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Cybercommunications on
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by Ravi Kalakota

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The Impact of Cybercommunications on Traditional Financial Services

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Abstract:

This paper presents a framework that provides a conceptual understanding of electronic commerce-based financial services. The paper then discusses some of the research issues that need to be addressed in this emerging area. Systematic research on online financial services is virtually non-existent. Most of the early work consists of anecdotal evidence from individual companies, usually in the form of trade journal articles which have no empirical basis. Clearly there is a need for industry-academia collaboration to understand the online financial services area better. There is also a need to develop methods and tools for measuring the effectiveness of these services. Traditional effectiveness measuring methods will be of limited use in cyberspace as banks enter an era in which financial products are treated as information commodities and banks are in competition with non-banks to serve customers with the best bundle of information.

Introduction

The financial services business has become intensely competitive with a blurring of delineation between banks and non-bank competitors [AS95]. The challenge facing the financial services industry is whether management has the creativity and vision to harness the emerging electronic commerce technology and provide customers with new financial products backed up with efficient business processes that satisfy consumers continually changing financial needs.

Every decade, the financial services industry seems to endure a wrenching change in its underlying business model. This decade has not been an exception to the trend. The financial services industry (and in particular banking) is currently undergoing structural changes that are often not apparent to industry outsiders. Banks and other financial institutions are undertaking a fundamental review of their cost and profit structures. This reassessment is driven by five factors: (1) emergence of powerful non-bank competitors; (2) rapid deregulation of many parts of the finance, foreign exchange and capital markets; (3) a greater emphasis on more nontraditional delivery systems; (4) lowering the cost of delivery, while increasing its convenience to the customer; (5) better leverage of electronic commerce technological innovations to their own strategic advantage [KALA96].

Of the five factors mentioned above, cost control in the short-term is seen as a crucial determinant of future survival. Many banks feel that in order to be profitable they need to reduce operating expenses. This train of thought is evident in the many

mergers and acquisitions occurring in the banking industry and also the increasingly push of the electronic service delivery channels. Financial institutions are all without exception searching for answers to the same question: How to reduce operating costs and still provide satisfactory customer service. One consistent answer seems to be emerging: Invest in forward-looking technology to augment the branch delivery network and improve overall operating efficiency.

In the last decade, such investments in technology have resulted in customer conveniences such as online banking, ubiquitous ATM networks, and interactive voice response system which provides customers with 24-hour-a-day, seven-day-a-week access to their accounts. New technology investment is being made at historically high levels. It is projected that banks will spend close to 20 billion dollars on technology in 1996 [EL95]. In fact, technology investment and activity remained vibrant and alive in a business environment otherwise marked by downsizing and harsh cost cutting.

Where is all this technology investment going? Financial institutions are resolutely rebuilding their technological infrastructures as the foundation of a strategy--compete on the basis of better customer service. These efforts have come despite intense pressure to downsize operations and manage costs. In the past, process and product innovation would have been sacrificed in favor of cost containment. Business strategies today are targeting the consumer and the need to provide a bundle of services specifically tailored to the customer. This implies a movement away from the traditional emphasis on products to a focus on processes and workflows.

The technology investment trend and process focus in the financial services industry has uncanny similarities to the automotive industry of the 1980s. The automobile industry went through a period of great turmoil and change. Survival depended on reengineering the complete value chain: design, build, delivery and customer service. The auto industry restructured their entire businesses. New technology was the lever that lifted their businesses to a new plane of competitiveness. They invested heavily even when the business was depressed and Japanese competition appeared to be winning. Likewise, the banks are investing and engineering new value chains: product design, delivery and customer relationships. In evaluating new value chains, many banks have been stumped by two issues: "How can we get customers out of branches without reducing overall customer service, loyalty levels, and the potential to cross-sell?" and "How can we ensure that new online technologies reduce, rather than add to, existing delivery channel costs?" [JM96]

Interestingly, a great deal has been written about the financial services commitment to technology. What is not obvious is the fact that improved customer service has replaced cost reduction as the objective of technology investment [KURT95]. There are a lot of things in the customer service workflow that need improvement. Banks have been focusing on the retail branches - automating those, automating customer access - and forgetting to develop the workflows necessary to support them or integrate them. This is precisely the reason why financial institutions are excited about online banking

and payments. It enables them to develop a software embedded process model that ties customers, intermediaries, and banks together.

In this paper, we will explore the framework that provides a conceptual understanding of electronic commerce-based financial services. We will then explore some of the research issues that need to be addressed in this emerging area. Systematic research on online banking product/services development is virtually non-existent. Most of the early work consists of anecdotal evidence from individual companies, usually in the form of trade journal articles which have no empirical basis. The reports are often superficial and driven by overly optimistic forecasts. Clearly there is a need for industry-academia collaboration to understand the online financial services area better.

An Online Financial Services Framework

To better understand the diverse financial services applications that are developing around cyber-transactions, I have developed a simple framework (see Fig. 1.1) that succinctly captures the infrastructure developments in this area [KALA95]. The framework essentially has six key elements: Network/Transport layer, Multimedia Content/Information layer, Electronic Publishing layer, Security/Authentication layer, Transaction Messaging and Distribution layer, and finally the Financial Services applications layer.

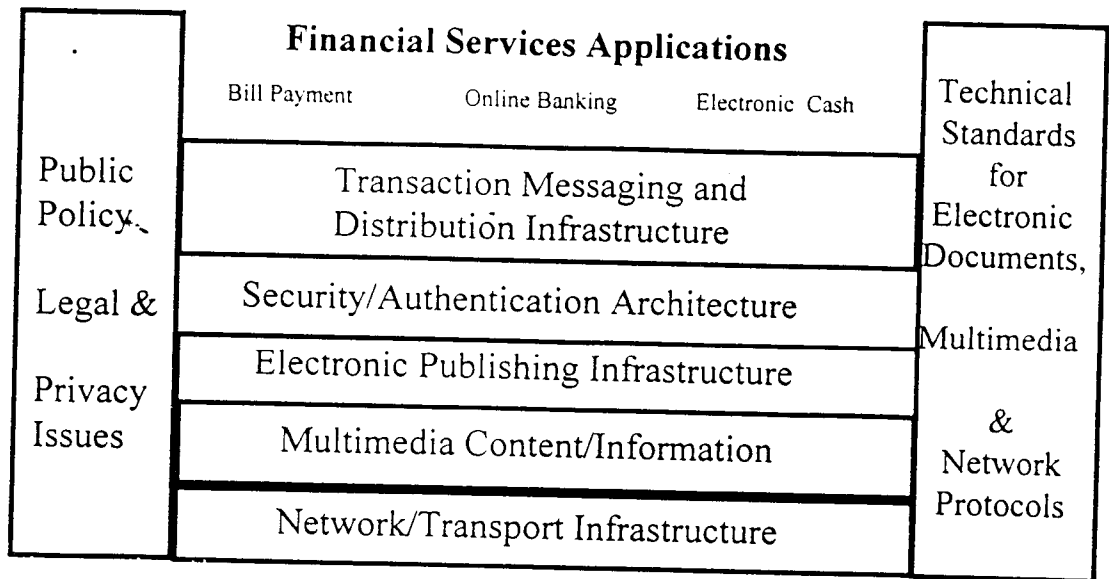


Figure 1 Generic Framework for Financial Services

Network/Transport Layer

The Network/Transport layer has many different types of transport systems and does not function as a monolithic entity; there is no single Interstate highway that connects the digital equivalent of Los Angeles to Miami. Instead, the architecture is a mixture of many forms of high-speed network transport, whether it be land-based telephone, air-based wireless, modem-based PC, or satellite-based. For instance, transaction requests sent from a portable PC in the French Riviera to the Bank of America's computer in Los Angeles might travel across several different types of transport networks interconnected with each other before it reaches its destination.

The players in this industry segment include: telecommunication companies which provide phone lines; cable TV systems which provide coaxial cables and Direct

Broadcast Satellite (DBS) networks; wireless companies which provide mobile radio and satellite networks; and computer networks, including private networks like CompuServe or America Online, and public data networks like the Internet.

Multimedia Content/Information Layer

Today, financial information primarily consists of text and numbers. As we become more sophisticated, it is not infeasible that financial data include pictures, audio, and video. But to really understand how content have evolved in the last three decades it is important to understand the changes that have taken with respect to financial data.

Since the 1960's and 1970's, banks and businesses have had the ability to automate their internal processing of financial data and transactions, using centralized computer systems. Since the 1980's, individuals and small businesses have had the ability to automate their own recordkeeping of financial data and transactions, using local PC software. Today, the cyberspace has brought the two worlds closer and both consumers and institutions would benefit from widely-available and easy-to-use methods for exchanging financial data electronically, making their interactions more convenient, accurate, and efficient.

To date, most solutions for representing and exchanging consumer financial data have been closed (designed for private networks), proprietary (designed for specific institutions) and/or narrowly-focused (designed for a limited range of financial activities). Increased need for customized financial products that are tailored to

consumers has created the opportunity for a more comprehensive approach to the representation of financial data. So, what is the problem? The challenge is to develop a consistent financial data representation scheme that addresses the desire of consumers and financial institutions to engage in a broad array of financial activities--data transfers, inquiries, applications, promotional communications, and transactions. Once financial data is created it may need to address numerous markets, including banking, credit, brokerage, mutual fund, insurance, payroll, accounting, and tax. Most importantly, the next generation data schemes must allow all the participants in financial transactions --individuals, small businesses, financial advisors, merchants, billers, processors, government organizations and financial institutions -- to communicate easily. This is easier said than done.

Electronic Publishing Layer

The Network/Transport layer is the underlying foundation which enables the transmission of content. The on-line system through which content is transmitted is very similar to the off-line world in which different types of products (i.e., content) are stored in distribution centers (i.e., electronic publishing servers) before they are loaded onto various vehicles for transport. In the on-line environment, multimedia content in the form of financial documents and data have to be stored and published. Today, the prevalent architecture that enables electronic publishing is the World Wide Web. The Web allows banks and individuals to develop content in the form of HyperText Markup Language (HTML) and publish it on a Web server. In short, the Web provides a means

to create product information (content) and a means to publish it in a distribution center (network server).

Messaging and information distribution

Once content has been created and stored on a server, vehicles, or messaging and information distribution methods, carry that content across the network. The messaging vehicle is called middleware software that sits between the Web servers and the end-user applications and masks the peculiarities of the environment. Messaging and information distribution also includes translators which interpret and transform data formats.

Messaging vehicles provide ways for communicating non-formatted (unstructured) as well as formatted (structured) data. Unstructured messaging vehicles are fax, electronic mail (E-mail), and form-based systems like Lotus Notes. Structured documents messaging consists of the automated interchange of standardized and approved messages between computer applications via telecommunications lines. Purchase orders, shipping notices, and invoices are examples of structured document messaging.

For the purposes of electronic commerce, existing messaging mechanisms must be extended to incorporate reliable, unalterable message delivery that is not subject to repudiation, to be able to acknowledge and give proof of delivery when required. The challenge in the development of messaging software is to make it work across a variety

of communications devices (PCs, workstations, set-top boxes, and wireless communicators), interfaces (characters, graphics, and virtual reality), and networks (satellites, cable, twisted pair, fiber optics, and wireless).

Security and Authentication Layer

This layer includes different methods for facilitating the secure transfer of transaction. Security is a fundamental requirement in developing applications such as online payment. For instance, in order to enable online payment for information, and ensure its safe delivery, the security infrastructure needs to develop encryption (making contents indecipherable except for intended recipient) and authentication (ensuring that customers are who they say they are) methods which ensure security of contents traveling on the network.

Financial Services Applications Layer

The different types of financial services transactions can be classified into (i) banking, (ii) bill payment, (iii) brokerage-related activity, (iv) retirement and financial planning and (v) corporate accounting.

Banking typically includes banking and insurance related transactions:

- Account Management. Statement and transaction data, balance inquiry, and funds transfer from checking, savings and money market accounts, including year-end summaries and tax notices (1099's).

- Loans and Credit. Online applications for consumer loans, mortgage loans, and small business loans, plus electronic account status and servicing capabilities.
- Insurance. Online applications for home, auto, life, medical, and small business insurance, plus electronic account status and servicing capabilities.

Bill payment includes both payment and presentment functions:

- Bill Payment. Electronic check-writing from any demand deposit account to electronic payees and non-electronic payees (such as individuals).
- Bill Presentment. Electronic delivery of bills and invoices by billers to consumers and small businesses, including receipt certification and promotional inserts.

Brokerage related transactions typically includes:

- Investment Account Data. Statement and transaction data, tax basis, and current quotes for investment securities (stocks, bonds, CD's, mutual funds, and options), including year-end summaries and tax notices (1099's).
- Mutual Fund Data. Online account applications, historical performance data, prospectus download, detailed tax and transaction data, including information on dividend reinvestment pricing.

Retirement/Financial planning transactions include:

- Financial Planning. Detailed data on current and projected financial status, typically to be shared between consumers and their financial advisors or financial institutions.
- 401(k) planning. Tools to assess users future retirement income needs and the impact of various asset allocations on their retirement income. The more sophisticated tools allow the integration of other personal financial components, such as life insurance, credit payments, and college tuition, to provide an complete overview of a participant's complete savings needs.
- Income Taxes. Electronic submission of payroll tax filings and payments to state, federal and international taxing authorities, including acknowledgments.

Corporate accounting related transactions include:

- Expense Reporting. Electronic submission of travel and entertainment expense reports, together with electronic acknowledgments, disallowances and reconciliations.

All of the above applications require some element of data sharing, i.e., standardized data formats to allow consumers to share their personal information and financial data with financial advisors and financial institutions of their choosing, and with their

consent. The development of secure online payment instruments (e.g., digital cash and electronic checks) is also a key requirement that needs to be addressed before sophisticated applications can be built.

In addition to the generic services listed above, electronic commerce will need to accommodate other desirable payment-related services such as currency exchange, cash management, escrow, investment and brokerage, financial information and reporting, and billing and payment.

Other Key Support Layers

Public policy and technical standards are the two support pillars for all financial services applications and infrastructure.

Public policy

Public policy encompasses such issues as regulatory freedom [JPM95], universal access, privacy, and information pricing. Unlike business activities which are governed by the Commercial Code and detailed case histories, electronic commerce currently poses basic policy and legal questions. Information traffic policy issues deal with the cost of accessing information, regulation to protect consumers from fraud and to protect their right to privacy, and the policing of global information traffic to detect information piracy. Again the issues themselves, let alone solutions, are just now evolving and will become increasingly important as more people enter the electronic marketplace.

Technical standards

Technical standards dictate the specifics of information publishing tools, user interfaces, and transport. Standards are essential to ensure compatibility across the entire network. Just as traditional transportation networks such as railroads face difficulties with different track standards in different countries, differing standards in electricity distribution (110 versus 200 volts) and video distribution (Sony BETA versus VHS), limit worldwide use of many products. In the financial services realm, there is a battle being waged over which electronic data interchange (ANSI X.12 versus EDIFACT) standard should be the dominant one.

Final Word on the Framework

While fundamental computing issues are just now being raised and solved, a variety of industries are developing new applications which target both consumers and businesses. Experiments are necessary in order to predict which applications will be successful, but these experiments require an infrastructure. And in order to plan the infrastructure, hard choices have to be made about what might be successful applications. A classic chicken and egg dilemma.

Crucial Research Issues

Electronic commerce coupled with de-regulation [JP95] is changing the model of banking. Banks today are becoming gateways to financial products rather than gatekeepers. In anticipation of impending changes, management is struggling to

understand how to best develop, implement, and deploy the next generation of financial services using various online channels.

The success of the next generation of financial products lies in the integration of four key elements: online payments and networking technology, back-office information infrastructure, business processes and workflows, and consumer interface/behavior issues.

As recently as a few years ago, online financial services primarily meant one thing for most companies: helping customers track their financial past. That's important, but people have many more facets to their financial lives, and they all interrelate. Investment decisions, for example, affect the taxes people pay, and both have an impact on retirement savings. In order to help customers, companies are beginning to think holistically, i.e., provide solutions for all facets. And enable the solutions to interact with each other. When consumers perform tasks in one part of their financial life, they should not have to do it all over again for another part. All the pieces should work together, so the sum will be worth far more than the individual parts.

To accomplish the integrated vision presented above, companies need to think differently. They need to focus on the service process. The service process then can be thought as one that takes customer requests as inputs, applies a production function on the input and generates a satisfactory output. The production function should then really be the focus of attention. In the online world the production function is actually a process that integrates various parties together in the form of a supply chain. I refer to

the existing structure of information flow between parties as Financial Supply Chains and the development or transference of these structures to the electronic commerce forum as Online Financial Supply Chains.

Online Financial Supply Chains is defined as: the process of coordinating activities involving a network of parties that perform the function of procurement of information, transformation of information into intermediate and finished content, and distribution of content to end-customers. This may involve integration of information across several different online intermediaries and databases. Organizational barriers between firms makes coordination of supply chains a top priority for the seamless fulfillment of financial services and to achieve the goals of maximum customer satisfaction (quality) and economic efficiency.

Examining the product development process from a supply chain perspective will require the integration of business processes (e.g., workflows), information (e.g., customer account data), and enabling technology (e.g., payment and transaction processing software). These components must be designed and developed concurrently in a manner that is customized for specific financial products (see Figure 1). The enormous problems associated with melding applications, computers, and networks means that the next generation of financial products must be carefully constructed to optimize over several variables which could impact performance and customer satisfaction.

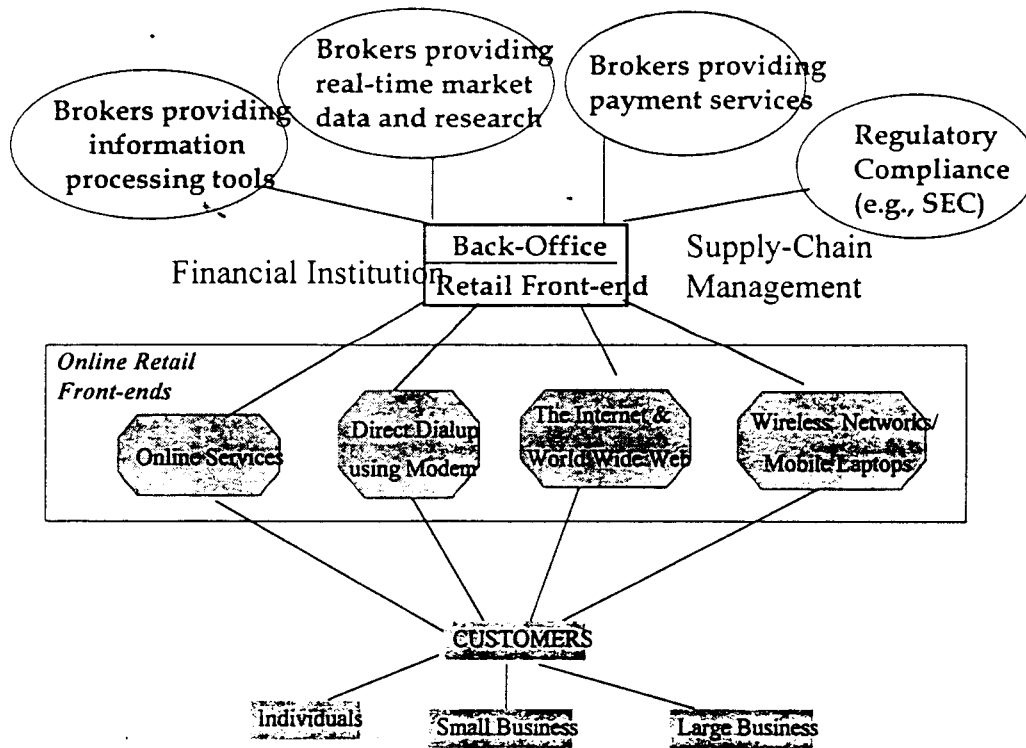


Figure 2: Online Financial Supply Chains

Clearly with the advent of online supply chains, the financial services production process must be re-engineered [DT95]. More specifically, the following questions in specific areas must be addressed:

New Product Development: What kinds of new products are made possible by technology? What does the consumer want? What new product development strategies are currently being pursued in the financial services sector? Are these strategies low-risk product enhancements or high-risk new products? Are these strategies contingent on the customer - individual customer, small business or large business? What are the detailed characteristics of low-risk incremental product enhancements versus the high-risk strategy of introducing completely new products?

Do these characteristics vary depending on intra-industry or inter-industry competition?

Industry and Market Structure: What is the impact of intra-industry (other banks and financial institutions) and inter-industry competition (telco's, automobile, retailers) on product variety and differentiation? The advent of software companies such as Intuit and Microsoft as potential competition creates an entire new set of market dynamics at the retail front-end. What is the impact of this competition? What strategy would minimize the threat? Does the advent of new payment instruments (e.g., Digital Cash, Electronic Cheques, and Encrypted Credit Cards) have any influence on market structure and balance of power? What is the role of payment intermediaries on the Internet? What is the role of financial institutions in the online mercantile process?

Financial Supply Chain Management: Institutions need to understand and debunk the myth that simply creating a Web presence is going to generate revenue. Revenue is generated from providing superior value to the customer in terms of either information content or value-added services. These value added services will be enabled by financial supply chains. The problems associated with financial supply chains brought about by lower transaction costs are fairly new and quite interesting. The challenge is to build an integrated model of various parts of the supply chain and understand how to manage it as a cohesive whole. The questions that arise are: How do management practices and organization structures vary when the distribution channels by which these products are delivered differ? For instance, if online banking is delivered via the

Internet and World Wide Web (WWW), what should the supporting process models be? More specifically, are these variations of management practices and organizational structure influenced by enabling technology, institution size, or type of product?

Support Processes and Back-office System Integration: For every new retail product, back-office services processes need to be designed for operational support. How are these new workflows (e.g., bill payment workflows) designed and standardized? In the case of fully automated retail products, how are the business processes embedded into software? With increasing intermediation in the financial supply chain, process and workflow design cannot be ignored. Ignoring these issues will result in less (or even minimal) return on technology investments.

Online Call Center Design and Management: An increasing number of big banks are committing millions of dollars to convert their dull telephone call center operations into souped-up cross-sales and service centers that can in many ways rival "brick and mortar" branches. Technologically sophisticated banks such as NationsBank, Keycorp, and Barnett have made the restructuring of call centers a priority. But, are these banks simply following the trend set by other banks blindly or are they investing wisely in continuing the buildup of telephone call centers?

Call center investments are not trivial. According to the American Banker (March 25, 1996) the cost of building a telephone call center is around \$3.5 million for technology and facilities and another \$5.5 million for the hiring of 250 to 300 customer service representatives who get paid between \$18,500 - \$24,500. The operational costs are also

quite high. According to the ABA's 1995 Retail Banking Survey Report, it cost the banks an average of 24 cents to handle a telephone inquiry via automated voice response, \$1.82 if a call center representative did the work, and \$2.93 if a representative in a branch answered the call.

There is no longer any question that call centers have evolved from a necessity to become a strategic differentiator for banks; the questions facing bankers are: how can financial institutions make call-centers more effective for a lower cost? How can they get more bang for our technology buck? How can they build online Web-based call centers that leverage off existing investment and complements the telephone call centers? This last question is especially important given the scale of investment and the emergence of complementary channels such as the Internet and the World Wide Web.

User Tracking, Relationship Management, and Performance Measurement: How do companies measure the effectiveness of the online banking investments? How do they track customers as they use multiple products? How do they distinguish between v
What are the operational measures (information privacy, data security, response times, customer service quality, and sales efficiency criteria) that need to be considered in the design of the next generation of online financial products and online financial supply chains? What do customers consider to be important signals of online service quality? How do we know that customers are getting value from an online presence? What are the issues and challenges in developing online customer loyalty and retention?

Summary

It is no secret that the financial services industry is being transformed by various economic forces. These forces are a mix of reduced operating costs, increased competition from non-bank institutions, less restrictive government regulations, new product/service delivery channels (e.g., Internet and the World Wide Web), new payment instruments (e.g., encrypted credit-cards, electronic money, and electronic cheques), and the erosion of product boundaries.

In the 1990s, electronic commerce -- banking over public networks (e.g., Internet) and online services (e.g., America Online) -- has opened the door to a new range of financial products and services. While many financial institutions are considering offering existing products through electronic channels, few firms are addressing the issue of effective or profitable online financial services product development.

This need for product development should be an issue of major concern at financial service companies. However, the above factors in isolation neither provide a theoretical framework for understanding the changes taking place nor a way for management or policy makers to think about the strategic direction to move in.

In this discussion paper, a series of questions are posed that emphasize crucial issues in online financial services. It is necessary to recognize that recent banking innovations have been driven primarily by technology, with help from market forces such as cost pressures and increasing competition. These advances in technology have not always

been accompanied by equally well-designed business processes, accounting practices, financial products, and services. There has been a considerable lag in the development of commercial policies, customer service, consumer protection, and liability statutes all of which are sensitive to the interests of the consumer.

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