

**Technology Innovation in Financial Services Industry**

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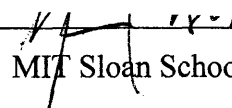
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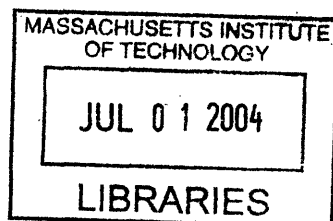
  
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by Gustavo J. C. Roxo da Fonseca

Submitted to the M.I.T Sloan School of Management in partial fulfillment of the requirements for the degree of Master of Business Administration

## **Abstract**

Over the last few decades, we have seen an enormous evolution in the financial services industry driven by technology innovations. Indeed, we cannot imagine the current financial system without electronic fund transfers, ATMs, and Internet banking among many other innovative implementations. In fact, the financial services industry is the largest market to IT suppliers which makes the financial providers the preferred partners in many technological innovations such as mobile technologies, security devices and customer relationship management (CRM) tools.

Although the importance of technology innovation is clear in transforming the financial services industry, we do not often find organizations getting sustainable competitive advantage through technology innovation. In fact, in most cases, financial providers have just been focused on being as good as the competition in terms of technology innovation, neglecting any sophisticated technology strategy that could enable them to primarily capture the value created by internal innovative ideas.

The goal of this research is to evaluate the stage of technology innovation in the financial services industry, its strategic relevance to the organizations, and its governance models. Based on the information gathered through reviewing relevant literature and interviewing people involved with technology and financial services, our work will propose some technology strategies that could improve the effectiveness of innovation to different types of financial providers.

Thesis Supervisor: Edward B. Roberts  
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# 1. Introduction

## 1.1. Context

Banks are intensive users of technologies and have a wealth of data available that may be helpful for the general understanding of the effects of technological change.

Technologies usually arise from three sources in particular: financial technologies; telecommunications and information technology (IT). As examples of financial technologies we can list risk management tools, financial product development, structured operations, etc. Unlike this, IT and telecommunication involve many types of hardware devices, software and communication infrastructure which can support financial activities.

If we compare the services provided in the 1970s and now from the technology perspective, it seems that we are talking about complete different industries. The fundamental duty of financial services to optimize the money allocation in a certain

community is no longer about cash or gold, but rather about electronic information stored and transferred along value chains.

Among many innovations, we can list massive adoption of credit cards, electronic funds transfer (EFT), call center services, and more recently Internet banking as important technology applications that have played a key role in the industry transformation.

In fact, the players in this market are usually some of the most valuable IT customers. One of the effects is that financial services providers have been chosen preferentially as early adopters for most of cutting-edge technologies. It turns out that innovation in IT is almost always related to innovation in financial services.

We can confirm these statements by taking a look at the IT spending (as a percentage of revenues) in the financial services industry in comparison to all industries as a percentage of revenues.

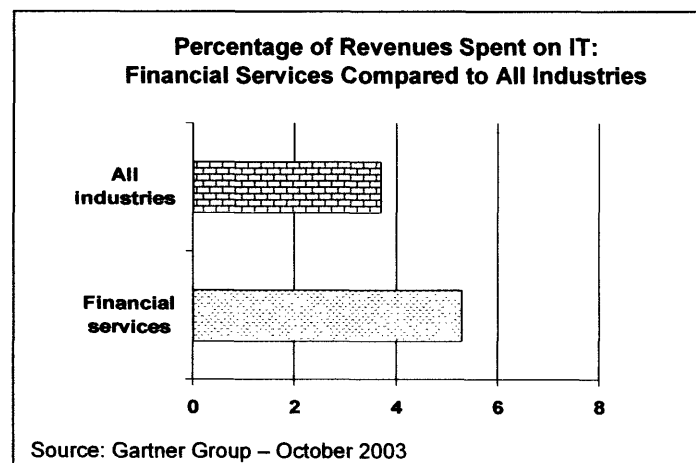


Figure 1.1: Percentage of revenues spent on IT: Financial Services compared to all industries.

It is important to note that the importance that IT has for financial services is also true the other way around. According to the Gartner Group, this is the most important industry for the IT services suppliers, representing 19% of the total market.

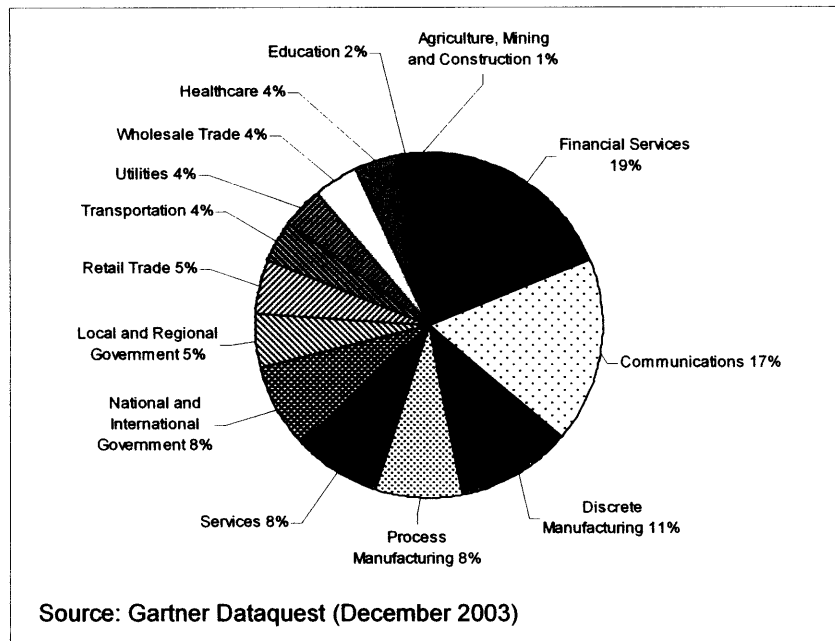


Figure 1.2: Worldwide IT Spending in Business by Vertical Market, 2004

This symbiotic relationship between financial services and IT reinforces the continuous search for new solutions and for the robustness of the installed base.

Nonetheless, innovation is not the only perspective of technology that concerns the industry. Hence, in the retail banking industry for example, customers expect overwhelming service as a standard, which means convenience, speed, simplicity, and moreover, low transaction fees. To do so, banks must work with the most reliable, robust, resilient and cost-effective technologies available in the market.



Therefore, we can say that technology is simultaneously important to innovation and operational excellence. And the industry cannot afford failures in any of these dimensions.

Although IT and telecommunications have these important roles, the industry has not perceived it as a source of competitive advantages, neither as innovation nor as operational excellence. If we look carefully at the largest banks in the US, we can see little differentiation on technology. Currently, they have used the same sort of ATM, networking, Internet banking and so on. In the particular case of ATM, this was not true in the earliest days of this technology when companies like Citibank used it to significantly expand market share.

In one of our interviews, a CEO of a large retail bank compared the banking industry to airline industry from the technology perspective. In his words, IT in retail banking plays the same role that engines play to the airline industry. Without engines, the airplane does not fly and providers cannot afford any failure during the flights. Moreover, innovations that add value through either cost reduction or revenue increase are very welcome.

However, the airline companies do not expect to differentiate themselves through this technology. They just want to assure that the engines have worked properly and the firm has access to reliable new technologies as soon as the competitors have.

This perspective matches with many other interviews we made as well as the updated literature.

One result is that IT and telecommunications have become commodities to the financial industry, and consequently it also has lost strategic importance over the last few years. Moreover, investments have shrunk and new development activities outsourced.

## **1.2. Purpose**

Our purpose in this research is to understand the most relevant issues related to the role of technology innovation in financial services. Based on this assessment, we will propose some strategies that could improve players' competitiveness through proper management and smart usage of technology.

It is important to notice that most writings on technology for financial services approach the issue from the technological perspective and how new devices or techniques could transform the business. In this work we intend to approach the subject from the other way around, which means beginning by understanding the industry itself, the technological environment, and afterwards, introducing some practices that we consider adequate.

### 1.3. Approach

This research relied on literature review, market reports, and interviews with important stakeholders related to technology innovation in financial services.

During the five months that we carried out this work, we interviewed managers involved with financial services industry as well as IT. On the financial services side, we talked to CEOs, CIO and managers in charge of e-business areas. Within the IT industry, we involved product strategists and customer relationship managers.

To come up with the proposals for technology strategies, we followed a pre-defined flow to gather the relevant information which will be the grounds for the last part of this work (figure 1.3).

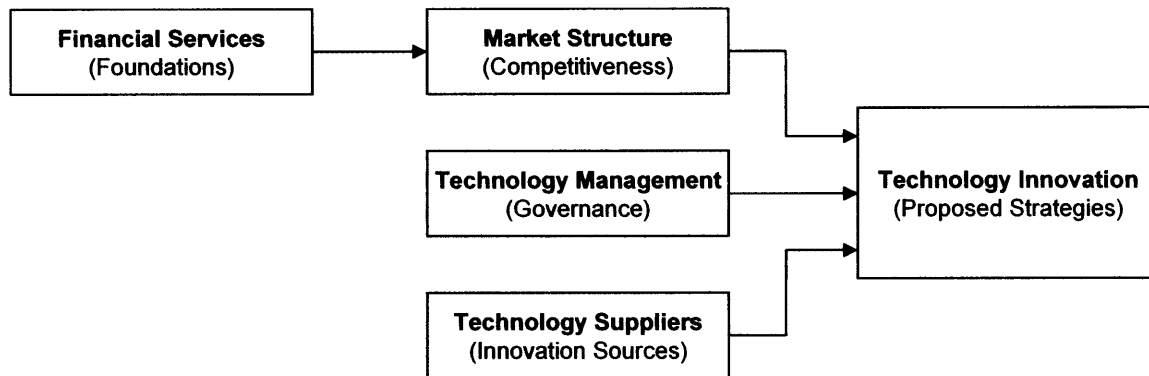


Figure 1.3.: Thesis approach.

First, we will present the industry dynamics in terms of its key processes and lines of business as well as the basic economics that support the financial activities. It will be

useful to discuss the market structure where we will apply the well-known Porter's Five Forces Model (Porter) to come up with the key factors that define the sector competition.

Besides the industry characteristics, it is also important to understand the sources of technologies provided to the sector as well as the management practices used by the competitors to deliver technology value.

Putting all this together in the last part of this work, we will propose how each kind of player in this market can maximize value creation, capture and delivery through technology innovation.

#### **1.4. Thesis Structure**

We intend to present a direct approach to the subject, beginning in chapter 2 with an overview of the current stage of the financial services industry, its major lines of business, key characteristics, and the competitiveness drivers within the sector.

Based on the foundations of financial services, in chapter 3 we will describe the market structure using Porter's Five Forces Model. The idea is to present an overview of some important issues related to the market competition, such as regulation, monopoly power, customer segmentation, customer and supplier relative power and so forth.

The next step is chapter 4, where we will present an overview of the most relevant sources of technology to financial services. We are particularly interested in sources of innovation that could effectively shift the competitiveness within and without the industry. As mentioned before, our approach is to find these sources from the business standpoint rather than the technological one.

In Chapter 5 we will discuss the current issues in technology management within the industry and how these issues impact innovation.

After that, in chapter 6, we will apply all previous information and preliminary conclusions to come up with some options for technology strategy that could optimize the value creation to a given player within this market. The overall intent is to present it in a clear format in order to help managers to define and implement the most effective technology strategy in their own organizations.

Finally, in chapter 7 we will present some conclusions and a summary of the whole work as well as some suggestions for further research.

## 2. Financial Services – An Overview

### 2.1. Introduction

The financial services industry is a very profitable and powerful business sector. As we can see in the table below, just in the past 12 years the average market capitalization growth of the top 10 financial institutions in the US was around 20% CAGR.

<b>1991</b>			<b>March 2003</b>	
1.	JP Morgan	13.0	Citigroup	177.4
2.	NationsBank	9.4	Bank of America	100.1
3.	Bank One	8.8	Wells Fargo	75.4
4.	BankAmerica	7.9	JP Morgan Chase	48.1
5.	Royal Bank	7.3	Wachovia	45.8
6.	CIBC	5.5	Bank One	39.8
7.	Bankers Trust	5.3	U.S. Bancorp	36.4
8.	Wells Fargo	5.1	Washington Mutual	32.4
9.	SunTrust	5.1	Fifth Third	28.9
10.	PNC	5.1	Royal Bank	25.9
<b>Total</b>		<b>72.7</b>		<b>610.2</b>
<b>20% CAGR</b>				

Source: McKinsey & Co, 2003

Table 2.1.: Market capitalization of top 10 financial institutions in the US (\$ billions)

Some of the reasons for such success were the wave of market consolidation, a strong profit growth during the 1990s, and the creation of a new breed of “super-institutions” (e.g. Citigroup, HSBC).

In this chapter, we intend to present an overview of financial services foundations that can explain why this industry has been so powerful and profitable since its beginning. It includes a discussion about the economic role of the banking activities as well as some basic definitions of lines-of-business, regulations and competitiveness within the financial services industry. At the end of this chapter, we present some business trends for the next few years.

## **2.2. Business Segmentation**

Financial Services is a very broad business sector. In fact, it is very difficult to determine its exact boundaries in terms of lines-of-business, products, services and customer segmentation. Although, it is common to see financial institutions providing services in different arenas such as securities underwriting and credit card, we can distinguish some basic categories of players (White).

The first one is the financial intermediaries, which hold financial assets (loans, mortgages, bonds, equity securities, etc) and issue financial liabilities (time deposits, insurance, obligations, mutual funds share, etc). Typical financial intermediaries are banks, savings banks, credit union, etc, in other words, the so-called traditional banking industry. It is

true that some non-bank companies have joined the group aiming at adding value to their core activities. Auto finance companies such as Ford Financial and GE Capital are examples of this group.

The second category are the financial facilitators that facilitate the financial transactions between the primary issuers of financial liabilities (government, firms and households) and the investors who purchase the financial assets. Stockbrokers, securities underwriters, investment bankers are examples in this group.

As we mentioned before, unless some regulations that create some few obstacles, competitors do not necessarily respect the distinction between these categories. Indeed, with the growth of non-traditional lenders and securitization processes as well as some deregulation acts worldwide, we have seen players quickly moving among financial activities depending on their own capabilities and business segment attractiveness.

### **2.3. Financial Intermediation**

The grounds for the financial intermediation activities are quite simple and intuitive. In a certain community, the financial intermediary is responsible for the optimal allocation of financial resources among its stakeholders, which include firms, households, and government.



In a very simplistic flow, we might assert that **firms** are responsible for **households'** income. These **households** consume **firms'** products which represent the revenues to the latter, and pay taxes to **government**, who also consumes **firms'** products and services. The **households'** surplus goes to the **financial intermediary** through savings and accounts. This money is used by the financial intermediary through lending contracts to firms and government, ending the monetary cycle (Kohn).

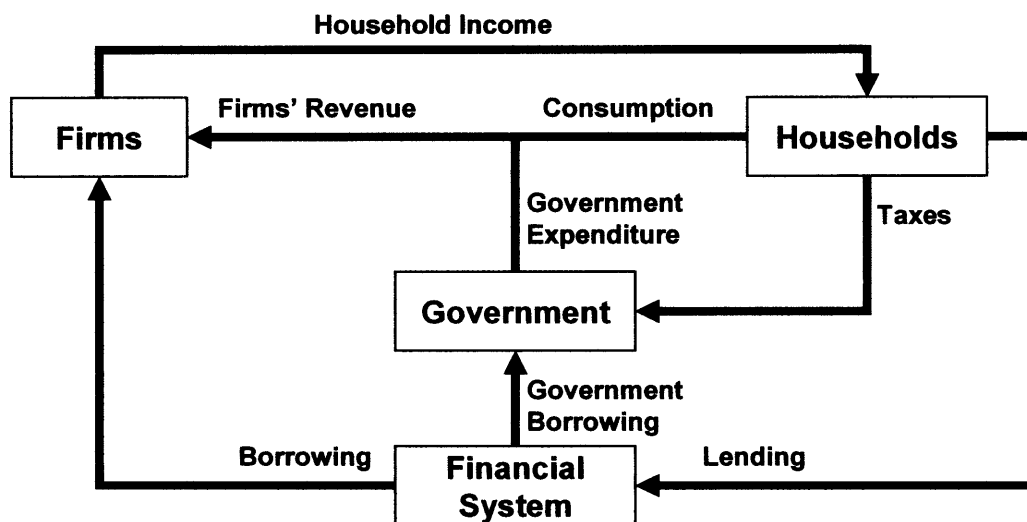


Figure 2.1: Monetary cycle with financial system optimization

In a broader description, we would say that the financial institutions are able to accomplish the following activities (Jordan): conducting exchange (clearing and settling claims); funding large scale enterprises (pooling and dividing resources); transferring purchasing power across time and distance; providing risk management (hedging, diversification, and insurance); monitoring borrower performance (mitigating adverse incentives); and providing information about the relative supply and demand for credit.

Therefore, the sources of revenues to financial industry (Frei): loan interest and base lending rates -primary revenue source; investment income from deposit balances – represented by net-interest margin; fee income - fees were variously assessed for checking accounts, late payments, and overdrafts.

Measuring customer revenue was relatively straightforward, whereas estimating costs at the customer level was notoriously difficult. Relevant costs included the following:

- **Interest paid on savings accounts or certificates of deposit.** Banks typically paid low interest rates on traditional savings accounts. Certificates of deposit cost more in terms of interest, but assured banks the use of the deposits for specified periods of time.
- **Transaction related costs.** The costs of customer interactions with banks varied. A teller transaction, for example, was generally more costly than a transaction that utilized an electronic distribution channel such as the ATM network.
- **Allocated "fixed" costs.** The cost of indirect support resources (e.g., the cost of electricity and physical infrastructure and salaries of network administrators) although not transaction specific, nevertheless represented resources that were consumed by customers. Allocating these "fixed" costs ensured that the revenue generated by customers compensated for the resource costs required to serve them. Moreover, these general operating costs were only fixed in the short term. Increases in customer transactions or demand for services could trigger a bank to consider, for example, opening a new call-center or increasing the capacity of an existing call center by adding telephones, computers, and personnel.

## 2.4. Economics of Finance

### 2.4.1. Perfectly Competitive Market

According to traditional microeconomics literature, a perfectly competitive market is one which has many buyers and sellers, so that no single buyer or seller has a significant impact on price (Pindyck and Rubinfeld). Moreover, the theory rests on the following assumptions:

- **Price taking** – each firm sells a sufficiently small proportion of total industry output, so its decisions have no impact on market price. In the financial services industry, though the current trend on consolidation represents a threat to assure price taking, some deregulation efforts regarding geographical constraints over the last decades have positively impacted competitiveness.
- **Product homogeneity** – all firms produce identical product. One major effort in this industry is looking after price discrimination in order to avoid product homogeneity. All ranges of products with different flavors as well as customer segmentation are fundamental instruments in this battle against homogeneity and as an extension, commoditization. As we will discuss later, most of the recent innovation within the industry is centered on this perspective.
- **Perfect mobility of resources** – as discussed in the previous chapter, the barriers created by regulators against new entrants in order to assure the stability of the financial system are also hurdles to achieving perfect mobility of resources.

- **Perfect information** – as we discuss in the next section, the financial industry is strongly dependent on information asymmetry which means exactly the opposite of perfect information.

When these assumptions hold, firms earn zero economic profit in the long run, and consumers have maximum surplus.

However, based on this superficial analysis of the industry, we notice that a perfectly competitive market is far from being the actual case in financial services. The factors listed above and their instances in banking that we presented are the causes of so-called deadweight losses, which mean the loss of both consumer and supplier surplus, due to regulations and monopolistic practices.

At a certain level, we could say that the path to a more competitive market relies on efforts from the regulators' side as well as the banking competitors' side. Our work in the following chapter will be to analyze how innovation can affect the competitiveness from these two perspectives. Moreover, we will discuss how each constituent might play this game in order to get its optimum result.

#### **2.4.2. Information Asymmetry**

One foundation of financing activity relies on the concept of information asymmetry. Information asymmetry is the condition in which at least some relevant information is known to some but not all parties involved.

Therefore, information asymmetry causes markets to become inefficient, since all the market participants do not have access to the information they need for their decision making processes, which drives the relationship to an adverse selection where the consumer chooses a product or service with lower quality due to the lack of information about it. In a continuous game, the seller who benefits from the adverse selection would not succeed systematically as the buyer would look for another seller as soon as he or she figured out the product or services was not what was expected (Nayyar).

When choosing service providers, buyers can reduce information acquisition costs by simply using any currently satisfactory providers of other services. Therefore, service providers can sell additional services to existing satisfied buyers more easily than they can sell to entirely new buyers.

This is the basis of the banking relationship. None but the customer's banker knows better about his/her financial behavior. It gives to this particular banker the advantage to offer the best products and services based upon a certain customer's needs. On the other hand, it is usually costly to offer better deals to a new customer without the same level of financial information as the first one.

From the customer perspective, the costs and risks of dropping the banker and choosing another is usually too high which pushes him/her to maintain a long-term relationship with the banker.

Obviously, this dynamics just happens because we have informational inefficiencies in our imperfect world. Nonetheless, we could imagine that without these inefficiencies the financial systems would be completely different in terms of competitiveness dynamics, or in Harper's (Harper) words: "*In a world free of information inefficiencies, the bank would have a greatly reduced role*".

In terms of technology innovation, the key question that comes up with this discussion is about the sources of disruptive technologies that could change dramatically the information inefficiencies and in some extent transform the market competitiveness and the business dynamics.

### **2.4.3. Regulations**

In an ideal world, governmental regulation would be a "public interest" tool for correcting the shortcomings of private-sector markets. These potential market imperfections include (White):

- The exercise of market power by sellers (monopoly, oligopoly) or by buyers (monopsony);
- Pervasive economies of scale in production;
- Positive or negative externality (spillover effect);
- Public goods problems;
- Pervasive uncertainty;

- Asymmetric information on the part of marketplace transactors;
- “Widow and orphan” marketplace transactors who cannot be trusted to make appropriate choices for themselves.

In this ideal world, regulators would costlessly and perfectly correct the imperfections of the market and improve the distribution of income and thus improve the social efficiency of markets. However, regulators find enormous hurdles in achieving their intent such as difficulties in formulating and carrying out policies, effectiveness of incentives (you get what you paid for) and problems of asymmetric information between regulators and the parties they are supposed to regulate.

Among all the imperfection listed above, **externalities** is likely the most important issue to the financial systems. An **externality** occurs in economics when the actions of one consumer or firm affect the well being or production of another consumer or firm with whom there is no direct business relationship. A well-known example of **negative externality** is the case of pollution by a firm in the course of its production which causes nuisance or harm to others.

How do negative externalities affect financial systems? Take for example a financial service company going bankrupt. The negative impact to depositors and other customers could be enormous. But if we extend the problem to a financial crisis such as The Great Depression in the US, when many institutions went bankrupt, the economic outcome was absolutely catastrophic.

Therefore, governments and particularly central banks all over the world spend considerable amount of time defining the effective regulations and policies to avoid such negative externalities as well as some of the other market imperfections applied to the financial market.

Over the past decade, regulations have changed substantially. We have seen cases of deregulation such as the US Gramm-Leach-Bliley Act in 1999 (Wilmarth) which repealed the Glass-Steagal Act of 1933 (still an effect of the Great Depression), opening up competition among banks, securities and insurance companies. However, certain rules still exist which cause some separation between the investment bank and the commercial bank. For example, the commercial banks are not allowed to pay commission to their employees who convince customers to also use investment services. They are only allowed to pay them a small fee for setting up appointments to meet with a financial advisor.

Back to figure 2.1 where we explained a simplistic finance flow and the role of the financial systems, one very important rule which is adopted formally in most economies is the **required reserve**. The **required reserve ratio** determines the percentage of deposits necessary for a certain total of loans committed by the bank. For instance, if in a certain country the **required reserve ratio** is 10%, it means that a certain bank must retain \$100 in deposits for every \$1,000 in loans contracts.



The **required reserve** is certainly the most common example of regulation within the financial market. But the financial market is in fact, a strongly regulated business in comparison to the rest of the economy.

Technology innovations such as broadband communication as well as some well-known accounting scandals (e.g. Enron, WorldCom) are among other factors responsible for some new and more sophisticated regulations on a local and global basis.

As we will discuss later in chapter 3, regulations and regulators are an important factor in market competitiveness. They bring controls and adjustments to externalities, whereas they also create heavy barriers to new entrants and consequently affect competitiveness.

## **2.5. Customer Segmentation**

The traditional financial industry is reasonably segmented. Basically, the dimensions involved in this segmentation are:

- **Personal and firm finances** – defining the segregation between personal or consumer (retail) banking and commercial and corporate banking.
- **Average income** – in terms of personal banking, this dimension usually separates customers in consumer (retail) and private banking.
- **Financial intermediaries and financial facilitators** – as described in the previous section.

Combining some of the most common instances of each dimension, we find out the most important customer segments and therefore how the banking industry is structured to serve them.

- **Retail Banking** – typical mass-market banking where individual customers use local branches of larger commercial banks. Services offered include: savings and checking accounts, mortgages, personal loans, debit cards, credit cards, and so forth.
- **Commercial Banking** – a financial institution that provides services such as accepting deposits and giving business loans.
- **Investment Banking** – a financial intermediary that performs a variety of services. This includes underwriting, acting as an intermediary between an issuer of securities and the investing public, facilitating mergers and other corporate reorganizations, and also acting as a broker for institutional clients.

## 2.6. Trends in Financial Services

From most of our interviews we observed that high-level managers have a very conservative vision about the future of banking. None of them ignores the impact of new technology (in particular, the Internet) on financial services but quite often they consider that these innovations just “reshape” the financial products and services to a new society, but they do not change dramatically the foundations of the financial system.

Nonetheless, it seems that some common trends are market consolidation, customer segmentation and mass customization. In one conversation with a manager of a financial institution in Europe, we noted that in this particular region, the impacts of geographical deregulations are still soaring and on the top of the priorities is how to take advantage of this new market structure as well as how to defend local market share against other European banks eager to expand to the rest of the continent.

In regard to regulations, we observed that continuous improvements are expected in financial controls particular to global organizations. However, it is clear that well-established players do not perceive the increase of regulations as a threat to future growth.

## **3. Market Structure**

### **3.1. Introduction**

In order to analyze the competitiveness in the financial services industry and particularly the importance of innovation in this environment, it is important to understand the dynamics related to competition, its constituencies and the key factors influencing this scenario.

Banking industry competitiveness is the ground for much research and discussion. The size of large banks and the profitability are often perceived as a lack of real competition in this market.

Recently, a new wave of large bank consolidation in the US which included the merger between Bank of America and Fleet; and JP Morgan Chase and BankOne, has raised the temperature of the discussion around banking competitiveness. The so-called “super-banks” are getting enormous market power and consequently can impose monopolistic practices to the market.

A very interesting research study (Berger et al.) investigated the banking profit persistence in the US and concluded that though it has changed over the past three decades, impediments to competition and informational opacity continue to be strong determinants of the increasing banking performance.

These upward shifts in industry persistence imply one or more of the following possibilities: 1) product markets have become less competitive; 2) the banking industry has become more opaque, and/or 3) the banking industry has become more sensitive to regional/macroeconomic shocks. In the case of the US industry, their results suggest that the most important issue is the informational opacity, though market concentration also has some influence but new entrants' barriers which implies in product markets less competitive very low influence.

In this chapter, we intend to discuss, in a structured way, the most important characteristics that determine the financial industry competitiveness and how technology innovation impacts these characteristics as well as how technology strategy is impacted by them.

### **3.2. Porter's Five Forces Model**

In this section, we will put together the concepts described in the previous chapter in a framework that could help us to understand the market structure of financial services. To

do so, we chose the well known Porter's Five Forces Model (Porter). It will help us to explain the sustainability of profits against customers and suppliers bargaining and against direct and indirect competition.

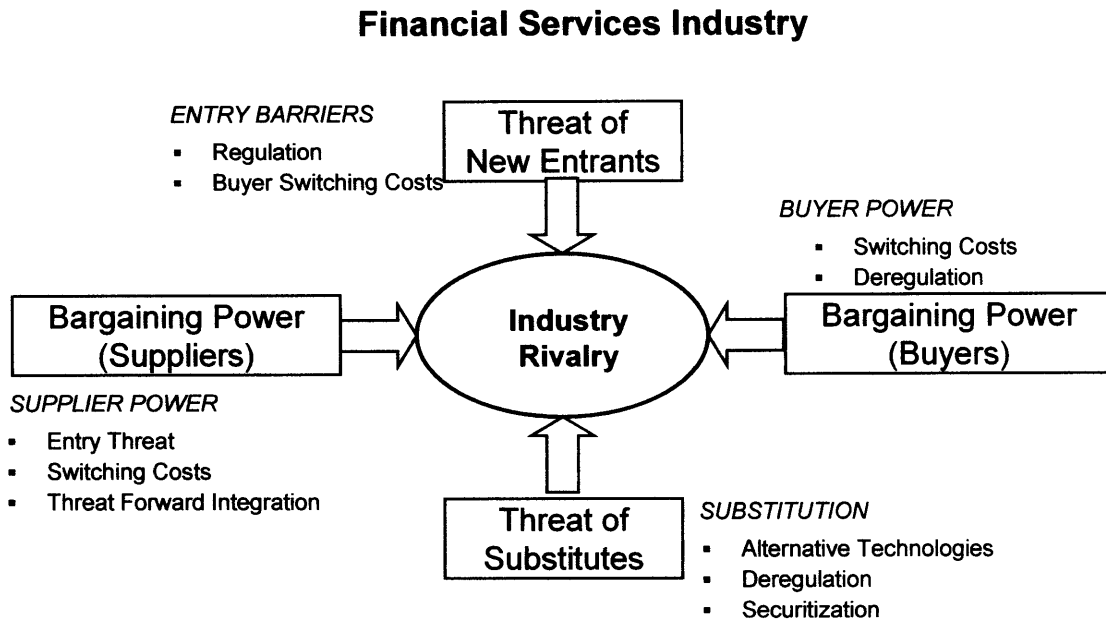


Figure 3.1: Porter's Five Forces Model applied to the financial services industry.

### 3.3. New Entrants

#### 3.3.1. Where do new entrants come from?

In some of our interviews, we observed that most bankers do not recognize a significant threat from new entrants. In their opinion, the barriers of regulations, fiduciary duties, and risk management are too high for companies without strong expertise in financial services. Marsh Carter, former CEO of State Street Bank pointed out that "... it is an

issue only in certain areas particularly because carrying a certain amount of fiduciary risk requires having a capital base”.

Nonetheless, these bankers admit that non-bank companies focused in niche market segments can really erode some of their profit sources. However, they do not believe that these niche players can expand their operations to a broad business proposition within the financial services industry.

For instance, we can find new entrants in the following niche markets:

- **Investment boutique** – a small investment firm specialized in offering specific, but limited services to a select number of individuals.
- **Consumer loans** – financial institutions owned (at least partially) by manufacturers that offer loans to stimulate their product consumption.
- **Leasing companies** – leasing companies specialized in financing/leasing expensive machineries.

IT and telecommunication firms were also mentioned by the bankers as likely to enter the banking sector. Indeed, they provide the grounds to a large banking operation, which means data processing and communication.

However, what we have perceived along the last few years is that large IT companies have historically preferred to have strategic alliances with large financial services

providers, strengthening their position as IT partner rather than competing with their most valuable customers in a new arena.

### **3.3.2. Barriers to new entrants**

As mentioned before, the fiduciary duties and related risks are likely the most important barrier to new entrants. However, many other factors impede this inflow. Among the barriers we could list are: geographic restrictions, such as that which happened locally in the US and within some countries that control foreign player entrance; allowances issue; risk management; reserve requirement and global regulation such as IAS and Basel Agreement.

In many industries, economy of scale and technology represent very difficult barriers to new entrants. Regarding technology, the more complex and technologically advanced the industry is (for instance biotech), the more difficulties the new entrants find to compete. On the other hand, in industry related to commoditized or standardized products and processes, such as car manufacturing, the larger the company is, the higher will its return be and therefore, it is very difficult to start small in a certain niche.

In financial services, we can find evidence of an industry strongly dependent on technology and with strongly commoditized products. However, we could not assert that technology and economy of scale are important barriers to new entrants.



In fact, both issues are closely related in this sector. As the highest costs are human resources, IT, when you achieve scale, it should drop your cost per transaction which would mean costs of IT.

However, this does not happen. In large banks, the costs related to legacy systems are much higher than an off-the-shelf solution that a new competitor can buy and start using (Engler and Essinger). Moreover, in terms of telecommunication, as the costs of internet connections have dropped dramatically, any company can afford very cheap links with branches and customers.

It is important to note, that although players with high market share have no considerable advantage in terms of economy of scale, size is quite important in terms of customer loyalty. This aspect represents one of the most important dimensions of the industry competition.

### **3.4. Supplier Power**

We could define different types of suppliers within the financial services industry. The first one is the traditional suppliers for a service industry, namely, IT, real estate, office supply, etc. A second would be the financial supplier or in other words a source of financial “raw material”. For this particular case, we would prefer to treat them as buyers once both depositors and borrowers are considered customers in this industry.

Therefore, analyzing in particular the service suppliers, we see that their bargaining power is not too big. As we presented in the first chapter, financial services providers are the largest IT customers and usually very powerful organizations. In this scenario, it is unlikely to see any important threat from suppliers unless some new technology changes it.

### **3.5. Substitution and Finance Disintermediation**

In one sense, the process of banking disintermediation represents a sort of threat from substitute products and services.

Disintermediation traditionally denotes those who participate in lending transactions when company A borrows money from company B (or capital market) without banking intermediation. Another important concept in this discussion is reintermediation in the sense of shifting from bank-intermediated lending to other intermediaries (Kohn).

In the US, there does not appear to be cycles of disintermediation and reintermediation over the long run, but rather a sustained trend of bank disintermediation. Over the last few decades we have had two important trends supported by regulations and market needs that improved disintermediation.

After 1980, banks were rapidly disintermediated, beginning in 1980-1993 with the bond market. This included junk bonds whose development was encouraged by the Depository

Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980 because thrifts deposit insurance was increased and thrifts were allowed to invest up to 20% of assets in commercial paper. A second disintermediation wave was in 1985-2000 with equity markets and insurers. Both of these channels benefited substantially from the long bull market, which in turn was encouraged by the introduction of tax-free 401 (k) plans in 1981.

Those trends which relied on the financial market idiosyncrasies were reinforced by some of the latest technology innovations such as the Internet and global communication. Indeed, putting together all processes of securitization, lending and borrowing are getting easier all the time, which means that in the future, financial services could be provided on an one-to-one basis without any intermediary.

According to Engler and Essinger (Engler and Essinger), banks have three basic ways of dealing with the threat of disintermediation. They can:

- Maximize the appeal of their products and services and the efficiency, speed, convenience and usefulness of the means by which these products and services are delivered.
- Team up with retailers offering primary levels of utility and create mutually beneficial joint ventures (or even mergers) with them.
- Extend their activities into new areas, whether these are areas of the financial sector (for example, a bank decides to go into the business of selling insurance directly) or non-financial areas (say, a bank decides to acquire a real estate agency

chain (again, this last development tends to blur demarcation barriers between financial institutions).

It is important to note that these trends do not represent a threat from new entrants once there is no new entrant coming into the market. However, it is a change in terms of service and product definition as well as in the industry as a whole. The traditional idea of the importance of the banking industry to the economy starts to be challenged by this situation.

Perhaps the key issue to be discussed is the financial market stability without banking institutions and how the regulators could control the money flow when faced with deep economic crisis, a situation which can happen periodically in any country.

### **3.6. Buyers Power**

We have seen how some technologies have transformed the customer/supplier relationship in order to shift the bargaining power in favor of the buyers. It has come out as an effect in a higher level of choice in financial products, lower switching costs, higher customer information, and rise in the ability to backward integrate.

Indeed, once IT solutions have provided an enormous flow of information, particularly through the Internet, some of the key factors related to banking competitiveness such as

information asymmetry and regulations have changed their relative importance. It is much simpler and faster in a virtual world to get the right information about a supplier.

Customers access a large amount of information and give any information needed by financial providers to get better interest rates, service fees, credit card discount, etc. We could assert that the easier the information flows through electronic devices, the lower will be the financial provider bargaining power.

In spite of all the trends listed above, it is important to note that power shifts slowly from suppliers to customers. Regulations on geographies, lines-of-business and product constraints have been a costly burden on this phenomenon.

### **3.7. Rivalry among existing competitors**

There has been a complex debate on the level of rivalry in financial services industry. Many times customers, press and academia complain about unclear information on products, prices and terms, particularly in comparison with the competition.

What we could assert is that it is an industry which usually avoids any sort of pricing wars, preferring to compete on the basis of product and service customization for different customer segments. It implies a high level of price discrimination practices and therefore a complex analysis approach by most of their buyers.

### **3.8. How innovation impacts this market structure**

As we can see, the financial services industry is a very complex sector in terms of competitiveness that intertwines different and somewhat antagonist interests and perspectives. Even a common sense economic concept such as perfect market competition is somehow not pursued when the outcome of a fierce pricing war could be too harmful to the whole system and its constituencies.

Actually, the financial system itself must work properly to optimize the money flow throughout the economy and the pricing risk among other tasks. The level of competition is not really a fundamental issue if the previous statements are preserved.

Therefore, the key question to be discussed and answered is in regards to the relevance and applicability of technology innovation within the industry.

We do not need to highlight, as we did before, the importance of technology to the sector and the huge amount of money spent or invested every year. But the fundamental puzzle is why these massive expenditures do not bring an effective and clear competitive advantage and why the players do not pursue such an advantage.

Answering this puzzle, we can derive the main point for this research as deciding what the technology fields and financial characteristics are (if any) that could really transform the industry and its competitiveness.

## **4. Technology Applied to Financial Services**

### **4.1. Introduction**

There are many sources of technology innovation applicable to the financial services industry. If we take for example an on-line application for a credit card, it could involve new technologies of telecommunications (broadband Internet, mobile devices), data processing (parallel processing, distributed computing), customer relationship management (Data Warehouse, CRM) and decision-making tools (statistics, artificial intelligence), just mentioning the most important ones.

In this chapter, we intend to discuss how new technologies impact the financial services. To do so, first we present a brief history of technology within the financial industry, including the most important changes that happened over the last three decades. Next, we present a simple technical architecture which will help us on evaluating the layers where each device or technique is effective. For each one of these layers, we will discuss the stage of the applied technology.

## **4.2. Technology Evolution – Brief History**

Prior to the 1980s, IT played a very strict role in the financial services industry. It was responsible for processing the information gathered from various paper-based documents which were then transformed into electronic format through data entry stations, mostly in central departments.

This centralized and narrow role started to change when new efficient telecom protocols and less expensive mainframe terminals were released in the market. Hence, the whole internal process became electronic and the first real-time transactions came out as new services and products.

The next important change happened when the industry replaced the mainframe terminals with PCs. In the beginning, it represented a simple matter of cost reduction as the PCs were cheaper than mainframe terminals but when some end-user tools such as word processing and spreadsheet were launched, the PCs started to change dramatically the way many operational tasks were done.

In the beginning of 1990s, the Client/Server architecture, aligned with the Reengineering wave (Hammer) levered higher investments in IT.



The industry investments on technology and new business application continued to grow until the mid 1990s when a larger and stronger wave hit the industry, the Internet.

Since 1998, the portfolio of financial services offered on Internet and the number of users have grown consistently despite the so-called e-market bubble burst in 2001. Currently, we can make payments, execute money transfer, negotiate a mortgage contract, open an account, trade securities, and track insurance plans, among many other services.

On the business origination side, the Dieringer Research Group concluded that almost one third of American adults have applied for a new account or policy online during 2003.

The fast spread of Internet banking may result in the benefits of this technology going primarily to consumers as banks incur the costs of providing these sites to maintain market shares. That is, competition may currently or in the near future force banks to adopt the technology just to keep existing customers and not charge enough to earn abnormal profits from providing this service.

Consistent with this possibility, banks offering Internet sites and those planning to adopt them generally referred to a need to remain competitive and retain customers, rather than any increase in revenues to cover their costs.

This is similar to the experience of U.S. banks adding ATM networks in the early 1980s without charging the full costs of implementing that technology due to increased competitive pressures (Berger, 2003).

In regard to the technology evolution in financial services, we observed that most of the fundamental innovations arose from the technology suppliers. These suppliers created patents, licensed solutions and protected their ideas from competitors, but always aiming at the largest likely number of financial providers as their customer base.

On the other hand, the financial providers have based their strategy on adopting new technologies as soon as they were convinced that these innovations could add value. More sophisticated tactics such as alliances with suppliers to assure exclusivity or intellectual property – IP protecting were rarely used over the last three decades.

One manager whom we interviewed pointed out that the industry is not interested in competing through innovation and it is convenient to have any good idea shared to the whole market in order to assure that the innovation assimilation is as fast as possible and likely surplus can be captured by all the constituencies in a reasonable way. He also observed that the key competition issues are scalability and customer satisfaction where innovation has a relative importance.

### 4.3. Technical Architecture

Technical architecture has been a very exciting theme within the IT industry. Many companies supported by important consulting firms have pursued the adoption of a flexible and simple IT architecture. The key objectives are: readiness to higher scale; flexibility to introduce new products and services and lower system maintenance costs.

Regardless of specific details, most technical architectures have the same key elements which are the distribution channels, middleware, back-end systems, customer management and management information systems – MIS (figure 4.2).

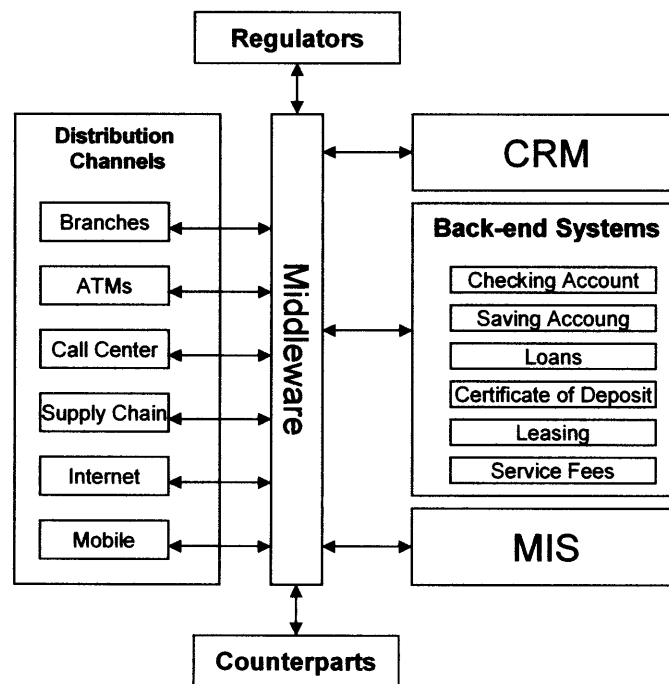


Figure 4.1.: General IT Architecture in Financial Services.

Distribution channels are responsible for the front-end applications and connectivity solutions used to allow customers to access financial services and products.

The financial services and products are encapsulated within the back-end environment and they are connected to the other architectural elements through the middleware solution.

The middleware solution is in charge of distributing all sorts of messages or transactions (depending on the technology) among each architectural element. Although the middleware has no information storage within it, this is the fundamental piece of any architecture to keep real-time systems flowing and alive.

The last elements are customer relationship management (CRM) and management information systems (MIS). Both layers are responsible to store large amounts of data and to deliver reasonable information to managers make decisions.

In fact, there is just one important difference between CRM and MIS – their purposes. CRM is focused on customers and all sorts of information to make them more satisfied and profitable, whereas, MIS is focus on making sure that the financial resources are well allocated among products, services, customers and geographies. It turns out that the internal areas responsible to manage these tasks are different and thereafter, the technical solutions are usually distinct. Nonetheless, there are many similarities between the technologies used in both layers.

## **4.4. Distribution Channels**

### **4.4.1. Traditional Channels**

Distribution channels are the first internal layer when customers interact with financial services providers. In the traditional branch structure, customers request services from the clerk who is responsible to access the internal systems. This simple workflow demands almost no previous knowledge by customers on how to make a certain banking transaction and it is also a very secure operation. However, it is costly to providers.

During the last decades, the banking industry has pursued all sorts of innovations that could be less expensive than the traditional branch operation as well as secure and friendly to non-expert customers.

As telecommunications became more robust and less expensive, banks began to use more extensively centralized call centers which brought more convenience to customers aligned with lower costs of real estate, training and headcount. Moreover, it did not create any substantial downside in security and customer satisfaction.

### **4.4.2. ATMs**

The ATMs were a more radical change to the industry. They have cut an important percentage of data entry cost as they transferred most of the operational tasks from clerks to customers.

If we take a look at the table bellow where we compare the growth of ATM's with number of banking organizations, gross total assets (GTA) and number of physical banking offices, we realize the effect of this technology in the industry and how it transferred a huge number of transactions to self-service concept.

<b>Year</b>	<b>Number of Banks</b>	<b>Gross Total Assets (GTA) (Strillions)</b>	<b>Number of Physical Banking Offices (thousands)</b>	<b>Number of ATMs (thousands)</b>
1984	14,392	3.44	50	58
1985	14,272	3.62	51	61
1986	14,058	3.80	51	64
1987	13,561	3.78	53	68
1988	12,984	3.78	54	72
1989	12,563	3.84	54	76
1990	12,202	3.77	56	80
1991	11,821	3.69	57	84
1992	11,359	3.67	58	87
1993	10,874	3.78	58	95
1994	10,362	3.99	59	109
1995	9,857	4.18	60	123
1996	9,448	4.35	61	139
1997	9,066	4.70	62	165
1998	8,711	5.04	64	187
1999	8,510	5.20	65	227
2000	8,238	5.55	67	273
2001	8,016	5.69	72	324
Average Growth rate	-0.033	0.030	0.021	0.101

Table 4.1: Growth of ATMs in comparison with some other banking industry indicators.

Although ATM has been a very successful technology, even today, we find a relevant number of customers having difficulties to use it and frauds are much more likely in ATM transactions than with a branch employee.

According to Berger (Berger) banks essentially had to “give away” the benefits from the ATM technology in the 1980s as the industry became more competitive due to deregulation and rents from market power shifted to consumers.

#### **4.4.3. Internet Banking and e-Business**

According to the research group eMarketer, there will be over 30 million households using internet banking in 2004 representing 26.1% of total households and 39.5% of total on-line households. It is more than double the number from just three years ago.

On-line banking penetration rate in Europe is not as strong as in the US, though the numbers are also impressive. In 2003 18% of the total on-line European households or 72.0 million people were using Internet banking.

Even in developing countries, the usage of virtual channels for banking has been considerable. In Brazil, according to the local Bank Federation, the number of people using internet banking was roughly 17 million, representing almost 10% of total population.

Although Internet Banking is a well-established technology, much progress and new fields of applications are expected from e-business technologies. Particularly, office banking through the Internet is not yet a well-developed market. Research from Informa Research Services discovered that only 12% of small businesses with annual revenues under \$1 million were banking online in 2002.

The fast spread of Internet banking may result in the benefits of this technology going primarily to consumers as banks incur the costs of providing these sites to maintain market shares. That is, competition may currently or in the near future force banks to adopt the technology just to keep existing customers and not charge enough to earn abnormal profits from providing this service.

Interviewing a manager responsible for the e-business department of a New England bank, he mentioned two important characteristics in the current stage of Internet Banking. Firstly, they have benchmarked the competitors and there have been no fundamental differences in terms of functionalities among the largest 10 players. Secondly, they are really focused on security improvements instead of new applications.

During the Internet bubble, many companies considered internet banking as a source of disruptive technology. Indeed, we observed many new entrants that based their operations largely on Internet channels. Moreover, some large organizations decided to launch specific internet-only units.

As of March 2002, there were 20 Internet-only banks and thrifts in the U.S. and about a dozen other such institutions have failed, been acquired, or voluntarily liquidated. A few large banks set up Internet-only units, and then integrated them into the main bank after poor performance. Perhaps, the most famous case of internet-only unit was BankOne's Wingspan.



One issue discussed during our interviews was the reason why Internet banking did not become a sort of disruptive technology which could change dramatically the industry competitiveness.

In most cases, the managers considered that the customers still need their own relationship managers to proceed with more complex transactions such as mortgage, life insurance, or for commercial banking, long-term loans. One asset manager asserted that customers feel more comfortable dealing face-to-face in these circumstances.

Christensen and Raynor (Christensen and Raynor) have a different perspective.

According to them, “if your idea for a product or business appears disruptive to some established companies but might represent a sustaining improvement for other, then you should go back to the drawing board”.

Indeed, internet banking was not a disruptive innovation to the financial services industry. Prior to the Internet, banks used to provide home and office banking solutions that had basically the same functionalities though they did not have the same convenience.

Therefore, to the established companies it was not a big deal to implement their internet banking solutions to replace the old-fashion home/office banking ones. From the customer perspective, there was no real incentive to change the financial provider to a

new one based specifically on the virtual channels but neglecting the traditional ones without an effective and long-term advantage in costs or product customization.

#### **4.4.4. Mobile Computing**

Mobile computing has been a frustration to the financial industry. Many of the efforts on mobile banking, m-payments and mobile corporate applications have spent huge money without effective return. One may say that it is strongly impacted by the difficulties the whole telecom market has faced over the last few years and in particular, the mobile technology companies. We might remind readers that even the highly expected 3G technology which would allow broadband mobile communication was postponed by the incumbents as a way to get better economic results before a new wave of huge investments.

Nonetheless, a very simple technology such as SMS – short messaging service has had a fantastic impact in terms of information flow from financial companies to customers.

#### **4.4.5. Information Security**

In the past, information security was related to internal good practices enforcement through password maintenance, audit track in operational systems, double-check in financial transactions and so forth. When the companies connected their internal networks massively to the “open world” through the Internet, electronic payments and market feeders (Bloomberg, Reuters, etc.), a new sort of security issue arose.

The considerable anonymity brought by this new scenario, raised the number of people eager to defraud banks and lenders without a high risk of being caught. Fraud losses in credit card, internet transaction and stock brokerage have increased quarter after quarter regardless of the huge investment in information security spent in the whole industry.

In 2003, in an annual survey, the Gartner Group asked some managers in the financial services industry about their top-ten technologies priorities and the highest scored was “Security Enhancement Tools”.

Many technologies have been tested to improve security procedures. Biometrics, smart cards, more sophisticated e-signature, e-Tag (RFID based) and voice recognition are some of the initiatives followed to enhance the authentication process, which is the front-door entrance for most financial transactions.

Once the hackers get entrance to systems, it is much more complex to avoid frauds or even operational damage such as system downtime due to excessive denied services requests. This scenario requires more complex tools to detect, identify and avoid the intrusion damage. Artificial Intelligence tools as well some other computing intensive techniques have been tested with reasonable success though it still early to say that it can solve most of the weaknesses.

#### **4.4.6. Financial Services in Supply Chain**

The offer of services and products through virtual channels in a high level of convenience to customers is roughly dominated by the financial services industry.

A new trend within the industry is to adapt its solutions to customer systems and processes. It consists in interacting with the internal systems of any customer to all sort of financial transactions such as product/service offering, financial auction, balance statements, accounting transactions, and so forth.

The key concern related to this business proposition is the cost of a customized solution for each customer. In fact, it would include costs with IT systems adaptation, security solutions, process/product design and P&L tools.

However, the adoption of enterprise resource planning (ERP) solutions as well as the diffusion of web services usage has facilitated the implementation of financial services solutions along the supply chain.

As the financial providers can develop a specific solution for each large ERP solution such as SAP, Peoplesoft and Oracle, it is fairly simple to roll out the implementation to other customers using the same platform.

Web services are able to encapsulate back-end systems complexity in a very simple protocol which requires very low cost from the customer standpoint to adapt its systems. It implies that web services has the proper capabilities to integrate different business

platforms offering all sort of financial services, online and real-time in a transparent way to customers along any kind of supply chain.

#### **4.5. Middleware**

For many, the term middleware is ambiguous and, therefore, requires definition before discussion. Gartner's definition of middleware provides a comprehensive taxonomy of middleware functionality and middleware products.

Roughly, middleware products are software solutions responsible for transferring information among different systems and modules, using a pre-defined protocol and controlling the accuracy of each transaction. Most famous solutions are Microsoft's TMS, IBM's Websphere and BEA's Tuxedo. Considering that most transaction in financial services are mission critical, middleware products are extensively used.

On the top of a middleware product, we find the particular middleware functionalities that are normally implemented by each financial provider which is directly related to each business dynamics. These functionalities are in charge of the communication among internal systems as well as with external entities such as regulators and counterparts.

The combination of middleware products and functionalities has gotten attention of managers because without a certain level of flexibility and scalability in this layer, large

organizations would face enormous problems to growth either organically or through acquisitions.

Indeed, the costs and time involved in financial products or services implementation can be very high when the systems are not easily maintainable.

In terms of M&A, technology has a fundamental importance during the hand-over period. Indeed, system and product integration is a hard part of these deals and if the firms are not well prepared for a non-disruptive, inexpensive and fast merge, most of the synergies will be lost.

According to Berger (Berger) improved IT and risk management methods may speed the processes of integrating the computer and risk control systems, reducing the costs of integration and the amount of time during which managers may be unaware of developing problems.

In regard to M&A, an effective middleware solution is much more important for a large organization. Usually, their systems are old-fashioned, complex, too internally intertwined and costly to maintain. As it is very difficult to rewrite all these systems using a more flexible architecture, the middleware can encapsulate all this complexity and make it simpler to connect to any other system or entity.

During our research, we perceived that this technology has different importance to IT managers and business unit leaders. The first group considers the most important issue in terms of assuring the adoption of future innovation. On the other hand, business leaders often do not understand the meaning of middleware and they are afraid of a self-contained innovation created by the IT guys that will never bring effective value to the organization.

Curiously, just one business leader, a former CEO of a banking institution in the US, mentioned that a kind of middleware adoption in the late 1990s was the reason for their success in the Internet age.

#### **4.6. Back-end Systems**

The back-end systems are also called core systems. This denomination gives us an idea of the importance of this layer to the overall architecture.

In general, the back-end systems can be product-oriented or customer-oriented.

By product-oriented, we mean that the fundamental information is a contract file and everything else is related to it. Niche players such as leasing companies normally use this architecture as they have few products with low cross-selling activities and workflow productivity is one of the most important measurements.

On the other hand, a customer-oriented architecture has the customer file as the link to any transaction, service or product. Large banks with large portfolio of products and services and strongly dependent on cross-selling rely on this architecture to develop their systems (Figure 4.3).

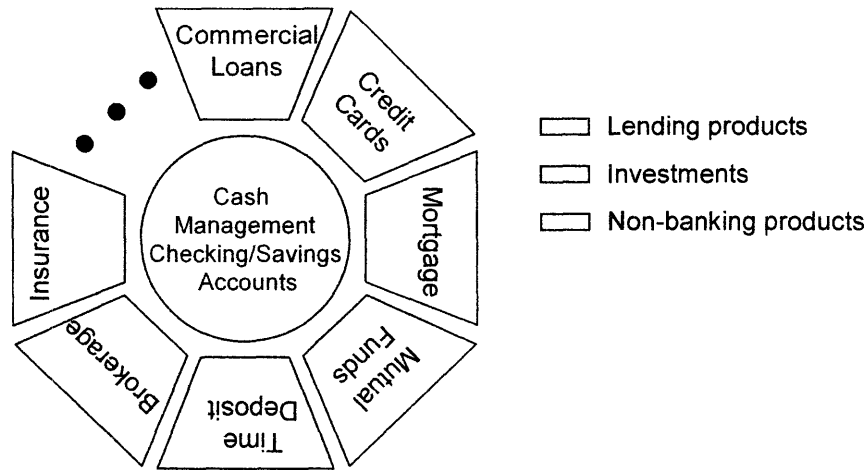


Figure 4.2.: Customer-oriented Architecture.

Clearly, a product-oriented architecture is simpler, less expensive but also too loose. As the organization grows and expands its portfolio, the product-oriented architecture becomes too narrow and the firm might move to a customer-oriented solution though it can mean higher costs and more complexity.

We observed in our interviews that banking managers are eager to change their in-house developed back-end systems to an off-the-shelf solution. They perceive the internal systems as expensive and complex and the intention in moving to an external solution is to copy the manufacturing industry experience with ERP applications.



During our research, we found some solutions available for small and medium-size financial providers but none of them could be applied to large organizations. Nonetheless, some solutions such as Fidelity Information Services (FIS) have been used for particular product processing (in the case of FIS, 40% of all consumer debt in the US were processed by this solution in 2003).

In fact, the debate about using in-house developed solution or off-the-shelf software packages hides another important issue which is the strategic role of the back-end systems. We heard from a CEO that any new development his team does could be copied by the competition, at most, in few weeks and the opposite is also true, which means that these systems are completely commoditized and we can get no differentiation from them.

#### **4.7. CRM and MIS**

CRM is a very broad concept and it has become a buzz-word in the IT market. It is curious to notice that most technology suppliers include some CRM functionalities in their products and services description.

Roughly, CRM is divided in two categories, the front-end tools and the business intelligence ones.

Front-end tools are represented fundamentally by the so-called CRM Sales suites which support call-center operation and salespeople such as Peoplesoft, Siebel and Pivotal.

They provide front-end applications combining all sort of customer information in a user-friendly manner that can enhance considerably sales and support services. The competitive advantage of these tools relies on how friendly they can gather information to present on the screen as well as the real-time processing capabilities to handle huge amounts of data as fast as possible.

The business intelligence tools are more complex. These applications derive from a whole bunch of technologies that during the 1990s promised large database management such as data warehouse and data mining.

Using the technology available for large database handling, CRM tools build up detailed structured files with all sorts of information about customers. In the particular case of financial services, it has been used for defining the target public in sales campaigns, scoring credit behavior, defining likely cross-selling opportunities, etc.

Although most of financial providers have some sort of CRM already implemented, the results are not impressive, so far. The main reasons are the complexity of implementation and a high expectation confronted with early poor outcomes.

One of the managers interviewed pointed out that it is very difficult to measure how effective your CRM solution has been as it depends on data quality (particularly, customer files) and organizational culture. He stated that “for traditional organizations, if

you give to a branch manager a complete history of each important customer that he/she can use on a daily basis, it could mean a very important change”.

In terms of Management Information Systems (MIS), we have noticed that most financial providers have different teams to develop MIS and CRM solutions, though they have many characteristics in common. One would say that it is necessary to avoid fraud and misconduct in general. But the fact is that companies with this approach are losing money creating duplicate structures which end up being not properly used once they can never see the whole picture at a glance.

## **5. Technology Management in Financial Services**

### **5.1. Introduction**

Unlike most industries, it is very difficult to find a specific R&D area in financial services providers. Usually, R&D functions are split among different areas such as IT, marketing, risk management and business development.

It turns out that an innovation can arise from any one of the areas listed above and the team responsible for that certain initiative often has to assure the commitment and get the involvement of all other stakeholders, which makes any project very costly.

In a conversation with a banker, he pointed out that his organization had tried to create a specific R&D department but it became too distant from the “real business”. Thereafter, most initiatives were either inconsistent with their business model or so broad that the business areas kept apart from it.

Having a specific R&D department or leaving some areas in charge of their own innovation a tradeoff between a very structured and clear process (high coordination) that is too centralized (low motivation) or a loosely coupled structure where many departments can come up with new ideas (high motivation) but no effective process to assure that some ideas will fulfill the complete development cycle (low coordination).

As in most cases where innovation has no coordination, it turns out that the fundamental sources of technology improvements are the IT and telecommunications suppliers.

Therefore, it is reasonable to think that the IT departments have all sorts of incentives to “monopolize” the relationship with technology suppliers and coordinate the innovative projects.

## **5.2. The Role of IT**

Until 2001, and particularly during the mid- and late-90s, investments in IT were relatively high and the industry boasted fantastic growth rates. However, after the Y2K bug ended and changes occurred in the Internet business, most of the large organizations changed their perspectives on IT.

Instead of considering IT as a powerful tool of innovation, those companies became wary because of its high related expenses and low ROI. In some cases, innovation has been perceived as a high-risk investment due to the well-known incapacity of implementation

in the IT industry as well as the gap between what the customer expects and what IT can truly deliver.

The debate has warmed up since 2003 when Nicholas Carr published a well-known article, “IT Doesn’t Matter” (Carr), where he states that IT has become a commodity, affordable and accessible to everyone and therefore, no longer offering strategic value to anyone. He also asserted that firms should shift their IT focus from an innovative perspective to a new approach of making “IT management boring”, worrying just about cost controls and robustness.

Although it is not a common sense within the industry, the idea is supported by some important evidences. The first one is the cuts on IT spending over the last few years.

In spite of the Gartner Group’s forecast for a slight growth of IT spending this year (2%, lower than the historic market growth), last year the IT budget shrank about 13% compared with previous year and other industries average (see table below).

Other important evidence we have observed in some companies that we analyzed is the IT disintegration, which confirms that IT has lost importance to the organizations.

**Estimated Change in IT Spending, by Industry, 2003 & 2004**

<i>Industry</i>	<i>2003</i>	<i>2004</i>
Communications	-17%	25%
Manufacturing - discrete	-2%	13%
Government (all)	-6%	12%
Services	-15%	11%
Healthcare	-0.30%	9%
Petroleum	5%	4%
<b>Financial services (all)</b>	<b>-13%</b>	<b>2%</b>
Manufacturing - process	14%	-1%
Manufacturing - process/food	7%	-1%
Distribution - retail	-12%	-8%
Utilities	6%	-9%
Transportation	0%	-12%
Manufacturing - process/chemicals	8%	-17%
All Industries	-1%	5%

Source: Source: Gartner, November 2003

Table 5.1.: Estimated change in IT spending, by industry, 2003 & 2004.

This disintegration process consists of splitting IT functions in two departments, IT infrastructure and software development. Usually these areas no longer report to a CIO but directly to a COO; sometimes, the infrastructure department reports to the COO and software development to each line-of-business general manager.

One would say that it negatively impacts the cooperation between IT infrastructure and software development, making the IT processes more costly and slow. This is true, but on the other hand, infrastructure activities which are very expensive in large organizations can be treated from the cost reduction perspective by the COO whereas software development can be more focused on business needs and related innovations by business managers.

### **5.3. Technology Outsourcing/Off shoring**

IT outsourcing is more than a trend in financial services. It is a reality. In 2002 alone, banking and credit card industries signed at least seven outsourcing "mega deals," with an estimated total value of more than \$20 billion. Four of these deals – American Express and JP Morgan Chase with IBM, and ABN AMRO and Bank of America with EDS – represented \$14.8 billion per year.

Outsourcing and off shoring are nowadays a common answer to the investment analyst pressure to cost reduction. Even when the deal is not that good, its announcement alone might raise the stock price; perhaps by 5% once the market reacts positively to the decision. Considering that we are talking about a 5 to 10-year contract, overtime all sorts of externalities make the cost reduction commitment absolutely untraceable. Afterwards, the company added value to the shareholder not from a good service contract but from the perception of cost cautions transferred to the market with the announcement. It would be even more interesting if the stock strength could be used in a M&A negotiation.

Usually, companies select the less strategic functions or areas to outsource and then, depending on the results, expand the initiative. The early stage targets are operational functions such as data processing and telecommunication monitoring. According to



Gartner Group, 74% of financial providers rely at least in part on outsourcing for disaster/recovery operations.

Off shoring software development has grown exponentially over the past few years. Indian companies such as Tata, Infosys and Wipro became large IT providers with many financial providers in their customer portfolio. Large American providers like EDS and IBM took their time to figure out the opportunity but now are trying to catch up with the established players by providing the same sort of service from India.

As we can perceive by the data presented in the previous section, cost control was the key motivation for most of large financial companies to consider any sort of outsourcing. The basic rationale is that once it is impossible to get effective advantages through smarter IT usage, it is logical to transfer it to a specialist supplier. The outcomes would be a minor high-level management involvement and lower operational costs.

Nevertheless, it is important to mention that suppliers and customers say that there are many advantages of outsourcing beyond cost reduction (Linder). They assert that it could improve quality, shorten implementation time and open the company to the supplier's innovation portfolio. Although some of these outcomes could happen, it is clear that they are not sufficiently attractive to motivate such important and risky change.

Concluding, it seems that outsourcing is a kind of "self-fulfilled prophecy". As many firms pursue the returns promised by suppliers, their economy of scale and negotiation

power will be higher. Based on this trend, capital markets will push more conservative firms to the same boat through over-valuation and more competitors will feel tempted to follow the streamline.

#### **5.4. Impact on Innovation**

As we pointed out in chapter 4, financial services are always eager for technology innovation. Nonetheless, we have not perceived any fundamental change in competitiveness or even in the industry key characteristics over the last decades due to technology progress. More dramatically, Hjalma Johnson says that “... *if you want to know what the next 125 years will be for banking, look at the last 125 years – and add in the computers and Internet*”.

Considering that most of the innovation capabilities for financial providers come from IT and telecommunications, the loss of relevance of these subjects to the whole industry becomes a critical issue when we define a technology strategy and particularly an innovation strategy.

Indeed, this scenario brings more constituencies and complexity to the strategic planning. Issues about intellectual property rights, confidentiality, flexibility and delivery capabilities come out as part of a governance definition.

Moreover, some firms may adopt a technology strategy where innovation is not a priority or concern. In that case, they might evaluate the risks involving the most likely future scenarios to make sure that it is an appropriate decision.

## 6. Innovation Dynamics in Financial Services

### 6.1. Introduction

During one of our interviews, we asked a banker what he would forecast in terms of changes in competition and market for the next 20 years. His answer was very straight: *“... nothing will change dramatically. I expect the same level of competition, almost the same large organizations, the traditional niche players and roughly the same products and services improved by some new technologies that will arise in this period”*.

Some other managers corroborated this perspective. They all mentioned the strong regulations, financial risks and fiduciary duties as the most difficult hurdles that keep new entrants away from this market

Rarely, we heard that technology innovation applied properly could change the market scenario and bring new strong players to the spotlight.

In this chapter, we intend to analyze the foundations of innovation dynamics, i.e. how innovation changes a particular industry and the differences between service and product oriented markets.

For each dimension presented, we will discuss the particular issues that impact the innovation dynamics within the financial services industry and distinguish it from other business sectors such as manufacturing, semiconductors, software, etc.

## **6.2. The Process of Innovation**

It is common sense to assert the importance of technology innovation to development growth and wealth creation (Solow). Moreover, we know the enormous impact of innovation on society and its power to work social change (Kuhn, Schumpeter).

However, from the enterprise perspective, the common good brought by innovation is not an effective incentive to invest in it. To do so, the company should pursue some competitive advantages through reaching different market segments, getting higher productivity, or building a defense against competitor attacks.

No matter the particular characteristics of a certain industry, innovation sooner or later arrives and changes the entire business. Industrial sectors can be conservative or technologically saturated but almost always we can find disruptive changes through innovations (Christensen).

Firms can act differently when dealing with innovation. They can be pioneers, followers, or even laggards, but they cannot ignore the impact of their technology strategies on their future successes or failures.

Particularly large organizations might have a well defined strategy for technology innovation. Utterback (Utterback) emphasizes “*the dangers inherent in large scale, which often leads to overemphasis on tending to current well-established business, a lack of entrepreneurial dynamism, and vulnerability to innovative competitors*”.

Many authors also studied the fate of failure for well-established competitors when new competitors with disruptive technologies came into the market (Foster, Christensen). In fact, the traditional competitors face increasing constraints from the growing web of relationships, binding product, and process change together. In other words, they suffer the burden of the legacy value.

A popular saying in the IT industry is that God created the world in just seven days because He had no legacy systems to adapt. From the innovation perspective, we should also add to the saying legacy customers, suppliers, internal culture, etc.

Porter (Porter, 1991) points out that “... *newcomers are outside the system of social constraints and may be less aware or less concerned about the disruptive nature of the changes that they promote to the existing web of mutual obligations and understood limits*”.

### 6.3. S-Curve

To understand the dynamics of technology innovation, many authors have used the S-curve model (Foster, Christensen) (figure 5.1). The model suggests that a certain product improvement in a given time period or due to a given amount of engineering effort is likely to differ as the related technologies mature. In the first stage, the innovator needs high investment (FTEs per weeks and capital expenditure) to accomplish a low rate of improvement. Then, as the technology becomes more diffused, controlled and understood, the costs are lower and the adoption rate is much higher. In the third stage, we do not see too much innovation and the performance asymptotically reaches a limit, regardless of the extra efforts invested.

As Foster points out, S-curves almost always appear in pairs, when a new disruptive technology overcomes the former one through outperforming the key functionalities, and so on and so forth.

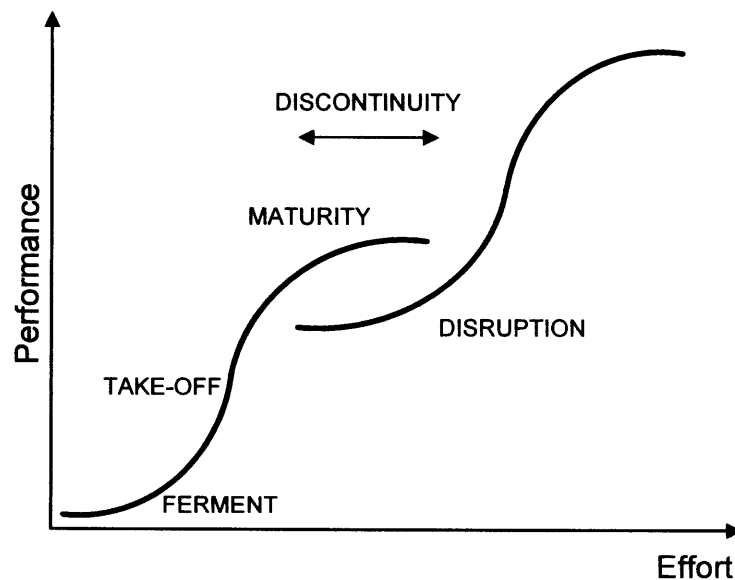


Figure 6.1: S-curve in pairs representing disruptive technologies.

To some extent, the model explains why disruptive innovation usually comes from a newcomer. In fact, in the beginning the disruptive technology does not represent better performance in comparison with the established one. However, its potential is much higher. For some of the reasons discussed above, the firms that rely on the mature technology tend to place their stakes on what they have on hand instead of jumping to another riskier boat, leading to an eventual failure.

From the newcomer perspective, we can identify three sequential steps in the evolution of their role in a certain industry. In the first phase, the challenge is to create a sort of innovation capable of fulfilling the needs of a particular customer segment and if it succeeds, spread it throughout the whole market. The transition phase is strongly based on capital expenditures to capture and keep market share through quality, product performance, etc.

But in the last phase, a comfortable situation of oligopoly must be analyzed from the shareholder perspective, which means analyzing the advantage for a shareholder to keep the investment in a firm within an oligopoly environment where ROE and ROA are lower than the two or three major competitors.

Nevertheless, a disruptive technology can completely destroy the market, even in a niche market, especially if the change process does not hurt the customer too much (education



and sunk costs); outstanding products or services are implemented with a completely different structure to avoid letting the traditional players copy it quickly.

#### **6.4. Disruptive Innovation in Financial Services**

When we apply the innovation dynamics discussed above to financial services, the key question is whether or not it is possible to create a disruptive innovation that could change dramatically the industry.

Although the cases where it happened in financial services were not as clear or as revolutionary as some examples in the IT or biotech industries, we could find many cases within the past two decades.

One example given by a CIO in Brazil during an interview was particularly interesting. In the 1970s, a large retail bank in Brazil decided to open new branches offering the convenience of parking lots to their customers, which was not a common practice in that period.

As the economy in Brazil was growing very fast at that period (in general, two digits growth in the beginning of 1970s), parking lots became a real issue to most people, and the service offered by this bank turned to be as important as financial services fees and interest rates.

There were most likely other important reasons for their success but the fact is that they increased their customer base enormously and by the beginning of the 1980s they were the largest retail bank in Brazil.

It is clear that the financial services industry has some particular characteristics that make it more difficult to innovate radically in comparison to other industries.

One important characteristic that inhibits disruptive technologies is the barriers to new entrants. It means that even when a particular company has a very innovative business model based on new technologies, the hurdles to overcome are so difficult that they prefer to either focus on niche markets or sell the idea to the whole industry and work as a technical partner offering the innovation to the whole industry. As we discussed in chapter 3, these barriers to new entrants consist basically of strong regulations, financial risks and fiduciary duties.

A second reason why disruptive innovations do not happen too often in financial services is the switching costs for customers. There are three causes of high switching costs within the industry: information asymmetry, regulator controls and service fees.

As we presented in chapter 2, the financial providers take advantage of the large amounts of data about their customers to offer better loan and investment conditions. Therefore, even when new entrants have better products and processes, they do not have the proper

information to allow a reasonable risk management and to consequently offer better interest rates.

Moreover, regulators, worrying about money laundering and financial institution frauds (hiding insolvency status, for instance), usually enact many procedures to track accounting transactions. These procedures make it too difficult to open and close new accounts. One direct effect is that even today it is not allowed to open checking accounts on the Internet in most countries. This lack of convenience makes customers “lazy” and they would need a strong reason to change their financial provider.

Even when customers are diligent and eager to experiment with new offers and thereafter to arbitrate among interest rates and services fees, it will be too costly to keep many accounts at the same time, as fixed services fees are usually very high and the advantages of a “good auction” process will most likely be drained to pay these extra expenses.

One final reason that could explain the innovation dynamics in this industry is the way in which technology innovations originate. Usually, they originate from suppliers and academia. In the case of technology suppliers, as we pointed out in chapter 5, the interest is in large and fast diffusion, while protecting the intellectual property from their technical competitors. Therefore, every player in this market has access to the same technology and the only thing that could differentiate a given financial provider is the time needed to market the products and services embedded in these innovations.

Finally, we did not find any evidence that the lack of competitiveness within the financial system could be a reason why innovations do not dramatically change the players' market shares. However, it is reasonable to think that in a non competitive market with fairly good ROE, there is no effective incentive to pursue differentiation via innovation. This is particularly true because it could motivate the competitors to do the same which could drive the market to a price war that would be a nightmare for any player within the industry.

## 6.5. Product, Process and Service Innovation

### 6.5.1. Product and Process Innovation

According to the Abernathy – Utterback model of dynamics of innovation (Abernathy and Utterback), the pattern of innovation of product and process in a given industry can be represented by Figure 5.3.

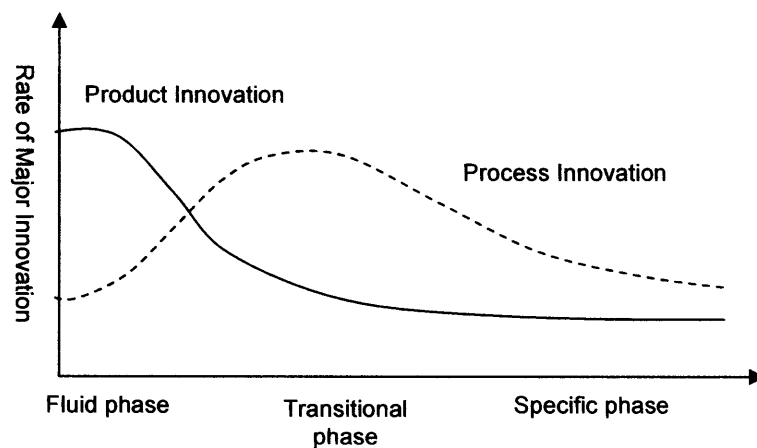


Figure 6.2.: The Dynamics of Innovation – Abernathy & Utterback

- **Fluid Phase:** The product innovation in an industry is highest in its formative years in the period called the fluid phase, where there is a great deal of experimentation.
- **Transitional Phase:** If the market for the new product grows, the fluid phase typically gives way to a transitional phase. Here the rate of product innovation slows down and the rate of process innovations speeds up.
- **Specific Phase:** The industry may then enter into a specific phase where the already standardized product suffers only incremental innovations. Products from different competitors are hardly differentiated whilst similarities are many. The product is mature and the process here receives maximum attention as costs are the essential aspect of the business.

Abernathy and Utterback have successfully proven this model with assembled products such as TV vacuum tubes, mechanical typewriters, hard drives, electric bulbs, and even automobiles.

Applying the model to financial services, we observed that some particular issues come up with. Firstly, it is very difficult to define financial products or services and to separate these concepts from financial processes. As the industry is labor and process intensive, it is clear that any boundaries created will be compromised.

If we consider that the product innovation usually comes from the technical supplier (as discussed in chapter 4), and the financial providers have almost no influence in these

developments, we might say that the Specific Phase is the most important as it represents the point at which processes are implemented within the organization.

In fact, the exploitation stage is the most costly for financial providers, as interesting products that are neglected in terms of developing efficient processes are very likely to fail.

While talking to a manager responsible for innovation in a large retail bank, he pointed out that the key problem is when an area comes up with a great product that needs IT and other internal areas to be completely developed. It turns out that the internal areas (in particular IT) create innumerable hurdles in terms of internal standards and procedures, so that it is almost impossible to launch something good in a short period of time. Moreover, all this coordination (as detailed in chapter 5) breaks up the team motivation to pursue innovative ideas.

This is a very interesting perspective as it is aligned with the model presented above, as it means that it is quite difficult to develop innovative products at the same time as we develop the processes related to it. The delay between the new product acceptance by customers and the implementation of efficient processes to fulfill the product requirements cannot be too long but it cannot be void either.

# 7. Technology Strategies for Financial Providers

## 7.1. Introduction

In this chapter, we will discuss how financial providers should establish their organization in terms of technology innovation. To do so, we will use a simple framework as a method of putting together all the important facets of technology strategy in specific dimensions and then will apply it to the financial services industry. This framework relies on the three following dimensions: how to create value; how to capture value; and how to deliver value through technology innovation (Henderson).

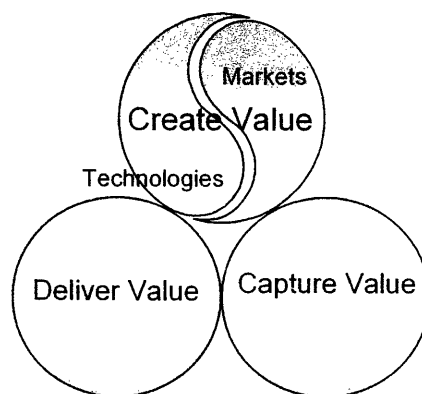


Figure 7.1.: Technology Strategy Framework

Firstly, to create value, firms should know what are and what in the future will be the important technologies within the industry. Among this portfolio of technologies, they must decide in which technologies to invest so as to pursue disruptive innovation. They must also decide in which technologies to invest so as to support the “business as usual” through incremental changes. This process might combine the firm’s knowledge about related technologies as well as customer demands. Moreover, firms should perceive when, in a certain S-curve, the current technology is reaching its limits in performance and it is the right moment to move forward to new technologies with better future perspectives.

Value creation through innovation does not mean that the company will capture this entire value surplus (Van den Steen). In fact it is shared among all the value chain, which means downstream, upstream and end-user (figure 7.2).

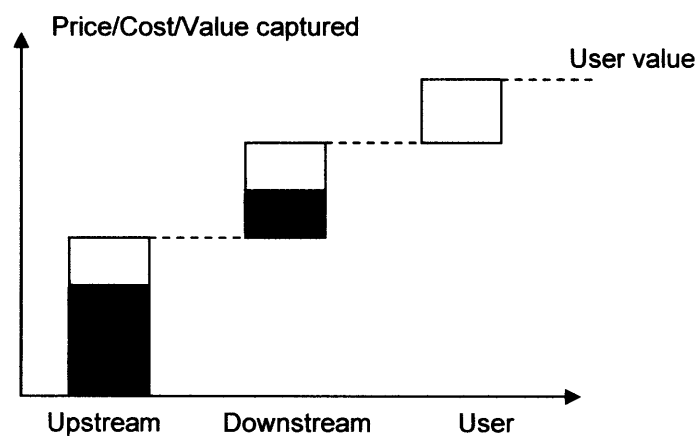


Figure 7.2.: Value captured in each step of the value chain.

Therefore, to maximize the value capture, companies could either appropriate the knowledge related to the innovation (through IP protection, secrecy, speeding up the time-to-market, etc) or control the necessary assets to exploit it (Teece).



Finally, firms have to decide how to deliver value or how to build the organizational capabilities to deliver it. By organizational capabilities, we mean the corporate governance to treat technology innovation, the organizational culture and the way in which it handles radical changes (Tushman).

To have an effective strategy for technology innovation, a certain company should go through these dimensions (create, capture and deliver value) analyzing its strengths, weaknesses, opportunities and threats.

Our intention in this chapter is to suggest some directions to financial providers depending on their market positioning and overall strategy.

In terms of market positioning, we could define two groups of players that represent the majority of the financial services industry: the large banks and the niche players.

	<b>Niche Players</b>	<b>Large banks</b>
<b>Business sectors</b>	Focused on a particular business such as car loans, securities underwriting, credit cards, etc.	All sorts of financial services and products from retail and commercial to investment banking.
<b>Customer Segments</b>	Usually aimed at only one customer segment	All customer segments
<b>Geographies</b>	Usually local players	Global players

Table 7.1.: Typical characteristics of niche players and large banks.

As a large bank, we mean those large organizations offering all sorts of financial products and services in different customer segments and geographies. Particularly in Europe, these sorts of players are called Universal Banking organizations. Examples of companies

in this group are Citigroup, JP Morgan Chase, HSBC, Deutsche Bank, ABN AMRO Bank, etc.

The niche players are focused on particular business sectors, such as mortgage, car loan, investment banking, asset management, etc, although they can offer their services in more than one geography or customer segment.

## **7.2. Creating Value**

As we discussed in the previous chapter, to create value in financial services, firms can focus on either product or process innovation, although, in this business the boundaries between each one are not clear.

### **7.2.1. Creating Value – Niche Players**

In our research, we observed that niche players have many opportunities to innovate using new technologies available in the IT industry.

In particular, we consider that the following fields are the most effective for niche players:

#### **Process Automation**

This is a developing application grounded by a business rule engine that orients the organization to think of the business as a series of processes flowing through internal

areas and out to customers and suppliers. The concept would make the firm faster and simpler and the processes cheaper. New technologies such as document imaging and management and workflow engines can be used to create very efficient processes in particular for companies focused on large customer bases and few financial products, such as brokerages, consumer lending companies and credit card processors.

### **Business Intelligence Tools**

As niche player do not usually have long term relationships with their customers, they work on credit approval, credit recovery and product offering much more than large banks (see chapter 2 on information asymmetry). Business Intelligence tools such as data mining, CRM and artificial intelligence engines could get more information from less data and therefore neutralize large banks' advantage of large customer databases. It is important to mention that these tools require very skilled people in order to be used effectively.

### **Security Engineering**

When niche players decide to expand their business, some important barriers are: strong capitalizations, banking regulations and fiduciary duties related to a large operation.

Therefore, portfolio securitization is a very interesting instrument when used properly to overcome these hurdles. While talking to the CEO of a large bank, he mentioned that even for them it is a very interesting option when coming into a new risky business.

However, he also pointed out that it is not a simple operation and often it is necessary to design a very complex deal to make it happen.

### **Account Aggregators**

The basic idea of an account aggregator is to get information from different financial institutions and present the consolidated statement in a user friendly way to customers (Moore).

While interviewing a manager responsible for e-business in a large retail bank, he pointed out that these initiatives affect customer data confidentiality and bank security. However, he also mentioned that when some local banks pursued building this sort of solution in a more secure way, the largest bank in the group decided to stay out because the solution could stimulate an undesirable price war.

As discussed in chapter 3, the switching costs are often the most difficult barrier to a niche player or a new entrant who is thinking of quick growth. Therefore, if a niche player is very competitive in price and quality for a particular service, it is very attractive to provide an account aggregator to its customer in order to make clear its product advantages.

### **7.2.2. Creating Value – Large Banks**

In most of our interviews and through reading the technical literature, we observed that large banks have currently been obsessed with two fundamental issues: customer relationship and scalability.

The reasons are clear; they need to improve information about customers to enforce cross selling opportunities as well as to decrease interest rates offered to long-term clients. In terms of scale, the new wave of acquisitions begun in 2003 confirmed the common strategy of getting bigger to obtain competitive advantages through economy of scale.

Having these points in mind, we suggest that the following technologies should be pursued by large banks in order to maximize the value creation through new ideas:

### **Customer Relationship**

During one interview with the CEO of a retail bank, he explained his strategy in a very simple way. He believes that technology is important to financial services but not essential. This means that it matters but it cannot create a sustainable competitive advantage to a certain firm, as there is no protection and it is quite easy to copy any new good idea. Therefore, the company should pursue growth through acquisition which depends on opportunity windows and organic growth. The organic growth comes from expanding your customer base which is complicated due to high switching costs and the goal of making your current customer more profitable; this presents the situation in which technology can best help the company.

Customer Relationship Management (CRM) tools should help this kind of organization to improve customer profitability, stemming from higher customer satisfaction, cross-selling and lower attrition.

As we discussed in chapter 4, most of the CRM promises have not become a reality yet.

As with other complex technologies that manipulate large amounts of data, it is very difficult to make the business requirements happen as planned.

When talking to a CRM manager, he pointed out the importance of having excellent people working with these tools. He also suggested that we should pursue people with mixed backgrounds in technology and financial services and avoid experts in either one of these fields that do not understand the other perspective.

### **Electronic Channels**

During our research, we observed that most large banks have commoditized services in their electronic channels. One manager responsible for the e-business area in a retail bank in New England pointed out that he did not see any difference among the internet banking services offered by the 10 largest retail banks in the US.

Perhaps internet banking has reached a saturation phase in terms of innovation but many other opportunities using the Internet are still immature. For instance, technologies such as web services to integrate the supply chain with financial services, mobile banking, and instant messaging could have enormous impact on convenience, cost reduction and higher revenues.

## **IT Architecture**

Whether it be to grow organically or through acquisitions, large banks should have a very flexible IT architecture. As we discussed extensively in chapter 4, banks having a flexible IT architecture can easily add new products and services with low system maintenance costs and nearly no impact in availability during the change process.

Moreover, costs of data conversion and product/service adaptation after an acquisition can be much lower if you have an architecture that properly absorbs external data and creates new products/services just by changing user parameters instead of fixing software source codes.

As investing in IT architecture is somewhat difficult for bankers that do not perceive the importance of this sort of infrastructure, the internal technical people have the role of convincing these business leaders of the real value behind a smart IT architecture.

### **7.2.3. Financial Services Network**

In one of our conversations with a manager responsible for innovation in a large bank, he stated that in the near future he foresees consistent growth of financial services networks.

Financial services networks consist of different companies collaborating with each other to offer different products and services in different distribution channels. Therefore, each stakeholder can focus on its particular capabilities and use the other's to present a complete portfolio of products and services to customers.

In the particular case of this manager’s institution, the idea has been investigated as a manner to offer other financial companies’ mutual funds to their customers. However, they have faced strong internal opposition as this sort of offer would likely compete against the internal asset management department.

It is reasonable to think that the bond among the constituencies should be the company that controls the final customer relationship either virtually through internet banking or through a traditional branch-based bank. Figure 7.3 shows how the financial services networks are structured.

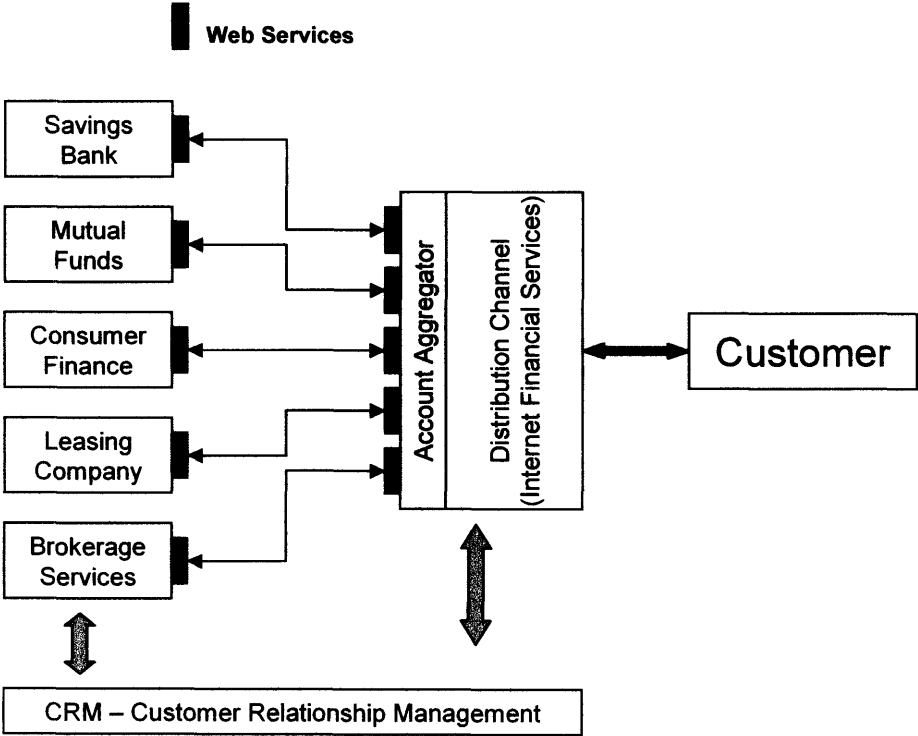


Figure 7.3.: Financial Services Network.



As we can see in figure 7.3, financial services networks can put together all kinds of financial providers and the key technologies used to carry it out are CRM (sharing information with all companies), web services (to simplify the connectivity) and account aggregators (to create the consolidated statements).

Within this business model, niche players could stay focused on their own markets without losing competitiveness to large organizations that offer the so-called one-stop-shopping convenience.

## **7.3. Capturing Value**

### **7.3.1. IP Protection, Licensing and Alliances**

As we mentioned before, intellectual property protection is not common within the financial services industry though its technology suppliers make extensive use of it.

In one of our interviews, a banker mentioned as an example a new security feature developed by one of his competitors who decided to patent the idea. In his opinion, it was not a smart idea, as the whole industry could take advantage of this innovation improving the customer perception of security in any financial transaction. He also observed that it is not in the technology innovation field that we are competing.

As a large bank, we agree that it is a very conscious position that a fierce competition through innovation could erode profit margins if the company does not catch up quickly.

Our perception is that each large player, having in mind that the game's outcome might not be advantageous, tends to allow for the free flow of new products and processes throughout the industry.

It is also clear that these large banks rely fundamentally on the accumulated knowledge obtained over decades of process and product improvement which is not easily copied by the competitor. In other words, effective value does not come from a particular innovation but from the overall system supporting the large operation.

Nevertheless, from the niche player perspective, some level of intellectual property protection should be very attractive. Indeed, as large banks can easily copy any good idea created by a niche player or new entrants, the competitive advantage brought by this innovation will not be captured by the niche player but dispersed among the large banks and technology suppliers.

Two major concerns arise with the intention of protecting intellectual property by niche players: how to do it when you are using a supplier's technology (at least in part); and how to patent processes which are in many cases the core of a certain financial innovation.

The first concern regarding tech suppliers could be solved by creating an alliance for a specific project. However, as we mentioned in chapter 4, the tech suppliers do not have strong incentives to invest in this sort of alliance as it is much more interesting to

implement a first solution with an “early adopter” customer and then to spread the innovation throughout the industry without any hurdle created by alliances with the initial partner.

One idea discussed with a manager responsible for e-business in a retail bank is to look for small high tech companies that have lower power when negotiating exclusivity or IP protection.

Regarding the hurdles of patenting financial processes and services, it can change dramatically depending on the country and the service you wish to protect.

Concluding, we observed that it is hard for niche players to capture value from innovation because they cannot compete against large banks which can rapidly catch up unless any protection or licensing costs delay their move. On the other hand it is too costly for a small company to create and maintain (litigations) patents.

#### **7.4. Delivering Value**

To understand how to deliver value through innovation in financial services, we should understand how the organizations can create an innovative environment. Usually the answer (Henderson) includes motivating and integrating R&D.

As we discussed in chapter 5, it is not common to find a specific R&D area in a financial provider. In fact, these functions are shared among some departments such as IT, marketing, business development and risk management.

Moreover, in many conversations, we perceived that the idea of creating an innovative organization is not a priority for most bankers. This does not mean that they are averse to having innovation initiatives but that it is not a fundamental issue in the company's business strategy.

Therefore, it is clear that large banks should pursue alliances which could maximize their business knowledge with technology suppliers' expertise.

## 8. Conclusions

During this research, we confirmed the importance of technology innovation to the evolution of the financial services industry. Many technologies that have been developed over the past few years dramatically changed the way we access and choose financial institutions. It is particularly impressive the changes that what web services, mobile computing, CRM and workflow engines have on improving industry efficiency.

We also can assert that financial services providers have been very successful in creating value through technology innovation, and our understanding from this research confirms this trend continuing in the near future.

Although the industry is very efficient in creating value, it is not that effective in capturing and delivering value. As we discussed throughout this work, in cases of very important innovations applied to the industry, such as ATMs and internet banking, the value created was distributed among suppliers, customers and large organizations.

However, we observed that this surplus distribution does not bother the bankers we interviewed. Just like a zero-sum game, they consider that if they lose advantage by not

protecting the intellectual property of one particular technology they developed, on the other hand, they can share the benefits of many other innovative ideas in several other cases.

In terms of delivering value, we also did not see any effective effort to change the current dynamics where innovations often come from suppliers and academia, and internal groups are just responsible to adapt such technologies to the firm's idiosyncrasies. Moreover, the idea of implementing a R&D structure as we see in many other industrial sectors does not get attention of many bankers.

This scenario, considered by a banker we interviewed as "comfortable", seems to be particularly interesting to technology suppliers who are offering innovations that address the business requirements mentioned in the previous chapter. It also appeals to niche players who could create business models using cutting-edge technologies without too much effort and avoid carrying the burden of legacy systems as the large banks do.

Nonetheless, one issue that can dramatically change the technology innovation dynamics in financial services is regulation. From the competitiveness perspective, regulators usually create too many barriers to new entrants based on the idea that radical changes can have a negative effect on the overall financial system.

In a scenario where the capital markets are responsible for guaranteeing the financial system solvency through efficient asset allocation, and any company could offer financial

services, technology innovation would be much more disruptive and therefore more relevant to this industry.

Finally, we suggest that future research studies in this area should focus on the particular effect of some technologies we mentioned as the most important to the industry. It would be interesting to analyze how financial providers could effectively capture value through a certain innovation and what would be the best governance model to carry out such technology.

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