands with larger marketing budgets come on-line, it will not be able to compete in effectively promoting its service.

### **Personalisation and Electronic Commerce**

Following banking and financial services, the United Kingdom's retail sector is the second largest investor in information and communication technologies. Intelligent agent applications are challenging traditional techniques and practices for providing customer services. Retailers are concerned that their traditional intermediary roles may be superseded by these software technologies if they become substitutes for retailer services. Although it seems unlikely that electronic stores will have significant advantages in logistics over traditional outlets in the United Kingdom, the possibility that personalisation will provide enhanced value to the 'shopping experience' (for some at least) is of considerable concern. At the extreme, an information rich environment about product characteristics may reduce the value of product branding.

It is clear, however, that portal firms do not achieve personalisation based on a direct one-to-one relationship with the user. User profiling relies on a combination of active and passive techniques to create a 'personalised' user environment. A high level of personalisation tends to be achieved only when many users are participating in an on-line community. In addition, a high level of user acceptance and participation in personalised on-line interactions appears to rely mainly on the intelligent profiling of individual user behaviour rather than on the intelligent agent technology *per se*.

## **Conclusion**

One of the most important features of personalisation is that users have the potential to assume control over what they want to see and participate in on-line. This includes the type of information that users are willing to provide in exchange for products and services. If a user assumes this element of sophisticated decision-making, branding will be unable to influence the processes by which users make their choices.

This view, which is widely held by portal firms, corresponds to the common perception that portal services generate content simply by aggregating links to products and services. The interviews revealed, however, that the portals are not generating content simply by automating user searches or placing whatever advertising links that will generate a fee. Rather, they are trying to create content in a structured format in order to persistently attract an audience. To achieve this, portal providers say that they separate the core functionality of their services (directory or database search) from their revenue generated by advertising.

Taken together, user profiling and usage patterns create a specific model of how information is collected, analysed and reused. Consumers continue to participate in this type of interaction primarily because the portal firms appear to have been able to balance consumer empowerment through personalisation with customer lock-in. They have achieved this by branding a usage pattern or style of interaction. By creating a type of lifestyle brand through consistent and reliable service, these portals find it difficult to disaggregate their product and service provision into specific value-added components. As these portal firms continue to grow, they will need to adapt the boundaries of relationships that contain trust continuously. It is for this reason that portals have tended to brand their 'total' package of products and services rather than a particular product or service offering.

## Section 5: Banks as Trust Service Providers

*'...technology is not the story ... here is the story ... we are using the best of breed technology but it is the service offering and the trust relationship that matters. We have been providing a trusted service for over 130 years'. (Canada Post Corporation, August 1998)*

### Preface

A trust service provider or 'trusted third party' is an institution for mediating the interests of businesses and customers to provide each with a reliable means of making commercial exchanges in the electronic environment.<sup>21</sup> The development of trusted third party mechanisms is under careful scrutiny because it is believed that institutions in this area will be necessary for widespread acceptance of business-customer Electronic Commerce. Since secure electronic commerce requires cryptography and is linked to the taxation authority, governments are taking an active role in attempting to shape market developments.<sup>22</sup> It is unclear whether this involvement will open, or further constrict, bottlenecks in secure payments, authentication, and other functions expected of trust service providers.

In technical terms, trust service providers are expected to perform the functions of: authenticating the identities of transacting parties; reducing the risk that one or the other party can repudiate their participation; maintaining data integrity; and, ensuring that the privacy of the parties is upheld.
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The issues surrounding trust service provision forcefully illustrate the problems involved in constructing institutions in the electronic environment that are functionally equivalent to those that have evolved over an extended historical period for non-electronic commerce. Some have contended that the process of extending existing institutions into the electronic environment is straightforward; but the controversies and uncertainties surrounding trust service provision suggest a different story.

Many industrialised countries such as the United Kingdom, the United States, Canada and the member states of the European Union are moving to reach agreement on an infrastructure for the provision of trust services. It is unclear, however, whether banks will be able to extend their current roles as 'holders of trust' successfully to become suppliers of 'trust services' within this infrastructure. Where new infrastructures involve either voluntary or mandatory licensing regimes, existing and new organisations will compete for a share of the expected opportunities created by new electronically-based markets. Those who succeed will need to develop innovative technical applications as well as to build market share based on the strength of their reputations as providers of secure transactions. Reputation in the electronic realm may be an extension of the successful transfer of trust relationships from the physical realm into this new medium, or it may require the creation of new trust relationships in the electronic environment.

This section focuses on how key contenders for these new markets are developing strategies for market entry. In particular, we examine the extent to which these strategies rely upon, or presume the presence of, a secure public key infrastructure.

## **Key Messages of this Section**

- Trust service provision is traditionally a major function of financial service companies. It is important to assess whether they will be able to provide these services effectively in the electronic environment.
- There is a keen interest in both the private and public sectors about trust service provision because it is regarded as a key element in promoting the growth of Electronic Commerce, (principally, but not only, in facilitating electronic payments and in supporting secure messaging).
- There is growing international consensus that it is possible to separate encryption issues related to electronic signatures from message encryption, thereby avoiding controversies over who might control 'public keys' in the interest of national security or policing powers.
- Interview evidence suggests that trust service providers will seek to distinguish between customers by creditworthiness in order to offer various 'tiers' of assurance and permission.
- A major problem in developing trust services remains the difficulty for users in understanding what is required of them and why these services are needed.
- The existing providers of trust services believe that they have an advantage in 'certifying' users because they already have contact with these users in the non-electronic environment. Whether users can make the connection between the trust elements of financial services with which they are familiar and those required in the electronic environment is unclear.
- Technical issues are not particularly important in the trust service market. Instead, the problems of user confidence and familiarisation are likely to be the predominant issues in determining success.
- The evolution of the trust services market is complicated by the influences of a mix of public and private initiatives. Public authorities want to promote Electronic Commerce *and* they believe that a common endorsed standard for the key elements of these services would serve the public interest.
- Private sector players in the United Kingdom believe that the government is attempting to move too rapidly to endorse a standard before sufficient experience has accumulated to 'lock in' the market to a particular standard.
- Private sector players are likely to endorse government actions to the extent that they allow the continuation of 'variety' in trust services provision rather than endorsing a single common standard. Private sector concerns about government leadership are especially acute in the area of digital signatures. It is widely believed that government proposals to grant digital signatures the same legal standing as hand written signatures are premature developments.

- It appears that private sector initiatives are leading toward a ‘competing services model’ with a limited degree of interoperability. The likely extent of interoperability is the greatest uncertainty in the trust services market. Many private sector players argue in favour of the provision of interoperability.
- A private sector initiated interoperability model for trust services (where Cross-Certification methods become a common standard across institutions) is fundamentally different from government initiated proposals to achieve a universal standard.
- Even if the government endorses interoperability as the appropriate standard for trust services, there are likely to be significant problems with respect to the scalability of such services for very large numbers of users (supporting one half to one million users is fundamentally different than supporting ten million users).
- The uncertainties of the market are encouraging trust service providers to focus on business-business services rather than on business-customer services. They expect to transfer their experiences from one market to the other.
- The companies interviewed for this study believed that government can have a significant positive impact on the development of the trust service market, but that the present approach of attempting to achieve a ‘common infrastructure model’ may be seriously flawed.
- As indicated in Section 2 of this report, the industry preference for an ‘interconnected’ system of providing trusted services is likely to be unstable and may quickly evolve toward a ‘competing standards’ model.
- Concerns about technical issues and a ‘common infrastructure model’ may fade as companies develop innovative uses of digital signatures in the Electronic Commerce marketplace. Internal organisational constraints and a lack of ‘relevant’ applications appear to be the major impediments to entry into the trust services market.

### **Implications of Key Messages for Scenarios and Financial Institutions**

The future development of the trust services market may be influenced substantially by both technical innovations in public key cryptography and by the extent to which governments insist on adherence to specific standards and practices (i.e. key recovery or key escrow) for a public key infrastructure. Despite the lack of consensus regarding the benefits of government-led initiatives to establish standards, attempts by companies to establish self-regulatory measures to enhance user confidence in electronic trading environments are enabling some contenders to make the transition to virtual trading. Over the longer term, such efforts run substantial risks of moving toward a ‘competing services model’. This is consistent with the conclusions of our analysis of emerging virtual community and intelligent agent institutions. However, it is less clear that users will benefit from variety in the provision of trust services.



It is clear that the interviewees for this study believed that the government is currently taking a flawed approach to these issues by favouring a 'common infrastructure model'. The private sector alternative is also problematic, but it seems likely that the private sector will continue to move forward with initiatives that frustrate government measures that are being taken, in part, to preserve variety and support returns to early entrants. The industry players do not see this as a viable structure in the long run.

The result appears to be a substantial deadlock in which there are real possibilities for government endorsement of standards that will be bypassed by private sector initiatives. This area is one of substantial uncertainty and confusion for users, and turmoil may be expected for some years to come. This is unfortunate, but given current trends, it appears to be inevitable.

This outcome is particularly problematic for financial service companies who would prefer rules that preserve private initiatives and the differentiation of service offerings. Financial service companies are faced with the prospect of becoming 'locked-in' to a common standard endorsed by the government. This will not be a problem if the common standard is universal. It is likely, however, that competing standards will emerge from private sector initiatives. If one or more of these initiatives is successful in providing better services to the user, government leadership in this area will be bypassed by private sector developments. Similarly, efforts to limit the competitive alternatives are likely to 'lock' users into solutions that may, in the longer term, prove to be inappropriate.

There does not appear to be a straightforward solution to the conflicting interests operating in this market. The 'interconnected' system offers a reasonable short term or 'learning' model, but it may be necessary to terminate a period of experimentation with a universal standard. The alternative is movement toward a 'competing services model' that will provide short and medium-term gains for companies that successfully promote trust services. Over the longer term, however, the 'competing services model' may not be in the best interest of customers and it may impose a significant overhead cost on Electronic Commerce. However, it is the 'competing services model' that seems the most likely outcome of the interaction between the design principles (standardisation and customisation) and the forces of competition (see discussion in section 2).

## **Reasoning and Findings**

Each new generation of technical innovations in information and communication technologies gives rise to major controversies over the regulatory control of key standards and the assignment of liability. Existing governance regimes, whether in the form of formal regulation and legislation or informal guidelines established through public policy consensus, are regarded generally as being inadequate in terms of securing both the competitive interests of business and the broader interests of citizens and consumers.

The diffusion of Electronic Commerce is no exception. The opening of new service markets for the provision of 'trust services' presents established private sector institutions with both opportunities and challenges. Innovative new entrants promise information security but are

relatively unknown players in the market; they do not have well-established reputational assets to build upon.

While business-business Electronic Commerce seems set to take off, at least within national markets, the business-consumer electronic market is growing selectively and unevenly. In the United Kingdom, Electronic Commerce is not fulfilling its potential to create new opportunities for British firms or, indeed, even to provide a new electronic marketplace that is more responsive to consumer preferences. Consumers appear to be apprehensive about entering into electronically-based commerce transactions because of concerns about privacy and fears of being subjected to unfair trading practices for which there may be inadequate redress.

Government initiatives to encourage the provision of a public key infrastructure aim to address these issues as well as to ensure that new trust services using highly effective cryptographic techniques do not compromise national security interests.

The private sector seeks flexibility and variety as new methods of providing trust services are sought. The public sector and government representatives aim to establish a level playing field through standards harmonisation and legislative action to ensure that no new barriers to competition or adverse effects on consumer protection are constructed by early entrants into the trust services market.

The private sector, including the major banks, financial services companies, other infrastructure providers (i.e. telecommunication and utility companies), and major consultancy firms are seeking a major share of the new electronic marketplaces, nationally and globally. Most of the contenders see self-regulation as a means of protecting their respective economic interests, but it also seems that many want government action aimed at protecting them from undue liability in the new virtual marketplaces.

The public key infrastructure model is portrayed frequently as being government inspired, while the trust service self-regulatory model is seen as being a private sector initiative. In fact, neither model is likely to stand on its own. This section examines the interactions between the two models and the implications that follow from their evolution. Particular attention is given to banks as major contenders for a share of the future 'trust service' markets.

### **Trust Services An Empirical Examination**

Trust services are based on public key technology and are supported by cryptographic techniques and organisational processes. There are many such trust services including certification authorities, key recovery agents, secure storage, and time stamping. A trust service supplier may choose to offer some or all of these services to support the functionality of authentication, integrity, non-repudiation and confidentiality that is required for secure exchanges. Service providers may also choose to offer these services in particular markets or for specific types of customers such as providing managed trust services for companies or trust services for public use.

By December 1998 there was little commercial activity in the trust service market in the United Kingdom or in continental Europe. The main market entrants looked set to be financial institutions including banks and credit card companies, telecommunication operators and post office organisations. However, utility, media, direct marketing, computer and software, major manufacturers, retail companies, the ‘big 5’ consultancy firms, public sector organisations and Internet service providers were all candidates for market entry early in 1999. Of these, only the main contenders and the ‘big 5’ consultancy firms had announced their intentions to enter the market in 1999 at the time this study was undertaken.

Our interest in the prospects for these players in the new market and the impact of market developments on Electronic Commerce required that we seek interviews with a broad range of prospective entrants. Because of differences in the influence of government action designed to ensure the legal enforcement of trading standards and to protect national interests, we sought interviews with players in the United Kingdom, Canada and the United States. Table 5 to Table 7 list the companies and organisations interviewed concerning the emergence of trust services (see Appendix 1 for a detailed list of company interviewees).<sup>23</sup>

Table 5. Trust Service Providers: Major Contenders

<b>Company Name</b>	<b>Description</b>	<b>Country</b>
The Post Office	Public Sector Monopoly	UK
Canada Post Corporation	Public Sector Monopoly	CAN
United States Postal Service	Public Sector Monopoly	US
Citicorp - e-Citi Group	Private Sector Financial Institution	US
Major UK Retail Bank	Private Sector Financial Institution	UK
Bank of Montreal	Private Sector Financial Institution	CAN
British Telecom	Private Sector Telecommunication Provider	UK
'Big 5' Consultancy Firm	Private Sector Consultancy	UK
VeriSign	Private Sector PKI Technology and Service Provider	US
Inter Clear Service Ltd.	Certificate Authority	UK
Entrust Technologies	PKI Hardware and Software Supplier	UK

Table 6. Trust Service Providers: Supporting Organisations

<b>Company Name</b>	<b>Description</b>	<b>Country</b>
Association of Payment and Clearing Services (APACS)	Banking Consortium	UK
ValiCert	Global Clearinghouse for Certificate Validation	US
Universal Postal Union (UPU)	International Postal Coordination Body	SWIS

Table 7. Trust Service Providers: UK Industry Representatives and Users

<b>Company Name</b>	<b>Description</b>	<b>Country</b>
Confederation of British Industry	Industry Body	UK
Major UK Manufacturer	Major Manufacturer (User)	UK
Shell Services International	Global Corporate (User)	UK
Hewlett-Packard Laboratories	Industry Representative	UK
European Electronic Messaging	Initiated Self-Regulatory Body -European Certificate	UK

Association (EEMA)	Authority Forum (ECAAF)	
Alliance for Electronic Business	Initiated Self-Regulatory Body - Emeritus - for a Global Trust Infrastructure	UK

Representatives of the Department of Trade and Industry and the Office of Telecommunications (OFTEL) in the United Kingdom, and Industry Canada and the European Commission also were interviewed.

### **Trust Service Development**

Electronic digital products including digital signatures and message encryption have been developed to provide methods of verification and to protect the confidentiality of transactions (see Table 8).<sup>24</sup>

Table 8. Applications of Cryptography

<b>Cryptographic Technique</b>	<b>Non-Repudiation</b>	<b>Data Integrity</b>	<b>Authentication</b>	<b>Confidentiality</b>
Encryption	.....	.....	.....	X
Digital Signatures	X	X	X	.....

An international consensus on separating the functionality of encryption for confidentiality from that of digital signatures for data integrity, non-repudiation, and authentication has begun to emerge (as indicated by the dotted line in Table 9).<sup>25</sup> This distinction is important to separate controversies surrounding regulatory issues, and law enforcement and confidentiality, from the need to establish the legal framework for the recognition of digital signatures.

The use of technical applications cannot provide assurances about a user's identity. Therefore, Certification Authorities (CAs) are needed to issue Digital Certificates (DCs),<sup>26</sup> which can be used to bind the specific identity of a user to a particular application.<sup>27</sup> When Certificates are used in 'open' environments, those who rely on the information contained in the certificate (the relying parties) need a means for verification. The establishment of a certificate chain is one way for a relying party to trust that another party's use of a public encryption key has been certified according to a set of technical and procedural standards. The use of a directory database that holds the public keys attached to certificates, known as Certificate Revocation Lists (CRLs), provides a means of verifying the identity or level of permission ascribed to the parties of an electronic transaction.

#### *What 'Trust Services' are Likely to be Provided?*

The firms interviewed for our study all suggested that they would not enter the market to provide trust services without first becoming Certification Authorities. There was considerable uncertainty about the kinds of 'trust services' that might be provided in addition to certification,

with some firms expressing the view that becoming a trust service provider was not a particularly high priority. The primary motivating factors influencing market entry and involvement in the design and/or development of some kind of public key infrastructure were a perceived need to demonstrate both an image of competence and sophistication, and a capacity to take a leadership role in Electronic Commerce. Although becoming a trust service provider was seen as a risky business in an uncertain market environment, all firms believed that ‘it was riskier not to do anything, than to do something and get it marginally wrong’. Table 9 summarises some of the incentives and disincentives for entering the trust services market.

Table 9. Negative and Positive Incentives for Adoption of digital technologies

<b>Negative Incentives</b>	<b>Positive Incentives</b>
Cost and complexity	Building trust and reputation
Lack of maturity and interoperability of security products	Reducing legal liability
Government restrictions on encryption technology	Data privacy legislation
	Emerging business needs
	Cross border Internet trading

Most of our interviewees appeared to be modelling their future service offerings on the experience of the market leader, VeriSign, and its Certification Practice Statement.<sup>28</sup> Potential market entrants were expecting to segment the trust services market by offering different classes of Digital Certificates (Class 1, 2, 3 and 4) which indicate levels of permission and assurances provided. These classifications are similar to the way that credit card companies offer ‘platinum’, ‘gold’, ‘silver’, or ‘bronze’ cards to subscribers.

In line with this view, one interviewee stated that ‘at this stage the British Telecom/VeriSign relationship is no more than a “rebranding” exercise ... market development is limited to the classes of certificates available. There is no capacity to extend how the certificate can be used’. This initial market segmentation strategy is to be followed by efforts to use attribute certificates. Attribute certificates, rather than identity certificates, are perceived to offer greater added value.

The strategies of prospective entrants depend significantly upon the way they handle the core process of certification, that is, the registration process. This process provides substantial insight into the difficulties in moving from a physical environment into virtual commerce arrangements. It also highlights the issues firms confront when they consider migrating their own internal ‘certification’ procedures used among already trusted players into the riskier public domain.

### *Registration as a Core Business Process*

Registration is a key part of the certification process that influences how digital certificates will be issued, distributed and validated in order to conduct commercial transactions using the Internet. The user can be actively or passively involved in the registration process. User

registration entails a process of communication between the Certification Authority or trust service provider about various policies, practices and procedures that are in place for the user of a certificate issued by a given authority.

Firms with an already existing extensive physical infrastructure believe they have a market advantage over new entrants who cannot reach out directly to the user. For example, banks have a branch infrastructure, post offices have local outlets, and the large consultancy firms have office locations in major city centres. In contrast, British Telecom lacks physical outlets but has extensive customer links through its network services. In Britain it is likely that most trust service firms will initially use physical presence and documentation to facilitate registration procedures.

Market reach and an established trust relationship with a consumer base are important prerequisites for market entry. In terms of Class '3' Certification, the British Post Office and possibly banks have a significant advantage for market entry. The reasons are twofold. First, Class '3' Certification is a level of certification that requires the physical presence of the subscriber to a certificate. Both the Post Office and banks have a physical high street presence, while British Telecom does not. Secondly, Class '3' certification requires the presentation of physical documents such as a passport. Both the Post Office and banks have established track records for the collection of personal documentation and details, and again British Telecom does not. At this stage, British Telecom cannot even offer Class '2', a lower level of certification. Unlike its American counterpart, VeriSign, British Telecom does not have access to a public database that would enable it to 'match' and verify the details of the documentation provided by subscribers.

When a user registers with a Certification Authority or trust service provider the identity of the user must be authenticated and a level of authorisation for electronic trading must be granted. From the service providers' perspective, this first point of contact gives the provider an opportunity to communicate the levels of security available to the user as well as to establish a relationship. None of the interviewees for this study had made public the detailed steps that will be used to authenticate users.

Establishing the credibility of registration systems is a challenge for service providers. Commenting on VeriSign's web-based registration process, one interviewee explained that:

'...the VeriSign model is one that is easy and quick. Click of a button. The problem for X with the VeriSign model is one of accountability and credibility at the technical level. That is, if you can acquire a certificate at the click of a button then there is a problem ... if you can talk to it, you can crack it'. (Interviewee).

This is the area where practices and procedures need to be built up to enhance the user's or subscriber's confidence in a Digital Certificate.<sup>29</sup> The issues surrounding the technical requirements for a public key infrastructure were regarded as insignificant barriers to market entry.

One of the most significant perceived barriers to entry was organisational issues surrounding the process of externalising information about the firms' internal processes, practices and procedures. Internal company politics, organisational inertia, and the assignment of responsibility or 'ownership' of the certification system within the organisation were all regarded as hurdles that

needed to be overcome. Interviewees emphasised the critical importance of not only what was communicated but also how it was communicated across the boundaries of organisations as well as between the public users of their services and other traders.

## *Competing on Business Policies, Practices and Procedures*

*'The key to differentiation is the policies, practices and procedures ... It is easy to copy the technology' (Interviewee)*

Most interviewees believed that certificate issuance would rapidly become a relatively low margin commodity business. Value for the market players would be created by establishing standards aimed at minimising incompetent trust service provision thereby enabling firms to compete on the basis of their distinctive operational policies, practices and procedures. It is believed that the establishment of *de facto* (or endorsed) standards in this area would provide a basis for establishing market leadership with respect to certificate issuance and use. It is likely that such standards would raise issues of liability as they become incorporated in Certification Practice Statements.

For many of the interviewees, the critical factor for business success was the way the accreditation of service providers is handled. The alternatives include self-regulatory accreditation procedures or a new regime for voluntary licensing by public authorities. They also entail legislative measures for standardised digital signature recognition or industry reliance on existing legislation with respect to contract liability.

## *Accreditation Regimes: Growth Potential for Trust Services*

The emergence of an appropriate accreditation regime was widely regarded by firms seeking market entry as the key to building confidence and trust in services offered in the new marketplace. Firms have been seeking to establish an accreditation framework through self-regulatory initiatives while governments have been moving toward the establishment of a public licensing framework. Consequently, firms have been 'racing against time' to establish their markets so that legislation will follow. A race can also be seen between potential service providers as they try to establish criteria for other service providers to measure their products and services against. Despite the efforts to take a leadership position in the market, however, first mover advantage appears to be limited both by market uncertainty and by technical immaturity.

The United Kingdom's March 1997 public consultation paper, *Licensing of Trusted Third Parties for the Provision of Encryption Services in the UK*, by the Department of Trade and Industry set out an initial framework for the mandatory licensing of Trusted Third Parties. By April 1998 a new set of proposals on Secure Electronic Commerce had emerged proposing a voluntary accreditation regime that was planned for introduction as primary legislation in early 1999. By December 1998, the Office of Telecommunications (OFTEL) had been proposed to serve as a 'voluntary' licensing body to supervise trust service providers once the market becomes active.

Interviewees for this study regarded the licensing role for OFTEL as a premature move reflecting an attempt to establish standards before sufficient experience has accumulated. A common view expressed by interviewees was that 'everyone is greedy, imagine trying to set standards with a telco [British Telecom] within OFTEL?'



The moves by the British Government to establish an accreditation regime are mirrored by European Commission initiatives and the somewhat different measures being promoted by the United States government to establish a secure infrastructure framework for Electronic Commerce. In both the United States and Europe, 'trust infrastructures' refer to services provided to the public where the suppliers are subject to legislation or specific regulations. While governments have been focusing on national interests and law enforcement considerations (including export controls on encryption technologies), business interests have tended to focus on how new legislation or regulations will impact on future business prospects and new Electronic Commerce trading opportunities.

The promise of a public 'trust infrastructure' or 'key infrastructure' is that it will create an environment that supports trade and facilitate the introduction of technical systems and procedures by enabling users to engage in on-line exchanges more securely. In the 'common infrastructure model', a trust service provider supports a common mechanism for key recovery (or 'key escrow' in the United States). Encryption keys are lodged with and managed by the 'Trusted Third Party'. In this type of key management system, the trust service suppliers are 'intended to become the digital equivalent of banks who issue currency to support financial transactions by virtue of their currency holdings'.

In the industry favoured 'competing services model', the main objective is for trust service providers to establish ways of building trust with users and of resolving potential conflicts as and when they arise. This is to be achieved on the basis of established standards and through recourse to procedures addressed in their Certification Practice Statements as well as self-regulatory measures.<sup>30</sup> Because many institutions already perform this role, this approach is regarded as favouring the entry of both incumbents and new players into this nascent market. As long as a new 'trust infrastructure' regime emulates industry proposals, firms are unlikely to resist some form of government sanctioned voluntary licensing regime.

Another key issue for firms in the new trust services market is liability. Here, recourse to contracts and legislation that parallel transactions in conventional physical markets are widely regarded as the best way forward.

#### *Liability: Transferring Physical Contracts into Electronic Space*

*'Although everyone is making an issue of liability, really everyone who is entering the market is just seeking to do it properly. We want to utilise liability and contract legislation. These are the unresolved issues but also the way to move forward' (Interviewee).*

Electronic commerce is expected to grow extremely rapidly if legal uncertainties can be reduced or even removed. However, government and industry players have different views as to the best means of reducing uncertainty. Building upon trading mechanisms in the physical realm, the recognition of electronic signatures as the legal equivalent of hand written signatures is regarded by most governments as a viable means of imposing a minimum standard for trade confirmation. However, industry representatives regard moves to establish such standards as inappropriate for business processes and as a reflection of a misunderstanding of market processes.

'The legal recognition of electronic signatures equivalent to hand written signatures will impose a minimum standard in the electronic realm, whatever its use. For businesses, this minimum standard has the potential to increase the costs of doing business. Why? Because signatures are used for a variety of reasons (to indicate approval of the content of the associated document, to indicate acceptance of ownership, to indicate completion of a step or phase in a transaction, etc.). Signatures also have different values. This will cost since new processes will have to be established for all such uses' (Confederation of British Industry, July 1998).

Alternatively, legislation with respect to electronic signatures for the European Union could be regarded as a move to ensure that electronic documents are signed and that signatures imply contractual terms and liabilities. This would help to achieve a harmonised market in Europe and encourage conformance with evolving global practices. Such terms and conditions could then be embedded within Certification Authority and trust service provider practice statements.

Developments in certification procedures, the use of digital technologies, and in the 'trust services' environment suggest a complicated set of interactions between the incentives facing businesses and those facing governments. The following section examines how firms have been responding to these developments.

### **Market Making Strategies**

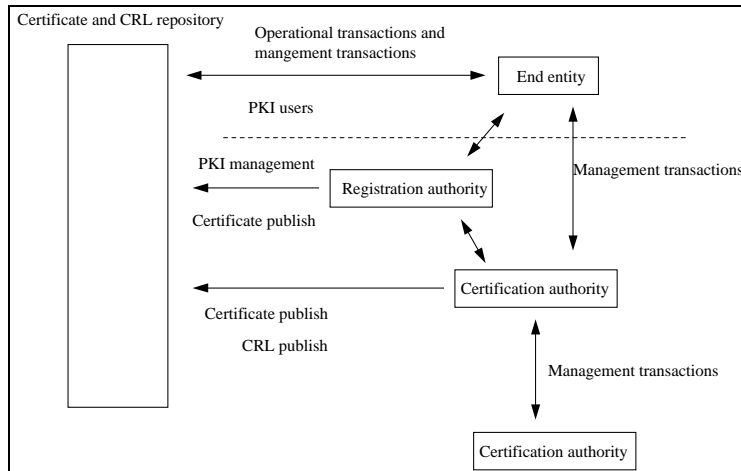
*'... security is not a layer, it is a discipline'*. (Electric Communities, August 1998)

In a physical market, one party to an exchange generally is able to use a number of environmental and personal cues to assess the likely reliability a potential trading partner. In a virtual environment the technical systems and procedures described in the preceding section are intended to provide a trading party with a measure of trust and confidence in the authenticity and reliability of a potential trading partner.

In theory, procedures are designed to enable a party to an exchange to look up the name of a claimed digital signatory in a directory managed by an organisation which has certified a public key as being registered to the signer's name. The reputation of the certification authority or trust service provider is critical in this regard. In a complex open network environment cross certification (or interoperability) between authorities is essential to enable trading parties to verify the security of their transactions.

Figure 7 on the following page shows the main elements of one potential market architecture.<sup>31</sup>

Figure 7. Architectural model of the Internet Public Key Infrastructure (PKI)



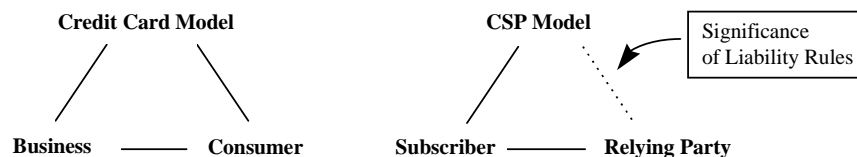
Source: Collieran (May 1997).

Note: End entity: user of PKI certificates and/or end user system that the PKI certifies; certification authority; registration authority, i.e., an optional system to which a certification authority delegates certain management functions; repository: a system or collection of distributed systems that store certificates and Certificate Revocation List (CRLs) and serve as a means of distributing these certificates and CRLs to end entities.

Cross-Certification (interoperability) is a means whereby users encounter and accept varying levels of permission associated with Digital Certificates. Cross-Certification depends upon the development of accepted practices for all parties to an exchange and provides the basis for active user participation and choice. The certification process for Electronic Commerce differs from the established credit card model (see Figure 8).

The dotted line indicates that there are no rules established with respect to the liabilities entailed in the relationship between the supplier of a Digital Certificate and a trading party who relies on this supplier to verify the authenticity and identity of that supplier's subscriber. This distinction is important when it is applied to the electronic exchange process since independent verification and acceptance of the certification process by the relying party, that is, cross-certification, remains to be addressed.

Figure 8. Credit Card and Certification Practice Statement Models



Interviewees had a variety of views with respect to the role of the certification process. Some regarded it as a means of establishing a 'contractual' relationship with a user. Others said that the certification process was one that enables the personalisation or customisation of the relationship

between the certificate issuer and the user. Open Internet standards were *not* regarded as being synonymous with interoperable 'trust infrastructures' for Cross-Certification.<sup>32</sup>

Trust services will require more than the technical standards implemented by hardware and software suppliers to achieve this goal. Trust service implementation involves new standards and practices for managing information flows and use. Interviewees suggested that barriers to interoperability could be built into these areas as a means of product and service differentiation.

Potential entrants into the trust services market also expressed varying views about the extent to which technical systems could provide a basis for establishing the necessary trust that would reduce the risks associated with electronic transactions. For example, one interviewee claimed that British Telecom was developing its system from a technological perspective: 'They only ever question themselves on how they can lay the risk off themselves. If they have 100 units of risk, they will not try to reduce this to 65, they will seek a total transfer'.

Most interviewees saw the emerging 'trust infrastructure' and services as extensions of their current lines of business although some regarded these developments as a stepping stone into a whole new industry. The problem was that 'we can't define what that whole new industry is'. Linking trust services to current lines of business was seen as a necessity to respond to regulatory (and social) obligations and as a means for overcoming the lack of education on the part of consumers and corporate customers with respect to electronic trading. One interviewee observed that:

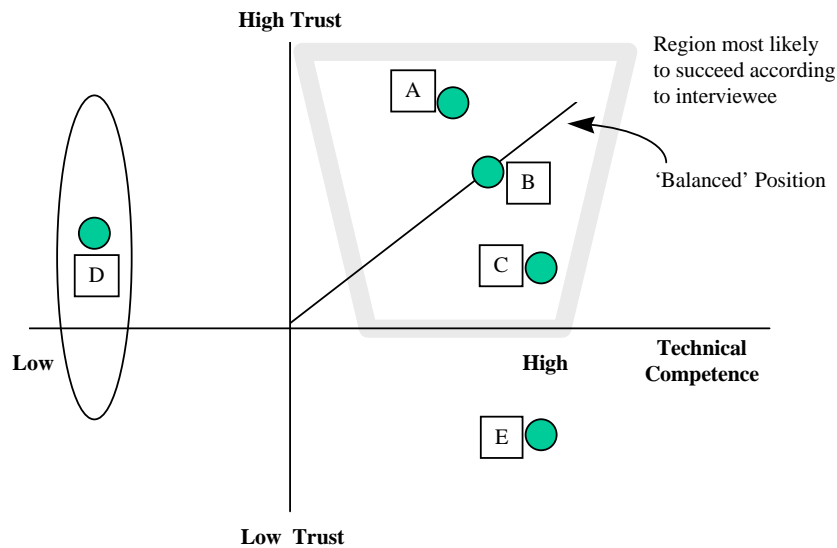
'... To take a leadership role is important. Users don't know what they want. They need to be led. A firm cannot just jump into an uncertain, immature market with a product. They need to tie it in with current business. Later, they will try to extend market boundaries. Therefore, a firm needs to take the competency of what the firm already has and create around it. Differentiation in the traditional sense of the term will occur later on, in a growth period based on particular features. Differentiation occurs after a firm has gone through a learning process.' (Interviewee)

### *'Sticky Trust' and Brand Association*

Conveying an appropriate level of trust in a certification system was recognised as a major issue for both established firms and new entrants. The ability to enter a high risk, uncertain market 'all comes down to brand recognition'. Firms seeking to enter the trust services market have a number of options for how they manage the 'brand extension' process.

Figure 9 illustrates several of these alternatives. Each involves assumptions about the transfer of trust from one line of business into a new one and most rely heavily on reputation and brand recognition. The horizontal axis designates the perceived technical competence associated with a firm's existing products and services; the vertical axis shows the perceived trust associated with the same firm's new 'trust services'.

Figure 9 Brand Association and the Trade-offs of Trust and Technology



Source: After Interview with major Trust Service Provider, 1998

- Note:
- A = a company division with high trust and medium technical competence.
  - B = joint venture with a balanced level of trust and technical competence.
  - C = a company with higher level of technical competence and a lower level of trust.
  - D = a new subsidiary with a moderate level of trust transferred from the parent to the new venture but with a very low level of technical competence.
  - E = a new entrant with a high level of technical competence and a low level of trust.

To illustrate the dynamics at work in the emerging market the interviewees provided some examples. For instance, to achieve position A in Figure 9, a Canada Post Corporation interviewee observed that 'we don't pretend to have technical expertise, that's why we partnered with Cebra which has the reputation for technical expertise with which we can combine our commerce and service orientation'.

VeriSign would be positioned at 'E' in Figure 9 as a new entrant with high technology competence. Although the brand is not well known, the company is acquiring default trust or trust by association with, for example, the American Institute of Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA) and British Telecom in the United Kingdom. The Office of Telecommunications representative also observed that none of the contenders in the United Kingdom are well-positioned to provide all the components necessary for trust services. While players may enter the market alone, they may also consider partnerships with other upstream players who would be better positioned to provide some of the components.

Digital Certificates can be used to grant varying levels of trading permission to a user. When new entrants take on this role they have the potential to challenge the authority of traditional 'trusted' intermediary firms such as banks and other financial institutions. They can also reduce the perceived market value of brand names. For example, VeriSign sees itself as a 'dis-

intermediator'. Its services enable customers and businesses to choose their trading partners by establishing direct links between certified 'trusted' parties.

The challenge for market players is to develop certification practices that are accepted by a critical mass of users. Certification and Cross-Certification systems offer a model for established 'holders of trust' to extend into new roles as providers of trust services.

### *Business Models for Trust Services*

*'... all you need to do is put in place proper policies, procedures and processes plus decent technology ... but no one is really doing this'* (Interviewee).

In an open electronic market, a relationship must be established with a trust service provider that can issue and/or verify the certification of trading parties, but traders do not necessarily have a pre-existing contractual arrangement with the service provider. Open access to Certification Revocation List directories provides a basis for establishing trust and all but one interviewee for this study indicated that their directories would be publicly available.

Many interviewees regarded this as an important source of competitive advantage over financial institutions. It was presumed that these institutions would be less likely to publicise their directories since their data and the contents of certificates and transactions may be used by other financial competitors thereby jeopardising market position. In addition, the interviewees believed that it would be difficult for financial institutions and banks to maintain a perception of 'independence' on behalf of the users if they felt that the data collected for certificate issuance may be used to supply other financial services.

Accounting firms were expected to experience similar problems since trust service divisions might be unable or unwilling to maintain confidentiality of information in the face of requests from the firm's audit division. Similar concerns have been raised about the United States Postal Services' proposal to manage the Internet domain name '.us' because physical addresses may be matched with personal details.

Some financial services companies are beginning to challenge business models that rely upon a public 'trust infrastructure' and on overly complex validation systems. A proposal by Global Concepts (a United States financial services industry forum) calls for an Account Authority Digital Signatures (AADS) model rather than a Certification Authority Digital Signature (CADS) model. The former is in the early development stage and would integrate Digital Signatures with traditional financial transactions and accounts.

Another initiative by financial institutions was announced in October 1998. This scheme seeks to establish a global trust infrastructure supported by eight of the leading globally operating banks.<sup>33</sup> The purpose is to push for the widespread adoption of business-business Electronic Commerce. The Universal Postal Union in Switzerland is conducting a similar scheme with 16 Post Offices world-wide.

These moves suggest that the provision of trust services and the uptake of the Electronic Commerce more generally will be on the basis of schemes like these rather than linked directly to government initiatives.

Whatever model is adopted, trust service providers must discover ways of generating revenues from their services. VeriSign pioneered a certificate-based revenue model for Certification Authorities where fees are collected from the issuance and revocation of certificates, but this model has been difficult to scale up to respond to the demands of business-consumer Electronic Commerce. Alternative models link revenue streams to subscriber fees levied on parties who check the validity of a Digital Certificate against a Certification Revocation List before finalising a transaction. The Barclays Endorse trial in the government-to-small business market for the Electronic Commerce market in the United Kingdom is an example of this model.

Scalability of trust services is an important market entry consideration. Interviewees commented that considerable innovation would be necessary to scale services up from 10,000 to 1 million, to 10 million users. All firms except British Telecom saw this as a major reason for the focus of trust services on the business-business Electronic Commerce market. Most interviewees argued that once the technical infrastructure for business transactions was in place, it would be easily transferred to the mass consumer market. This view contrasts with the emphasis on building trust relationships which was present in firms' views in our other two case studies about the important role of brand and other market development strategies for Electronic Commerce.

### *Building Trust in Electronic Commerce*

*'... we want 90 per cent of central Government's routine purchases of goods and services to be made electronically by 2001, and for 25 per cent of Government services to be available electronically by 2002'. (Mandelson, 9 September 1998)*

Government leadership and demonstration of the security of electronic trading in the public procurement and government-citizen services areas is expected to stimulate the growth of other Electronic Commerce market segments. However, one interviewee commented that, 'the problem is that you cannot count on them [the Labour Government] to get their act together' and others believed that measures would not be taken to establish a public 'trust infrastructure' until after the next election in Britain.

Most Electronic Commerce initiatives are occurring in the business-business market where companies may choose to outsource trust service functions or provide them in-house. Strategic choices involve considerations about the value of the firm's knowledge base (intellectual property) and the potential dilution of market value if some part of this knowledge base enters the public domain or is transferred to a competitor in the market. For example,

*'...X doesn't have any clue if they are selling a joint-venture partnership with Y or if they will be selling Certificate Authority services directly to Y's customers. ... Also, X now fears the issue of intellectual property. They are afraid that Y may decide to 'learn' [the certification process] and begin to deliver the services themselves. The question arises about what needs to be in place to protect X's know how?' (Interviewee)*

Because knowledge of trading party activities provides the key to the profitability of trust services, the future establishment of trust service providers depends on the definition of the roles and obligations of the service providers and parties involved in electronic transactions. One interviewee commented that ‘to find out the roles and responsibilities between a Trusted Third Party, X and Y hasn’t progressed yet’.

‘... it all centres on i) who owns the data; and, ii) who owns the processes ... No matter what the scenario, there is a definite requirement for trust and this must have some form of hierarchy. Firms will need to decide what information they want to retain and what they want to turn over to a private company’ (Interviewee).

Interviewees for this study pointed to the role of a Privacy Enhanced Mail (PEM) Infrastructure Model where flexible features could be added to the attributes of Digital Certificates and Authorities could be constrained to provide services only within pre-defined territories. The PEM model divides the ‘trust model’ into parts in order of hierarchical authority: Trusted Third Party, Certificate Authority, Registration Authority and Local Registration Authority. Even the separation of roles and responsibilities within this model has encountered some problems. As one interviewee commented:

‘... one of the big lessons learned was that there is a distinction between meeting the needs of business versus enforcing a standard. A CA architecture needs to be implemented from the bottom up. Business needs should be fit into applications. There must be flexibility at the lower end but this must link up with setting standards (technical and core concepts) from the top down’ (Interviewee).

In this example, it was further suggested that the roles and responsibilities of the Trusted Third Party, the Certification Authority and the Registration Authority should not be separated but instead should be retained as a unit, separate from the local registration authority who in this case was responsible for the ‘relationship’ with the users.

Perhaps the most problematic aspect of the trust service provider experiences is the blurring of the boundaries between public and private markets. While business-business markets may be considered ‘closed user groups’, issues regarding how identities are used in business-consumer markets raise additional issues. One service provider noted that:

‘There are differences in the market for public versus private identities that are used on the Internet versus Intranets, respectively. All applications are configured for the public route. From a technical perspective, public is easier to deal with. However, lines blur especially when companies may want to send contracts or communications with a solicitor’ (Interviewee).

A public ‘trust infrastructure’ sanctioned by government via voluntary or mandatory licensing provides a route toward clarifying the respective roles of trust service providers and consumers who participate in Electronic Commerce transactions. As firms have begun to develop and operationalise ‘trust services’ they are starting to suggest that a public trust infrastructure will be cumbersome, costly, and unnecessary to protect security or build confidence. In fact, interviewees suggested that the VeriSign model had helped illustrate that market share could take precedence over security issues without necessarily jeopardising users.



Voluntary licensing of trust service providers was expected to create problems for the development of the business-consumer market by increasing costs of service provision due to stringent licensing requirements and reducing the quantity, variety and quality of services. Some interviewees argued that unlicensed service providers would be forced to assume unlimited liability in order to build trust while voluntary licensing would enable other trust service providers to assume 'limited' liability, thus reducing their incentive to provide a high quality service.

National public 'trust infrastructures' were also expected to create cross-border trade barriers resulting in reductions, not only in the quality of the trust management infrastructure in the United Kingdom, but also in the balkanisation of the infrastructure throughout Europe. Finally, a voluntary licensing regime was expected to encourage premature standardisation of technical systems and organisational policies, practices and procedures resulting in slower innovation and market growth.

### **Do Banks Stand to Win or Lose?**

Banks may have a strong advantage in the market for 'trust services' because their major clients are seeking to outsource payment systems without jeopardising security. For example, 40 retail and manufacturing firms control 80 per cent of the total industry in the United Kingdom by volume. These firms have Intranets in operation and are seeking expansion into Extranets to form closed user groups. Managed Extranets would provide additional functionality including libraries of knowledge, terms and conditions of contracts and semi-structured data, new product launches, sales information, as well as data on promotions, logistics, distribution, and ordering.

Banks are regarded as the 'communication managers' between retailer, manufacturers, and customers. Banks can support the management of information flows for monetary authorisation and payment information including remittance, foreign bank statements, direct debit and direct invoicing. Banks already hold most of the data for the participants in the value chain. The establishment of closed user groups would enable information 'access points' to be controlled. Managing and providing a secure payment process is the priority requirement for these firms rather than secure messaging. For business-business Electronic Commerce, banks are clearly well positioned.

However, the migration path into the business-consumer Electronic Commerce market is not as clear. Although banks have accumulated substantial trust they are also institutions that have accumulated vast amounts of information about consumers' financial circumstances in much the same way as credit and other financial institutions. This may jeopardise their capacity to migrate into business-consumer Electronic Commerce markets. Consumers may be concerned about the multiple capacities in which these institutions are able to influence the outcomes of their commercial transaction patterns.

Table 10 on the following page compares the market entry strategies of the main contenders in the British market for the provision of trust services at the time our research was undertaken.

Table 10 Trust Service Market Entry Strategies

Company	Entry Strategy	Core Focus	Stimulus	Market Reach	Role of Certification
British Telecom	Market based	Logo/Seal of Trust	Intranets	Global	Co-ordination Role
The Post Office	Infrastructure	Accreditation	Transitional Positioning to expand into new markets	National	National Identity
Major 'Big 5' Consultancy	Infrastructure moving to Market	Accreditation	Expand value add Consultancy	Global	Risk Management
Banks	Market	Leadership in cryptography and smart card market	Internal Requirements including maintenance of consumer base	Global, Local	Risk Assessment (underwriting)

## **Conclusion**

Despite the emphasis by prospective market entrants on the benefits of self-regulation and the virtues of *de facto* (or endorsed) standards, the firms interviewed for this study also commented that 'first mover' advantages would be limited. Limitations included high levels of market uncertainty, the immaturity of technical systems, and their own organisational policies and practices. They claimed that 'first movers' were quite likely to be superseded. Early entrant firms risk their reputations and stand to lose the trust of customers and suppliers they have accumulated in the value chains of their existing lines of business.

By seeking to influence, but not to manage, the accreditation process for trust service suppliers, firms appear to be seeking a solution that will balance a public common trust infrastructure scenario with a private sector, entrepreneurial competing services model of market development. The competing services model faces uncertain demand and the need to resolve internal organisational conflicts as to how relationships with users can be established and produce profits for suppliers.

Existing companies, especially large companies in the financial services, banking and management consultancy sectors, face potential conflicts of interests over the internal ownership of information about user behaviour and transactions. New entrants face equally formidable entry barriers given the capacity of existing players to benefit from 'sticky trust' and utilise their reputational assets to expand into new lines of business.

Establishing a new regime for governing electronic markets is not a simple matter of establishing a replication of the ground rules for trading in physical markets. Government interests in national security, legal enforcement of contracts, individual privacy, and the competitiveness of national

markets within a global trading environment, point to the likelihood that some form of public trust infrastructure will emerge.

The trust services market is expected to take off in the first quarter or middle of 1999. Announcements in the United Kingdom are expected from Barclaycard, one or two of the 'Big 5' accounting firms, British Telecom, The Post Office, and one or more of the major financial institutions (including retail banks).

The prospects for the success of these ventures are tied intimately to the public's perception of whether sufficient attention is given to ensuring that consumer and citizen interests are protected. Any failure to do so will have an enormous impact on both the reputations of these firms as 'holders of trust' and as suppliers of 'trust services'. It is unlikely that these institutions will chose to rely only upon their internal business practices to establish features of an evolving trust infrastructure.

## Appendix A. Companies Interviewed

Alliance for Electronic Business (AEB)	UK
Association of Payment and Clearing Services (APACS)	UK
Auto-by-Tel UK Ltd	UK
Bank of Montreal	CAN
Big 5 Accounting Firm	UK
British Telecom (BT)	UK
BT Array	UK
BroadVision UK Ltd	UK
Canada Post Corporation (CPC)	CAN
CitySearch	US
Confederation of British Industry (CBI)	UK
Department of Trade and Industry (DTI)	UK
DigiCash Inc.	US
Electric Communities	US
eBay Inc.	US
e-Citi Group, Citicorp	US
Excite	UK
European Commission, DGXIII	BEL
European Electronic Messaging Association (EEMA)	UK
Entrust Technologies Ltd	UK
Ice.com	UK
Industry Canada	CAN
Infoseek	US
Inter Clear Service Ltd	UK
Major UK Retail Bank	UK
Millicent, Digital Equipment Corporation (DEC)	US
Major Manufacturer X	UK
Mondex International Ltd	UK
NetPerceptions	US
Netscape Communications Ltd	UK
OFTEL	UK
(The) Post Office	UK
RS Components	UK
Shell Services International (SSI)	UK
Talkway	US
Tripod Inc.	US
280	US
United States Postal Service (USPS)	US
Universal Postal Union (UPU)	SWIS
ValiCert	US
VeriSign, Inc.	US
Yahoo!	UK/US

## **Appendix B. Glossary of Acronyms**

AEB	Alliance for Electronic Business
AICPA	American Institute of Public Accountants
AOL	America OnLine
AADS	Account Authority Digital Signatures model
APACS	Association of Payment and Clearing Services
CA	Certificate Authority
CADS	Certification Authority Digital Signature model
CICA	Canadian Institute of Chartered Accountants
CPS	Certification Practice Statement
CRLs	Certificate Revocation Lists
DCs	Digital Certificates
DES	Data Encryption Standard
IMRG	Interactive Media in Retail Group
ECAF	European Certification Authority Forum
EEMA	European Electronic Messaging Association
HTML	HyperText Mark-up Language
IP	Internet Protocol
ISO	Organisation for International Standardization
ITU	International Telecommunication Union
OPS	Open Profiling Standard
P3P	The Platform for Privacy Preferences (P3P), World Wide Web Consortium
PEM	Privacy Enhanced Mail
RSA	Rivest, Shamir, Adleman
SMTP	Simple Mail Transfer Protocol
WWW	World Wide Web

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## Notes

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- 1 Interviews in the United Kingdom 34, the United States 18, Canada 4, European Commission 2.
  - 2 This terminology is used in preference to the more unsettled term 'cyberspace' which, for many, connotes cultural and social features of a particular type. The significance of this distinction can be illustrated by comparing the terms 'commercial cyberspace' with 'commercial electronic environment'. In our view, the former term is more confusing than the latter.
  - 3 In the first instance, an endorsed institution is one that is generally accepted as appropriate. This may be augmented by more formal endorsements such as those granted to suppliers promoting the institution, by major users adoption, or by formal voluntary public standards. The usual role of more formal mechanisms is to reinforce social and economic acceptance.
  - 4 The IP is a better example than HTML which has begun to become differentiated through the proliferation of 'plug-ins.'
  - 5 An example of a standard vying for this role in the case of formatted text is 'Adobe Acrobat' while further augmentation of HTML-related standards might allow the common standard to become browser-related.
  - 6 Mitchell (1996) develops ideas about the architecture of these locales that may range from the *piazza* where individuals freely congregate (and can recognise one another's presence) to more secluded and private places where entry is by admission only and visitors may or may not encounter one another.
  - 7 A common, if somewhat technical, definition is that 'virtual communities' are social groups that use 'computer-mediated communications'. The members of these communities may never have met in person or they may share the same office building. Their persistent use of networked computers to communicate with one another is the defining characteristic of a virtual community rather than other interactions that they may or may not have.
  - 8 Additional data were drawn from the growing literature on virtual community formation and the trade press.
  - 9 For example, older on-line service providers like AOL (previously America OnLine) and the San Francisco based community known as the WELL (Whole Earth 'Lectronic Network).
  - 10 Reputation systems rely either on active or passive participation by the virtual community member. Reputation building is an active process for the user when the site owner gives users a significant degree of control over their actions. It is passive when the site operator retains significant control. In both cases, reputation building depends upon recognition by other users.
  - 11 The 'hacker culture' is the best example of a 'gift culture' where participants compete for prestige (reputation) by giving time, energy and creativity away.

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- 12 There are many similarities here with the ‘informational exchanges’ observed by von Hippel (1988) in the case of practising engineers from competing companies who exchange technical information in an effort to avoid wasting company resources but with the intent of not giving away more than they receive in value.
- 13 With respect to the Auto-by-Tel British site that is to be launched in early 1999, one interviewee commented that ‘the level of technology and services of the Auto-by-Tel US are more sophisticated than we need. We will use these and innovate around them once we “listen” to the user’.
- 14 The vulnerability of users to the propagation of rumour is exemplified by the recurrent appearance of urgent warnings about the dire consequences of opening particular e-mail messages. These hoaxes are responsible for substantial losses of productivity. They are all the more frustrating because those propagating the rumours are likely to be acting in good faith, attempting to protect family and friends from harm.
- 15 Even sophisticated user communities are known to suffer from over-reliance on software. According to J. K. Martin, Lecturer in Mechanical Engineering, ‘it is a guiding principle of the National Association of Finite Element Methods and Standards to assume that all [computer model] results are wrong by default until sufficient interrogation and experienced judgement have been applied to the whole analysis. Unfortunately I often encounter people who say there is no need for this any more “as it is all done by computer” - rather worrying coming from tomorrow’s aeroplane designers’ (*Times Higher Education Supplement* 1998, p. 15).
- 16 There are no universally accepted standards of what constitutes permissible observation of user behaviour in the electronic environment. What might be perfectly acceptable to one person may be deeply offensive to another. And, whatever use is being made of ‘captured’ data, those who are concerned about loss of privacy will imagine that much more is being observed than may be the case in practice.
- 17 Although in institutional environments many personal computers accessing the electronic environment remain connected to the Internet at times when the user is not active or present, the prospect of intelligent agents transmitting data from inside the institution is unlikely to be welcomed by those responsible for security.
- 18 Additional data on company strategies were drawn from the trade press.
- 19 BroadVision, a leading software supplier of personalisation technologies, indicated that the intelligent agent component of its product accounted only for approximately 25 per cent of the database package. As one interviewee suggested, although ‘BroadVision is sold as a one-to-one personalisation and customisation tool, [this is done] for marketing purposes only’. It was not thought to reflect the functionality of the software package itself.
- 20 Providers have complex arrangements for traffic sharing and they are often exclusive to the participating companies. A Netscape interviewee in the United Kingdom outlined its agreement with Excite, the search engine provider. Excite purchases the right to provide 25 per cent of the search services for Netscape’s Netcentre. Excite benefits from: i) traffic flows directed to its website, ii) owning the search result pages, and iii) owning the ‘real estate space’ for advertising. Netcentre owns the profiles of the users and the added value comes from the user profiles that are then used for targeted marketing and cross selling of products and services.
- 21 In technical terms, trust service providers are expected to perform the functions of authentication of the identities of transacting parties, to perform procedures that reduce the risk that one or other party to the transaction can repudiate its participation, and to ensure that the privacy of the parties and data integrity are maintained.
- 22 The provision of privacy and data integrity, which necessarily involves high level encryption, engages government interests in taxation and security enforcement. From the government’s

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- viewpoint, electronic transactions should provide no more reliable refuge from legal enforcement than existing mechanisms of exchange.
- 23 The names of interviewees are not listed to protect anonymity because of the commercial sensitivity of this emerging market. Additional data were drawn from published and unpublished documentation and special interest group sources.
- 24 A Digital Signature is an electronic seal used to mark a message with a unique identifier that provides authentication and supports non-repudiation. When a message is received, the Digital Signature is checked against a hash to validate the integrity of the data received. In government and European Commission documents, electronic signatures, rather than digital signatures, are used to denote technical neutrality for the technologies chosen to perform these functions. Encryption is based on the use of public and/or private keys.
- 25 In Europe, various consortia and companies are working on trust products for Electronic Commerce. For example, the SEMPER (Secure Electronic Marketplace for Europe) project funded by the European Commission DGXIII Advanced Communication Technologies and Services programme is developing a generic architecture for secure electronic commerce using the Internet. ID2 Certificate Manager is involved in large scale production of certificates for secure identification. ID2 was established by AU-System Group in 1996 and is based in Sweden where it is focusing on secure personal identification and digital signatures.
- 26 Digital Certificates include data elements such as a copy of the public key of the subscriber, a reliance limit, an expiration date and a reference to the URL where the Certification Authority's Certification Practice Statement (CPS) resides. Certificates are based upon the type of authentication using either identification or a level of permission that is assigned.
- 27 A trust service provider may or may not perform the function of a Certification Authority.
- 28 VeriSign holds the largest share of the Digital Certificate market but its position is being challenged.
- 29 The procedures currently utilised to enhance user confidence noted in this study included: ensuring that only one identifiable institution is involved in managing and funding a Certification Authority; reliance upon a minimum of three individuals 'present' when encryption keys are signed; adequate technical support; careful selection of technical applications; twenty-four hour operation; personnel vetting; and the physical inspection of the servers and other aspects of the technical system.
- 30 Self-regulatory measures are being devised by the European Certification Authority Forum (ECAAF) sponsored by the European Electronic Messaging Association (EEMA) and the Alliance for Electronic Business (AEB) which is heading the 'Emeritus' project sponsored by the European Commission. Participating organisations include: the Confederation of British Industry, the British Computing Services and Software Association, Direct Marketing Association and Federation of Electronics Industries, and partners in Belgium and Spain. Plans are to establish an industry-led framework for the provision of a global trust services infrastructure.
- 31 The British government has suggested that the fundamental requirements for the public key infrastructure include: flexibility, scalability, modularity, resilience, policy enforcement, simple interfaces for electronic commerce applications, client choice, use of latest cryptographic techniques, development plans and the use of 'strong' encryption.
- 32 Technical standards for Internet security include the ISO/ITU X.509 v.3 Standard for Digital Certificate format; S/MIME Secure email using hybrid cryptographic techniques and X.509 v.3 Certificates (RSA, RC2, DES); Secure Sockets Layer for secure transmission using hybrid cryptographic techniques and X.509 Certificates (RSA, RC4, DES); and Secure Electronic Transaction for secure payments using hybrid cryptographic techniques (RSA, DES).

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33 The eight financial institutions include: Chase Manhattan (US), Citibank (US), Bank of America (US), Bankers Trust (US), Barclays (UK), Deutsche Bank (Germany), Hypo Vereinsbank AG (Germany) and Amsterdam's ABN Amro Bank NV along with e-commerce security firm CertCo.