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Networks and partnerships in the evolution of home banking

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Abstract

IT and various other technologies are being deployed to deliver financial services to the home. 'Home banking' is a techno-economic network which is currently being constituted. The development of three technology-based remote delivery channels - telephone banking and financial services, PC banking, and interactive TV - is described, using actor-network theory. Inter-firm partnerships and alliances are shown to play a prominent role in the process of translation of these complex and systemic innovations.

Keywords

Diffusion, networks, actor-network theory, financial services distribution, home banking, inter-firm partnerships.

1 INTRODUCTION

This paper is concerned with the emergence, diffusion, and institutionalisation of 'home banking'. This is a vague concept or vision which involves people

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conducting banking transactions and a variety of other personal financial activities - buying insurance, making claims, buying pensions and other investments - from the home, although they could be (and are) equally well carried out from the office, or, with a digital cellular phone, a laptop or personal digital assistant, almost anywhere. So while 'home banking' is a double misnomer, it serves as a convenient shorthand for location- and time-independent access to retail financial services through non-traditional channels, mostly enabled by or heavily dependent on IT. It represents a discourse comprising a wide range concepts and practices, and is an innovation in the process of constitution at this moment.

Banking and other financial services have long been seen as part of that range of information, entertainment and shopping services which could be provided to consumers at home via 'new' information technology (Cawson et. al., 1995) . Throughout the 1980s, there were a number of attempts by financial services organisations to introduce various forms of home banking via telephone, teletext, and PC. In the UK few succeeded before the Midland Bank's telephone banking experiment with First Direct, and telephone sales and administration of motor insurance through Direct Line. These in turn led to a host of imitators among established financial institutions and others, and a consequent surge in telephone banking, insurance, and investment. The telephone has become within the space of a decade an established channel for the distribution of financial services.

PC or on-line banking is in an earlier stage of construction, one in which we can observe actors being enrolled and mobilised in partnerships and alliances as a momentum towards the innovation develops within the industry. Belief in its inevitability, and the consequent need for financial organisations to participate or lose ground permanently, are spreading. Meanwhile as network computing and interactive TV enter the scene as possible alternatives to the PC for the mass market, they too are viewed as vehicles for home banking.

'Home banking' then denotes an array of practices and technologies, conducted not by one but many organisations, both within and outside the financial services sector. To locate our study within the diffusion literature, we are concerned here not with the diffusion of an isolated innovation, but with a cluster of innovations having one general object. Further, within each variant or channel of home banking (telephone, PC, interactive TV), there are competing configurations, especially among the newer ones, each of which could be viewed as a different innovation. Partnerships play a particularly important role in the latter. Finally, our focus is on the diffusion of a group of related innovations throughout a sector, and on the agents of diffusion and how they themselves become associated with the innovation, rather than on explaining the adoption decisions of individual organisations or adoption by consumers, although these are necessarily involved.

For a number of reasons we depart from the diffusionist approach and view home banking as a *techno-economic network* which is being realised through a complex series of interactions between financial services providers, their customers, and suppliers. It is comprised of the distribution channels (which are themselves networks) and the distribution strategies of competing and collaborating individual firms both within and outside the sector. We argue here that diffusion is best seen as a process of translation (Callon, 1986), in which an idea becomes social reality, as certain actors define a problem in a manner consistent with their own interests (*problematisation*), and then seek to align the definitions of others in a manner consistent with their view (*interessement*). A techno-economic network evolves as more actors become associated with it through *enrolment* and *mobilisation* by others. For a time the innovation itself is unstable, various interpretations or configurations compete, the groups and alliances around it shift constantly (Cawson et al., 1995), and are themselves transformed by the innovation. Maturity or success is the stabilisation of the network through the association of more actors to it and a convergence of understandings about it. It becomes irreversible or institutionalised when the interrelationships become so complex and entangled it is impossible to unravel them or go back to that point at which a particular translation was but one of a number of competing alternatives (Latour, 1991; Callon, 1991; Knights et al., 1993; Hanseth and Monteiro, 1995).

Given the scope of the network comprised by 'home banking', our aim in this paper is limited, first, to exploring the conditions of possibility for the emergence of 'home banking' and second, to describing some aspects of the process through which 'home banking' is being constructed currently. In the context of this conference, our paper is intended as a contribution to the study of the role of networks, partnerships and alliances in the adoption and diffusion of technologies within a sector. We find our approach a logical extension of Robertson, Swan and Newell's discussion (1995) of the role of inter-organisational networks in the adoption of MRPII by individual manufacturing organisations, although it uses a somewhat different theoretical framework. In the first conference also, Hanseth and Monteiro showed how actor-network theory could be fruitfully applied to the diffusion of information infrastructures within a sector.

The next section of the paper explores the conditions for and the obstacles to the emergence of home banking in general, from the perspectives of financial services organisations and consumers respectively. Part 3 describes the emergence and stabilisation of telephone banking in the UK since the mid-1980s. Part 4 demonstrates the efforts of software houses to enrol and mobilise financial institutions in PC banking from 1994 onwards, and the reactions and counter-alliances they provoked. Part 5 discusses the role of partnerships and alliances in recent developments in interactive TV.

2 THE CONDITIONS OF POSSIBLITY FOR 'HOME BANKING'

Distribution has become problematised in the financial services sector for a number of reasons. Products have become more standardised and similar, and it is difficult or unprofitable to compete on price. Most traditional distribution channels represent large overhead costs, such as the bricks and mortar of the bank or building society branch network and its associated staff. Technological innovations including the ATM and the credit and debit card have allowed banks and building societies to externalise labour costs to the customer (through self-service) and reduce the requirement for processing cheques, while at the same time meeting a perceived consumer demand for convenience - round-the-clock access in a wider range of locations. 'Home banking' is an extension of this strategy. At the same time, new competitors have successfully employed the technologies of remote distribution to enter the industry either from other sectors, or from other geographical areas. Therefore established financial services organisations, increasingly threatened by competition from within and outside their sector, seek to save costs, provide better service to their customers, and differentiate themselves through their distribution systems (Devlin,1995).

Among consumers, there is little evidence of a pre-existing demand for home banking, just as there was no evidence that they wanted ATMs before 1967. However consumers were frustrated by short banking hours and once ATMs were introduced they became almost universally used. Similarly, consumers want greater convenience because of changing lifestyles. This is being used to enlist them into particular forms of remote distribution. Mintel's surveys (1994, 1995) have shown that the proportion of adults in Britain 'liking the idea' of home banking was only 19% in 1992 and 21% in 1994, but had grown to 26% in 1995. Similarly, a survey carried out in autumn 1995 by MORI for ICL Financial Services showed that 45% of British adults would use a home banking service through a television or PC, compared with one-fifth who were interested in such a service through the television the previous year. Almost 25% of the 1995 sample thought they would be using home banking within two to five years. Bankers therefore appear justified in expecting a six-fold increase in home banking transactions by 1997 (*Financial Times*, 5/7/95). Demand is actively created by the marketing efforts of organisations, such as the aggressive advertising campaigns of Direct Line. Consumer 'needs' have been and are being constructed in the process of diffusion as consumers, like other groups, are recruited to the innovation.

Given the interests of financial institutions in promoting it, receptivity at least on the part of some consumers, and the nearly universal availability of technologies of remote distribution such as the post and telephone, it is a question why home banking did not take off before the latter half of the 1980s. Some of the conditions

for its emergence we would suggest are an increasingly privatised, home-centred population, growth in the numbers of women working outside the home, increasing price-consciousness, and the high standards of efficiency and service set in other sectors, such as supermarkets. We plan to conduct a more detailed study of these issues.

3 TELEPHONE BANKING AND INSURANCE

The great advantage of telephone banking was a tried and tested technology at the consumer end, with around 90% of households in the UK owning a telephone and about 94% in the US What was innovative was not the technology but the decision to provide the service, and the back-office technology and organisation required to deliver it. In the UK, some financial organisations had offered limited telephone banking services on an occasional basis for some time, but it was tied to the branch system. Technological and organisational conditions for the growth of telephone banking were the centralisation of administrative tasks formerly conducted in the branch in regional and central processing centres, and the integration of customer account data for different products in single customer information databases (a process by no means complete in many institutions). However, without the exemplary success of one or two innovating organisations it is unlikely telephone distribution would have so quickly become stabilised as a standard offering for banks, building societies and insurance companies in the UK.

First Direct and Direct Line were both set up in the 1980s specifically as telephone operations. Direct Line Insurance was established in 1985 as a low-cost, low-premium provider of motor insurance by telephone. It subsequently expanded into household insurance, personal loans, mortgages, life insurance and savings accounts. By early 1996 it had become the largest motor insurer in the UK and one of the top ten insurers of homes and contents. It benefited from the substantial rises in the premiums of mainstream insurers, consumers who were more price-conscious and more willing to switch insurers, and general expansion of the market. However Direct Line is highly competitive on price partly because of its low expense ratio and its tendency to 'cherry-pick' the best risks, while providing a high quality service. Other direct writers have since entered the market and all the composite insurers have strengthened their direct sales operations, some setting up independent direct writers. Direct writers' share of the general and life insurance market has been growing steadily.

First Direct was the result of a project within Midland Bank charged with finding a way to serve more discerning and more up-market customers. Market research indicated a decline in the use of branch networks and a nucleus of people who wanted to conduct their banking business by telephone without visiting a branch. First Direct was accordingly set up on a greenfield site with new staff and systems

in 1989. It was the first full, 24-hour telephone banking service with no branches and is run separately from the Midland, except for use of its branch and ATM network for cash and deposits, and shared processing facilities. First Direct had 650,000 customers by March 1997 and planned to achieve a million by the year 2001. It regularly attains the highest customer satisfaction ratings of any bank.

By 1996, at least 18 major British banks and building societies offered a telephone banking service. Most were add-ons to the existing branch network rather than stand-alone services. Financial institutions without a branch system in the UK, such as Citibank of New York and Save & Prosper, the retail arm of the merchant bank Fleming's, have been able to enter the UK retail banking market in this way.

Currently more than 90% of large banks in the US and 72% of middle-sized banks have at least one call centre, and telephone banking is said to be the top priority of 84% of banks. Telephone transactions grew more than any other retail bank channel in 1995 (39%) to 15% of all retail banking transactions (Lunt, 1996). According to Tower Group, telephone banking will account for 28% of all customer-initiated contacts in the US in 1997, and 32% by the turn of the century (Zack, 1996).

Although telephone distribution seemed at first to be limited to relatively simple products, more complex ones such as mortgages, loans, pensions and other investments are now being sold through this channel. The diffusion of telephone banking has been accompanied by an elaboration of technologies both at the consumer and provider ends, which is supplied by a new branch of the computing and communications industry. Telephone distribution of financial services has also produced a highly sophisticated and finely tuned socio-technical system, the call centre. In the US, the number of customer service representatives, who operate the call centres in financial services, is expected to rise from 57,500 in 1995 to 64,400 by the end of the century (Zack, 1996). There are said to be half a million people working in call centres in all industries in the US, and approximately 50,000 in the UK. Glasgow alone has 40 call centres with 4,000 employees. Telephone distribution has also given rise to an entirely new management discipline. The Call Centre Management Association was set up in the UK and had 190 member companies from different sectors by May 1996 (*Financial Times*, 10/6/96).

Summary

Telephone distribution of financial services has become a stabilised techno-economic network in the space of about a decade. Most of the relevant actors have been mobilised in a dense set of relationships; some consumers remain to be recruited. Telephone banking has become a requirement rather than a differentiator for financial services organisations. The proportion of total transactions conducted

by telephone is expected to continue to grow, but the market is now overcrowded with providers. One of the possible configurations of 'home banking' has come into existence.

4 PC BANKING

Our account of telephone banking is a retrospective reconstruction of a mature network. In the case of PC banking we are observing the process of construction of the network currently.

The conditions for home banking in general are also supportive, in the main, for distribution via PC. From the supplier perspective, one of the main advantages of PC banking is reduced cost. According to a Booz-Allen and Hamilton study, the average cost of an Internet payment transaction is $0.13 or less, $0.26 for a PC banking service using the bank's software, $0.54 for telephone banking, and $1.08 for a bank branch (*Financial Times,* 12/8//96). For organisations which already have telephone banking operations, PC banking is an extension of this existing service. It can also be implemented in stages for relatively little cost (see below). Another motive is fear of falling behind nonbank competitors such as brokerage houses and mutual funds, which have in general been far quicker to adopt new means of distribution.

The role of fashion and hype should not be underestimated. The general view is that PC banking is the wave of the near future, and that banks which do not provide it will be left behind. This view is of course promoted by the technology companies with interests in PC banking. It is accompanied by certain assumptions regarding consumers: 1) that home PC buyers and Internet users want and expect financial services delivery via their PCs; 2) that this group is growing rapidly and will soon form a majority of households; 3) that they represent precisely those market segments financial institutions want most to attract as customers. This perception of consumer demand is widely represented in the media and especially the business press, where PC banking has a high profile.

The CEO of CheckFree (see below) however sees the process as driven by major banks trying to control costs, not by consumer demand. He says 'They don't talk in terms of marketing to see how many people are interested. They talk about how many people are going to move to electronic banking. There is a very big difference between banks looking at it is something they will market rather than something they will drive', addidng that when Wells Fargo, NationsBank and Citibank 'start to move all the banks in the country have to move.' (*Banking Technology*, November, 1996).

PC banking however faces a number of obstacles either not faced by telephone banking, or not to the same degree. Security of transactions, especially over the Internet, is a major issue which is currently being addressed at a number of different levels, including the SET protocol agreed by Visa and MasterCard. PC banking unlike the ATM or telephone is dependent on the diffusion of relatively new consumer goods which require a major investment of time and money by the customer. The PC itself represents a major hurdle. People who already own and have already mastered the PC probably would not find home banking more difficult to learn to use than any other software, although this depends on the banking software. The perceived risk and relative advantage of online banking for the consumer largely depend on his or her access to and experience with a PC. Another issue is whether those who do use PCs and the Internet at home have an equivalent interest in managing their personal finances by these means.

In the rest of this section, we describe the diffusion of PC banking in the US and U.K before 1994, and the various alliances which have emerged subsequently.

Before the Internet era

In the US, the take-up of PC banking was slow before 1995, because of the low home PC base, high fees charged by banks for the service, and unfriendly software. Between 11 and 14% of medium-sized and large US banks had developed online banking before 1995 (*Money,* Sept. 1995), using either proprietary systems or packaged software. But according to the American Banking Association only 1% of personal banking was PC-based (*Financial Times*, 6/3/96).

In the UK, Nottingham Building Society launched the first major home banking service in 1983, in partnership with the Bank of Scotland. It used the Prestel videotex system which was neither fast nor easy to use. The experiment stalled at around 5,000 customers. The Bank of Scotland subsequently launched the HOBS Home and Office Banking Service in 1985, which was targeted primarily at small businesses and professionals but was also available for personal customers. This used either the customer's PC and modem or a screenphone. In its early form it did not generate a great deal of interest (Devlin, 1995).

Microsoft and Intuit

Since about 1994, conditions on the consumer side have become more favourable to the growth of online banking and other financial services, including rising sales of home PCs and modems, the growth of online services and the Internet, and the popularity of personal financial management software. Microsoft and Intuit with their aggressive financial services strategies have actively exploited these developments.

It is estimated that 20 million US households own and 12 million use personal financial management software, which helps users keep their personal accounts and do financial planning, write and print cheques (*ABA Banking Journal*, April 1996; *Business Week*, ,26/8/96). Intuit's *Quicken* currently has about 80% of the personal finance software market. Microsoft was a late entrant but acquired at least 15% of the personal finance software market with *Money*. Both companies already offered bill payment facilities. Although Microsoft and Intuit are competitors, they had plans to merge which were only abandoned when threatened with antitrust action. They have also used the same transaction processor.

In 1995 both companies put in place the bits for a home banking package to offer banks and *Quicken* and *Money* users. They brought out new releases, both of which incorporated communications software for online services, and made it easy to sign up with a bank for full banking services. Similarly, from Windows 95 it was easy to sign up for Microsoft Network (MSN), which was refocused as a provider of Internet access. Intuit had acquired National Payment Clearinghouse as its transaction processor, under the name of Intuit Services Corporation, which became the processor for both *Quicken* and *Money*.

Nineteen US banks signed up in 1995 to provide online banking services through *Money* and *Quicken*. These included three of the largest New York banks, five of the top California banks, and the largest US savings and loan. Intuit also signed up American Express and Smith Barney, the stockbroker. By August 1996. ISC was processing payments for about 300,000 customers of client banks.

Microsoft and Intuit thus offered financial institutions a quick and easy route into on-line banking, with, in the case of Quicken, popular, user-friendly software; in the case of Microsoft, the power of the brand and the bundling of *Money* with Windows 95 and MSN. Since banks actually signed up with ISC rather than with Microsoft and Intuit, they could offer their customers a choice of software for one fee. Both packages allowed banks to download their own logo and user interface onto the software when the customer signs up. The banks which signed up hoped to benefit from the software houses' customer base, and to gain experience with the PC channel.

Other bankers, however, viewed the big software houses as potentially dangerous competitors, not as partners (Randle, 1995; Radigan, 1995). They argued that the technology companies control the context of PC banking, and customers acquired through them have greater allegiance to the software than to the bank. Customers will therefore be inclined to rate-hop, accelerating the trend to commoditisation of financial services. The fees charged the banks by the technology firms for processing are confidential, but were estimated to be $5-7 a month per account, resulting in significant revenues to ISC. Consequently, a number of banks entered

alternative partnerships which gave them more control; these are summarised below.

Microsoft and Intuit have meanwhile modified their offerings in order to accommodate the banks' concerns with regard to the branding and processing issues. In 1996 they signed up a number of third-party processors in order to give banks a choice, and in September, Intuit sold ISC to CheckFree, an independent company. Microsoft offered banks Open Financial Connectivity and Intuit Open Exchange, and Intuit offered free to banks an easy-to-use, bank-branded home banking service, *BankNow*. 37 banks were offering their customers *Quicken* by October 1996.

Alternative alliances

Online service providers

An alternative route for banks is partnership with an online service, with the advantages of greater security than the Internet and a choice of their own back-end processor. However, subscription to an on-line service also represents an additional obstacle and expense to the customer, and banks still do not control the context in which they appear. In Britain, TSB Bank introduced the first online, real time PC home banking service in May 1996, in partnership with CompuServe. Relatively few US banks have offered electronic banking through on-line services.

The Internet

Some 285 US banks were on the World Wide Web in 1996, and 31% of banks surveyed by Business Research Group had established Web sites (*American Banker,* 3/7/96). Booz-Allen and Hamilton found that 154 European banks had sites on the Web, with the rate of increase nearly 90% a year. In February 1997, 18 UK and Irish banks had Web sites, as well as 13 UK building societies. Relatively few were as yet using their Web sites for interactive banking; the vast majority are used for promotion and response only. The cost of entry is low; most European banks reported spending less than £16,000 ($25,000) to set up their sites, and the same amount again to run them (*Financial Times* 12/8/96). 52% of the American banks said their initial investment was below $5000 and three-quarters spent less than $20,000. The Web is therefore widely seen as levelling the playing field between large and small banks.

The Royal Bank of Scotland announced the first UK Internet banking service, Direct Banking PC, to be available from spring 1997. Microsoft developed most of the software, and the customer has to use Windows 95 or NT and Internet Explorer. Perks available to customers include an additional 30 days free access to Microsoft Network, and a discount on *Money 97*. However, financial data can also be exported to *Quicken*. RBS use their Web site to provide very full details.

Security First Network Bank

Security First Network Bank was launched in October 1995 as the first bank to be set up specifically for the Internet. Its parent was a bank holding company in Kentucky, and its software was developed by Five Paces Software, an off-shoot of a company which provides security for the US Defense Department. By July 1996, SFNB had something under 5000 accounts, and was receiving 80-90 new applications a day. The real significance of SFNB however, is as a test bed and customer demonstration site for the software, which is being sold to other institutions. Five Paces sees itself as the bank-friendly alternative to Microsoft and Intuit, providing banks 'with a turnkey solution from soup to nuts'. They claim their *Virtual Bank Manager* product enables a bank to open shop on the Internet in three months or less for $25,000.

UK banks have used a variety of approaches to PC banking. The Bank of Scotland launched its latest HOBS system based on Windows in March 1996, which seems to be more popular with customers. Barclays Bank, which has been experimenting with the whole range of remote distribution technology, launched PC home banking in February 1996, using Windows software which was developed by the bank 'in order to be able to control the look and feel of the product', but with an interface into *Quicken* and *Money* for those who wanted it. Barclays' system has sophisticated security features developed with Visa Interactive, which Visa plans to market to other banks (*Banking Technology*, 2/96).It was being piloted with 2500 existing customers and was to be launched officially in the last quarter of 1996. Subsequently, Barclays was the first UK bank to arrive at an agreement with Microsoft to provide PC banking through *Money* from early 1997.

The Meca consortium

The Meca consortium is a group of US banks which bought a software house so that they could offer PC banking independently of Microsoft and Intuit. Meca Software's personal finance management product, *Managing Your Money*, had 600,000 customers. As of autumn 1996 BankAmerica Corp. and NationsBank had begun offering PC banking services based on *Managing Your Money*; the Fleet Bank began in early 1997.

Integrion

Integrion, a consortium of 15 North American banks and IBM, began offering home banking services over the IBM Global Network at the end of 1996. Together the banks have approximately half the household accounts in the US and Canada. This too is represented as an explicit challenge to Microsoft and Intuit, promising banks a high degree of control, flexibility in processing options, and bank-branded software (*Financial Times*, 15/10/96) 'We are trying to hold on to our customers,' the president of the fourth largest bank in the US is quoted as

saying 'The real battle is for control of the electronic transactions infrastructure. Microsoft says they want to control that. If Microsoft controls it, that makes commodities out of all banks' (*Financial Times*, 18/9/96).

Summary

PC banking illustrates very well some aspects of the process of translation. The interests which financial institutions already had in home banking made them ready recruits to PC banking. Consumers became available as they purchased PCs for home use and gained access to the Internet. Microsoft and Intuit, separately and together, attempted to enrol banks and consumers to their particular translation, one which makes the user interface software, which they control, central. They put together all the pieces of a PC banking channel so that they could offer a ready-made solution which banks and consumers could just sign up for. Some banks have done just that, but others fled into competitive alliances. Microsoft and Intuit responded by modifying their offerings to make them more attractive to banks, to enrol them in their vision of the future of PC banking.

This network which has yet to stabilise. It is not apparent which, if any, of the competing alliances and configurations will emerge as the new 'design paradigm'. The consumer response is as yet uncertain. Each new offer by a bank seems to be met in its early days with a rush of applications, followed by slow growth and levelling off as the pool of enthusiasts is absorbed. Finally, PC banking may not stabilise before it is superseded by another version of home banking, possibly via interactive TV.

5 INTERACTIVE TV

PC banking is being problematised while still under construction. Sceptics point out that for the average consumer, PCs are still expensive, hard to use, quickly obsolete and probably provide more facilities than most people want anyway (*Business Week*, 19/8/96). Ordinary telephone lines are inadequate for the increasing volume of Internet traffic, and ISDN lines are beyond the reach of most (*Business Week*, 26/8/96). Digitisation is rapidly leading to the convergence of telephone and TV with computing. There is a gathering belief that the vehicle for home banking to the mass market in the longer term will be interactive TV in some form, as part of a package including information, news, communications, entertainment, and online shopping. The technology is available (Perry, 1996); the problem is putting together the right business package. Profits are potentially enormous, but depend on whether consumers and advertisers are willing to pay enough to cover the huge costs of providing such services. The project demands cross-sectoral collaboration both to make it attractive to consumers and to provide the necessary resources. We briefly survey recent activity here.

At least 81 trials of interactive television services in homes are planned or underway throughout the world (Price Waterhouse, 1996). The purpose of these trials is to assess what services people want, how much they'll use them, and how much they're willing to pay for them. (*Marketing* 6/6/96). As the results are usually confidential, it is difficult to say just how successful they have been, but observers are always less enthusiastic than the companies are openly.

The Orlando and Cambridge trials offered interactive digital television via cable Time Warner launched the Orlando experiment in 1995 with a dozen partners. Customers in 50 households in Florida have been offered services including music, telephone, data transmission, a shopping mall, a pay-per-view video service, and ability to play video games with other households involved in the trials. In December 1995, a banking service with Barnett Banks was added. Time Warner is rolling out the system tested in Orlando across the US, upgrading its networks in 37 states at a cost of more than $5 billion. The National Westminster Bank engaged in a joint venture with a local cable television network, Cambridge Cable, ATM Ltd. and Fujitsu ICL, to trial interactive television home shopping and banking in 250 homes in Cambridge, England, in 1995.

For banks and other financial institutions, online banking without the PC seems neatly to sidestep Microsoft. They therefore quickly expressed an interest in the network computer as a potential vehicle (*Banking Technology*, May 1996). The NC is being targeted at large companies, but Oracle, Sun Microsystems and Acorn also see the NC as a cheap, user-friendly information appliance for the home. Because the software resides on the network, customers would not have to buy or install remote-banking software, it would be available on request and the bank could update it as often as it wanted to (*ABA Banking Journal*, March 1996).

Cable is not the only means of delivery. British Telecom was conducting interactive TV trials using ordinary phone lines in 2,500 homes in Colchester and Ipswich until July 1996. NatWest Bank was also involved in this pilot. Announcements in the past year of plans to deliver digital television by satellite and terrestrial transmitters will accelerate the pace. BSkyB announced that it planned to offer up to 200 channels of digital satellite television in the UK by the end of 1997, increasing to a total of 500 channels within a couple of years. BSkyB needs partners, both to make the service more attractive by offering a wider range of services including Internet access, home banking and home shopping, and to subsidise the set-top digital decoders so that they can be sold at £200-300, or around half cost price. To this end, BSkyB has been involved in detailed discussions with BT for most of the year. The set-top boxes would have sockets connecting TV sets to phone lines as well as BSkyB, the computing power of a PC and the fastest modem that can be used with conventional phone lines. BSkyB has also been seeking other partners such as banks and retailers. Negotiations with

Barclays Bank broke down in November, whereupon BSkyB began talks with Hong Kong and Shanghai Banking Corporation. Meanwhile, BT is in discussions with the BBC regarding providing interactivity on digital terrestrial television.

Summary
A number of banks see interactive TV as the mass market alternative to the PC for delivering home banking and other financial services . Since no single organisation can deliver the service, financial institutions have entered into partnerships with cable companies and retailers to test the consumer response, and are currently involved in negotiations with companies planning to introduce digital TV by satellite and terrestrial channels. Each of these channels is in competition with the others, and within each there are competing consortia seeking to enrol partners and eventually consumers to their particular configuration.

6 SUMMARY AND CONCLUSIONS

'Home banking' is one element in a vision of a society transformed by IT and the virtualisation of economic relationships. A generalised consumer demand for convenience and service at low prices, combined with the interest of banks and other financial institutions in reducing their expensive physical networks, provide the conditions of possibility for the emergence of new means of delivering financial services to the home. A number of possible routes exist, each one in itself a network comprised of different combinations of actors. The three we have chosen to examine represent different degrees of complexity, are in different stages of evolution, and illustrate different features of network construction.

Telephone banking is the simplest of the three, requires the least inter-organisational cooperation, and is the most mature. It relies upon a technology already widely diffused and well understood by consumers. We have used it to illustrate how the density of relationships grows as a network stabilises.

PC banking is a more complex innovation, depending on the diffusion among consumers of expensive and time-consuming goods. While some banks have developed their own PC banking systems, take-up of these has been very limited. The growth of the Internet and the efforts of Microsoft and Intuit to enrol banks in their networks in 1995 gave PC banking a major push - either in partnership with, or in counter-alliance against, the software houses. Banks have entered partnerships with different kinds of organisations which have an expertise they lack in this area, such as software design, security, and online service provision. We have used PC banking to illustrate the process by which actors seek to interest, enrol and mobilise others in a translation which makes themselves the 'obligatory point of passage'. The example also shows how actors evade a particular translation which does not suit them and set up on their own.

Interactive television as a medium is still under development, but is already seen by communications and financial services companies as a vehicle for home banking among other services. It is especially interesting because of the size and complexity of the undertaking, which requires the cooperation and enlistment of a large group of very big players even to get off the ground. Mega-alliances are being formed in a global race to deliver the service; the stakes are very high, and even large retail banks come to look like junior partners.

In this paper we have used actor-network theory as a framework to describe a very broad range of phenomena we have grouped under the heading of 'home banking', a project which is not without difficulties. Any one configuration of any one channel could be viewed as a techno-economic network in its own right, and worthy of having the process of translation described in detail. We have chosen instead to discuss several concurrent developments in a broad-brush approach. The disadvantage is loss of detail and possibly persuasiveness; the advantage is the ability to compare the development of one network with its competitors. This also reflects the position of the providers currently, having to make strategic choices regarding which channels to back, and which partnerships to enter.

Our aim here has not been to critique diffusion theory, but to demonstrate the power of an alternative approach. Some ideas from diffusion theory provide insights into certain aspects of the process, for example consumers' adoption of PC banking. Further, the development of telephone banking in the UK can be understood as a simple process of diffusion, since a couple of innovators were copied by others hoping to gain a similar advantage, until it became just another condition for being in the business. However, it can also be described as a network.

PC banking however, and even more interactive TV, are systemic innovations with large network dependencies. There is a problem of adoption by consumers, as well as by providers. Although there is certainly a fashion element in PC banking, financial institutions are also being recruited to the innovation by powerful partners who are attempting to define. the network of relationships they want to achieve and ensure their own indispensability to it. In all this, the consumers, for whose benefit these vast technological and organisational apparatuses are called into being, seem rather like the scallops in Callon's well- known study (1986). What are their intrinsic properties ('Needs')? Will they attach themselves to the net in sufficient numbers to be harvested profitably? They remain silent. They are sampled by means of surveys and pilots, but no one really knows what the mass of them will do until the whole complex network is in place.

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8 BIOGRAPHY

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