KEYNOTE ADDRESS: THE NETWORKED BANK

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The financial services industry is moving rapidly into the information age, to which many refer as the networked economy. This economy represents the integration of people and institutions obtaining information, transacting business, and entertaining and educating themselves in a connected world, with electronic networks as the underlying backbone. This electronic backbone supports many interfaces including bank branches, ATMs, noncash kiosks, trading desks, stock exchanges, call centers, remote personal computers, and smart card connections.

The growth rate of the networked economy is explosive. Morgan Stanley forecasts that the number of network users for e-mail, interactive web use, and on-line services will grow from 52 million worldwide in 1995 to over 380 million in the year 2000. They also report that Internet hosts are multiplying at a rate of over 100 percent per year, with nearly 10 million hosts or servers connected in 1996. And, although about half of the Internet activity now is located in the United States, growth rates are high around the world—and the highest in emerging economies such as Eastern Europe, Africa, and the Middle East.

Electronic channels are becoming the standard for all types of transactions, from making airline reservations to checking account balances and paying bills. IBM's *Beyond Computing* publication reports that 55 percent of corporate and information technology executives believe that Internet-related technologies will have the single largest impact on their business of all technology issues in 1996.

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Within five to seven years, you will be able to make any financial transaction over the Internet, in a secure environment. Networks will be pervasive, and everyone will have access to them. In your wallet you will carry a smart card that has the power of a PC. The challenge for every financial institution is to figure out what to do with that power, because it is going to be everywhere. My purpose tonight is to describe my vision of how technology will transform the financial services industry in this networked world—creating the "networked bank." I will begin with a description of the networked bank and an overview of the key technologies that support the networked banking environment. I will then offer strategies for how banks might respond in this new competitive landscape. I will conclude with a summary of the issues that affect the networked bank and may be worth consideration by the Federal Reserve System.

The Networked Bank

Changes in technology and in consumer behavior have allowed electronic channels and interactive financial services to become a reality. This on-line, electronic banking scenario is defined as the networked bank. Everything in this environment is networked: The customers are connected to the bank and to each other through branches and electronic channels; the bank is networked to other financial and technology product and service providers through alliances and special relationships; the employees of the bank are networked through cross-functional processes and modular teams.

The networked bank can be described further by its three major components. The first and most visible component of the networked bank comprises its *access channels*. Access channels include tellers, ATMs, telephones, screen phones, and PCs, which enter the banks' systems via branches, the ATM network, call centers, and on-line direct banking services. In the past, a bank would have managed its branch and ATM networks as a group of distribution channels and controlled the availability of the bank's products and services. In the networked bank, control of the channels is in the hands of the consumer and of the channel provider, and the channel provider is as likely to be a third party, such as an on-line service provider, as it is to be the financial institution. With the proliferation of electronic channels, consumers will determine when, where, and how they will access their financial services.

The second component of the networked bank is the bank's *customer information and relationship management system*. This system is the bank's data warehouse of customer relationships, product information, and related tools and analytics. For example, the networked bank collects customer preferences and profitability information on a transaction-by-transaction basis, and then uses this information to create new products

and to market them selectively to targeted customer segments. The data provide the bank with the capability to offer new value-added services proactively to its customers and thereby to increase its ability to enhance customer relationships and retention. Modeling tools allow the networked bank to understand its most profitable customer segments by product and by access channel. Effective use of this customer relationship information becomes the bank's most valued asset and source of competitive advantage.

The third component of the networked bank is the *core back-office system.* The core banking system represents the bank's operational systems, support for retail and commercial banking functions, systems for subsidiaries or acquisitions, and, perhaps most important, links into other content-providers' systems. The networked bank has the ability to offer a wide variety of products and services, some of which may actually be provided by other firms. For example, a networked bank may ally itself with insurance firms, brokerage firms, travel agents, and retailers to offer a rich mix of financial and nonfinancial services. Therefore, a critical competence of the networked bank is in developing the ability and cultural attributes required to work in a network of alliances.

TECHNOLOGIES

Five major technologies empower the networked bank: human-centric technologies, networks, scalable processors, intelligent agents, and new tools such as object-oriented programming and data mining. IBM Research has forecasted the development of these technologies out over the next 10 years, and it is therefore possible to anticipate some of the challenges and opportunities that these technologies will bring to the networked bank environment.

Human-centric technologies are those that allow people to use computers and related digital technology more easily. In IBM's view, the next 10 years will yield significant breakthroughs that will make computers much more natural, navigational, and easier to use—so much so that virtually everyone will become a user. Many are convinced that within the next five to seven years you are going to be able to talk to your computer. It is not going to reason with you, but you are going to be able to give it commands. The key aspects of these breakthroughs lie in speech recognition, including natural language support so that the computer can understand a normal human voice and vocabulary; 3D graphics and animation for high-quality, realistic images; thin screens that allow the computer to be carried in your pocket or mounted on your living room wall; simultaneous speech translation capability; and pen device support, with handwriting recognition and touch screens. You are not going to have to deal with typing and all the mouse keys that we have today. You

will be in command of your computer, and many people who are not users today will become users.

The new human-centric technologies provide financial institutions with the opportunity to enhance their products, improve service levels, and enter new markets. For example, E-Bank in South Africa has launched a highly successful direct banking initiative in which they are providing banking access to the previously unbanked population. E-Bank is doing this through high-function, self-service machines that read a customer's digital image off a smart card and validate his identity with his fingerprint on the ATM for positive authentication.

Network infrastructure and management technologies will also have a profound impact on financial institutions. These technologies support the electronic backbone that provides local, regional, and global connectivity for institutions, corporations, governments, and individuals. In the next decade these technologies not only will drop rapidly in price but also will increase in capability, as broader bandwidth allows the delivery of data, voice, and video images to the desktop. The network infrastructure technologies for personal and local area networks may use wireless transmission such as infrared or radio frequencies for convenience and flexibility in the office or at home, while high-speed commercial networks will use advanced transmission technologies such as asynchronous transfer mode (ATM), which allows simultaneous transmission of data, voice, and images. We are going to deliver full motion video, multimedia voice data to you, to the desktop. Everyone tells me we will never do financial planning at home. But what if, as I do my calculations, I push a button and my banker comes up? He can see the same screen I see, and we have a conversation, then I go back to my model. That is the kind of capability you are going to have, and that is a planning horizon that is real to bankers today.

Network management technologies include the communication servers that route message traffic and perform security roles such as screening for authorized users and transaction access; data and network management systems, which monitor and ensure performance, reliability, and connectivity across internal (intranets) and external sites; and encryption techniques ranging from hardware encoding to public and private keys. One of the major implications of network technologies is that they effectively eliminate national or geographic boundaries by creating a globally connected environment. Networks allow banks—and other players—to extend their reach and establish an electronic presence anywhere in the world, with minimal incremental overhead.

The third relevant technology for the networked bank is *scalable processing capability.* Scalable processing takes advantage of the steep price performance curve on which the chip technology rides. A 1985 Cadillac on the same technology curve would create a 1995 model with some interesting characteristics—it would have a top speed of 230 mph, it

would get 2100 miles on a tank of gas, and it would cost $42; the only drawbacks would be that it would weigh 34 pounds and it would be only four feet long.

Examples of scalable processing include smart cards, which can have PC processing and storage capability and can be used for everything ranging from a stored-value electronic purse to multi-function support for all types of financial, medical, and government entitlement systems; radio-frequency identification tags, which allow proactive communications for applications such as inventory control and positive identification; and low-cost PCs or "thin clients" on the network, which reduce the overall electronic access costs to the user and allow better control of application software through the network. At the high end, scalable processing also allows the financial institution to manipulate huge quantities of data for analysis, whether calculating derivatives or data mining for customer marketing campaigns. If I can take a customer data base and combine it with transaction processing capabilities so that I really know what's going on with the customer, I can increase the response in a direct mail campaign from 1 to 2 percent to 4 to 5 percent. Do you have any idea of the economic difference for Land's End, say, or for a financial institution? The economics are staggering, but so are the issues of privacy, of customer "ownership," and of who has the most information.

Scalable processing facilitates all types of new transactions for the networked bank. Smart cards enable us to have new financial instruments and transactions, including e-cash, e-checks, e-credit, e-debit, e-travelers checks, and e-coupons. Network-based applications allow a bank to manage its software centrally and to download functions to consumers as needed, rather than forcing it to maintain thousands of individual copies of software distributed throughout the customer base.

The fourth group of technologies are *intelligent agents*. An intelligent agent is software that does what it is commanded to do—"Go out and find me a low-cost car loan with these payment terms." It consists of rules-based processing, where the agent can follow user-specified rules as well as "learn" from transaction patterns. An intelligent agent can seek, filter, and prioritize information into relevant and customized forms, in a proactive manner. It can perform transactions on the individual's behalf, such as automatically investigating new mortgage options when interest rates change by two points.You are going to be able to sit at home with your intelligent agent and it will go into the electronic network, with millions of servers out there, and screen and prioritize information and bring it back to you. However, the other side of this scenario is that such agents can also cause the increased commoditization of products. In response, a networked bank can develop intelligent agents that act to reintegrate commoditized products and thereby protect the bank's brand while creating value for the consumer.

The final group of technologies for the networked bank are *new tools and techniques for managing data and information,* such as object-oriented programming and data mining. Object-oriented programming has been around for quite some time, although it is finally becoming prevalent with advanced visual development tools and the ability to re-use objects. Object-oriented programming permits faster development cycles and improved time-to-market for new applications.

Data mining is relatively new to the financial services industry, although it has been exploited by retail and mail order companies for micro-market segmentation and targeted marketing campaigns. The data-mining tools and models provide the ability to analyze customer and transaction data and more quickly identify potential new areas of business. However, data mining also exacerbates one of the most pressing societal concerns about the networked economy—that of personal privacy. Thus, the networked bank must manage the privacy of its customers' personal and financial information while effectively mining that information for cross-marketing purposes. The bank has to be careful not to overstep its role of "trusted advisor" and thereby endanger its fiduciary responsibility to the consumer.

Overall Impact—The Five Rules

All of these technologies will affect financial institutions' internal operations and cause a dramatic change in the overall competitive landscape. The networked economy brings exciting new growth opportunities as well as significant threats to the banks.

For example, in the networked economy scenario, it is easy to visualize a full-function, video, on-line service provider that comes into every consumer's home through a high-speed communications network, such as the cable television network. The consumer turns on his "PC-TV" and is confronted with 500 channels from which to choose. The channels include many things: traditional television stations, pay-per-view movies, shopping at the local on-line mall, arts and entertainment, electronic mail and chat groups with other consumers, and even financial services such as electronic bill payment or investment management. Probably at least a dozen financial services channels are being offered, all with close to the same set of products and services.

The issue for the bank is how to differentiate itself in this environment. If the channel is owned and controlled by a third party, it will be very hard for the bank to promote its brand and catch the consumer's attention with unique value-added services. The solution is for the bank to change its strategy and determine how to optimize its presence—and profitability—across all its channels. The bank must adapt to the new rules of competing created by the networked economy.

(1) *Electronic value chains will be established.* Banks will have to form

alliances with other content providers, technology vendors, network infrastructure providers, on-line service providers, and access channel providers, and with their customers. The new electronic value chains will have to match or even exceed the functions of today's physical environment. For example, for e-cash to become an accepted financial instrument, banks will have to establish linkages with each other and with retailers, doctors, post offices, telephone companies—wherever people may want to do an e-cash transaction. The linkages may even extend across state and national boundaries, as in support of travelers check and currency-exchange functions. Standards, security issues, and settlement rules will have to be defined and agreed to by all the parties involved in the electronic value chain.

(2) *Power will shift to the channels and to consumers.* As the consumer becomes more technologically sophisticated and accustomed to accessing on-line services, she will determine which channels to use to access her desired financial services, at her convenience. Banks must provide services on those channels or they risk being invisible to the consumer. The consumer will choose the products, services, and channels she wants, from whichever provider best meets her requirements, with little or no loyalty to a particular financial institution.

(3) *Value chains will disaggregate.* Today, a bank has an integrated operation, with infrastructure (the branch), content (the bank's product), and context (a teller, or the advice you get at the bank). The networked bank must manage its products and brand across a variety of channels. This means that the bank has to understand its product costs and profitability by customer segment and by channel, and be able to provide the right mix of products with the appropriate financial performance. The executional infrastructure may or may not belong to the bank, depending on cost considerations. In addition, the bank must learn how to differentiate its brand when its products are just menu items on a screen. The bank will compete based on the value of its context, the complete value proposition that it offers its customers, not just its individual products.

(4) *Assets will be revalued.* The networked bank's most important asset will shift from being its physical presence—its branches—to its customer information and how it uses that information to create knowledge-based assets. The bank must use the new data-mining tools and electronic transactions effectively to manage its business and to enhance customer relationships.

(5) *New cultures will emerge.* Finally, the networked bank competes with a host of new players with very different business strategies, cost structures, and cultures. The bank has to change its own culture in order to become the type of entrepreneurial and flexible organization required to compete in the on-line, electronic world. The networked bank needs staff with new skills, ranging from Internet Web masters to network security specialists. The bank will also have to learn to operate in an

environment where it does not control all the components, and it must move from a physical, hierarchical organization to a networked, modular organization.

Bank Responses and Strategies

A bank can choose among several strategies in order to compete as a networked bank. One response is to adopt *a customer-centric strategy.* This strategy is based on the ability to leverage the bank's customer data in order to serve each customer with a unique interactive relationship and provide contextual value. The value is created by customizable products and services proactively offered to meet the customer's requirements, which the bank understands from its data-mining and intelligent-agent tools. In the customer-centric strategy, the bank focuses on building a strong interactive relationship with each customer. The bank builds knowledge into its products so that the products are more specific to, and interactive with, each customer. For example, a knowledgeable loan product not only will offer the customer the ability to do "what if" analysis on the type of loan he can afford, but also will custom-build that specific loan for the consumer, based on his criteria. Another attribute of a customer-centric strategy is the development of co-evolved customers. Co-evolution implies that the bank teaches as well as learns from the customer in developing new products and services. This interaction increases the potential for customer intimacy and retention.

A second response for the networked bank is to compete based on *a life-event strategy.* This strategy allows the bank to become the leading provider of integrated products and services for specific life events, such as buying a house, sending children to college, or planning for retirement. In this scenario, the bank groups its products around the particular event and offers an integrated suite of products and services.

Establishing the electronic value chain is critically important to enabling the bank to offer this comprehensive set of products. For example, a retirement planning suite may include a range of products —pensions, trusts, short- and long-term investments; legal services, such as estate planning; financial advice ranging from investment choices to tax considerations; and even related services in areas of health care, retirement care facilities, and travel. The bank becomes the one-stop-shopping source for everything to do with retirement and can provide significant value-added by bundling all these disparate products in a way that is convenient and easy for its customers to use.

Still another aspect of the life-event strategy is the building of communities of like-minded customers. This can be done through affinity products, such as sponsoring a credit/debit card for a local sports team. It can also be done by extending the bank's network to allow its customers to talk to each other. The challenge for the bank is to stay at

the forefront in anticipating its customers' requirements and providing world-class proposals for the specific life events. The risk is that much of the product content will move away from the bank—for example, move from financial products to health-care planning, in the retirement scenario—and leave the bank in the position of having developed a new market, only to lose it.

A third major response for the networked bank is to compete with *a commodity strategy*. In this case, the bank achieves its competitive advantage by providing its products across a wide range of channels at the lowest cost. The bank would ally itself with other financial institutions and with on-line service providers for establishing the connection to the customer, and focus its efforts on providing the best product in a particular area, such as mortgages or auto loans.

The commodity bank must be very good at managing its costs, creating innovative products, and establishing a strong group of partnerships. The challenge is to maintain the best product at the lowest cost; otherwise, the bank has a high risk of being disintermediated by other competitors. The bank also has to determine how, or if, it keeps its brand visible in this strategy. The commodity bank may find it advantageous to co-brand or even private-label its product, in order to assure the broadest distribution via other financial institutions.

The Challenges of Risk

One major challenge that we have not thought enough about in the industry is the set of electronic risks that we are going to be faced with every day. Regulators at this conference understand the technological aspects of high-value payments risk thoroughly, and we cannot contribute much there. The problem in the low-value, high-volume payment world is not the risk of any individual transaction going awry, but of the fraud that happens out there.

With the pervasiveness of the Internet and the interconnections of the electronic environment, some people are going to misrepresent themselves and some are going to attack your systems. They are the hackers, who would like to get into Citibank's system just to tell all their friends at the Cyberspace Cafe that they did it. They are the pranksters who want to change the picture on your home page. They are what we call frackers, who steal telephone numbers. (About 10 percent of cellular phone industry transactions go to these thieves, who do not pay for the calls. The nice part is that the cost of a marginal phone call is not too much. Can you imagine what the marginal cost would be in the basic banking industry?) Another group we are increasingly worried about are the Internet vigilantes, who have a point of view about something and want to attack you for not agreeing with them, by attacking your system.

Finally, there are the outright criminals and organized crime groups. I have bank clients whose firewalls are attacked constantly.

The risk that we are all going to have to manage involves all the things that these people are going to do. They are going to eliminate files, they are going to insert viruses, they are going to do spoofing. They are going to imitate others. (One of the things they do is get into an e-mail system and pretend to be the CEO, and send out a lot of messages to people in the company, positive or negative.) We are going to build firewalls, and we are going to have to build increasing controls, because this area of security is going to be really important. Yet banks are going to have to do this in an environment where they must also make it easy to deal with their systems, not just for the customers but for their partners in the electronic world.

Some areas in the security world worry me on a more basic level. In a pervasive electronic environment, what if someone could break the operating system on smart cards, say? Another question relates to the whole world of electronic cash—not a security issue, but one of great concern to banks. What do banks do, in an environment where you can, from a technological standpoint, move money back and forth without it going through the balance sheet of a bank?

Issues for the Federal Reserve System

Finally, I would like to outline the challenges the networked bank represents for all financial institutions and for the overall regulatory system. The major issues are broader than just banking, although the depository institutions most likely will drive much of the change. The issues can be grouped into three areas dealing with the industry structure, the financial products, and the newly empowered consumers.

I. Industry structure
   - How will the Internet and other on-line services change the industry as they create new competitors, lower the barriers to entry, and remove national borders?
   - What are the risk implications of global electronic financial services?
   - What new businesses can the banks enter? What will be the impact of these new businesses on banks' costs, profitability, and risks?
   - How does the regulatory environment change when banks are competing against other companies offering similar products, but with very different strategies, cultures, and cost structures?
   - How do banks remain viable players in this new competitive environment?

II. Financial products
- How can banks best manage all the new electronic products such as electronic bill payment, e-cash, e-credit, and e-check?
- How are standards (EDI, security, regulatory) determined for these new products?
- What are the real security risks involved, and who is responsible for managing them?
- What new clearing organizations and cash-pooling services will be required for these new products?
- What happens to checks?

III. Consumers
- How will electronic networks change the way in which consumers purchase goods and services?
- How will the consumer be protected when anyone can set up an electronic "bank" and offer bank-like services?
- Who is looking after the consumer's right to privacy?
- How can we ensure equal access and nondiscrimination in the electronic environment?

Banks are about to undertake a series of changes to respond to the electronic world. They will turn to customer-centered strategies, life-events strategies, and others like those I have already described. Make no mistake, the electronic world is going to change the face of the financial world dramatically.