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E-finance: status, innovations, resources and future challenges

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# E-finance: status, innovations, resources and future challenges

E-finance

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## Abstract

**Purpose** – This purpose of this paper is to provide an overview of the status of e-finance and discuss related issues and challenges. Provides data about growth of e-finance in the last decade. Introduces advances and innovations in e-finance and challenges facing the financial services and IT industries.

**Design/methodology/approach** – The paper employs the archival method of reviewing related literature (theoretical, applied and empirical) and organizing and presenting the topics to provide an overview of e-finance status.

**Findings** – The major contributions and finding of this paper include all areas of e-finance, application of technology to e-finance, growth of the e-finance in the financial services industry.

**Research limitations/implications** – The paper provides areas of e-finance that face many different challenges and calls for further research in a number of areas related to e-finance technology and the interface of financial services and IT.

**Practical implications** – The paper brings all scattered information and data about e-finance under one umbrella that would make scholars and practitioners aware of advances in e-finance and applications of innovations and new technology to financial services provided.

**Originality/value** – The main value or contribution of this paper is bringing together most of available literature, advances, innovations, application of IT in the financial services industry and showing how organizations could benefit from such innovations. It also provides ideas to scholars for further research in this area.

**Keywords** Communication technologies, Electronic commerce, Financial services

**Paper type** Research paper

## 1. Introduction

Global integration, deregulation, advances in the Internet technologies are dramatically changing the structure and nature of financial services. Internet and related technologies are enabling new financial service providers to compete more effectively for customers.

The technological changes are accelerating financial sector development by lowering the costs, increasing the breadth and quality, and widening access to financial services. It can considerably improve efficiency and decrease the costs of internal business functions such as expense reporting, contract labor management, and time-and-billing procedures.

Allen *et al.* (2002) define e-finance as “the provision of financial services and markets using electronic communication and computation. E-finance activities include all types of financial activities carried out over the cyberspace or other public networks, such as online banking, electronic trading, provision and delivery of various financial products and services such as insurance, mortgage and brokerage”[1].

Andrew Fight (2002) defines e-finance “all which relates to the linking of business, finance, and banking via electronic means, encompassing information gathering,

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processing, retrieval, and transmission of data as well as the transmission, purchase, and selling, of goods and services"[2].

The UNCTAD defines e-finance as "that of financial services delivered through Internet or online. E-finance includes online brokerage, banking, insurance, and other financial services. Internet technologies have now penetrated all aspects of financial services industry, both retail and wholesale, back-office and front office, information and transaction"[3].

E-finance is about web-enabled finance function, which includes all areas of financial services industry. However, if its true benefits are to be realized, e-finance is far more than just adding a web front-end to financial services. It is about changing fundamentally the value proposition of the finance function by redefining its core activities, changing the interaction mechanism between itself and its prime customers, and moving it up the value chain by creating and assisting others in the organization to create better value for shareholders. Technology enablers play key roles in making the transition to e-finance. An e-finance transformation sees finance change its role from transaction processing to true business partnering, with far reaching implications on interactivity with customers, suppliers, and others within the organization[4].

Developments in technology and deregulation are eroding the nature of what has made banks special. On the lending side, e-finance allows non-banks financial institutions and capital markets to reach far more borrowers, including small and medium-size enterprises (SMEs). On the deposit and payments system side, many deposit substitutes (such as stored value cards) are emerging and many non-banks are offering payment accounts.

The purpose and main focus of this paper is to provide:

- an overview of e-finance, its growth, impacts and future prospects in the financial services industry and e-commerce;
- a summary review of the nature of the financial products, services and information that are available to institutions and individuals globally, relevant costs, benefits, and drawbacks;
- an analysis of the advantages/disadvantages of legacy and e-finance, potential areas of growth, consolidation, and the future path of the industry in a rapidly-changing environment;
- a review of technological infrastructure and regulatory advances (or lags) that have enabled (hindered ) the growth of e-finance and e-business;
- a review of the impact of e-finance globally, including its impacts on international trade and investment and on developing economies and unique and extra challenges they face;
- introduce examples of products and services unique to e-finance; and finally,
- identify areas or issues related to e-finance that needs further research and investigation.

## 2. Evolution of e-finance

Electronic finance was not born with the advent of the internet. In fact, it dates back to 1871 when Western Union Corporation introduced distant money transfer for the first time. Western Union introduced the first consumer charge card in 1914 and the first

prepaid card in 1993. In 2006, the company handled 147 million consumer to consumer money transfers and 249 million consumer to business transactions.

Although e-finance has existed for a long time, the internet, the Web, and telecommunication technologies dramatically changed e-commerce and e-finance since the mid-to-late 1990s. Institutions developed new web-based platforms to deliver financial services quickly and efficiently. The trend began with services such as banking, insurance, and trading services and moved to other institutional activity areas including foreign exchange and cash equity trading.

According to Miniwatts Marketing Group, as of November 2007, 1.262 billion or 19 per cent of the world population have access to the internet. North America leads the internet penetration though Asia has the largest number of total internet users (462 million)[5].

The key drivers of the evolution of e-finance include,

- *Technology.* Computer, Internet, and Telecommunications Technologies enabled business to be conducted in a fast, efficient, and secure way.
- *Globalization.* Worldwide liberalization of trade and investment facilitated the phenomenal growth of global business including the internet-based e-business and e-finance.
- *Regulations.* Both deregulations of the finance industry and re-regulations of e-commerce facilitated the growth though in some areas lacking behind technology.
- *Entrepreneurship.* Creativity allowed entrepreneurs, start-ups, and seasoned companies to break “old economy” traditions and deliver business solutions through new, exciting, and often radically different structures.
- *Capital.* Capital provided the financial means to put these technical and human wheels in motion.
- *Competition.* The above factors created a globally fertile and competitive environment and pool of talents to compete for introducing new technologies, concepts, and models.

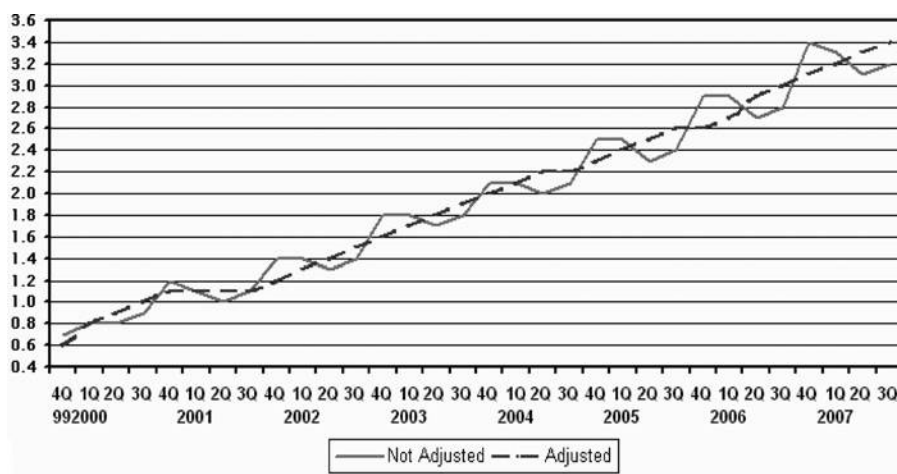
These factors have affected providers, users, regulators, and investors by creating remarkable transformation in financial industry.

The US e-commerce as a percentage of total retails sales increased 566 per cent from 0.6 per cent to 3.4 per cent between 2000 to 2006 (see Figure 1). Forrester Research estimates the online purchases at about 5 per cent of total US retail sales, excluding airline tickets and by 2011, it is expected to account for 9 per cent of sales[6].

### 3. Literature review

Allen and Gale (1997) argue that bank-based financial systems eliminate risk through inter-temporal smoothing. Banks are able to build up reserves in good times and run them down in bad times. Disintermediation prevents this from happening because assets will be marked to the market and the current owners will obtain the full increase in value. The extent to which e-finance leads to this type of disintermediation remains an empirical issue.

**Figure 1.**  
Quarterly US retail sales:  
total and e-commerce  
estimates are based on  
data from monthly retail  
trade survey and  
administrative records



**Source:** US Census Bureau [www.census.gov/mrts/www/data/html/07Q3.html](http://www.census.gov/mrts/www/data/html/07Q3.html)

Woods (1997) in *"E-Money: Financial Management in the Electronic Age,"* explains the security of electronic cash transfers, deposits and payments, and shopping online and who would be responsible in case of identity theft and losses.

Claessens *et al.* (2000) argued that together with technological advances, the emergence of e-finance, offer great benefits to consumers worldwide. They also call for a review of public policy in four areas: safety and soundness, competition policy, consumer and investor protection, and global public policy. The changes can accelerate financial sector development by lowering the costs, increasing the breadth and quality, and widening access to financial services. The e-finance impact globally would be material especially in the developing countries.

Claessens (2001) analysed the impact of e-finance on the financial systems in different countries, and the leapfrogging opportunities for emerging markets. The authors addressed new policy issues and the role of government intervention in light of these developments. Special focus is given to models of financial sector development that enable and promote e-finance in banking, capital markets, insurance, housing finance, and microfinance areas, drawing on innovative applications from the industrialized and the developing world.

Herbst (2001) argued that "innovations and growth of e-finance have lagged those of e-commerce in general. E-cash has stumbled along but not lived up to its early promise or its current potential. Despite growth of e-commerce and e-finance, some of initial promises such as the growth of e-money have not materialized." He viewed the growth in e-finance as augmentation of legacy system and innovation in new technologies and value propositions.

Allen *et al.* (2002) provided a comprehensive definition of e-finance and outlined research issues related to e-finance. They focused on the use of electronic payments systems, the operations of financial services firms and the operation of financial markets. A number of research issues were raised: Is the widespread use of paper-based checks efficient? Will the financial services industry be fundamentally changed by the Internet? Why have there been such large differences in changes to market microstructure across different financial markets?

Lopez (2002) argued that a strategic model should address issues such as the risk of cannibalization, the increase of the penetration rate, the training of employees, the education of customers with a view to go beyond the branchless system, and to increase the trust, the legal regulation of the activity, and problems derived of the globalization of the economies with faster, cheaper, easier capital transactions, and an increasing difficulty for following them.

Fight (2002) provided an overview of some of technical systems that have been enablers of e-commerce and e-finance and provided examples of legacy institutions and new entrants who have adapted the new technologies. He argued that e-commerce and e-finance are breaking the established patterns of doing business and are defining the "new economy".

Kolodinsky *et al.* (2004) discussed factors affecting the adoption of e-banking products, their relative advantage, compatibility, complexity/simplicity, trialability, transparency, risk, and product involvement. They believe that the banking industry lags in adopting new technology.

Joshi (2004) in *E-finance: Log in to the Future*, provides a detailed discussion of the growth of e-finance and challenges developing economies such as India had to meet to log on to the new economy of e-commerce and e-finance. He discussed cyber crime, security, and regulatory issues in addition to e-banking, e-trading, and e-finance products and their marketing.

Yuntsai *et al.* (2004) employed the analytic hierarchy process and evaluated the performance of four e-payment systems: credit card, stored-value card, smart card, and telecommunication bill. The results showed that the stored-value card had the highest performance. Their findings also suggested that a payment alternative can be flawed technologically but can still become the *de facto* e-payment scheme due to the advantage of an established customer base. They suggested that multiple usages be added to e-payment systems with higher economic/social merits so that they can gain a critical customer base.

Dandapani *et al.* (2001, 2004, 2005) examined the growth of virtual banking with a focus on the economics of their business model. They explored both the impetus and constraints for their growth. While the online banking by brick and mortar banks increased dramatically, only a few Pure Play Virtual banks turned into brick and mortar banks to survive.

Shahrokhi (2001, 2002, 2004) provided a comprehensive overview of the applications of the internet and IT technology to financial services industry. He documented the evolution, growth of e-business and e-finance, and their impacts on the global economy.

Hakman (2006) in *Electronic Financial Services: Technology and Management*, covers the issues of technology management (ICT) and its applications to banking, insurance, stock trading, e-payment, and e-finance system in use by the major financial services worldwide

Gewei and Garland (2006) in *E-finance: The CCMP Model*, suggests a model that extends the e-finance framework from the technology perspective and provides a basis for a more comprehensive approach to financial digitization. Specifically, the e-finance model is comprised of four components: digital wealth creation, wealth collection, wealth management, and wealth protection (CCMP). Extensions of enterprise application integration (EAI) with CORBA (Common Object Request Broker Architecture), and web services are presented to demonstrate the value-added implications of a networked approach to business digitization.

Canard and Gouget (2007a, 2007b) presented an off-line divisible e-cash scheme where a user can withdraw a divisible coin of monetary value that can be parceled and



spend anonymously and unlinkably. They presented the construction of a security tag that protects the anonymity of honest users and to revoke anonymity only in case of cheat for protocols based on a binary tree structure without using a trusted third party. This is the first divisible e-cash scheme that provides both full unlinkability and anonymity without requiring a trusted third party.

The “*E-Finance Lab*” of Frankfurt, Germany is a pioneering industry-academic partnership between Frankfurt and Darmstadt Universities and industry partners[7] with the main goal of developing scientific yet managerial methods for rearranging the business processes of the financial service industry. The overall approach is to apply industrial methods well established in other domains, such as automotive supply chain optimization, to the financial supply chain. To pursue its goals, since 2003, e-finance lab has formed study clusters that encompass different areas of financial services industry. They are:

- *Cluster I*: Sourcing and IT Management in Financial Processes.
- *Cluster II*: Emerging IT Architectures to support Business Processes within e-finance.
- *Cluster III*: Customer Management in the Financial Service Industry.
- *Cluster IV*: Reshaping the Banking Business.
- *Cluster V*: Managing the Securities Trading Value Chain.

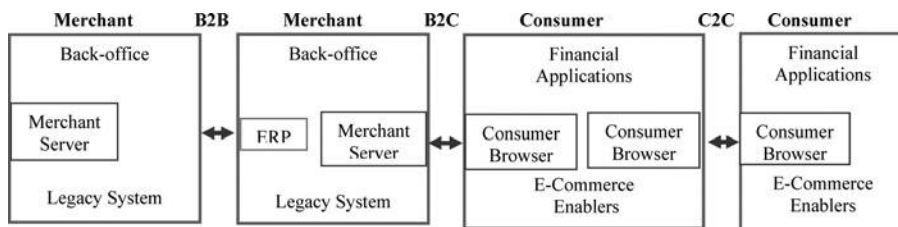
#### 4. E-finance model

The e-finance sector can be divided into five broad categories:

- (1) Business-to-Business (B2B),
- (2) Business-to-Consumer (B2C),
- (3) Consumer-to-Consumer (C2C),
- (4) Technical infrastructure to support the e-finance platform, and
- (5) Global institutional and regulatory environment that facilitate the functioning and growth of e-commerce and e-finance.

These categories are depicted in Figure 2, which provides the platforms for e-commerce and e-finance.

The B2B sector includes services in corporate finance, investing, institutions, and international finance issues such as foreign exchange, derivatives and new issues, and back-end processing. The B2C sector includes services such as online trading, basic online banking, electronic bill payment, mortgages, and insurance. The C2C sector includes payment for online transactions and electronic money transfers. The fourth component is the technological services that support the e-finance platform integrating



**Figure 2.**  
E-commerce – e-finance  
platforms

**Sources:** Böhle, (2002) and Author

the IT architecture of the firm with the internet platform as well as older legacy systems. The infrastructure services are key enablers of the industry and are designed to create, migrate, and support e-finance. Finally, regulations influence and are influenced by e-finance products and services (some of which without any precedence).

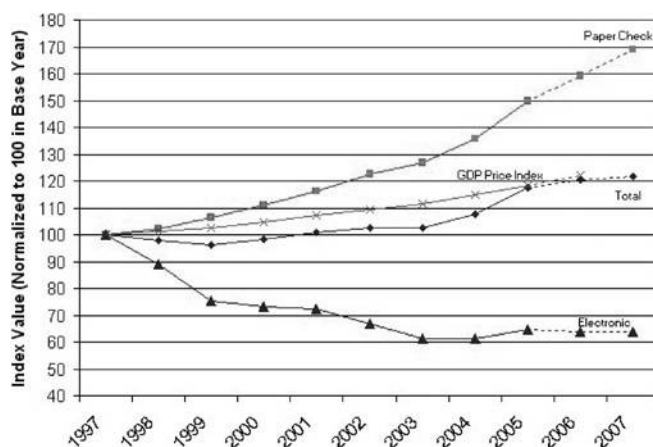
#### 4.1 Trends in the B2B financial service sector

**4.1.1 Reduced transaction costs.** B2B providers have enhanced the value proposition of institutional financial services by giving their institutional clients broader product selection, faster execution, increased price transparency, tighter margins, and greater cost savings due to reduced transactional costs. The internet has enabled legacy institutions to handle increasingly complex transactions involving many business partners. By adopting universal standards for loan terms and lending parameters, the finance industry enabled more customization within the open marketplace.

Figure 3 compares indices of fees for the Reserve Banks' priced services with the GDP. The price index for paper check and electronic payment services in 2007 increased 6 per cent and 0.1 per cent, respectively. Based on 2006 data, the price index for all priced services increased an estimated 20.3 per cent from 1997 to 2006, compared with an estimated 22 per cent growth in the GDP price index over the same period[8].

**4.1.2 Disintermediation and electronic re-intermediation.** The e-finance technologies enhance the long-standing evolution of the financial services sector from one dominated by financial intermediaries to one dominated by capital markets and financial institutions that hold marketable securities. Traditional financial intermediaries transform illiquid, hence non-marketable, assets (e.g. bank loans) into liquid liabilities (e.g. demand deposits). This role has become less important over time as the liquidity of financial assets originated by intermediaries has increased. Another important issue is that disintermediation and re-intermediation allow the financial system to share and spread risks. Figure 4 highlights the e-commerce and e-payment intermediaries.

The internet accelerated the development of new online trading mechanisms, alternative trading systems (ATS), fueling interest and activity in institutional electronic trading. Most of the new market structures allow investors to mitigate their market risks while increasing price transparency. Participants have much greater



Source: The Federal Reserve Board of Governors  
[www.federalreserve.gov/paymentsystems/pricing/2007repricing.htm](http://www.federalreserve.gov/paymentsystems/pricing/2007repricing.htm)

**Figure 3.**  
Price indexes for federal reserve priced services



**Figure 4.**  
E-commerce and  
e-payment intermediaries



**Source:** Knud Böhle, (2002). See References

access to the information and flows/orders that drive prices and bid-offer spreads, allowing for more informed economic decisions. Over time, this price transparency is expected to lead to even more participation, deeper liquidity, and tighter margins.

The internet also spawned a whole new way of managing a business's finances: online accounting. Rather than buying a software package at a store, companies can now subscribe to a web-based accounting service for a monthly fee. These services are focused on the US small-businesses and focused on financial accounting, rather than manufacturing or distribution accounting market. They are not suited for large companies or environments in which heavy multicurrency functions and reporting are required. The software package in the crosshairs of these services is Intuit QuickBooks[9].

*4.1.3 Customized solutions and integrated services.* The ability of the internet and e-commerce technology to customize service, or components of service, is a major factor behind the proliferation of sophisticated services such as investment planning, tax and estate planning, and tailored investment accounts. By using the internet to bundle products with related information and services, creative companies can improve the effectiveness and efficiency of their clients' businesses. This new delivery mechanism enables these companies to forge a strong, long-lasting client relationship that de-emphasizes product price and exchange-based transactions.

*4.1.4 Electronic trading.* Many ATS market structures/mechanisms have been created over the past few years through web-based technologies. The financial world is edging closer to the notion of liquid, 24-h global trading across markets and products. Online institutional trading in equities, bonds, currencies, commodities, and derivatives is readily available through the corporate storefronts of major institutions. One of the most interesting and significant ATS mechanisms – the Electronic Communications Network (ECN) – resulted from changes in US securities laws and has been a direct result of web-based technologies. Many financial companies are joining ECNs, where they can match trades with other participating members, saving them the cost of going through an exchange and allowing them to trade 24/7.

Knight Trading, a large electronic NASDAQ market maker, actively employs technology to sort, match and execute incoming orders instantaneously. The time previously spent in sorting and matching trades is now spent analyzing trading patterns and managing proprietary risk. Charles Schwab runs its own internal trading operation, enabling it to carry out many mutual fund transactions by swapping shares among its customers without involving or even notifying the mutual fund companies.

Besides eliminating transaction costs, internal trading preserves Schwab's control over client transactions and the resulting information.

*4.1.5 Electronic funding – Venture Capital – IPOs.* The internet and of internet start-ups have had dramatic effects on equity markets around the world. Like other areas of finance, electronic funding such as IPO and venture capital have benefited from the IT technologies.

Electronic IPO. In the past decade, WR Hambrecht & Company has pioneered and spread the use of online Dutch auction and open IPOs methods. Unlike the traditional method of book building method used by underwriters on Wall Street, the auction and open methods is the way IPOs are priced and allocated. The stark difference between such methods was brought to light with the Google IPO in 2004.

In the traditional method, underwriters collect bid price and size interest from clients and then determine allocation. In open IPO and Dutch auction clients submit price and size interest electronically. Based on the maximum clearing price for available shares, allocation is awarded on a pro-rata basis to meet size demands or a maximum basis to achieve depth.

WR Hambrecht has helped many companies raise billions of dollars via auction or Open IPO. Examples include, Ravenswood Winery (RVWD), Salon.com (SALN), Andover.net (ANDN), Nogatech (NGTC), Peet's Coffee & Tea (PEET), Briazz (BRZZ), Overstock.com (OSTK), RedEnvelope (REDE), Genitope (GTOP), New River Pharmaceuticals (NRPH), Google (GOOG), Clean Energy (CLNE), and NetSuite (N)[10].

Venture Capital. The web has become a powerful medium for entrepreneurs in search of venture capital and for venture capitalists looking for investment opportunities. Information, which would have previously taken a lot of research to find or was unavailable can now be obtained with an internet connection and a few clicks. It is now possible to acquire data on most of venture firms and firms that are seeking new businesses to invest in. Furthermore, information to prepare the entrepreneur for the requirements of venture funding is abundant on the web. Even the process of actually obtaining funding has been impacted by the use of the internet.

The internet has impacted the venture capital funding process in many ways: instant access to information, electronic business plan writing and submission, direct contact between entrepreneurs and funding sources, and the elimination of physical boundaries are just a few of these advantages. Some specific sites are used as examples of how technology is being used to improve the overall venture capital process.

Many web sites offer information on the basics of venture capital and resources for both sides of the financial services industry. The venture capital hubs match for fund seekers and funding sources such as Angels, private placements, LBOs and IPOs for different funding stages including Seed, Start-up, Early Stage, Later Stage, Mezzanine and Bridge.

The internet is also a source for entrepreneur training and development opportunities. The Kauffman Fellows Program, a partnership between the Center for Entrepreneurial Leadership and numerous venture capital firms, is one of many programs created to develop new entrepreneurs through mentoring by senior entrepreneurs and venture capitalists.

In addition to providing elementary information about venture capital, the Internet has also become one of the most comprehensive sources for listing for venture capital firms. These on-line directories provide the names and contact information for hundreds of venture capital sources. Most of the venture capital firms on the web will also present information on the types of products and markets that they are interested in, their investment philosophy, their requirements and the services they offer.

Both Yahoo and Google provide comprehensive listing of venture capital firms. Other directories include Capital Venture, FinanceHub, Venture Capital World, Venture Capital Institute, and Price Waterhouse. Price Waterhouse also sorts the companies by industry and state, making it easier to pick specific firms.

New tools and services have also evolved as a result of the explosive growth in the use of the internet. For example, there are now search engines and databases that specialize in matching entrepreneurs and venture capital investors, based on the amount and type of investment, the business industry, or geographical preference. These tools increase the number of successful matches in a much shorter time, which benefits both the entrepreneur and the venture firm. Some firms have commercialized this service. Other online sources for venture capital include:

Venture Capital Access Online (<http://www.vcaonline.com>) is an online marketplace for the venture capital and private equity industry, FundingPost (<http://www.fundingpost.com>) provides services to Angels, Venture Capital Investors and Entrepreneurs including over 7,000 CEOs, and 500 Venture Capital Funds. American Venture Capital Exchange ([www.avce.com](http://www.avce.com)).

Entrepreneurs can share ideas, experiences, and advice. Provides help with business plan, information on how to approach a VC firm, and solutions that delivers the valuable information you need. Entrepreneur.com provides online services to small business on their search for start-up guides, women entrepreneurs and host of useful templates and publications.

Go BIG Network ([www.gobig.com](http://www.gobig.com)) is an on-line marketplace that connects the startup and small business community. vFinance, Inc. ([www.vfinance.com](http://www.vfinance.com)), is a financial services company specialized in emerging opportunities, providing investment banking, trading, ADR liquidity pools, trend forecasting, and consulting services to micro, small and mid-cap high-growth companies, and to institutional and high net-worth investors.

#### 4.2 Trends in B2C financial service sector

**4.2.1 Financial intermediaries – portals.** The internet industry that includes telecommunications and technology enablers let traditional financial institutions augment their services and introduce new products. However, a host of independent websites offer free financial Intermediaries to individuals. Examples include: Bloomberg, CNN/Money/Fortune, MarketWatch, MSN-MoneyCentral, Hoovers, IPO Home, IPO Resources on ZDNet, Google and Yahoo Finance, and Free Real Time, Federal agency websites such as the Federal Reserve Board, BEA, and Edgar at SEC and EDGAR Online, Inc.[11].

**4.2.2 Online trading.** The introduction of online trading and associated tools such as quotes, research, and portfolio management modules, has been a boon to investors seeking self-directed financial management. And indeed, the online Internet tools have reduced investor reliance on financial planners, advisors, and brokers. Over the past decade, online customers have been developing investment strategies, following the markets for stocks, bonds, mutual funds, and exchange traded funds (ETFs) and rebalancing their portfolios using easily available online financial tools. Online trading is typically offered through the corporate storefront models (Wit Capital, Web Street Securities and Ameritrade) that provide their own institutional online trading services or through a vertical portal model (Schwab and E\*Trade) that offers their own, or third party, online trading services, in tandem with other financial services.

The new internet brokerages such as E\*Trade, Datek, Ameritrade, Scotttrade, and others have revolutionized the brokerage business by offering low, flat-rate discount

commissions on stock trades, free online screaming prices, free stock quotations, online order entry, more efficient order execution, and better customer service than traditional brick-and-mortar brokers. In addition, the online brokerage companies offer high-quality, free stock research, and market analysis services that were available for a fee from traditional firms. The electronic brokerage industry provides a dynamic environment where information and transactions flow continuously around the clock, and expensive research services are unbundled from transactions.

*4.2.3 E-banking – online banking.* Electronic banking is the delivery of banking services through the use of electronic communication, primarily the internet. You may also see or hear e-banking called internet banking, on-line banking, or PC banking. E-banking may include ATMs, wire transfers, telephone banking, electronic funds transfers, and debit cards.

Home PC banking, introduced in the late 1970s, was very limited, tedious and cumbersome. One of the world's first home online banking services was set up by the Nottingham Building Society (NBS) in 1983. Using a computer and telephone, the system (known as "Homelink") allowed on-line viewing of statements, bank transfers, and bill payments. Actual set-up of transactions remained manual, requiring written instructions to the bank for processing.

By the mid-1990s, most financial institutions offered online services. A 2005 national survey by Grant Thornton found that 81 per cent of community banks offer 24/7 online account access and 65 per cent online bill payment services to their customers. With the commercialization of the internet, online banking services such as checking and savings account balances, deposits, funds transfers, payments, and credit services are offered to customers through different online banking models[12].

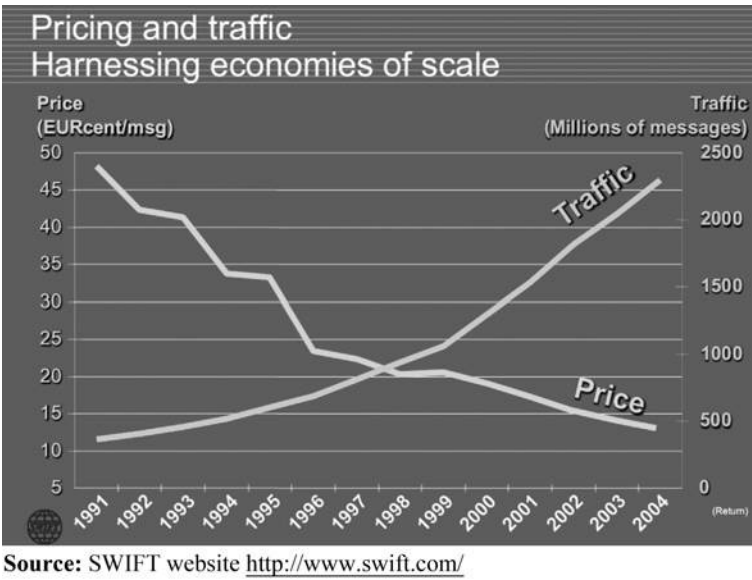
The degree of the internet penetration as a measure of customer readiness to transact on-line is a key factor in explaining customer conversion to Internet banking. The world's total internet usage from 2000 to 2007 has grown by almost 250 per cent, including about 120 per cent of North America[13] (see Figure 5). With the growth, there has been an increase in online banking activities.

According to projections by the Federal Reserve Board, over the next decade or so the proportion of electronic transactions would increase dramatically from 7 per cent to 14 per cent of total US consumer sales. The opposite would be true for the traditional paper checks. The cost of processing incremental web transactions is quite low compared to the standard teller-assisted transactions. A Booze Allen study found that the cost of processing an incremental financial transaction amounts to \$1.07 through branches, \$0.52 through telephone banking, \$0.27 through ATMs, \$0.015 through home PC banking, and only \$0.01 through internet platforms[14] Once the fixed costs are covered, the economics of offering banking services through the internet are quite compelling.

Online banking features. Online banking solutions have many features and capabilities in common, but traditionally also have some that are application specific. The common features fall into several categories:

Transactional – Performing a financial transaction such as an account to account transfer, paying a bill, or applying for a loan. Of special note, electronic bill presentment and payment (EBPP) offers online, real-time presentment of bill content, and payment choices. EBPP is the easy way of viewing billing status, remittance items, and presenting balances using a universal browser from any location. Various industry studies have shown that EBPP models have facilitated consumers with much needed convenience and time savings as according to recent surveys about 68 per cent of the

**Figure 5.**  
Pricing and traffice of  
legacy vs web-based  
transactions



consumers preferred EBPP models for the sake of convenience as compared to 7.6 per cent for cost savings[15].

Non-transactional – Online statements, check links, co browsing, chat.

Administration of Financial Institution – features allowing the financial institution to manage the online experience of their end-users.

ASP/Hosting Administration – features allowing the hosting company to administer the solution across financial institutions.

Internet banking often includes personal financial management support, such as importing data into a personal finance program such as Quicken, Microsoft Money or TurboTax. Some online banking platforms support account aggregation to allow the customers to monitor all of their accounts in one place whether they are with their main bank or with other institutions. Business banking also commonly includes support of multiple users having varying levels of authority, and transaction approval process such as wire transfer.

E-banking is likely to grow in the future. However, there may be many customers who prefer not to use it. While e-banking customers can be more demanding about prices and the quality of services, they can also be expensively fickle customers, only staying with a bank so long as it offered the best charges for its services on a comparative basis. Banks are looking for new products that will increase customer “stickiness”, through better-tailored services, or higher switching costs. The future projections of the various payment modes indicate that by 2010 over 62 per cent would be in non-paper modes[16].

*4.2.4 Personal finance/wealth management.* The essence of wealth management relates to personal financial advice, planning and execution, many clients do not want to replace these personalized services with web-based products and interfaces. Accordingly, B2C wealth management platforms give clients web tools that promote

additional flexibility and convenience. Such ventures allow authorized customers to access account, market information and verify the order status and overall portfolios.

Specific advice on investments wealth, taxes, trusts, and retirement planning is then provided face-to-face by associated private bankers, investment managers, or financial consultants. For clients who prefer a self-directed approach and appropriate guidance as needed, there are Internet platforms that can create an entire financial plan for a flat fee. For instance, financial planning sites such as Financial Engines[17], FinPortfolio[18], and Direct Advice[19] supply retirement and investment advice based on user-defined inputs and goals.

*4.2.5 Insurance and annuities.* The internet has laid the foundations for an online insurance market. The insurance industry has four major segments: automobile, property and casualty, health, and life netting to \$300 billion out of \$1.9 trillion financial services sector[20]. This sector has increased its online presence as consumers have gained comfort with the process and insurers have determined how to manage channel conflict and resolve regulatory issues. The price dispersion for products such as term life policies initially increased, but fell later as larger number of consumers began shopping online.

There are two ways of delivering insurance online. The first model is an internet-based insurance carrier, used by established insurance companies or new “virtual” insurers (usually associated with established companies) to sell products through the corporate storefront models. The second model is that of ventures acting as “virtual agents” through the insurance marketplace or vertical portal, each acting as an internet distribution network (Banks, 2001).

#### *4.3 Trends in C2C sector*

*4.3.1 Online trading.* An online trading community exists to provide its members with a structured method for trading, bartering, or selling goods or services. The earliest trading sites known to the internet include eBay, Amazon, Yahoo, and later Google and many others have revolutionized traditional business models, have created new ones that are knowledge and technology efficient. These communities are sometimes described as the electronic equivalent of bazaars, flea markets, or garage sales. eBay is a prime example of C2C sector.

Founded in 1995, eBay Inc. offers global commerce, payments, and communications. eBay’s original vision was to create the world’s first global economic democracy. It saw a “people’s market” in which anyone in the world could sell or buy just about anything for a fair price[21]. Since its inception, eBay has expanded to include some of the strongest brands in the world, including eBay, PayPal, Skype, Shopping.com, and others.

Additionally, there are some business-run websites facilitating trades between members. Some of them charge a fee for each successful transaction. Examples are: SwitchPlanet – users can trade books, CDs, DVDs, and video games for free. SwitchPlanet also offers many social networking features to help members connect; Peerflix – members are able to trade their DVDs using the website, with only a small transaction fee for each DVD received; and Swango – members can trade their gently-worn clothing, shoes, and accessories with each other in an online environment that closely mimics real-life clothing swap.

*4.3.2 Trading circles.* A trading circle is a form of online trading designed for the viewing of TV series and episodic media. Videocassettes, DVDs, and CDs represent the items normally exchanged. Each member agrees to pass an episode on to the next



member in a timely fashion, thereby allowing all members of the group to view the series. Examples include Swaptree, PoshPoints, SwapaCD, and SwitchPlanet.

5. Technology infrastructure for e-finance

Figure 6, by financial technology partners (FTP), highlights the interface between financial services and technology and service solutions. FTP tracks over 5,000 global participants in the financial technology sector. The sector is considered the dynamic convergence of financial services and technology-based solutions. Many of the key financial technology companies are interrelated, growing, and consolidating.

The internet has changed many business models perhaps the most important of which is B2B e-commerce. The impact of this on finance has been that it is now possible, for example, to receive electronic orders through a B2B portal or an intermediary and use these to drive order fulfillment processes within the organization's internal systems. At the other end of the cash to cash cycle, businesses are effectively using supply chain systems to make their purchases. New technologies can significantly reduce transaction processing, or eliminate it altogether. These technologies are now maturing and finding a place in organizations.

Vertically integrated financial service companies are growing rapidly and creating synergies by combining brand names, distribution networks, and financial service production. The liberalization of the capital account and the deregulation of financial markets have contributed significantly to the growth of financial markets in the industrial countries. Information Technologies have made a central contribution by increasing the ability to move information both in terms of volume and speed, making it difficult to establish restriction on capital accounts.

To stay competitive and relevant, financial institutions must invest in ITs. The e-finance industry players need infrastructure services. Irrespective of the business model of the e-finance firm (i.e. pure players model, bricks and clicks model, or hybrid

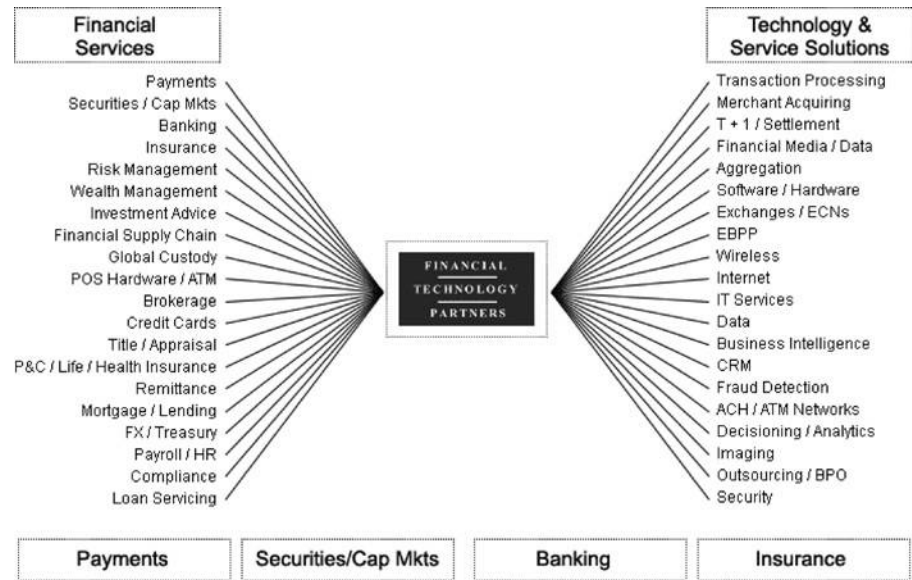


Figure 6.  
Interface between  
financial services and  
technology and service  
solutions

Source: Financial Technology Partners: <http://www.ftpartners.com/ft/index/cfm>

bricks and clicks model), the process of developing the e-commerce platform for the e-finance sector consists of understanding the IT system functionalities, designing the system, building the system, and testing the system. Further, even if the financial services firm has decided to outsource the entire e-commerce site development and operation to a service provider, the firm still needs to have a site development plan and some understanding of the basic e-commerce infrastructure issues such as cost, capability, and constraints[22].

## 6. Systems or organizations facilitating e-finance

### 6.1 *Society for Worldwide Interbank Financial Telecommunication (SWIFT)*

Society for Worldwide Interbank Financial Telecommunication (SWIFT)[23] provides financial data communication and processing services to support the business activities of worldwide financial institutions for securities, payments, foreign exchange, and money markets, as well as trade finance. Its dedicated telecommunications network guarantees the rapid, cost-effective, secure, and reliable transmission of financial data using a range of ISO-compliant standardized messages that have been developed by SWIFT in conjunction with its users and industry organizations. Originally designed to eliminate the need for paper-based processes in the financial markets, SWIFT has also lowered costs, increased productivity, and helped reduce risk in the securities industry by providing several of the key elements necessary for the automation of the settlement process, and by providing a reliable and secure network.

Owned by nearly 3,000 of its user banks, SWIFT also connects other categories of non-bank financial institutions engaged in the securities industry. SWIFT is present in over 208 countries, handled over 3 billion messages during 2007 and has over 8,200 users worldwide.

### 6.2 *Automated clearing house*

The automated clearing house (ACH) network[24] is a highly reliable and efficient nationwide batch-oriented electronic funds transfer system governed by the NACHA Operating Rules, which provide for the Interbank clearing of electronic payments for participating depository financial institutions. The Federal Reserve and Electronic Payments Network act as ACH Operators, central clearing facilities through which financial institutions transmit or receive ACH entries. ACH payments include:

- Direct Deposit of payroll, Social Security and other government benefits, and tax refunds;
- Direct Payment of consumer bills: mortgages, loans, utility bills, and insurance premiums;
- Business-to-business payments;
- E-checks;
- E-commerce payments;
- Federal, state, and local tax payments

Electronic checks are becoming more popular in recent years. According to the Neilson Report, in 2006 the ACH network ranked second only to Visa in transaction volume with \$13.43 billion, up 15.3 per cent. Visa's 2006 growth rate was 13.2 per cent. Two of the most impressive areas of consumer ACH transactions relating to the payment

processing industry were in “Internet” and “Telephone” categories. Consumers are increasingly pay for goods and services by traditional check writing.

The growth of electronic ACH/check payments appears to be coming at the expense of credit cards and paper checks. More than 3.44 billion transactions worth more than \$7.0 trillion were conducted during the third quarter in 2007. These figures represent growth rates of 11.7 per cent and 8.0 per cent, respectively, over the same quarter of 2006. There were 2.11 billion debits and 1.34 billion credits, for a total of 3.44 billion. The statistics include commercial inter-bank and government transactions, but not “on-us” transactions.

American businesses and governments use the ACH Network for payments to and from trading partners, vendor payments, business-to-government tax withholdings, intra-company cash management transfers, and to exchange remittance information regarding payments.

About 19 billion more electronic payments were made in 2006 than in 2003. In contrast, the number of checks paid fell by about 7 billion over the same period. Of the 93 billion non-cash payments in 2006, about 63 billion were electronic and around 30 billion were checks. The highest rate of growth from 2003 to 2006 was in ACH payments, which grew about 19 per cent per year, followed closely by debit card payments at almost 18 per cent. Meanwhile, checks declined by an average of 6.4 per cent per year since 2003, indicating the pace at which checks payments has been decreasing since the mid-1990s has picked up in recent years[25].

Multiple hurdles challenge international trading activities. With increasing cross border volumes and shorter settlement periods, securities firms cannot afford the risk and cost of manual processing and failed trades. To respond to these challenges, the securities industry must prepare for major changes. Several competing solutions are being sponsored, including the global straight through processing association’s (GSTPA’s), Thomson Financial/Depository Trust and Clearing Corporation (DTCC) global joint venture and other internet-based solutions and tools. Participants in cross border trading, including broker-dealers fund managers, custodians, exchanges, and depositories need to re-engineer technical, business process, and operational architectures to realize the ultimate goal of GSTP.

### 6.3 Online trading community

As discussed earlier, online trading communities exists to provide a structured method for trading, bartering, or selling goods or services. These communities often have forums and chartrooms designed to facilitate communication between the members. These can be further segregated into two parts:

- (1) Formal Trading Communities are business-run websites maintained for the purpose of facilitating trades between members. Some of these charge a fee for each successful transaction.
- (2) Informal Trading Communities are lesser-known sites that specialize in a multitude of services including community trading. Examples include, 1UP, Craig’s List, IGN.

### 6.4 E-money

E-money allows payments (including P2P payments) without involvement of a third party during the payment transaction. There are two main types of e-money: “e-cash” including electronic purses and multi-purpose stored value smart cards; and

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“cybermoney” (also called “network money”), which are prepaid software products used for payments or transfers on cyberspace.

E-finance

### *6.5 Price comparison service*

On the internet, a price comparison service (also known as shopping comparison or price engine) allows individuals to see lists of prices for specific products. Most price comparison services do not sell products themselves, but source prices from retailers from whom users can buy. Price comparison sites typically do not charge users anything to use the site. Instead, they are monetized through payments from retailers who are listed on the site. Depending on the particular business model of the comparison shopping site, retailers will either pay a flat fee to be included on the site or pay a fee each time a user clicks through to the retailer web site or pay every time a user completes a specified action – for example, when they buy something or register with their e-mail address[26].

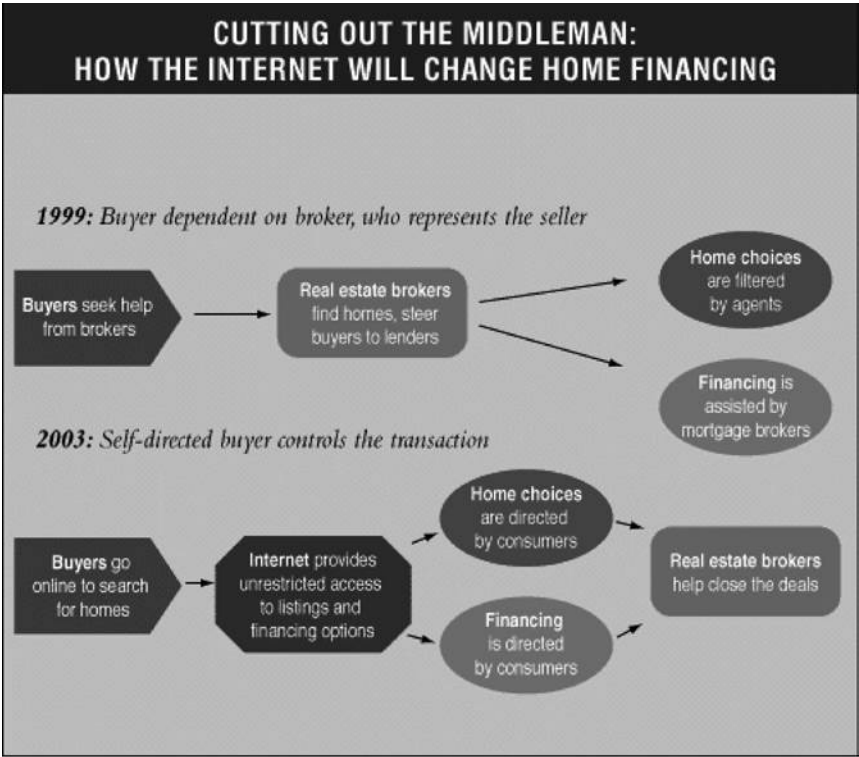
In the area of e-mortgage, LendingTree, and e-loan are two different examples of such innovations, which enable borrowers to do online comparison shopping for loans. Although online aggregators widely differ from one another, they generally fall into two basic categories. Originators, such as e-loan and Intuit Inc.’s Quickenloans.com, operate much the same as off-line mortgage brokers and mortgage banks. They accept, process, and underwrite loan applications. Pricing is based on a mark-up of rates and points quoted by wholesale lenders.

By contrast, referral sites, which include LendingTree and Providian Financial Corp.’s GetSmart.com, pass along leads to retail lenders, who then handle the application and underwriting process. GetSmart collects fees strictly for its leads; LendingTree assesses “a few dollars” for each referral and “several hundred dollars” when a loan closes. So far, neither business model is remotely profitable. E-loan lost \$40 million last year; LendingTree, \$25 million. E-loan had to secure \$40 million in new funding from a consortium of investors that included Charles Schwab & Co[27]. Similar services are available in the insurance industry. Sites such as SelectQuote and Insweb are prime examples. Figures 5, 7 and 8 depict how the internet has changed home financing and mortgage industry.

### *6.6 Online auction business model*

The online auction business model is one in which participants bid for products and services over the Internet. The functionality of buying and selling in an auction format is made possible through auction software that regulates the various processes involved. The strategic advantages of this business model include fewer time constraints, no geographical constraints, pressure of intense social interaction through large numbers of bidders and sellers, network economies, and the ability to capture consumers’ surplus.

Several types of online auctions are possible. In an English auction the initial price starts low and is bid up by successive bidders. In a Dutch auction, multiple identical items are offered in one auction, with all winning bidders paying the same price – the highest price at which all items will be sold (treasury bills, for example, are auctioned this way). In a reverse auction, a need for a good or service is specified and the maximum price at which a firm will have that need filled is listed. Then, service providers who can meet that need actually bid the price down, competing against one another, to get the order. General Motors uses this approach to source most of the parts used in the production of its vehicles.



**Figure 7.**  
The internet and home financing

**Source:** Forrester Research Inc., Cambridge, Mass

6.7 *M-finance: mobile banking*

Mobile banking (also known as m-banking) is a term used for performing balance checks, account transactions, or payments via a mobile device such as a mobile phone. Mobile banking today (2007) is most often performed via SMS or the mobile internet but can also use special programs downloaded to the mobile device.

Mobile banking in the USA first appeared a before 2000, but it failed to catch on over the following few years. As an example, Wells Fargo shuttered its original mobile banking operations in 2002. It had only 2,500 users at the time. Wells is one of the first financial institutions to offer online banking and now is among the pioneers of mobile banking in the USA. Wells Fargo isn't just peddling "m-banking" to its customers; it also is providing small business and commercial "m-banking" services[28].

6.8 *Value proposition*

Beyond building consumer demand and securing the mobile channel, banks also are challenged to build the business case for mobile banking, mostly because the ROI is impossible to pinpoint. The smaller banks are reluctant to use this technology and waiting for the big banks to take the plunge. The Net Banker that tracks online banking activities forecasts that 25 per cent of US households will use mobile bank access by the middle of the next decade. The mobile banking adoption curve for the next 10+ years is expected to be identical to that of e-banking since 1995.





**Source:** Stijn Classens, *et al.* Electronic Finance: Reshaping the Financial Landscape Around the World

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**Figure 8.**  
The new world financial services

## 7. Impacts of e-finance

A “traditional” finance department may have enterprise wide electronic financial systems, but there are still some legacy systems in operation and transaction processing is still largely paper based. E-finance is poised to replace the bulk of transaction processing with straight through web-enabled processes without the need for manual intervention.

A major driver for e-finance is the ability to build key financial controls into the systems. The result is a finance function where transaction processing is minimal, reducing waste and risk while improving operational efficiency. E-finance has the potential to bring about remarkable short term efficiencies, but its true significance lies in the fact that it allows finance to move away from its traditional control oriented role to being more of a strategic business partner that helps conceive, design, and realize the systems and processes in the new world of e-Business.

### 7.1 E-finance and financial accounting

Integrated systems and analytical applications are both important aspects of the e-finance technology platform. Integrated information systems reduce system maintenance costs and database errors, and improve information accuracy and timeliness. Integration means tying back-office, front-office and new “Web-office” systems together into a cohesive whole. Tight integration between a Web storefront and back-office inventory, order-entry and billing systems is necessary to link the Web office to the back-office. That does not mean an e-finance function cannot take advantage of more loosely interfaced best-of-breed applications to supply specialist functionality, only that this should be an exception rather than a rule.



E-finance is an information services provider and must be cross-functional in scope. An integrated information system also makes available a wide range of analytical applications that gives users access to valuable operational data. Integrated systems provide a better foundation for gaining business intelligence from financial statement and consolidation report writers, Online analytical processing (OLAP) query tools, business-specific balanced scorecard electronic consoles and more. Delivering business intelligence via analytical applications is one way of making sure that information consumers understand the value of e-finance in the organization. Technology can change accounting from a cost center to service centers and from information island to information hub. Table I highlights some of the tactics for e-finance.

Along with terminology, the functional scope of today's accounting modules needs to expand. Customer-centric business models, popular today, are not supported by current accounts receivable modules. An e-finance department may be better served by a system designed for revenue-management that combines traditional accounts receivable functions with elements of sales force automation (SFA) and customer relationship management (CRM) modules. From a finance perspective, an expanded revenue-management module may be more useful to a customer-centric business.

Numerous online accounting vendors have emerged with the growth of the internet. Below is a sample of such vendors: BAport Technologies Inc., BizTone.com, eLedger.com Inc., Intacct Corp., NetLedger Inc., and Peachtree Software Inc.

Paper to digital	Information island to information hub
Use electronic transactions (EDI, EFI)	Ensure back-office and front-office systems are integrated
Scan documents and store as images	Engage in collaboration commerce using the Web
Create online intranet report libraries	Electronically distribute financial reports and alerts
Distribute report electronically via e-mail	Provide role-based portals for information access
<i>Pull to push</i>	<i>Entity focus to asset focus</i> , Focus on:
Schedule reports for automatic production	Asset acquisition process
Trigger reports via business events and rules	Asset retention process
Send exception alerts via e-mail	Asset collaboration process
Automate document routing using workflow	Asset optimization process
<i>Full-service to self-service</i>	<i>Reactive to proactive</i>
Provide employee self-service portal	Enable push reporting via the Web
Provide business partner self-service portal	Deliver exception alerts (foresight not hindsight)
Let users subscribe to reports and alerts	Define and systematize key performance indicators
Create a 24/7 Web storefront	Create Balance Scorecards for your business

**Table I.**  
Transforming tactics for  
e-finances

**Notes:** Technology can transform accounting departments from cost centers to service centers, from information islands to information hubs. Here are some tactics that can move finance to e-finance  
**Source:** McKie (2000) in the References

### *7.2 E-finance as information service provider*

Another process that ranks high on the list for transformation is delivering information throughout the enterprise. Creating and distributing financial reports electronically (e-reporting), whether they are requested (“pulled”) by information consumers, or scheduled or triggered (“pushed”) by a system, is a core competency of an e-finance department. Reports are seldom printed: instead they usually get converted to a variety of formats and delivered via intranet report libraries or e-mail for online viewing and analysis. File-based reporting relies on electronic report libraries and archives, the association of reports with electronic subscriber lists, and either static (view-only) reports or dynamic (view and analyze) information packages.

The combination of workflow and reporting is poorly supported in today’s accounting applications, but that will change, and finance will be able to deliver true exception reporting to managers. As more reports are triggered by business events, which are, in turn, driven by business rules, managers will receive fewer unfocused reports. Instead they will receive the reports or sections of the reports they need, when they need them. In fact, some managers’ interaction with an e-finance system may be limited to receiving alert-, report-, and transaction-approval tasks that are automatically managed by workflow technology.

Easy access to information increases the likelihood that decision-makers use the data available to them. That’s where the concept of portals comes in. A portal is an electronic gateway that gives employees access to applications and financial information. Every e-finance department needs a portal to regulate the flow of information. Portals can be used in several ways by different people with varying degrees of access to financial information. The Internal Revenue Service and SEC provide excellent portals. E-reporting and e-filing have positive contribution especially for public companies in their SEC and tax filing and e-reporting in the post Sarbanes-Oxley world.

Internet-based accounting services have expanded their scope to include linked Web storefronts, online purchasing, and small-business sales-force automation and customer relationship management applications. Online accounting vendors provide these services directly, or they opt to create close links to other web-based service providers that specialize in related application areas. NetLedger Inc., for example, is forging ahead through alliances with CyberBills, for online bill presentment and payment, and with Red Gorilla for time and expense tracking. As these systems mature, they become competitive with low-end mid level accounting packages. The shrink-wrap accounting vendors and their reseller channels will have a real fight on their hands[29].

### *7.3 Impact of e-finance on international business/trade*

The internet has the capability to generate international market expansion and future growth for the firm, a concept known as internationalization. Both international market penetration and the development of new international customers are achievable goals for the internet enabled firms. The acceleration of globalization of changes the once slow and cumbersome process of advancing the firm’s product into international markets. Further, new virtual network intermediaries or electronic marketplaces reduce the need for the firm to have human and financial infrastructures necessary for internationalization. However, more traditional relationship networks are still the primary mechanism for internationalization. Thus, a new theory of internationalization is not needed but rather an evolved version of network theory may be a better explanation of internationalization of SME’s in today’s digital environment[30].

#### 7.4 Impact of e-finance on developing countries

E-finance and globalization offer many important opportunities. E-finance has great potential to improve the quality and scope of financial services and expand opportunities for trading while widening access to financial services for a greater number of retail and commercial clients through more cost-effective delivery of services. In some emerging markets, online brokerage is already on par with that in developed countries. In some countries, a lack of regulatory barriers and initial markets has made new entry across a spectrum of services attractive. In other countries, entry has been more specialized[31].

For many countries, e-finance will allow easier access to global capital and financial service providers, bringing opportunities to quickly widen access to and improve financial services. Achieving such gains will require that emerging markets give far greater priority to improving the framework for financial and other information, modernizing and strengthening their legal systems, and improving technology-related infrastructure. As financial services are imported, the need for a domestic safety net and corresponding regulation and supervision declines. As financial services are imported from abroad, the question is raised of whether small, undiversified economies should have domestic equity and debt markets and banking systems.

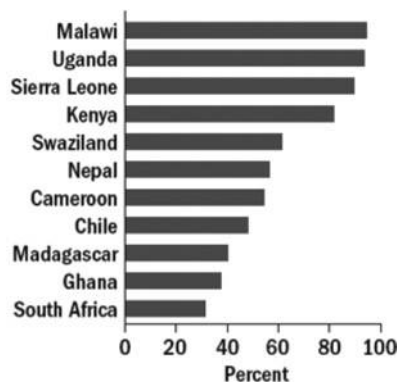
E-finance will offer fewer choices to economies with poorly capitalized banking systems, weak regulations, and extensive guarantees on liabilities. To reduce the risk of financial crises, regulatory approaches in developing countries should recognize weak governance and institutions, scarce human resources, and concentrated ownership structures. These impairments make textbook solutions difficult and argue for simpler approaches. More entry by foreign financial institutions will often be the best way forward[32].

#### 7.5 Affordability issue

It takes over \$700 to open a checking account in Cameroon – more than the country's per capita

GDP. In 10 per cent of countries surveyed in a World Bank Report, a person must have an equivalent of at least 50 per cent of per capita GDP to open an account. As a result, only 20 per cent of families in Africa have bank accounts.

Figure 9 shows the share of the population that cannot afford checking account fees in numerous developing countries. However, more stable and predictable monetary



**Figure 9.**  
Population that cannot  
afford checking account

Source: The World Bank Report – 2007

policies, privatization of many state-owned banks and improvements in regulation are encouraging more banks, such as Barclays or Standard Bank of South Africa, to compete for new customers[33].

### 7.6 Outsourcing

Increased competitive pressures and the speed of technology changes are leading to rapidly increasing outsourcing relationships. Outsourcing allows small institutions to benefit from economies of scale and gain access to expertise. For larger institutions, the advantage is more that of being able to concentrate management time on core businesses. Increasingly services are being outsourced internationally.

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### 7.7 Treasury and cash management

Corporate treasuries, worldwide, are making efforts to use internet technologies for streamlining their treasury management systems. Efforts are being made to create a framework that unifies and co-ordinates their financial and global operations online – accurately, efficiently, and at a lower cost than before. For treasury professionals, the web is a source of vast global information in a real time. Corporate treasuries are looking to leverage treasury liquidity throughout their internal and external procurement and distribution partnership chain. This increased integration will allow firms to become more aggressive in their investment and cash management practices.

As the dynamics of doing business change for the clients, treasury systems developers will have to overhaul their existing offerings and cater to entirely new needs and opportunities created by e-commerce. In the e-commerce treasury, due to the large value transactions, errors can be devastating. Operating processes must be sound, reliable, and secure, particularly in the context of straight through processing, and also the high pace of transaction execution.

The internet technologies provides treasurers with new tools for efficient cash management services (CMS) offered by banks who assume the role of cash managers and are guide corporations to manage their cash in a more productive way. For maximizing the benefits of CMS, corporate treasurers should their current system of MIS for cash management compare them with costs associated with outsourcing CMS[34].

### 7.8 Electronic billing and payment services

Oracle's Siebel e-Payment Manager enables organizations to give consumer and businesses comprehensive online access to bills and invoices. It offers specific capabilities for both B2C and B2B billers, including the ability to cost-effectively present bills online and provide customers with multiple payment options[35].

In recent developments, IBM has partnered with ACI Worldwide, an electronic payment software vendor that serves over 110 large financial institutions, to create a payments system based on service-oriented architecture (SOA) principles. ACI's software will be combined with IBM's System z mainframe, DB2 database, WebSphere middleware, Tivoli IT management software, and Crypto-chip technology, according to an IBM statement. ACI also intends to host its software in IBM's data centers, for customers who desire an on-demand payments system. The combination of IBM and ACI technologies is expected to result in an SOA foundation that allows payment information to be shared throughout enterprises, many of which see a tangle of legacy systems strewn across their IT environments[36].

7.8.1 *Wholesale payment systems.* Recent statistics indicate that despite the potential cost savings and ease of transaction, electronic bill presentment and payment (EBPP) has not taken off as expected. With the reluctance of individuals to disclose their financial information on the internet, and the lack of a compelling reason for people to pay their bills online, adoption of EBPP has been slow. However, recent developments indicate increasing interest among banks to help clients with electronic invoice presentment and payment (EIPP) solutions. Standards, architectures, and models that are relevant for the e-payments and the online transaction process are numerous[37].

7.8.2 *Retail payment systems.* Digital cash systems have failed to penetrate the payments market while electronic trading of securities has been a success in most countries. At present, the credit card system dominates retail internet payments despite being costly, open to fraud, and lack of anonymity. They are also poorly suited to micro payments or person-to-person payments, and new systems such as PayPal have emerged in recent years to address this lacuna. It is run by an oligopoly displaying the typical characteristics of low innovation and charges poorly matched to the relevant costs. In coming years, payments on the internet may be made by a virtual “cyber money”, which might be issued by banks, but also by telecommunications or IT companies.

Banks are now integrating retail payments into their systems. A global standard with a common layout is needed for this to grow, including a globally understood account number, if the goal is to achieve delivery-versus-payment at a retail level. In deciding between open and private systems, and centralized and decentralized typologies, a balance is needed between competition and cooperation. Regulation may be needed to promote open and common standards, minimize switching costs, and allow flexible pricing. Figure 10 highlights e-commerce intermediaries.

8. Lessons from global e-finance experiences

Four basic misconceptions were frequently present in the business strategies employed in the earlier stages of the development of e-finance. First, while the internet can reduce financial transaction costs, these gains have often been exaggerated or misinterpreted. Second, while it is cheap and quick to create a basic website, designing and implementing a fully functional, industrial-strength application capable of securely



Figure 10.  
E-commerce and  
e-payment intermediaries

Source: Böhle, (2002). Integration of Electronic Payment Systems into B2C Internet Commerce – Problems and Perspectives – Background Paper No. 8; Electronic Payment Systems Observatory (ePSO); April 2002

accommodating a large number of complex transactions and huge variations in volume is a complex and protracted undertaking. Third, rather than eliminating possibilities for intermediation, the abundance of information, opportunities, and relationships created by the internet increases the need for new intermediation structures and mechanisms. Fourth, contrary to the view that e-business would revolutionize the financial industry and destroy the incumbent “dinosaurs”, the evolution of e-finance clearly demonstrates the advantages of established financial services suppliers, as long they have the capacity to evolve and to embrace the new approaches and technologies.

Financial innovation can help to increase the efficiency of the financial system. This facilitates the operation of monetary policy, but at the same time complicates the environment in which monetary policy operates. To deal with this complexity, bank regulators need to respond by monitoring the financial landscape, by following developments closely and by trying to predict the consequences of innovations even though they may appear very marginal. In Europe, the ECB’s monetary policy strategy claims that it is well designed to deal with these challenges. Although it gives a prominent role to money, it also takes into account possible influences of financial innovation on monetary aggregates. Furthermore, through its examination of non-monetary indicators, including both real and financial variables, the information from monetary aggregates can be cross-checked, which makes monetary policy more robust and less dependent on single indicators that may become distorted by financial innovation[38].

The EU, through SEPA project represents the next major step towards closer European integration. SEPA will allow customers to make non-cash euro payments to any beneficiary located anywhere in the euro area using a single bank account and a single set of payment instruments. All retail payments in euro will thereby become “domestic”, and there will no longer be any differentiation between national and cross-border payments within the euro area.

### *8.1 Cross-border finance and regulations*

In the e-finance world, cross-border expansion becomes less expensive and less risky. The resources devoted to foreign e-finance are often situated in the home country so that the same resources can be switched from one foreign market to another. As e-finance expands, less informed consumers would gain access to markets, raising issues for cross-border investor protection and transparency. Regulators may need to protect consumers accessing offshore financial services. The easy spread of information – and misinformation – could make asset prices and capital flows more volatile. Herding, turbulence, and contagion may increase, and countries may become more vulnerable to attacks on their currency. Capital account restrictions will be more difficult under e-finance, and the growing number of creditors complicates coordination prior to or during a financial crisis, particularly in emerging markets.

### *8.2 Trading systems*

Trading systems – equities, fixed income, and foreign exchange – are consolidating and going global. Trading is moving towards electronic platforms, not tied to any location. Electronic trading and communication networks have lowered the costs of trading and allowed a better price determination. These changes offer great benefits to consumers worldwide. The proliferation of financial products, delivery channels, and institutions, along with the speed of innovation, has allowed easier comparison of prices and products. For example, with the slashing of retail brokerage costs, and



cheap access to vast information from the internet, online trading now accounts for over half of retail stock trades in the USA and online traders. Many wholesale and retail payment systems have been introduced to facilitate faster cash management. One example of a fast developing retail system is web-based POS.

### 8.3 Stock market

Historically, one of the major functions of a stock exchange has been to provide a marketplace to match up buyer and seller at a price determined at arm's length, or unbiased, negotiation. Ideally, there would be one clearing house where all orders to buy and sell securities would have the opportunity to interact with one another. While that does not exist, for many years the New York Stock Exchange (NYSE) has been the closest thing to it. The NYSE has been the predominant securities trading exchange because it has continuously provided all six basic functions that an exchange can potentially offer, while many newer exchanges provide only two or three. These basic functions are to:

- (1) Facilitate the search for counter-party, or the opposite side to a trade.
- (2) Disseminate market intelligence before trades occur, either as formal quotations or as other soft, but valuable, information.
- (3) Consummate trades, determining the price and quantity that clears the market.
- (4) Disseminate post-trade information, such as the price and quantity of the trade.
- (5) Clear and settle the trade. This involves comparing and matching the various parties to a trade so that everyone agrees on the cash and shares to change hands.
- (6) Certify, both implicitly and explicitly, the quality of the issuers whose shares trade on the exchange and the quality of the trading counterparties who transact on the exchange. At a minimum, this involves listing requirements, self-regulation, market-watch, and surveillance.

Most players have historically considered the price determined on the NYSE to be the "market price". The same is true for securities listed on the NASDAQ. Many newer exchanges, however, do not independently determine a price. They simply look up the price on the NYSE or NASDAQ and then cross match buy-and-sell orders. Moreover, a new type of exchange, known variously as an ECN or ATS, does no certification of issuers. These exchanges simply trade shares that are listed on another exchange, free-riding on the certification process of the other exchange. In essence, the changes that have occurred, primarily in the 1990s, have involved a fragmenting of the marketplace, with new entrants focused on one or a few parts of the process in order to operate efficiently and economically.

## 9. Risks and challenges

### 9.1 Regulatory issues

The deregulation of the London stock market in 1986, the passage of the Riegle-Neal Act in 1994, the deregulation of the Tokyo stock market in the 1990s, the crumbling of the Glass-Steagall Act in the late 1990s and broad financial deregulation measures around the world have led to the increased amalgamation of the traditional and e-finance environments. Competition in e-finance is expected to accelerate over the coming years as deregulation continues to make its way around the world and new entrants enter particular areas of the market, develop new niches/product expertise, or expand into new countries. Check clearing in the USA is manually intensive, involving

multiple handling of the physical check. Check clearing for the 21st Century (Cheque 21) was passed into a law in October 2003. Cheque 21 allows banks to truncate checks and begin transferring their electronic images. Businesses benefit from the speed of funds transfer and consumers can view their transactions online immediately.

### *9.2 High barriers to entry*

The finance industry has historically been both protected and plagued by high barriers to entry. In particular, new entrants to the financial markets have to have strong human resource management, a deep knowledge of risk, adequate financial resources, responsive customer service, a robust technology infrastructure, and a well-established brand name/franchise. The first two factors – management of human resources and risk management oversight – can be major barriers for new ventures. The ability to serve customers quickly and securely has been the backbone of traditional financial services for decades. The management of information and the ability to solve customer problems in a secure and rapid fashion are major benefits of dealing through a web-based system.

The financial sector has traditionally been very reliant on technical infrastructure to handle many aspects of business, including trading, reporting, processing, and control. Historically, this requirement has been a barrier to entry because institutions had to invest large amounts of money to implement technical solutions. Now, firms are able to use the Internet's technologies to adapt their architecture to deliver e-finance services. The effect of low technology delivery cost is evident from the fact that many non-financial portals or B2C exchanges such as AOL Finance, Intuit Quicken, Bloomberg, Yahoo Finance, and MSN MoneyCentral provide financial services. These portals provide extensive financial news, research and quotes, analytical services such as calculators and other financial analytical engines and supply links to financial services through partnerships and alliances with financial sponsors.

Moreover the banking industry can be challenged by a category of new entrants called converges such as airlines, consumer goods retailers, supermarket chains, and computer software and hardware companies, which are already enjoying brand names, large customer bases and established distribution channels or interfaces with customers. Once these branded converges have established a foothold in the banking market, the need for banks to intermediate payments in the longer-term is reduced. In the future, e-money may be easily transferable among consumers and businesses without the need for financial institutions to act as intermediaries[39].

### *9.3 Value proposition*

A successful e-commerce strategy in the financial services industry involves rethinking and challenging value propositions. Some organizations started as intermediary sites and eventually transformed themselves into full-fledged corporate storefronts (Bank of America and Barclays) or integrator/portal sites (Citibank and American Express). Some organizations concentrate on a specific value-adding product. For example, e-loan and InsuWeb are active marketplaces, whereas FinanceWise and Finweb act as financial Intermediaries. The financial services industry had to rethink its e-commerce business strategy and that involves reinventing products and services, redefining the value proposition and perhaps creating new business models.

### *9.4 Revenue and cost dimensions*

The e-commerce revenue structure is quite complex, as the web has altered the established concepts of pricing. In contrast to traditional models, the web allows for

free products and services, differential prices for the same product, and customer profiling. The pricing function is very complex for the e-finance business model, given that the internet is a relatively new medium. Therefore, it is hard to understand the value of providing features such as news headlines, e-mail, stock quotes, trade execution, investment advice, portfolio management, bill paying, front-to-back processing/ fulfillment, and so forth to the average customer. Further, it's still unclear as to which services should be "bundled" or "unbundled".

The revenue generation within B2B exchanges is an even more complex issue. The practice of charging a fee for bringing sellers and buyers together may not bear fruit, as many of these buyers and sellers may have a long history of dealing with each other outside the exchange. Furthermore, a sustainable revenue flow will depend on the relationships between exchange participants, the degree to which the underlying market served by the exchange is fragmented or concentrated and the relative balance of buying and selling that occurs within the exchange. These pricing complexities are likely to be an ongoing challenge for all participants as competition creates new ways of reconstructing the value chain and doing business.

### *9.5 Technology architecture*

The nature of the business model dictates the selection of the most appropriate technical platform for the e-finance model. For example, a basic information model with a relatively static information base would require routine technical maintenance and security to keep it operational. On the other hand, an e-finance model that uses dynamic information such as streaming headlines, stock quotes, and other real-time information will require an intricate technical construction and maintenance schedule. Similarly, corporate storefronts that offer interactive, transaction-enabled services and products require an even more extensive technical architecture that is secure and guarantees a certain level of performance. In addition, the architecture should fit well with the legacy systems, providing a seamless link with the existing corporate systems.

### *9.6 Security*

Security and data privacy, the global character of the provision of e-finance services and entry by non-regulated new intermediaries are challenges faced by the financial regulators and financial services industry. The online environment leaves all the operations of a financial services firm susceptible to external and internal threats. Security of transactions and data privacy are increasingly matters of concern for regulators worldwide. Moreover, such threats can exist internally within the organization. Pre-employment screening and security and on-going education become all the more relevant in today's technology-intensive environment in which an employee can e-mail massive amounts of information with the click of a mouse. For example, recent announcement by a rogue trader, acting without supervision, had rung up \$7.2 billion in losses this month at Societe Generale of France sent shockwaves across Europe and the world[40].

If operations are outsourced, the financial services firm needs to ensure that the outside vendor follows the same security guidelines in its employment practices. Security measures that combine hardware and software tools need to be employed to fight internal and external attacks. These measures include intrusion detection, encryption, password protection, firewalls, and virus controls. Firms need to have a plan to update their systems regularly.

### 9.7 Adapting global technology to local requirements

While internet technologies are global and standardized, their applications can and must be adapted to local circumstances. Distinctions between proximity and remoteness remain highly pertinent, even if the distance becomes virtual rather than geographical. The need to localize financial solutions is even stronger in e-finance for SMEs, which for the most part operate within a limited geographical area. Furthermore, their characteristics, size, financial structure, and sectoral mix can vary considerably even within the same country or region.

## 10. Conclusions

The evolution and growth of e-finance has been phenomenal during the last decade. The adoption of internet technologies around the world and the implementation of key regulatory measures, such as electronic signatures and cross-border contacts should spur further growth in e-commerce. Financial services industry was among the earliest adaptors of information technology. E-finance sector of e-Business are interlinked. E-business in the financial services industry has been slow to evolve because of complexity of inter-organizational relationships, regulations, security concerns, lack of standards, and conservative principles.

E-finance builds on new business models and processes and demands new paradigm and software to clearly position finance as a service center within organizations. The benefits of e-finance are many and include: reducing the cost of transaction processing, expanding the information scope of accounting and finance's systems, extending the information reach of the finance department, and improving the quality of financial information. However, to realize these gains, finance professionals must embrace and leverage new technology, realign the traditional accounting mind-set and skill set, engage in process transformation initiatives, and focus on delivering value-added information services to the organization. Furthermore, they must have a solid understanding and implementation of the technology platform.

The impact of the internet on financial services is clear. However, certain trends are emerging: expansion of B2B e-finance, automation of customer services, consolidation in local and regional financial operations, growth in global services, migration towards 24/7 global trading, blurring of business and product lines, disintermediation of traditional products and services, creation of alternative partnerships and alliances, and consolidation of portals, storefronts, exchanges, and marketplaces.

Technological developments should reduce the cost and enhance the security and convenience of dedicated digital media. There is a clear need to ensure open markets, minimizing the effect of switching costs, and police the pricing structures of both new and old transaction media. Regulation and supervision of payments markets should do much to promote the development of digital money.

E-finance can streamline traditional business processes and deliver value-added information services by using Internet-based technology. Leading finance, accounting, and IT executives are transforming the finance function by deploying a strategic application of the IT technologies to the financial services, or e-finance.

## Notes

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### Appendix. E-banking processing enablers

CyberSource: Forrester Research report shows that the US online retail, without airline tickets, hit \$131.1 billion in 2006. CyberSource processed \$34 billion that year, though its count includes international transactions and airline tickets. Analysts say e-commerce is growing even faster in Europe and Asia, where CyberSource sees growth. In 2007, it introduced payment systems for Brazil, India, and Ireland. It expects to start accepting debit payments in China in 2008[41].

Global Payments Inc. a leading provider of electronic transaction processing services recently introduced a next generation payment processing platform, Global Transport (TM). Global Transport was designed with a uniform application programming interface supported by multiple communications options to simplify and speed integration to the merchant's payment acceptance environment for debit, credit, and EBT transaction processing.

Heartland Payment Systems, Inc., a leading provider of credit/debit/prepaid card processing, payroll and payment services, has been named "Financial Services Sales Organization of the Year" in the "Best Run Sales Organization" category by Selling Power magazine.

Bottomline Technologies provides collaborative payment and invoice automation solutions to corporations, financial institutions, and banks around the world. The company's solutions are used to streamline, automate and manage processes and transactions involving global payments, invoice approval, purchase-to-pay, collections, cash management, and document process automation.

Total System Services, Inc., through its subsidiaries, provides electronic payment processing and related services to financial and nonfinancial institutions in the USA and internationally. Its services include processing consumer, retail, commercial, and government services; stored value; and debit cards.

Fiserv, Inc. provides information management systems and services to the financial and insurance industries worldwide. Its services primarily include transaction processing, business process outsourcing, document distribution services, and software and systems solutions. With acquisition of CheckFree Corporation, an electronic payment processing company, provides financial e-commerce products and services globally.

E-Payment Matrix. This site is provided as a community service to everyone who is looking for more information on e-payment solutions. Here you can discuss, rate, and compare various e-payment solutions. The site is designed for individuals in search of efficient and safe e-payments system. It compares ten different e-payment services and provides useful information.

PayPal has quickly become a global leader in online payment solutions with more than 153 million accounts worldwide. Available in 190 markets and 17 currencies around the world, PayPal enables global e-commerce by making payments possible across different locations, currencies, and languages[42].

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1. Kogilah Narayanasamy, Devinaga Rasiah, Teck Ming Tan. 2011. The adoption and concerns of e-finance in Malaysia. *Electronic Commerce Research* **11**, 383-400. [[CrossRef](#)]