

**Changing Capital Markets Industry Structures:
The Internet Challenge to Incumbent Leaders**

by

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Submitted to the Alfred P. Sloan School of Management and the School of Engineering in Partial
Fulfillment of the Requirements for the Degree of

Master of Science in the Management of Technology

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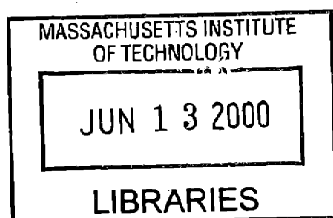
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ABSTRACT

In his 1997 book, The Innovators Dilemma, HBS Professor Clay Christensen discusses the impact of “disruptive technologies” on leading incumbent firms in various industries. In many ways the phenomena of the Internet and the World Wide Web threaten to become the most disruptive technology to many industries in many decades, and perhaps much longer. This thesis examines one such industry: that of the institutional capital markets.

The institutional capital markets industry consists primarily of broker-dealers, serving issuers and investors in concert with asset collectors, organized exchanges and regulatory bodies in various, but inter-linked, geographical and product-defined capital markets. The size and economic impact of the industry, which transacts in excess of \$1 trillion daily, is enormous. The trend in the industry since the global depression of the 1930’s has been one of consolidation and increased integration of product offerings. Beginning in 1997 new, Internet-enabled business models began to pose a serious threat to the existing industry structure. Traditional product bundles are being dis-aggregated and re-priced. New agents are re-intermediating traditional brokers and exchanges. Networks are dramatically improving the efficiency of information. Barriers to entry are falling fast.

This thesis examines the developments in electronic, institutional capital markets primarily from the perspective of leading incumbent firms. The legacy market structure is examined and new changes to that structure are analyzed. Three leading firms in particular are employed as examples. Electronic Communication Networks (“ECNs”) are discussed as the primary challenger to the status quo. Incumbent strategies and potential scenario outcomes are discussed and evaluated. Some recommendations are ventured.

The thesis is based upon a) a review of the academic literature of technology innovation, b) a survey of current media reporting and, where available, proprietary research, and c) interviews with the management of two of the leading incumbent firms. Some internal, proprietary material was also provided by Merrill Lynch, Inc.

The academic literature referenced herein focuses on the legacy of work in innovation in technology and includes most notably Porter’s work on competitive advantage and industry analysis, particularly the famous “five forces”; Foster’s introduction of the technology ‘S’ Curve; Christensen’s work on disruptive technologies and the responses by leading incumbent firms; and Henderson’s teaching in technology strategy and managing the innovative process. Secondary references are made through these scholars to earlier foundation-building work by Tushman, Clark and others.

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I**Introduction: Success and Fear in the Capital Markets**

Despite an unprecedented decade of profitability, growth and concentration of market share during the decade of the 1990's the world's leading investment banks now face a withering attack upon their core franchise businesses from a wide array of new Internet-enabled start-ups. This paper will examine the structure of the global capital markets industry, the nature of these new and potentially disruptive threats, the strategies being employed by both incumbents and challengers, and several likely scenarios for outcomes in the next one to two years.

Three global investment banking institutions - all based in the United States - lead the rankings across most product categories in the international capital markets. The leaders of Goldman Sachs ("Goldman"), Morgan Stanley Dean Witter ("MSDW") and Merrill Lynch ("Merrill") have succeeded in building financial services franchises that dominate their industry. The next tier of players primarily consists of International Universal Banks, which are based upon the foundations of commercial banking models but have added investment banking capabilities over time. This second tier includes Citigroup and Chase Bank in the U.S. as well as Deutsche Bank, HongKong Shanghai Bank, Credit Suisse First Boston, and any number of others, depending upon how the rankings are defined. Each of these players has a distinctive culture, value offering and product mix, but all compete directly with one another in the capital markets. For the purposes of illustration, this paper will focus on the top three leaders.

At the end of the 20th century, these banks are unquestionably thriving. As illustrated by the earnings table below, all three firms enjoyed record profits, and very healthy returns on equity in 1999. Performance over the entire decade was also quite strong.

| Financial Results: Top 3 U.S. Investment Banks 1995-1999 | | | | | |
|--|------|-------------|--------------------------|--------------------------|-------------------------|
| | | <u>MSDW</u> | <u>Merrill Lynch</u> | <u>Goldman Sachs</u> | <u>3 Firm Total</u> |
| Revenues (\$billions) | 1999 | 34 | 35 | 13.3 | 82.3 |
| | 1998 | 31 | 35 | 8.5 | 74.5 |
| | 1997 | 27 | 31 | 7.5 | 65.5 |
| | 1996 | 22 | 25 | N/A | N/A |
| | 1995 | 19 | 22 | N/A | N/A |
| Net Income (\$billions) | 1999 | 4.8 | 2.6 | 2.7 | 10.1 |
| | 1998 | 3.3 | 1.3 | 2.4 | 7 |
| | 1997 | 2.6 | 1.9 | 2.8 | 7.3 |
| | 1996 | 2 | 1.6 | N/A | N/A |
| | 1995 | N/A | 1.1 | N/A | N/A |
| Total Capital (\$billions) | 1999 | 40 | 69 | 40 | 149 |
| | 1998 | 38 | 70 | 26 | 134 |
| | 1997 | 34 | 52 | N/A | N/A |
| | 1996 | 31 | 33 | N/A | N/A |
| | 1995 | N/A | 24 | N/A | N/A |
| ROE | 1999 | 32.6% | 23.5% | N/A | N/M |
| | 1998 | 24.5% | 13.4% | N/A | N/M |
| | 1997 | 22.0% | 26.5% | N/A | N/M |
| | 1996 | 20.0% | 26.6% | N/A | N/M |
| | 1995 | 16.4% | 19.8% | N/A | N/M |
| Total Staff | 1999 | 53,000 | 67,200 | 15,400 | 135,600 |
| Source: Annual reports, Goldman Sachs, Inc.; Morgan Stanley Dean Witter, Inc., Merrill Lynch, Inc. | | | | | |
| Note: Goldman Sachs was a private company before 1999 and did not publish public results. | | | | | |

These firms have prospered upon the waves of globalization of commerce and capital flows that have affected the entire world economy. The technological advances that have in part driven this globalization have also benefited the banks, accelerating information flow and driving down costs in a sector which regularly leads in investment in and adoption of new information technology. Both globalization and technology have in turn driven extraordinarily robust world economic growth during the past decade and longer; growth which has buoyed corporate earnings and stock markets, fueled the emergence and growth of new companies, and driven the remarkable profitability of investment banks like these three. Finally, a major obstacle to the growth of investment banks and the continued consolidation of the financial services

industry finally fell in 1999 after nearly 70 years. The repeal of Depression era Glass-Steagle legislation clears the pathway to the combination of commercial banking, investment banking and insurance offerings in the U.S. – an expected boon to the international competitiveness of U.S. based firms.

Yet at the apparent apex of their power, the leaders of these firms appear to be in great fear that the phenomenon known as the Internet may alter the competitive landscape in such dramatic ways that these remarkable franchises may be torn down and their traditional competitive advantages eliminated. The Internet itself, as well as parallel advances in software and telecommunication capabilities, are spawning new business models which challenge the status quo from multiple directions. To name just a few important models: Electronic Communication Networks (“ECNs”) are threatening to disintermediate investment banks in their traditional roles as market makers; on-line brokers are rapidly stealing market share from traditional brokers; Internet based investment banks are attacking the primary issuance process; and once-proprietary research is being amalgamated and redistributed by online content aggregators.

The phenomenon of the Internet as dire threat to existing business models in financial services has first arisen and been widely reported in the arena of retail equity brokerage. Industry consolidation among wholesale and retail brokerage houses and also with commercial banks, had led to the dominance of the retail brokerage sector – at least in the U.S. – by a handful of firms with enormous reach in distribution. Merrill, Citigroup (through SalomonSmithBarney) and MSDW were the major leaders in this sector. Charles Schwab was also a notable competitor, with a discounted, no-frills brokerage offering. But upstart, web-based, on-line brokerage firms – most notably E-trade – arrived seemingly in the night and began to eat into market shares with heavily discounted yet efficient services. In a remarkably short period of time E-trade’s business model has become dominant for a large segment of retail investors, and dozens of other on-line brokerages have followed. Notably, Charles Schwab was able to perform a remarkable transformation of its business to counter – and take full advantage of – this sea-change, while the such venerable firms as Merrill, Citi and MSDW have been relatively sluggish in their response.

This was in the retail sector, where much of the Internet hype was generated until 1999. But pundits and players everywhere in industry now seem to accept that the truly big story of the Internet revolution will be the e-transformation of business-to-business (“B2B”) commerce. In an often cited (but not necessarily well understood) report at the end of 1998, Forrester Research forecast that annual B2B e-commerce activity in the U.S. alone would grow from only \$ 43 billion at that time to a remarkable \$1.3 trillion per year by 2003.¹ By way of contrast, that number – \$1.3 trillion – is already, right now in 2000 traded in the

¹ “Resizing On-Line Business Trade”, The Forrester Report, Forrester Research, November 1998

global capital markets **nearly every single day**. If B2B is going to be big, the global capital markets likely represent the biggest arena of all for the game to be played out.

This paper will focus on secondary trading in the institutional capital markets, as distinguished from retail and primary markets, and primarily on the emergence of ECNs as potentially disruptive employers of new technology. However, we will also touch upon both primary issuance and retail lines of business.

The paper will follow this outline:

- Discussion and analysis of the legacy model of institutional capital markets
- Discussion of disruptive technologies and new market entrants
- Profile of the ECN threat
- Analysis of disruptive characteristics
- Discussion of the incumbent perspective and response
- Development of some scenarios for the future
- Discussion of technology management issues
- Strategy prescriptions for incumbents
- Discussion of organizational factors and issues
- Conclusion

During the course of the discussion, we will introduce and develop several themes which are of the essence to the future of the industry:

- Consolidation vs. Fragmentation in markets, liquidity, organizations and networks
- Proprietary Technology vs. Complimentary Assets as a source of competitive advantage
- The Open vs. Closed nature of technology standards, platforms and business models
- Integration vs. Modularity in product-service offerings
- Economies of Scale and Scope vs. Network economies

II

The Legacy Structure of Institutional Capital Markets:

Perhaps the most fundamental way to understand capital markets is to begin with this simplistic value chain:

Providers of Capital → Financial Intermediaries → Users of Capital

This chain of intermediated investment and borrowing recurs at a multitude of levels. Savers (providers of capital) make deposits in Savings and Loan Associations (intermediaries), who lend the money to homebuyers (users of capital) in the form of mortgages. Retail investors buy stock in IBM or AOL through a broker, or perhaps a mutual fund. Investment managers at these funds, or at pension funds or insurance companies invest on in stocks, bonds and options through Investment Banks. The key to the value chain is the role of intermediation. **Because both providers and users of capital have always been large in number and extremely fragmented in organization, intermediaries have arisen and been profitable by providing liquidity and information, enabling discovery of demand, supply and price and offering supporting services which facilitate the execution of transactions between ultimate lenders and borrowers.** The essence of both commercial and investment banking is to serve as a distribution channel between investors and users of capital.

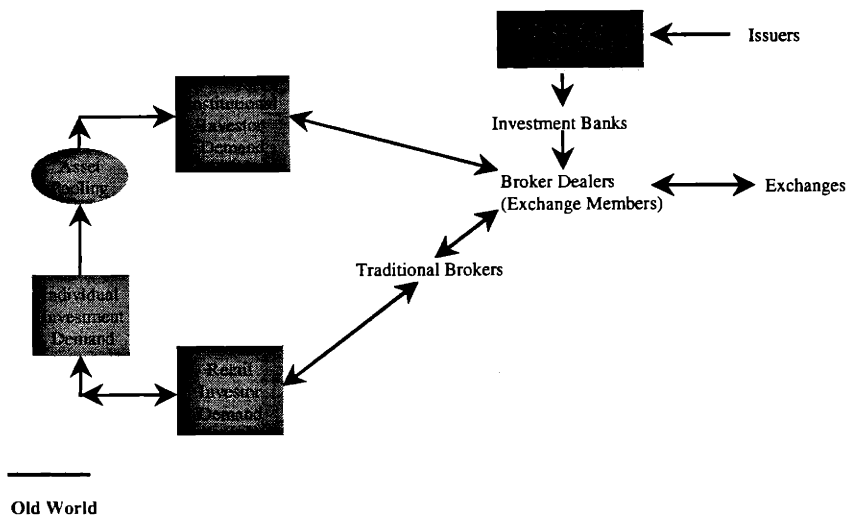
We can therefore use this simple value chain to align the players in capital markets:

| <u>Providers of Capital</u> → | <u>Financial Intermediaries</u> → | <u>Users of Capital</u> |
|---|--|---|
| Retail Investors Institutional Investors - Mutual Funds - Pension Funds - Insurance Co.s - Hedge Funds | Investment Banks Commercial Banks On-line and traditional Brokers Exchanges | Corporations Governments, Agencies, Municipalities Individuals |

The model addresses both retail and institutional sectors. The institutional sector involves the collection of retail assets into relatively large pools of investable money under professional management. This is the role of mutual, pension and hedge funds and of insurance companies. In the capital markets, these players represent the wholesale side of investors and are collectively known as the “buy side” (because they are usually buying stocks and bonds). The investment and commercial banks which service these institutional investors, are often “selling” stocks and bonds, and are therefore collectively known as the “sell side”. The users of capital, primarily corporations, but also government entities at various levels, are “issuing” stocks and bonds in their names, and are referred to collectively as issuers.

Another useful way to look at the relationship among investors, intermediaries and issuers is by following the flow of transactions or “order flow” in the capital markets. Again, the chart below is simplistic, but we will build upon it later in order to illustrate the role and effect of ECNs and other challengers to the status quo.

An Equity Capital Markets Model



Beginning on the left, individual investor demand either finds its way to the market as retail investment through a broker, or is consolidated into investment pools by institutional investors. Both brokers and institutional investors then must access the liquidity of the overall market through Broker-Dealers, also known as market makers. From the top right, the original supply of securities is provided by issuers, who

come to the market through their hired investment banks. It is important to note that the market makers who dominate access to liquidity and the investment bankers who control primary issuance may be (and most often are) the same firms. These two distinct activities constitute the core franchises of investment banks, and are known as primary origination and secondary trading & sales. Goldman, Merrill and MSDW are the global leaders in these activities. The other critical feature of this arrangement is the privileged and symbiotic relationship between the investment banks and the exchanges. In the equity markets, exchanges are mutual companies owned by their members. The banks are the members. Through this relationship, market-making institutions have been able to effect a monopolistic hold on access to market liquidity. As much as the longest bull market on record, **this choke-hold on the investment value chain is the foundation of much of the profit in the industry. It is also the point of vulnerability that has now come under direct attack by the ECNs.**

The fixed-income, or bond, markets function a bit differently. There is no organized exchange for most fixed income securities. Instead, the network of broker-dealers who trade in these instruments is connected by an array of direct telephone lines, inter-dealer brokers, and electronic information services, which provide timely data to professional traders. However, just as with equities, these professionals hold exclusive control over access to “the market”, which is the virtual network. In some ways the barriers are even higher; for example, without a central exchange that reports transactions price discovery is even more difficult for outsiders.

In the pre-Internet world, success at intermediation required both scale and scope. For the purposes of convenience and efficiency institutional investors tend to concentrate the bulk of their trading activity and business among a small number of broker-dealers. Scope of product reduces search costs for various issuers and investors and makes the intermediary more attractive as a “core provider” of financial services. Scale is required in terms of capital to support inventory and risk positions, in human resources to provide breadth of product and research information as well as client service, in sourcing and distribution networks to provide access to the broadest possible market for investors and issuers, respectively, and in technology infrastructure to make it all work in a controlled and efficient manor. These economies of scale and scope have partly driven the consolidation that has characterized the financial services industry in recent decades.

One additional perspective on the value chain for capital markets transactions will complete the picture:

| <u>Client Management</u> → | <u>Pre-Trade Information</u> → | <u>Trade Execution</u> → | <u>Post-Trade Service</u> |
|----------------------------|--------------------------------|--------------------------|---------------------------|
| Marketing | Research | Liquidity | Clearing |
| Sales | Market Flows/Insight | Price | Settlement |
| Relationship Mgmt. | Analytics | Anonymity | Reporting |
| | Price Discovery | Large Order working | Custody & Service |
| | IPO Calendars | Speed | Risk Management |
| | Inventory | | |
| | Advisory & Structuring | | |

In the legacy or traditional model of capital markets service offerings, the highest leverage or critical offerings in the value chain are these:

- **Client Management:** a personal, trust-based or advisory relationship with the investor, providing “high touch” and very responsive service;
- **Pre-Trade:** generation and communication of relevant and useful research and investment or trading ideas;
- **Trade Execution:** provision of liquidity to ensure clients’ ability to execute transactions quickly and at efficient prices. This is critical and requires investment banks to hold inventory, take risk positions on their own books, commit to make a market in many securities and to maintain sufficient capital to support these activities.
- **Post-trade service:** reliable and error-free back office processing services which minimize information and processing costs to the client

However, value capture occurs only at one point in the chain. Under the traditional model, the broker-dealer captures revenue only at the execution of the trade either in the form of a commission, or more typically, on a “spread” or mark-up imbedded in the transaction price. (The firm also earns some margin on financing clients’ trading positions). Essentially this means that relationship servicing, research, liquidity provision, risk capital support and back office processes are all costs to the firm which are supported by – and implicitly bundled with – trade execution. As long as the bundle remains integrated and the model is similar for all competitors, this cross-subsidization of value offerings is viable, and rivals may compete on the basis of relative quality of value offerings within the integrated mix and with little

direct pressure on price. **However, if and when a new market technology enables the efficient unbundling, or dis-integration of these services, the entire industry is likely to be disrupted.**

The Legacy Model - Industry Analysis: Porter's Five (plus Grove's sixth) Forces: ²

Rivalry: The pre-Internet institutional capital markets were characterized by a stable, even clubby, balance of interests among the participants. Industry rivalry was intense in terms of competition for human talent and also for specific primary issuance mandates, but overall price-based competition was limited. We have mentioned consolidation as a theme and industry consolidation itself was an area of rivalry, as firms competed to acquire both scale and scope of product offerings by acquiring rivals with presumably complimentary capabilities.

Suppliers: Suppliers in this market are the issuers of debt and equity. Historically these market participants have been almost completely fragmented. With the exception of Fortune 100 firms with outstanding credit worthiness and strong earnings, issuers have had little bargaining power.

Buyers: Similarly, the buyer, or investor, base has also been fragmented and able to exert little influence on price. This however, has changed substantially during the past decade or so as great pools of assets have been formed among mutual funds and pension funds in addition to traditional insurance investment pools. Increasingly, these pools of investment funds are exercising their power not only in corporate boardrooms but also in their dealings with the Street. Ironically, the power of large investors to achieve an advantage in pricing is diluted by the slippage that generally occurs when trying to execute large, block transactions.

Economies of scale: Economies of both scale and scope have been high, in terms of required risk capital, technology infrastructure and distribution networks, as well as an all-inclusive range of financial product offerings.

Substitutes: Given the profitability of this industry, remarkably few viable substitutes have existed. This is in part due to the regulated nature of financial markets. Also network economics favor the concentration of liquidity, and the broker-dealers, together with the exchanges have effectively monopolized this critical

² Porter, Michael, Competitive Strategy, Free Press, 1980

asset. Smaller investment banks have prospered at the fringes of the system, focusing on various niche markets, but the system overall is both relatively free of viable substitutes as well as dominated by a small number of large firms.

Complimentors: The chief complimentors to the business are both the exchanges and the institutional investors who gather assets into sizeable pools. We have seen how the exclusive relationship between dealers and exchanges benefits both. The professional money managers who gather and concentrate funds to enable more efficient processing of “block” transactions and the physical exchanges which facilitate crossing and clearing of trades. Prior to the Internet, threats from substitutes appeared to be minor, and the major source of rivalry was rather global contenders attempting to use relatively enormous capital bases to buy their way into the club. Other important complimentors include the information agencies, e.g., Reuters, Telerate and Bloomberg, who deliver market news, price data and other information to participants.

Appropriability and Complimentary Assets:

With very few exceptions, appropriability of technology, in its root sense of “know-how”, is entirely loose in the investment banking and brokerage industry. This is true for several reasons. First, financial transactions are composed entirely of information, and that information generally becomes public as soon as the transaction is executed. Novel transaction structures, particularly in derivative products, are known to have given rivals temporary innovative advantages, but are imitated almost immediately. Second, there is virtually no patent or copyright protection and precious few trade secrets involved in financial intermediation. Negotiations may be secret, but deals almost never are. Once concluded, financial deals are almost always subject to disclosure. Third, financial markets are somewhat heavily regulated, and the most basic pillar of financial regulation – at least in the U.S., which sets the tone for world capital markets – is the principle of “full disclosure”. The responsible firms are also eager to advertise their new capabilities to prospective clients. Finally, the investment banking community is notoriously both incestuous and mercenary. Everybody knows everyone else in the industry – often socially as well as professionally – and job-hopping among firms is rampant. In this environment information disseminates very rapidly indeed. Strategies based upon appropriability of technological assets are rare enough, and successes even rarer.

The basis of profitability therefore has resided with the arrangement and control of complimentary assets, and in some instances with speed of innovation. Traditionally in the industry the creation of complimentary assets has been the primary basis of competition. We have seen in the value chain, how capabilities in client relationship management, research and information delivery, liquidity and risk capital, and back office processing are all brought together to support the revenue producing instant of trade execution. Each of these capabilities represents a competitive asset to the firm, along with capital, brand reputation and associated trust, regulatory relationships and the internal management and control processes that tie them all together. None of these assets alone – with the possible exceptions of brand reputation and trust – is difficult to replicate. (This is an important point to note in the context of disaggregated service offerings.) Competitive advantage has been established in the corporate processes and culture that allow key assets to be applied in concert. Evidence of this phenomenon appears frequently. For example, despite the commonality of information for any given deal structure or even the underlying information technology, few firms are able to re-create the processes that enable leading firms to deal successfully in complex derivatives. The industry often sees individual “stars” and even entire teams or departments jump ship and move *en mass* to a new firm, tempted by enormous signing bonuses and guarantees. More often than not, these people find it tremendously difficult to replicate their earlier success within the new organization and culture, which often lack the familiar complimentary assets. These missing assets may include a sales force which is competent to market the product, back-office processing technology or procedures which cannot accommodate new structures, managers who do not understand risk complexities, or even client relationships which are unsuited to the new product in question. Even for relatively simple products, a complimentary asset such as global distribution capability to a broad base of regular investors can be extremely difficult – and costly – to replicate.

Together with the advantages of scale and scope, the advantage of a system of complimentary assets over that of tight appropriability of knowledge has been a fundamental driving force behind the continued (and accelerating) pace of consolidation in the industry in recent years.

Integration vs. Modularity in product-service offerings:

In a new and as yet unpublished article from the Harvard Business School, Professor Clay Christensen and doctoral student Matt Verlinden discuss the strategic question of vertical integration in the context of

evolving and disruptive technology.³ The authors note that much of U.S. industrial history has been dominated by large firms that have pursued vertical integration as a successful strategy for achieving competitive advantage by ensuring control over the resources and processes of their product offerings. Yet the authors offer counter examples where both leading incumbents and upstart challengers have chosen to de-couple activities in the value chain in favor of a specialized or modular approach to competition. Among the authors' conclusions are the following:

- integration works best at the high end of markets, where demand for functionality may still exceed technological ability;
- a de-coupled or modular approach is more likely to succeed down-market or where technology capabilities have over taken demand for functionality;
- the question of integration vs. dis-integration of capabilities and services is important for sub-processes as well as for end products;
- vertical integration may dominate as a competitive strategy in the early phases of industry development, while dis-aggregation may sweep an industry later in its development;
- when the dominant business model shifts in an industry from vertical integration to a modular or horizontally stratified model, profitability may shift markedly from assemblers of end-products to providers of sub-systems and components.

One prominent example is the automobile industry, which throughout most of its history has experienced both continuous vertical integration and horizontal consolidation as dominant firms sought and achieved increasing economies of scale and levels of control over supply chains, design processes, manufacturing capacity and distribution channels. By increasingly integrating all of these functions and all of the thousands of parts which make up a modern automobile into a single, highly-branded and proprietary offering, those firms who survived to become the big three U.S. auto-manufacturers were able to sustain product differentiation and earn attractive returns. However, the rise of several technologies in the 1980's and the 1990's has initiated the dis-integration of this approach and the disruption of integrative strategies. Other examples offered by Christensen include the P.C. industry (think of Dell compared to DEC) and most recently the microprocessor industry.

Christensen and Verlinden do not focus their discussion on the question of horizontal consolidation. However, in many of these same industries, we have seen a coincident concentration of competition into a

³ Christensen, Clayton and Matt Verlinden, "Disruption, Dis-integration, and the Dissipation of Differentiability", Harvard Business School, 2000.

relatively small number of players. MIT Professor James Utterback has long ago illustrated that technology-driven industries exhibit an evolutionary pattern whereby many firms emerge in the early stages of design ferment to compete for opportunities in a new market. Utterback demonstrates that these competitors continue to appear and remain relatively large in number until a superior, or dominant, design emerges. Once this design takes hold, in fact becoming an industry standard, barriers to new entrants begin to rise, while at the same time, marginal contenders begin to fail – or to be acquired by leaders - at increasing rates, leading to industry consolidation.⁴

If we take these two observed phenomena together, and reflect upon the history of such industries as automobiles, computers, semiconductors/microprocessors, and many others, we see how vertical integration and horizontal consolidation have often proceeded hand-in-hand. The institutional capital markets - and more generally the investment banking industry – provide another classic example of how vertical integration and horizontal consolidation together have come to dominate industry structure – at least until very recently. The most interesting question now facing this industry may be whether the Internet as a disruptive technology is about to catalyze the reversal of this trend.

Financial service offerings have been predominantly vertically integrated, within the scope of the U.S. market, at least since the establishment of the national banking system in the early 19th century, although, specialty firms have long existed for the operation of such services as trust, clearing, investment management, etc. On the horizontal axis, the early industry model separated retail banking from commercial and investment banking, and insurance too was a distinct industry for the entire 19th and 20th centuries. Early trends toward horizontal integration were derailed by the Great Crash of 1929 and subsequent federal legislation proscribing the co-location of commercial, investment banking and insurance businesses within a single holding company. However, beginning not long after the revival of the U.S. economy and financial system that followed World War II, the march toward integration of financial services offerings has been relentless. The trend has, however, accelerated notably in the past few decades. This consolidation has been primarily driven by two competitive factors:

- 1) the need for access to ever wider and deeper **distribution** for financial products, and
- 2) **scale economies** in garnering and servicing assets under management.

Additionally, both of these forces have prevailed in the context of increasing globalization of competition in financial services, in turn driven by advances in telecommunications technology. The perceived

⁴ Utterback, James, Mastering the Dynamics of Innovation, Harvard Business School Press, 1994, p. 31.

competitive advantages from these two sources of economies of scale and scope have been the driving forces behind each of the following developments in the 1980's and 1990's:

- A trend in acquisitions of asset management companies by traditional investment bankers and commercial bankers (e.g., Morgan Grenfell, Mercury Asset Management)
- Cross-market acquisition of smaller investment banks by large global players in order to fill in gaps in global distribution capabilities (e.g., ING buying Barings PLC and Bankers Trust buying Alex. Brown & Co., and in turn being acquired by Deutsche Bank).
- Development and acquisition of investment banking capabilities by several commercial banks, often stretching the original Glass-Steagle regulations to the limit (e.g., Bankers Trust Company, JP Morgan)
- Combinations of wholesale and retail financial services firms (e.g., Morgan Stanley with Dean Witter; Salomon with SmithBarney).
- The subsequent pressures and eventual fall of Glass-Steagle in 1999, permitting such enormous integrative mergers such as Citibank-SalomonSmithBarney-Travellers Group

The following table from Bruce Wasserstein's Big Deal, illustrates the recent extent of large-scale consolidation in the U.S. domestic banking industry alone, and does not attempt to include non-U.S. and cross-border consolidation.⁵

| Acquirer | Target | Approx. Deal Value (\$B's) | Announce Date |
|-----------------------|----------------------------|-----------------------------------|----------------------|
| Travelers Group | Citicorp | \$72.6 | 1998 |
| NationsBank | BankAmerica | \$61.6 | 1998 |
| Norwest Corp. | Wells Fargo & Co. | \$34.4 | 1998 |
| Banc One Corp. | First Chicago NBD Corp. | \$29.6 | 1998 |
| First Union Corp. | CoreStates Financial Corp. | \$17.1 | 1997 |
| Fleet Financial Corp. | BankBoston Corp. | \$15.9 | 1999 |
| NationsBank | Barnett Banks | \$14.8 | 1997 |
| Wells Fargo & Co. | First Interstate Bankcorp. | \$10.9 | 1995 |
| Firstar Corp. | Mercantile Bancorp. | \$10.6 | 1999 |
| Chemical Bank | Chase Manhattan Bank | \$10.4 | 1995 |

For many years, the expected logical outcome of this consolidation has been the dominance of global financial services by a narrow oligopoly of truly enormous, truly global universal banks. The financial press – at least until the potential disruption enabled by the rise of the Internet – appeared to be nearly unanimous that only a handful of players would survive in this world. In the mode of a self-fulfilling prophesy, this widely held expectation intensified the pressures and urgency within firms to further integrate and consolidate, lest any one player be left behind and thereby marginalized.

Perhaps the clearest example of the integrated financial services strategy is the value proposition to the retail customer posed by the newly integrated Citigroup. As the logic of the combination goes, the truly universal retail bank would be able to offer the individual customer, anywhere in the world, the best available financial products in every category. To maximize efficiency (and minimize the cost of service) clients would access this cornucopia of service via the Internet (herein may lie the flaw). Mortgages and home equity loans, checking, savings and money market accounts from Citibank; mutual funds, on-line trading and market research from SalomonSmithBarney; sweep accounts linking the two; and life, health and property/casualty insurance, as well as retirement planning from Travelers. A single on-line financial advisor would be available 24x7x365 to provide advice (and undoubtedly to market Citigroup products).

The model is seductive. What client would not appreciate the convenience of managing the entirety of his/her financial activities in one seamless, integrated application? Yet the model has two significant flaws:

- 1) While consumers want convenience and integration, they are reluctant to acquire it at the price of sacrificing choice. Consumers will resist being constrained on their choice of provider.
- 2) The Internet now allows consumers to have it both ways. The convenience of aggregation together with a very extensive range of choice is now available through the open architecture of the net. (We will return to this in a later section)

Critical Competitive Capabilities:

From even these simplifying models of the traditional capital markets industry structure, a few select capabilities stand out as critical to the success of the incumbent leaders here at the end of the century:

⁵ Wasserstein, Bruce, Big Deal, publisher, date; original source: Securities Data Corporation, as of September 30 1999, p. 301.

Capital: The combined equity capital of the Goldman, MSDW and Merrill was at the end of 1999 was nearly \$150 billion. This capital is required to support total combined assets of \$955 billion. The lion's share of these assets (78%) are classified as trading securities.⁶

| Total Capital and Asset Allocation: Top 3 U.S. Investment Banks 1999 | | | | |
|---|-------------|--------------------------|--------------------------|-------------------------|
| | <u>MSDW</u> | <u>Merrill Lynch</u> | <u>Goldman Sachs</u> | <u>3 Firm Total</u> |
| Total Capital | \$40B | \$69B | \$40B | \$149B |
| Total Assets | \$367B | \$328B | \$250B | \$955B |
| Trading Assets | \$276B | \$269B | \$202B | \$747B |
| Trading Assets as % of total | 75% | 82% | 81% | 78% |

Source: Annual reports, Goldman Sachs, Inc.; Morgan Stanley Dean Witter, Inc., Merrill Lynch, Inc.

These securities are the inventory of investment banks. Prior to the rise of widespread electronic trading networks, banks have been required to hold this level of inventory in order to be able to provide liquidity to their investor clients. The less liquid the market, the more inventory must be carried relative to a given level of transaction volume. S&P 500 equities, for example, are highly liquid and broker-dealers are able to turn their inventory very frequently, maintaining relatively small positions given the volume of investor business. High yield debt, also known as junk bonds, are very illiquid by comparison, which is to say that they change hands less frequently in the market. The size of "junk" inventory is therefore relatively large compared to trading volume. Only well-capitalized firms are able to support the necessary positions required to create for investors a well-stocked warehouse of securities. Capital has therefore been a critical competitive advantage in the traditional model, and the need to optimize capital usage has been another driving factor behind consolidation in the industry.

Distribution: After capital, which one might consider the prerequisite for admission to the game, distribution is probably the single most critical competitive factor in the old industry structure for investment banking, as well as the most potent driver of industry consolidation. It is also likely to be the

⁶ Note: Trading securities includes securities owned, securities borrowed and securities purchased under agreement to resell. Off-balance sheet derivative commitments are not included.

process most disrupted by the new technology. The ability to distribute securities is central to a firm's ability to underwrite primary issues, to reduce the risk of holding inventory, to provide liquidity to clients, to distribute other financial services products of the firm, and to achieve economies of scale in operations. The wider and more effective the firm's channels for pushing through product volume, the more efficiently it can operate. Distribution means access to investors. Originally, the distribution channels of the leading investment banks were organized around the core U.S. institutional investor base: insurance companies, mutual, pension and hedge funds and some corporate treasurers. The pursuit of additional channels has been a primary driver behind global expansion and horizontal consolidation, as banks sought to tap the pool of foreign investor demand. Similarly, the down-stream extension of firms like Morgan Stanley and Salomon Brothers into the retail investor markets was a play for wider distribution. Two developments in the retail market made this an attractive strategy in the 1990's. First was the tremendous increase in personal investing. Second was the development of technology that enabled firms to manage large numbers of small investors as a cohesive source of liquidity. The quest for competitive advantage through ever broader distribution channels continues to drive consolidation, most notable perhaps in the retail sector and the merger of Citibank with Travelers. Yet a critical threat to this strategy is posed by the Internet, which in theory allows the broadest conceivable electronic distribution of information – and therefore financial products – to anybody with a server and a web-page.

Relationships: Relationships may be intangible and difficult to quantify meaningfully, yet may also be the most sustainable form of competitive advantage for incumbent firms. The Internet promises dramatically to reduce the friction of information, thus threatening the profitability of traditional infomediaries, like investment banks. However, much has been made of the issue of information overload on the Internet and the sure-to-be critical role of both filters and trust. Relationships can be very effective filters and also receptacles of trust. Large capital markets transactions are negotiated among individuals who over time develop strong professional – and often personal – relationships. To date none of the ECNs appear to be attempting to replicate this symbiotic relationship, although on-line investment banks such as W.R. Hambrecht surely are.

Technology: The return from investment in technology has long been an issue of debate in the overall economy, but the debate has been especially intense in technology intensive industries such as banking. There is little question that enormous investment has been required as the price of admission in systems which process transactions, analyze markets and risk, track client activity, enable regulatory reporting, provide accounting for revenues, expenses, assets, and liabilities, etc., etc. What is absolutely amazing in the financial service industry has been the level of redundancy in technology investment. For decades

virtually every leading firm has insisted upon building these enormous technology platforms and networks internally and on a proprietary basis. As an illustrative example, consider just the specific business of foreign exchange trading. There are perhaps 50 major foreign exchange trading banks in the world. Each of these firms spends upward of \$10 million each year maintaining, enhancing and building information systems that support this business. At the same time the trading of foreign currencies has become the most commoditized, most liquid and lowest margin financial activity on the planet. Revenues have been squeezed to minute margins (only one or two 100ths of percentage point). Yet all of these systems perform almost identical functions. The slice of the system which provides any sort of proprietary differentiation is very thin indeed – perhaps only one or two percent of total annual development expense. Even worse, none of these systems are built to the same standard, so additional middle-ware is required to enable the systems to interconnect in order to automate such functions as trade confirmation and settlement.⁷ Yet at no time has a viable third party or consortium of market participants proved able to address this remarkable inefficiency and seize the opportunity serve a needy market. The same story is repeated across all the product lines in the banking industry. The Internet, combined with a general recognition of the value of open standards in such areas, seems certain to disrupt this presumed source of competitive abilities. Closed architecture, proprietary, legacy systems have already become more competitive liability than competitive advantage.

⁷ This description is intended as an illustrative example only. No formal research has been conducted by the author to substantiate the numbers. However, the observations and “order-of-magnitude” estimates are based upon 10 years direct experience in the industry and with these issues.

III

The Internet as a Disruptive Technology

The Internet has been described as “the mother of all disruptive technologies”. This hyperbole may turn out to be appropriate for the economy as a whole, and to be accurate even for the capital markets, but at least initially this is less than obvious. What factors make the Internet such a disruptive threat to established industries and legacy business models in general? Fundamentally, the web shifts the emphasis from the creation and delivery of physical goods and services to trade in information products. The www enables global, real time communications among virtually all human, hardware and software agents on the planet. It allows the economy to approach much more nearly the ideals of perfect information and frictionless commerce, which underlie the most basic economic assumptions of “efficient markets”. In short, the net threatens to fundamentally change the basis upon which the world conducts its business.

Yet these same features have described the global capital markets for at least a decade, and in many ways much longer. Financial transactions have always been – and remain – pure information goods. The Internet does not alter this. Global, real time communication is nothing new in international banking. The first transatlantic telegraph cable was laid in 1866, displacing fast “clipper” steam and sailing ships as a source of competitive information advantage.⁸ In 1987 Bankers Trust Company installed a computer application named REMOS, which provided live, real time, globally consolidated information about the firm’s foreign exchange risk positions throughout the world. Capital markets trading has been conducted over proprietary networks like Reuters 2000-2 and EBS (which together dominate 70% of the global foreign exchange market) and Bloomberg terminals since the mid-1980’s.⁹ In the most liquid markets, for example those for G-7 currencies and U.S. Government Securities, price information and liquidity are so efficient that bid-offer spreads have now narrowed to only 1 or 2 “basis points” or 100ths of a percentage point. Can the Internet really constitute such a terrible disruption to an industry which is already so networked and technology rich?

⁸ www.NYSE.com

⁹ “eCommerce in the U.S. Fixed Income Markets”, The Bond Market Association, November 1999, p.1.

Locating the Industry on a Technology S-Curve:

Students of technology innovation will be familiar with the concept of technology S-curves, introduced by Foster's 1986 "The S-Curve: A New Forecasting Tool", and employed pervasively in later work by Utterback, Henderson, Christensen, and many others.¹⁰ It is initially unclear where on a particular S-curve to locate the global financial services industry at the turn of the millennium. At one end of the spectrum, we see the classic symptoms of an industry struggling with the phase of advanced maturity associated with the top of the S-curve. Consolidation is pervasive, and will be accelerated by the recent repeal of Glass-Steagle legislation enforcing the artificial segregation of banking, securities and insurance businesses. Pricing margins have been competed to miniscule levels. Returns on invested capital, while enjoying a tremendous bull market, are essentially dependent upon the returns to risky portfolios. Technology innovation in investment banking, continues at the periphery of product attributes, including ever-more-sophisticated derivative products, continued disaggregation and rebundling of risk attributes, and a growing emphasis on selling sophisticated advice and "structuring" capabilities. Most innovation, however, goes on in process technologies, including risk management, "black box" proprietary trading models, financial forecasting, back office process efficiencies and the development of technology systems themselves. The marginal benefit of even these process enhancements seems to have slowed. All of these are classic symptoms of an industry approaching the top of long technology S-curve.

At the other end of the spectrum – the Internet-enabled end of the industry – we see by contrast tremendous ferment, experimentation with new business models, and ubiquitous innovation. On-line brokers have entirely disrupted the retail segment of the equity markets and are broadening inroads into institutional markets. Third party exchanges and electronic communication networks like Island, Archipelago, Instinet, BRUT and literally dozens of others are exploring new business models in equities, government, agency and corporate bonds, mortgage and asset backed securities and virtually every other sector of the capital markets. As traditional broker-dealers race to create their own "institutional portals", a struggle is emerging as to whether single-dealer portals or third-party aggregators and exchanges will dominate this competitive space – and capture the value in the chain. (More about this later under the section "Scenario Analysis".)

From this perspective, the Internet appears indeed to be a disruptive technological threat to the capital markets segment of the investment banking industry. Abernathy, Clark and Utterback all discuss the

¹⁰ Foster, R., "The S-Curve: A New Forecasting Tool" in Innovation the Attacker's Advantage, Simon & Shuster, 1986, Chapter 4.

distinction between “competency enhancing” and “competency destroying” technological innovations as one potential key to the disruptive nature of technological evolution. Until now advances in information technology had largely been competency enhancing from the perspective of the incumbent firms. Increases in telecommunications bandwidth, processing speed and networking technologies all enabled the global networking of large corporate information systems. These technologies enhanced these firms’ capabilities to source, intermediate, manage and distribute financial products throughout the world. The huge investment required to build these capabilities discouraged new entrants, and the added range enabled by them encouraged both aggressive expansion by single firms and consolidation among firms. The defining characteristic of almost all these development efforts (with the notable exception of Euroclear/CEDEL) is that they were constructed upon proprietary, closed systems. By comparison, the emerging Internet-enabled model of capital markets exchange is being built upon the relatively open-system architecture of the www. It is this openness which threatens to destroy the core competencies of the incumbent oligopoly and which constitutes the disruptive nature of the technology.

The primary threat from Internet-based challengers to the incumbent investment banking industry arises from the potential of the net to provide more efficient intermediation of financial transactions. With the world-wide-web, innovative opportunists are creating new ways for the fragmented population of would-be borrowers and investors to find one another and do deals. On-line brokerages provide essentially the same service as traditional, telephony-based brokers, but can do so at a lower cost. As investors become less reliant upon the advice and guidance of human “experts” to execute investment decisions, they are drawn to more-cost effective services. On-line exchanges go a step further by creating a virtual community of investors with issuers, within which supply and demand can be matched via electronic networks rather than through investment banking intermediaries. In both cases, the new offerings are purpose-built from scratch to provide the most efficient possible execution of transactions. Internet technology provides the cost-efficient platform, while the overall business model avoids the baggage of ancillary services built up by traditional brokers and expected by their traditional clients. By comparison, these incumbents are burdened with the vast infrastructures built over the years to support a full-service business model.

The essence of many of these offerings is the disaggregation of the product offering. ECNs, for example, provide a market place for the efficient matching of complimentary interests among buyers and sellers. The ECNs initially have not attempted to provide research, advice, structuring, after-sales service or more than basic trade reporting. Essentially, the ECN’s have occupied the **value-capture link** in the traditional value chain – **and only that link**. As they compete the price down for the unbundled execution of trades,

they may well earn a sufficient return on capital because they do not carry the burden of the full-product bundle. Forced to match these lower execution prices, traditional bankers are faced with the unpleasant choice of taking losses or finding ways to convince clients to pay for the other components of the integrated bundle.

The approach is a classic attack from below, with a product, which on traditional value offering scales is well inferior, as described by Christensen in The Innovator's Dilemma.¹¹ Initially the offerings of the ECNs and discount brokers appear inferior as they are shorn of the personal relationship with a dedicated broker, as well as research, risk capital and liquidity, and after sales service. But the price performance is such that an early group of lead users – presumably with ample access to these other attributes from other sources – begin to use the web-based services for marginal trades. The adoption has taken-off rather rapidly, as clients figure out that they can cherry pick the now broader system, purchasing full-service when they need it and going electronic (and cheaper) when they don't.

An apt analogy may be the introduction of ATM's to retail banking in the early 1980's, where after customers now use the electronic interface for the bulk of their mostly simple transactions, but require that a teller or bank professional be available when they want to re-mortgage their homes. The problem for the incumbent investment banks is that third parties are building and operating the ATM's, and collecting the fees.

Apparent disruptions to the structure of capital markets and to legacy business models:

The conclusion is that the fundamental feature of the Internet: the ability to share information among the world's business and professional population at negligible cost is indeed proving disruptive to this market. The reasons are multiple:

- The global distribution channels for information about products and services, as well as information products and services themselves become freely available commodities. The proprietary distribution channels of investment banks are directly challenged.
- Information efficiencies are being driven from the system with remarkable speed. Information about securities and the underlying issuing entities, once closely held by investment

¹¹ Christensen, Clayton, The Innovator's Dilemma, HBS Press, 1997

professionals, is fast becoming ubiquitous on the web. The ability to charge a fee for that information is falling toward zero.

- The rapid evolution of virtual market places threatens the legacy monopoly over financial exchanges. The cost of execution is also falling toward zero.
- These virtual market places and the interconnectivity of all potential investors are fast replacing concentrations of inventory as the primary source of liquidity. Large stocks of capital may no longer be a requirement or an advantage for players. On the other hand, access to large stocks of capital appears to be freer than ever to Internet based start-ups.
- The change in information dynamics shifts power from sellers to buyers across the net. This is particularly evident in the capital markets.
- The Internet threatens to re-intermediate all traditional intermediaries. This type of intermediation has been the essence of investment banking.
- The leveragability of the net to access broad distribution and liquidity has lowered the barriers to entry for new players. These new players are fast attempting to unbundle and “cherry-pick” the traditional capital markets value chain.

V

New Entrants

The fast-emerging field of new, electronic-based entrants can be segregated into several types of players:

On-line Brokers: On-line brokers do not offer any fundamental change to the network of capital markets players. So far the impact of these entrants has been limited to the automation of the retail investor-broker relationship through a web-interface. The electronic broker routes the retail order flow through the system in a manner similar to the flows for non-electronic trading. The emergence of on-line trading firms like E*Trade, Ameritrade, Datek and a host of others has been a direct threat to traditional retail brokers like Merrill Lynch, SmithBarney, Dean Witter and others, and fast resulted in a significant erosion of market share. Among leading incumbents, only discount broker Charles Schwab proved able to react fast enough. Schwab's conversion to E-Schwab, executed despite the real risk of cannibalizing its own profitable business, allowed it to reverse its position from besieged defender of market share to aggressive attacker for market share. The new electronic brokers have substantially leaner cost models than traditional brokers because they rely far less on human brokers. The result has been a dramatic trend in reduced commission rates to retail investors. More importantly, the rise of on-line trading, along with the long running bull-market in U.S. equities, has likely been a major factor in the substantial increase in retail trading volume.

On-Line Issuers: These firms represent a fundamental challenge to one of the core franchises of leading investment banks - primary issuance of debt and equity securities. This market has been entirely dominated by investment banks, and for large issues, by the top one or two tiers. Before the advent of on-line issuers, the CFOs of corporations seeking to raise capital in the public markets were highly incentivized to select one of the leading firms with the greatest ability to place (distribute) their securities. As noted in the prior discussion of distribution capability as a key competitive factor, consolidation has led to the dominance of a small number of firms in this area. The result has been a pricing structure where investment banks typically receive 7% of funds raised for equity new issues, and somewhat smaller, but still substantial, fees for secondary offerings and debt issuance. By using the Internet for distribution, new on-line issuers propose to provide comparable service with much leaner cost structures than traditional banks, and thus offer issuers fee structures well below the 7% level. Among the notable challengers in this field are Wit Capital (named after a beer), DLJ Direct, and E*Offerings.

Besides distribution, the key task of the primary underwriter is to “price the issue”, that is predict at what price (cost) issuers will most efficiently be able to raise capital. This is typically done through a process known as “book-building”, whereby the investment bankers canvas their existing investor clients for indications of interest or “soft orders”. For issues that are expected to perform well, there may be competition for a limited supply of product. Rather than increase the offering price to reduce demand, however, the banker will allocate shares to favored clients. In this way, bankers are able to arbitrarily assign stakes in a bet that is rigged to pay well, because demand has been managed to outstrip supply in the after-market. In the era of Internet start-ups, the markets have become accustomed to huge run-ups in the prices of newly public companies on the day of or few days following an IPO. This is typically regarded as great news to the company and its owners. However, in purely economic terms, each point by which the IPO price underestimates true demand for a given security represents money left on the table and an increase in the cost of capital raised. A few of the start-ups in on-line investment banking are attacking this opportunity directly through the net by substituting electronic auctions for the traditional book-building process. The auction process exposes investors to the risk of the “winners curse” and is therefore not necessarily preferred by large, previously favored, investors. But the auction has the double advantage of achieving the best possible price for the issuer, as well as more a democratic allocation of shares among investors. The pioneers in this area include W.R. Hambrecht in equities and MuniAuction and Bloomberg in the debt markets.

Information Aggregators: Financial information vendors such as Reuters, Telerate and Bloomberg have long been an essential component of the capital markets industry. All were originally designed to disseminate market news and/or facilitate the sharing of bid and offer interest among professional dealers. Over time, many additional features were developed, including e-mail, chat, market commentary, research distribution, etc. More importantly, many of these services extended their networks to become alternative trading systems or virtual exchanges for certain classes of securities, most notably foreign exchange and U.S. Government obligations. All of these market services shared a common model; they each ran on proprietary, closed information networks. In most cases, even the hardware required to access the network was provided by the vendor and required to sit on the desktop next to the traders’ own workstations. All of these firms are now undergoing great change in their delivery models as they strive to take advantage of the potential of the Internet. In January of 2000, one of the largest, Reuters PLC announced an overarching shift in its strategy to focus on the web as the foundation of its service delivery. It’s stock rose more than 10% in one day on the announcement. New challengers too are swarming in the information segment. Multex is an example of an aggregator of others’ proprietary research, which it then disseminates over the web on a per transaction fee basis, capturing the economic rent that the Investment Bank research

departments have long foregone. Analytics and content providers like Barra and Telescan provide customized, web-based analysis tools and content either as a direct service to market professionals or on a private-label basis to investor portals, like the web-sites of Fidelity, Citigroup and American Express. The potential models in this area are virtually limitless, and revenue sources include technology licensing, content subscription, revenue sharing, advertising, and transaction fees.

Electronic Communication Exchanges (“ECNs”): The final group of electronic entrants into the capital markets, and the focus of this discussion, is the ECNs.

ECNs are primarily a phenomenon of the NASDAQ traded equity market, but have also spread to other equities, to fixed income and derivatives and to overseas markets. An ECN is a type of alternative trading system (“ATS”). The ECN fundamentally is a fully automated system that matches orders and sets prices for trades in the designated security. ECN’s are privately developed and managed electronic networks. All of these networks were originally designed with a closed architecture and proprietary standards. However, all ECNs appear currently to be converting their architectures to net-based platforms. Basically, ECNs function as an electronic stock (or bond) exchange, however they are distinct from exchanges primarily in that the regulatory burden imposed by the SEC is much lighter for an ECN. Technically, ECNs are registered broker-dealers and, like investment banks in this role, serve as agents for buyers and sellers of securities.

The original ECN was Instinet, formed by Reuters PLC in 1969 and still wholly owned. Instinet was created as an alternative electronic exchange for professionals in the market place – primarily broker dealers – to facilitate the matching of orders outside the traditional exchanges. While the exchanges remained the central source of liquidity, the Instinet alternative offered 24 hour per day, 7 days per week access and low transaction costs. Instinet had this alternative market niche to itself until in 1997, when three other ECNs were approved by the SEC.

The sudden rise of the additional ECNs owes its emergence more to the irregularities of the NASDAQ market than to the advent of the Internet. During the 1990’s, the NADAQ was plagued by a number of highly publicized trading scandals. As described in an early section of this paper, the link between investors and the exchange was dominated by the broker-dealer members of the exchange, known as market makers. Market makers are required to post the best bids and offers for a given security on the NASDAQ quote montage. Market makers earn their revenues by trading between these prices and capturing the “spread”. By definition, the narrower the spread between bid and ask, the more liquid the

market for that security. However, market makers benefit from wider spreads. What appeared to have happened too regularly in the early-mid 1990's was that market makers were ignoring or discarding orders into the system which did not cross an existing opposite order, but only narrowed the spread. Through their monopoly power, they were able to exclude these orders as a matter of course and preserve their franchises and economic rents. If, however, buyers and sellers could find one another outside the NASDAQ system and away from the control of the market makers, they might be able to execute trades at tighter spreads, saving money for both parties. This was the impetus behind the creation of private trading networks. An investigation into these practices was launched by the SEC and the U.S. Department of Justice and carried on during 1994-1996. In 1997, NASDAQ published new Order Handling Rules. These rules required market makers to either a) execute all orders at the bid/offer price, b) narrow the spread in the NASDAQ public price montage, or c) divert the order to the ECN for execution.¹²

These diagrams from MLDM provide an illustration of how ECNs augment the existing order flow structure.¹³

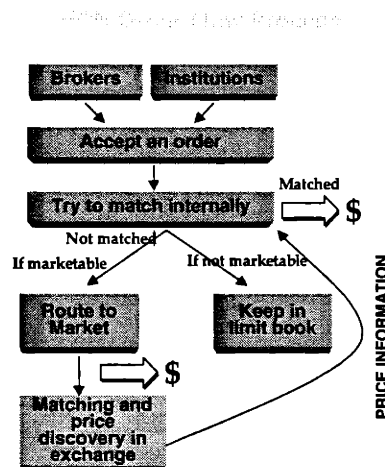
ATs provide order matching to investors and non-market making brokers

Electronic Communication Networks (ECNs)

- Market participants enter limit orders for display to all other counterparties in the system
- Orders persist until a counterparty enters a counter-offer, at which point the trade is "executed" and cleared
- If orders are not matched internally, some ECNs can search for liquidity outside the system by accessing alternative pools (other ECNs, SelectNet, Market Makers)
- *Examples:* Island and BRUT

Electronic Call Markets

- Crossing Network**
 - A system which batches orders and crosses them at set times using prices that have been set elsewhere, usually a primary market
 - *Example:* ITG's POSIT
- Open Book Auction**
 - A system which continuously aggregates, sorts and matches buy and sell orders of different sizes and prices
 - *Example:* Optimark



¹² This section on the regulatory forces behind the emergence of ECNs is adapted from "ECNs – Who will the Winners be?", Meridien Research, Inc., July 1999

¹³ The two following diagrams are both from Merrill Lynch Direct Markets, "MLDM Update- October, 1999".

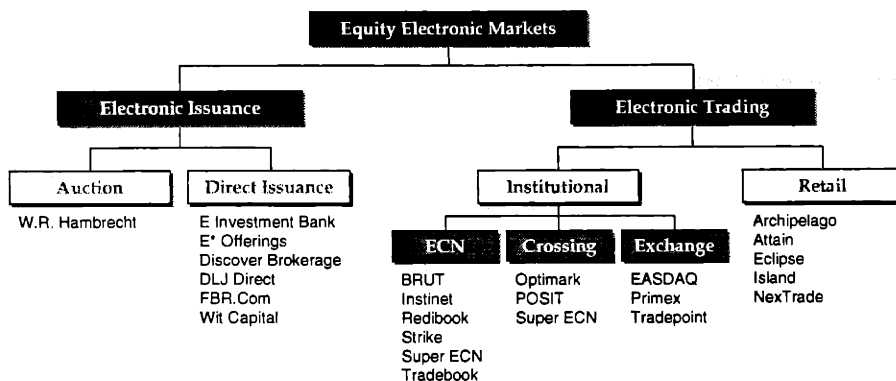
The important point to this history is that the rise of ECNs is attributed not to organic market demand but to a regulatory irregularity. In theory, an efficiently operating central exchange is in a natural monopolistic position and should concentrate liquidity for the most efficient matching of supply and demand. In practice, one very likely scenario is that such a central limit order book will emerge. If this happens, the value of multiple ECNs is virtually eliminated. The most interesting strategic question may be, "which players get there first?" – exchanges, ECNs, broker-dealers or some completely unrelated entity, for example E-bay or Yahoo.

In 1997, the SEC approved four ECNs: Instinet, The Island, BRUT and Archipelago. Since then five more equity market ECNs have emerged. In 1999 ECNs accounted for nearly 30% of all NASDAQ volume. They have been forecast by Meridien Research to reach 50% by the end of 2001 and continue to grow thereafter.

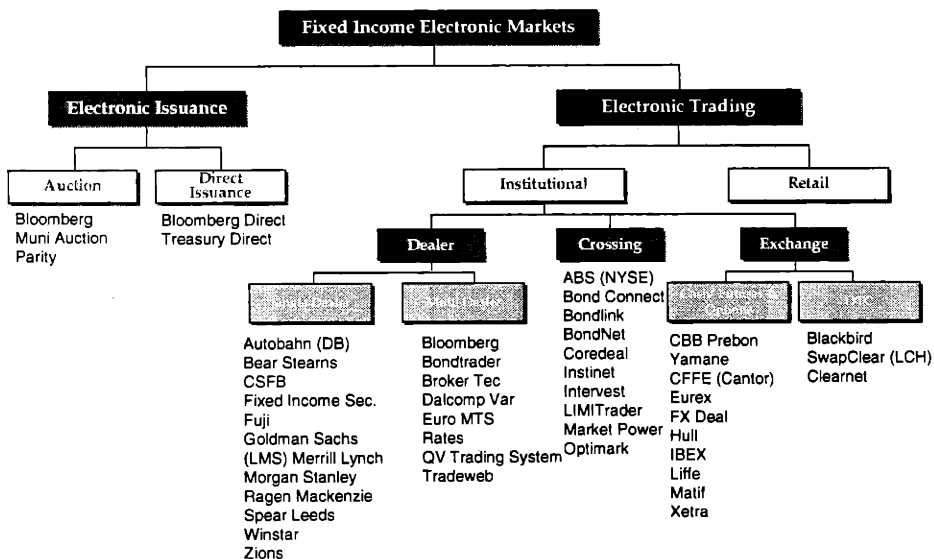
ECNs arose in the equity markets first, both because of the NASDAQ rules issues and also because of the equity markets have the most liquidity of both buyers and sellers relative to the number of issues. Fixed income markets have been slower to evolve alternative trading systems for several reasons. First, the bond markets have no history of central exchanges. Fixed income trading has been conducted among a loose network of market professionals linked by telephone and information-only trading systems. Second, Outside of government obligations, the fixed income markets are far less liquid than the more active equity markets. Third, the investment characteristics of bonds tend to be more complicated than those for equities, including "on the run" vs. "off the run" issues, various maturity dates, underlying covenants and cross-default provisions. However, several competing models are emerging as prototypes for electronic bond markets, in such sectors as, for example, municipal bonds, collateralized loan obligations, corporate paper, etc.

The diagrams on the following page illustrate the shape of the emerging ECN industry.

Equity ATS



Debt ATS



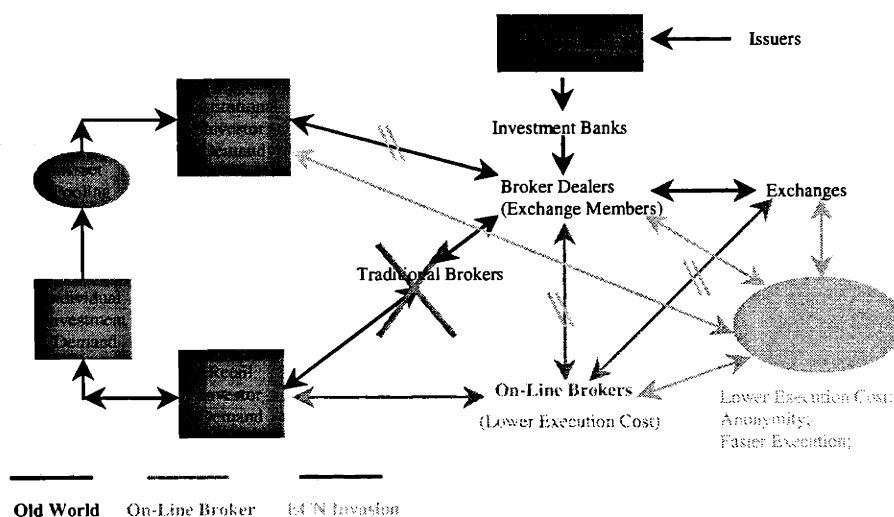
Exchanges vs. ECNs

| | | | | | |
|-------------------------------|---|------|------|------------|---|
| Superior marketability | <ul style="list-style-type: none"> • Continuous transactions / "all weather" • Short sales, limit/stop orders | High | High | Low | <ul style="list-style-type: none"> • Most systems accept limit orders only |
| Fairest price making | <ul style="list-style-type: none"> • Best and market efficient prices • Free from manipulation | High | High | Moderate | <ul style="list-style-type: none"> • Pricing depends on liquidity in system • ECNs are price takers, not price makers |
| Free and open market | <ul style="list-style-type: none"> • All orders made openly, not in secret • Democratic price setting | High | High | High | <ul style="list-style-type: none"> • Excellent transparency and anonymity |
| Dependable, continuous quotes | <ul style="list-style-type: none"> • Ability to check trades against continual and dependable quotations | High | High | High | <ul style="list-style-type: none"> • Order trail is continuous and electronic |
| Increased safety of dealings | <ul style="list-style-type: none"> • Collective regulations • Fraud reduced/eliminated; integrity | High | High | Developing | <ul style="list-style-type: none"> • Current ECN regulatory framework under construction |
| Stable capital | <ul style="list-style-type: none"> • Consistent liquidity to stabilize prices | High | High | Low/NA | <ul style="list-style-type: none"> • Insufficient liquidity exists on most systems |

Source: Robertson Stephens Corporate Strategy Analysis

The ECNs pose a direct and critical threat to the broker dealers like Merrill, MSDW and Goldman Sachs, as well as to the traditional exchanges. Again the essence of the capital markets offering has been a bundle of various services, encompassing client acquisition, information, execution and after-trade servicing. Yet, almost all revenue is derived, or captured, at the point of execution as a spread or commission. This is the precise – and only – point in the value chain under attack by the ECNs. As illustrated by the diagram below, the effect of ECNs is to dis-intermediate the broker-dealers from the flow of orders by directly connecting investors, electronically.

An Equity Capital Markets Model



In contrast to the existing partnership of broker-dealers with the traditional exchanges, the ECNs offer several attractive features to institutional investors. Routing trades through ECNs can afford traders the cover of anonymity, which can help to disguise intent when moving large positions and thereby avoid price slippage. On the other hand, the transparency of the ECN order book allows visibility to all potential traders. The ECNs have also increased speed of execution, further reducing slippage. The standard for order execution is now 30 seconds. ECNs are also aggressively expanding available hours for trading, with many offering a 24x7 market place (although the practical market may still be limited by poor liquidity in non-peak hours). Finally, ECNs eager to achieve market share are paying investors for order flow, thereby subsidizing their trading costs. All this adds up to increased empowerment of traders relative to broker-dealers and legacy exchanges, and a building trend of the complete commoditization of execution.

There is another interesting aspect to the diagram above. In addition to directly linking institutional investors to one another, the ECNs have also established direct links to the broker-dealers as well as to the exchanges. The benefit to the ECNs from these linkages is obvious. Any would-be exchange needs to maximize access to pools of liquidity. The exchanges are the traditional locations of concentrated liquidity, but the broker-dealers with both inventory and client order flow, are also major sources of liquidity. Finally, the ECNs are also interconnected among themselves, sharing sources of liquidity. At this point in time, these interconnections are incomplete and in places inefficient. Yet the logical outcome

is a highly efficient electronic network of all the participants in any given sector (type of security) in the capital markets. We briefly mentioned one scenario, where a central limit order book emerges and drives all the ECNs from the market. In this second scenario, the central order book is virtual, residing in the network of all interconnected players. The question of which scenario evolves is dependent upon several factors:

- The underlying efficiency and cost models of competing structures may ultimately determine the optimal, and therefore dominant, market configuration.
- Early concentration of liquidity in one contending player or model may cause the market to “tip” in this direction. The essential commodity offered in financial markets is liquidity. Cost and underlying technology are second order factors.
- Alliances among various stakeholders may tip the balance toward a preferred model.
- Regulators, primarily the SEC, may decide to determine the outcome rather than let purely market forces decide.¹⁴

Returning again to the context of Utterback’s work, we can view the current state of the industry as one of tremendous ferment with many new challengers emerging to test competing designs. The dominant design has yet to emerge, yet the market expects a resolution in the next one-two years. Consolidation and the elimination of many of these new challengers is sure to follow, yet the degree to which consolidation is manifested – possibly, ultimately to a single exchange, will largely depend on the power of connectivity over the natural monopoly tendencies of an exchange.

The uncertainty over this outcome explains the apparently paradoxical behavior of the leading broker-dealers with respect to the ECNs. As illustrated in the diagram above, the ECNs, while fundamentally threatening to dis-intermediate the dealers, are also directly connecting to them. The brokers are permitting – even aggressively courting – these connections because they cannot risk being excluded from a potentially large source of liquidity. This is a classic dilemma of being forced to collaborate with one’s enemy. Beyond establishing connectivity, however, the leading dealers are also investing in the new challengers.

¹⁴ On February 29, 2000 the Wall Street Journal published a letter from the leaders of several leading broker-dealers, including Merrill, Goldman and MSDW, to Arthur Levitt, Chairman of the SEC.¹⁴ The Chairman of these three firms, as well as others, testified to the Senate Banking Committee the following day, championing the regulated imposition of a central limit order book. Notably, their viewpoint was opposed both by Charles Schwab and by the Chairman of the New York Stock Exchange. “Responding to Chairman Levitt’s Call”, Wall Street Journal Interactive Edition, <http://www.wsj.com>, February 29, 2000.

Equity ECN Ownership Structures

| ECN | Ownership Stakes in Referenced ECN | | | | | | | Others |
|-------------|------------------------------------|---------------|------|---------|-----------|-----|---------|--|
| | Goldman Sachs | Merrill Lynch | MSDW | CIT/SSB | JP Morgan | DLJ | E-Trade | |
| Instinet | | | | | | | X | Reuters |
| Island | | | | | | | | DTK Holdings, Europe@web 7.5 percent, TA Associates |
| Brut | X | X | X | | | | | Knight/Trimark, ACS, Sungard |
| ARCHIPELAGO | X | X | | | X | | X | Townsend Analytics, G. Putnam, Southwest, CNBC, Instinet, American Century |
| Redibook | | | | | | X | X | Lehmen, Waterman, SLK, Fidelity, Schwab, NDB |
| Tradebook | | | | | | | | Bloomberg, Bank of New York |
| Strike | | | | X | X | X | | Prudential, Hull, 24 firms in group |
| Optimark | X | X | | | X | | | Dow Jones, Softbank, PCX, NASDAQ, Knight-Trimark |
| Primex | X | X | X | | | | | Bernard L. Madoff Investment Securities |
| Tradepoint | | X | X | | X | | X | UBS, DKM Warburg, American Century |
| MarketXT | | | X | X | | | | Herzog, Polaris |
| NexTrade | | | | | | | | Privately Held |
| Attain | | | | | | | | All-Tech Direct |

Sources: TowerGroup, Traders Magazine, Securities Industry News and the Authors, February 2000

The table tells two important stories, one each from the perspective of the ECNs and the dealers. Following any line horizontally for any given ECN one can see the collection of investments from several brokers. The motivation for ECNs to seek these investments is clear. Liquidity is the essence of competition among ECNs and competing exchanges. By recruiting the major dealers as strategic – and equity – partners each ECN hopes to “jump start” volumes and liquidity on its exchange. Investing broker-dealers are expected to route order flow to the favored ECN. Additionally, association with these leading names gives a new ECN an aura of credibility with investors, thus also enhancing potential liquidity. Archipelago has been particularly aggressive with this tactic, recruiting competing investment banks Goldman, Merrill and JP Morgan, as well as competing ECNs E*Trade and Instinet. By comparison, Island ECN has fast risen to become the number two ECN by volume (behind Instinet) by tapping into the retail day trading volume of its parent company, Datek.

The other perspective is that of the investing dealers, read along vertical columns in the table. The noteworthy point here is the multiple investments made by several of the firms in competing ECNs. The generous characterization of these investments is that these firms recognize that the ECNs have the potential to substantially change the marketplace, and as leaders in that marketplace, these dealers have an interest in participating in and influencing that development. The more cynical answer – and one offered candidly by a number of the investors – is that these firms simply don't know who the winners will be at

the end of this stage of ferment. Consequently – and rationally – they are spreading their bets across a number of horses. Of course the investments also afford the dealers an opportunity to closely watch developments in this space. Moreover, the equity investments have – thus far – provided a welcome return on investment, as buoyant markets for Internet stocks have lifted all ECN boats.

Ironically, the proliferation of ECNs has had at least the potential, if not the actual effect, to disserve the institutional investors who constitute much of their target client base. The *raison d'être* of ECNs is to ensure that investors obtain the best possible price available in the overall global community of traders, where the traditional exchanges did not always provide this guarantee. Yet during this period of ferment, the creation of multiple alternative markets, as well as the order matching systems deployed by the ECNs may undermine this objective. The multiplication of markets which have yet to be efficiently linked may lead to the fragmentation of liquidity, denying major investors the depth in any single exchange to efficiently transact large block trades. Further, the automated order-matching process makes it difficult for large blocks to be “worked” through the system by discrete agent market-makers. The solution to both problems is the ultimate efficient linkage of all entry points to what becomes effectively a single virtual market or “super-ECN” limit order book. The role of ECNs in future market scenarios such as this one is explored in a later chapter.

V

Market Disruptions: Analysis of New and Evolving Industry Dynamics

An industry analysis that incorporates these new entrants and potential business models enabled by the Internet paints an altogether different and far less promising landscape for incumbent broker dealers.

Return to Porter's Five (plus Groves sixth) Forces:

Rivalry remains intense among existing firms, but has now been intensified by the new entrants. Price competition is now open and fierce; commissions and spreads on the execution of transactions is falling toward zero. The phenomenon is most obvious in the retail brokerage arena, where commissions have fallen from \$100 and higher at full service firms in 1997 to \$29.99 per trade at E*Trade, then \$9.99 at Ameritrade and now free - \$0.00 – per trade at American Express (given a sufficient account balance). The pricing of institutional execution is more difficult to track but has reached the neighborhood of \$1 per large trade. Spreads are also narrowing, driven by intense competition among the ECNs themselves to capture a critical mass of volume, market share and liquidity. Without the expense burdens of large stocks of capital and inventory, high-touch personnel-heavy sales forces, and full service infrastructures, these ECNs operate at extremely low costs, placing intense pressure on price. Incumbent dealers are both losing profitable business to these alternative trading systems as well as cannibalizing their own higher margin business through competitive E-offerings. It is unclear that any legacy firm with a traditional cost structure can be profitable in trade execution.

Buyers have dramatically increased their power through the use of the Internet. Prior to the emergence and interconnectivity of the ECNs, investors' ability to discover optimal pricing was strictly limited by search costs. In order to seek out and discover prices that might be available in the market place but not posted on the exchange montage, money managers were limited to telephoning dealers or other investors one at a time in the hope of improving price. The interconnectivity of the ECNs, exchanges and dealers now allows this information to be accessed from any node on the network. As connectivity grows and the efficiency of information transfer continues to improve, buyer power will increase further. The fundamental enabling condition of dealers as infomediaries has been the inefficiencies of information and price discovery in the markets. The Internet and the ECNs directly address these inefficiencies and threaten to eliminate the players who thrive on them.

Suppliers are similarly empowered by the web and the advent of on-line investment bankers and specifically by the auction model of distribution. In the pre-Internet marketplace, suppliers were wholly fragmented. Worse, for all but the largest corporations issuance of securities was an infrequent or at most occasional event. There was simply no economic rationale in building a distribution network with investors and allowing issuers to bypass the investment banks. (A notable exception is the direct Commercial Paper programs developed by many large and frequent issuers of this short term paper in the 1990's. In many ways, these were the forerunners of broader, web-based on-line issuance.) The banks invested heavily in these channels and paid for this investment by concentrating the supply of new paper, pushing through as much volume as possible. The Internet, and specifically on-line issuers, challenge all this by putting access to the broadest possible dissemination of information and distribution of securities into the hands of any issuer. The market is already witnessing downward pressure on the institutionalized 7% commission for IPOs, and observers – including the SEC – are watching carefully to see how the auction method of distribution is accepted by the investor community.

Barriers to Entry have fallen remarkably. Upstart firms targeting only the trade matching function have no need to painstakingly build distribution and other ancillary service infrastructures. Capital requirements are modest because the ECNs act only as agents and do not take principle positions. The technology is relatively inexpensive. Perhaps most important, the central mission of the SEC is to protect investors in the market – even at the expense of dealers. As a result, the regulatory climate for this new breed of challengers has been as welcoming as could be imagined.

Economies of Scale face perhaps the biggest reversal as a competitive advantage with the advent of Internet-based challengers. The large-scale economies model of capital markets services had been linked to the broad integrated offering of services that were bundled into the single instant of revenue capture at execution. Global distribution capabilities attracted –and could only be supported by – large volumes of order flow. Inventory and capital were scaled with the ability to provide liquidity. An enormous back office infrastructure was required to handle the volume. All this fueled consolidation in the industry. But the World Wide Web offers the greatest scale of distribution imaginable, and when working efficiently in fluid markets, eliminates inventory as a requirement for liquidity as well. Back office processing can be out-sourced and rented. Very suddenly, the pillars of competitive advantage through economic scale have substantially been removed.

Substitutes in the new model are, of course, the ECNs, on-line brokers and on-line issuers themselves. The power that is accruing to investors and issuers is the power of choice among this new supply of potential substitutes.

Complimentors may represent the final stage of this revolution in the capital markets. The role of the traditional exchanges as complimentors to the broker-dealers is clearly under siege. At the same time, new complimentors are emerging which support the insurgency of the ECN's and on-line issuers. As these primary attackers capture the execution link in the value chain, specialized complimentors logically follow to fill in the other links. Multex provides research and analytics. Barra provides risk management. State Street Bank, Chase and Bank of New York provide clearing and custody services. And so on.

These substitutes to the old regime and their newly emerging complimentors are essentially unbundling the integrated service offering of the traditional broker dealers. The ECNs provided only the first move, removing the lynch pin. Destroying the old pricing model for capital markets services has been a relatively simple and straightforward process. The more complex and interesting steps will be the re-pricing of the various service components as new complimentors step into specialty roles and incumbents work to redesign and restructure their service offerings.

Integration vs. Dis-Integration of Service Offerings:

The unbundling and re-pricing of various components of the capital markets value chain comprise the essential disruptive activities of web-enabled challengers to the *status quo*. **The fundamental question for the future structure of the industry is where and to what extent market dynamics will now support integrated versus dis-integrated service models and business structures.**

Let us now examine more closely the bundle of services:

Trade Matching and Execution: We continue to see how specialized and focussed electronic matching networks are able to modularize the provision of liquidity. As costs and other barriers to entry remain low – or more likely fall even lower – competition in this space will remain intense. If the architecture of the overall industry network continues to become more open, it is likely that several differentiated or specialized ECNs may be able to survive through access to a virtual pool of liquidity created by networking all the players together. In this “super-ECN” scenario, select individual players may compete

on execution quality and other non-cost-driven factors, but many will always compete on cost/price models, thus driving any economic rents from pure execution as a service. An alternative scenario involves the emergence of one or perhaps a few electronic exchanges as dominant sources of liquidity. A possibility for this is a NASDAQ and/or NYSE backed central limit order book. In this scenario, the economies of a natural monopoly drive all business to a single dominant exchange – or perhaps a few exchanges differentiated by product (e.g., listed equities, OTC equities, high tech stocks, bonds, etc.) In the monopoly scenario, the dominant exchange(s) may well be able to capture economic rents, although their ability to do so will be limited by the close supervision of government regulators. In any case, it is nearly impossible to imagine a scenario where access to exchanges can continue to be monopolized by an exclusive group of large broker-dealers. In any event, both institutional and retail investors will demand and obtain direct access to the electronic exchanges via the open architecture of the web. **Conclusion: Execution will continue down an inevitable path to complete modularization and away from dominance by legacy broker-dealers.**

Inventory and Liquidity: Where liquidity is not provided by the network – that is where the depth of connected buyers and sellers is not sufficient to sustain an efficient market - market makers (broker dealers) have traditionally served a critical role as providers of liquidity. The provision of liquidity involves the utilization of the firm's capital to stand ready to buy or sell securities when only one side of the demand equation is naturally present in the market. In order to be able to provide liquidity market makers must hold inventory of securities (in order to have stock to satisfy demand) and be prepared to buy securities (effectively increase inventory). The holding of inventory in financial securities is analogous to inventory in any other industry, but with some key differences. Again it may be helpful to think of the Dell business model as a point of comparison. Inventory is costly to maintain. It is held as an asset on the balance sheet that must be funded by either liabilities or equity. In the case of Dell, the "cost of carry" on inventory is Dell's weighted-average cost of capital. In the case of a financial services firm, variable funding is easily accessed from the market at a variable cost. Dell's competitive model is critically dependent upon driving inventory costs from the system. Inventory held by market makers also constitutes a large cost. Yet there is one critical difference: financial securities yield interest or dividends. This income offsets the cost of carry. In many cases, the net cost of carry may actually be negative. However, the other negative aspects of inventory are common to both securities and manufactured goods or raw material. Chief among these is the risk of declining value. One of the great advantages that Dell has over Compaq is its short turn around time for components inventory. The issue here is not the funding cost, but the risk that inventory becomes devalued while in stock, for example due to the announcement of a superior substitute. Most of the capital committed by investment banks is required to protect against the

downside risk of devaluation in their portfolios. In addition to funding costs, this capital is also costly, as are the sophisticated monitoring infrastructure and processes required to control the risk.

The unique ability to provide liquidity to the system may prove to be a sustainable competitive advantage for broker-dealers as a class against the challenge of the ECNs. However, the ability to provide this service profitably on a consistent basis over time has proven elusive for many firms. Again, the essential activity in the provision of liquidity is the taking of positions in a range of financial instruments. Players in the market do this in essentially two forms: 1) Investors take positions with the expectation of earning a superior return and they select their assets accordingly. They also enjoy cost models that are optimized for this activity. 2) Market makers take positions in order to service the first group. They have less discretion in selecting which assets to hold if they are to serve their customers. Unless they are absolute specialists in market-making, they will also have more burdensome cost structures. These are disadvantages in the market, compensated for by their ability to extract a price for providing the service. The critical question is how this service will be priced in the future, as ECNs and other new players continue to segregate other services from the provision of liquidity. **Conclusion: in the most liquid markets, the provision of liquidity via stocks of inventory will be eliminated as uncompetitive by the more efficient electronic networks. However, more complex, structured and illiquid markets will continue to benefit from – and be willing to pay for – proprietary sources of liquidity for some time to come. Yet, even here, as Christensen points out, investors are likely to demand increased liquidity over time, leading to more standardization in the debt markets.**¹⁵

Research and Market Advice: Broker-Dealers have also differentiated themselves by the quality of their research. In the 1990's top research analysts have risen in stature and compensation to rival leading investment bankers. Recognized names like MSDW's Mary Meeker and Merrill Lynch's Henry Blodgett have proved able to attract investors' accounts and trading activities to their firms in order to gain access to privileged research. Yet research too is subject to commoditization, modularization and aggregation. As the net has generated explosive growth in active trading by individuals, firms that cater to both retail and institutional investors have been compelled to offer their research to a broad audience. The natural and efficient channel for distribution is the web, and competing firms have quickly tumbled to a standard of distributing their research as other web information is distributed – for free. Once research is widely and freely available via the web, aggregation by modularly oriented services follows naturally. Multex currently leads in this niche, aggregating current research from most leading firms and delivering an indexed product to investors on a subscription basis. MIT's Michael Siegel has also suggested that this

¹⁵ Christensen, Clayton, e-mail to David Berray dated April 6, 2000.

disaggregation of research from the broker-dealer service bundle may open the path to truly independent research, offered at a price from non-affiliated, specialized research houses, as for example, that offered by TheStreet.com. The traditional research product of investment banks, Siegel argues, is inherently flawed by a conflict of interest. Investment Banks provide research both to attract investors and also – more importantly – to attract primary issuers. Issuers like to see liquidity in their securities after the initial offering, and research – as well as market making – supports liquidity. Few issuers will agree to hire a firm to raise public financing without some commitment that research coverage will be ongoing. The conflict arises because the investment bank has an interest in its issuing clients success (higher stock price), and likely holds inventory in the firm's securities as well. Siegel suggests that this potential conflict may explain why the total range of analysts' recommendations from investment banking research departments is disproportionately weighted toward "buy", "accumulate" and "hold" recommendations, with relatively few "sell" suggestions. Given the value of truly superior information and analysis in the market, Siegel suggests that a substantial opportunity now exists for independent research by subscription – a very modular approach.

Analytics: Specialized, web delivered analytics packages are fast populating both retail and institutional market space. An analytics offering is primarily a software algorithm for acquiring and sorting data. The web enables both easy access to market data and an efficient delivery channel for the software. The ability to develop quality analytics products is largely independent of the surrounding infrastructure of a large broker-dealer. Relatively small teams of experts – or even individuals – can bring credible analytics software to market. The information economics are such that the marginal cost of producing and installing an additional copy is negligible. While every broker – whether retail or institutional – is certain to incorporate some level of analytics functionality into its portal, most provide the service for free. Investors are also at liberty to augment with entirely modular selections from the marketplace. Differentiation may be sustainable at the high end in this product, thus forestalling complete commoditization. However, modularization is almost certain to be complete. For example, the analytics behind such sites as Fidelity, Citigroup, American Express and most recently AOL's personal financial portal are already out-sourced to a company called Telescan, based in Houston Texas. More sophisticated packages are widely available to the institutional market as well. Most notable among these providers is Barra.

Clearing: The clearing and settlement of securities transactions has already been de-coupled from trade execution. Clearing is a process and technology intensive activity and is characterized by tremendous economies of scale. The largest broker-dealers all offer clearing and settlement services, while smaller brokers generally do not. This already-modularized industry structure effectively eliminated another

potential entry barrier to the ECNs, as they were able to enter the marketplace for trade execution without being required to build clearing capacity. The critical value offerings in a clearing service are reliability (quality in terms of assurance or error free transactions) and cost. Clearing is a commoditized, scale economy driven business that should increasingly be dominated by just a handful of big firms, perhaps specializing in the process. As large dealers look for alternative revenue models to augment declining revenues from execution, they are all looking toward increased third party clearing – previously a back-end, low-glamour, ancillary service – as a potential way to support their large installed infrastructure. This will inevitably lead in the near term to over-capacity and the elimination of economic rents, as the cost base is largely fixed and installed, and prices will approach the negligible level of variable costs.

Custody: Custody services, including safekeeping, monitoring corporate actions, dividend, coupon and cash management, etc. are also characterized by great economies of scale. Typically provided by large, global commercial banks, these services are already disaggregated from trade execution and the other components of the value chain. Consolidation to a relative few global players has also accelerated in the past decade, with Chase, State Street, Citigroup, Deutsche Bank, and HSBC among the top tier.

Primary Issuance and Origination: The origination of new issues of debt and equity is already experiencing isolated attempts at modularization through new Internet-enabled business models. New issuance for the moment remains a very profitable area of investment banking, with fees of 7% of proceeds raised standard in the equity markets. Until recently, the integration of origination with trading and sales has been clearly logical, because the success of an offering is primarily dependent upon the lead underwriter's ability to distribute the offering among investors. While information networks are inefficient and the channels of distribution are largely monopolized, this integration is entirely logical. However, a few challengers are beginning to demonstrate that the power of the Internet to reach investors may allow electronic-based offerings to disintermediate entirely this traditional channel. The first clear example of this new phenomenon occurred when the city of Pittsburgh floated an offering of municipal bonds directly to investors via Internet start-up MuniAuction in 1999. However, in another example, large Fortune 500 corporations have been accessing the market for short-term commercial paper directly for several years.

Advisory and Structuring: Advisory and structuring remain the highest margin product offerings of the investment banks. As the march of technology and communication relentlessly erodes the profit margins in more commoditized products like lending, trade execution, investment management and even primary issuance origination, top-tier firms continue to retreat up the value-added curve toward advice and structuring. The market strategy, much like that of strategic management consultants, is for top firms to

position themselves as trusted and highly-sophisticated advisors to the very top management (CFO, President, CEO and Board level) at large or fast growing companies. The synergy with the firms' other capabilities lies in providing advice that leads to transactions. Unlike consultants, bank advisory groups charge little for the advice and earn most of their fees on the consequent – if any – transaction. As famously portrayed in such records as Brian Burrough's and John Heylar's 1990 Barbarians at the Gate, there is an inherent moral hazard to favor advice which leads to transactions. From the investment bankers' point of view, they are simply offering an integrated solution – advice together with implementation and execution. Investment bankers will surely continue to prosper at this high-end of the market, and it is likely, as suggested by Christensen and Verlinden, that this is a market where integration may continue to prevail. However, it is also conceivable that as the transaction execution aspects of implementing financial strategies continue to dis-integrate and commoditize, structuring and advisory may become more modular as well.

Questions concerning dis-integration:

For the purpose of evaluating the relevance of Christensen's, Verlinden's and Utterback's propositions the important questions to leaders of both incumbent and challenging firms are:

1. Have the overshooting of customer demand for functionality combined with the emergence of a disruptive technology in the form of the Internet created the necessary conditions for a shift in the dominant model from vertical integration and horizontal oligopoly to a more modular and decentralized phase of industry development?
2. For which customer segments is this most acute?
3. What links in the value chain are particularly susceptible to modularization and where, on the other hand, will market forces still favor an integrative product offering?
4. Is this a relatively durable condition or only a temporary phase of adjustment to the new technology?

At the critical trade execution link in the capital markets value-chain this appears to be exactly what is happening. In the retail markets, which presaged this dramatic shift, the dynamics were fundamentally different. Retail investors had never had access to the service, information, research, low costs, etc., which professional investors have long enjoyed. The underlying cost models of the required infrastructure simply made the prospect uneconomical. The net changed that, and while the on-line, discount brokerage services could not match the quality of traditional offerings, they were much better than anything previously

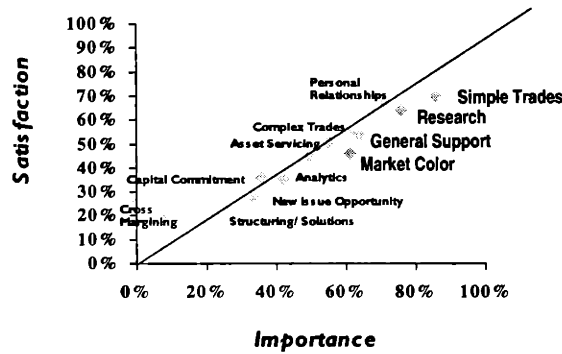
available at a much lower cost point – and most important – “good enough” for a very large class of individual investors. Similarly, for small and medium sized institutional investors, the ECNs appear to offer an acceptable level of service and liquidity at an attractive price discount. Until deeper liquidity develops, however, the most demanding investors – the largest insurance co.’s and asset funds, will continue to require – and be willing to pay for – the deeper liquidity and order management capabilities of a full-service investment bank.

How this effects the other links in the value chain is less clear. Recall that until recently, the entire chain of services has been bundled into a single offering. It is now clear that various new competitors will attack this bundle and attempt to modularize every link. The outcome is dependent upon how these services come to be re-priced, as surely they must. Wherever services are perceived to add real value and their provision is not explicitly dependent upon ancillary capabilities, independent modularity may yield a more competitive product. Non-value-added services should be abandoned or explicitly recognized and subsidized as loss-leader offerings by profitable business lines. Truly inter-dependent offerings should remain integrated.

Market research commissioned by Merrill Lynch and conducted in 1999 by Greenwich Associates and The Cambridge Group attempted to address this question.¹⁶ In a survey of institutional investors and money managers, the study asked which factors in the dealer-investor relationship were most important to investors, and then what levels of satisfaction did the investors experience from their dealers along those same factors. The results were averaged and plotted as a scatter-plot on a scale of 1 to 100 for both axes, and a 45% line was interposed. The authors hypothesized that data points above the line, i.e., where the rating of satisfaction exceeded that of importance represented features where performance exceeded demand. Conversely, points below the line suggested under-performance vs. demand. Although not shown here, the results were also broken down to identify differences in perceived satisfaction and importance among various types of clients, i.e., investment managers, brokers, pension funds and portfolio traders.

¹⁶ Greenwich Associates and The Cambridge Group, “Mid-Sized Institutional E-Commerce Study, July 1999 (from Merrill Lynch Direct Markets presentation)

Importance vs. Satisfaction: Total Sample



Source: Mid-Size Institutional E-Commerce Study, July, 1999; Greenwich Associates and The Cambridge Group

For the purposes of our speculation as to whether firms are providing service levels above those demanded by their clients and therefore opening the door to disruption and dis-integration, the results are inconclusive. The graphs show a strong correlation between what investors consider important and what dealers are able to deliver satisfactorily. (Note: quantitative statistics were not available – the perception of strong correlation derives only from observation of the plots). In no case are there service attributes where satisfaction is rated substantially above importance. On the contrary, there are several points, particularly among investment managers, hedge funds and portfolio traders, where dealers perform poorly on several of the most important criteria. The findings would suggest that clients do not perceive themselves to be over-served by the dealers. However, it would be prudent to note that the survey was designed to gauge client perceptions and may not accurately predict client behavior given alternative offerings that are not yet widely available and known.

Complimentary Assets: Do Critical Capabilities Become Critical Liabilities?

In this new, unbundled and dis-integrated or modular world, the traditional complimentary assets and sources of competitive advantage may actually become liabilities:

Capital may not ever be a direct liability, insomuch as it can always be readily re-deployed. However the large inventories of securities and proprietary risk positions which leading incumbents have carried may well become liabilities. As markets become both faster and more efficient, the need for intermediary

inventory is eliminated, or at least reduced. At the same time, the volatility of asset prices may increase, as it surely has in recent years. This volatility exposes position takers to greater risks, which over time can only be supported by greater returns. It is difficult to see the source of those returns as margins continue to be competed downward. Certain market competitors – specifically hedge funds – will continue to compete in the market on the basis of proprietary risk positions. Yet these firms are designed and purpose-built to engage in this activity and have comparatively lean cost structures in order to do so. They also avoid potential conflicts with investing clients, because they have none. It seems unlikely that investment banks will, over time, be able to remain competitive in deploying risk capital in the financial markets. At the same time they will no longer be well paid for providing liquidity. On the other hand, new market entrants appear to be having little trouble attracting sufficient capital to underpin new business models. Capital as a source of competitive advantage to large legacy firms appears to be substantially weakened.

Distribution: We have seen how the Internet disrupts the competitive advantage of large physical (human) distribution networks. These networks are extremely costly. As customers increasingly choose to self-serve via the web, demand volume will continue to drop while at the same time execution margins approach their natural limit of zero (in fact they could conceivably become negative, as firms resort to buying transaction volume in order to get other business like asset-servicing in a new model of service bundling). It is absolutely certain that the major firms will need to dismantle or substantially re-deploy these distribution networks. Their cost structures cannot be competitive otherwise. Yet large organizations are resistant to change – especially so when enjoying record profits. **The inability to rapidly reconfigure these resources and dramatically reduce underlying costs may be the most pressing challenge to these firms today.**

Relationships: may be the last and most robust source of competitive advantage for incumbent dealers. Access to information via the net continues to grow exponentially while at the same time the friction involved in switching among vendors of any kind continues to fall. Increasingly, the battle for market share – and the presumed profitability that attends it – is one of achieving “stickiness”. As noted earlier, relationships can be highly effective and valuable filters and can contribute to great “stickiness”. But relationships alone will not retain value-seeking clients. Real value must be provided at a competitive price. **The challenge to incumbents is to retain the relationships while employing a cost model that allows for competitive pricing of service and value.**

Technology: Installed proprietary technology is a costly albatross for incumbent firms. The web has democratized (even communized?) access to technology. Legacy systems impair flexibility while

imposing enormous costs in maintenance and capital commitment. Concentrated pools of incumbent technology professionals may provide a great advantage in a market with insatiable appetite for technology talent, but only if incumbent firms can retain the best minds and deploy them effectively. On the other hand, large installed bases of hardware and software assets are certain to be a drag on speedy change as well as on profitability.

VI

The Incumbent Perspective : Market Analysis

The initial and most visible response of leading incumbent firms to the advent of web-based challenges has been to move their legacy service offerings and business models online. All four of the leading broker dealers, as well as many second tier competitors, have developed and introduced web-based portals to their offerings. Goldman Sachs calls their offering "Financial Workbench". MSDW's is "Client Link". Merrill is calling theirs "Merrill Lynch Direct Markets" ("MLDM"). Citigroup uses "e-Citi". All of these portals have a common underlying approach to enabling client access via the web – that is, they all are, or intend to be, cross-product, integrated offerings. The underlying intent here is to make available the entire product range of the firm, as well as ancillary information and links, to all qualified clients, all the time and all in one place. MLDM head Michael Packer calls this the "client window" onto Merrill Lynch. It may be interesting that these firms are unanimous on this approach. Large investment banks, including each of these, are traditionally organized along product lines. One fundamental split is between debt and equity. Another is between primary issuance and secondary trading. Within these categorizations, the organizations are further segregated into sub-products; e.g., within debt: government, municipal, corporate, within corporate debt:

High grade, medium grade, high yield (junk); and within high grade, short term vs. long term. This segregation and decentralization of control by product line enables the benefits of specialization, deemed necessary to be competitive in these intensely competitive markets. However, the decentralization also engenders problems in control, efficiency, and – most important – client management across the product silos. For all of the 1990's, and longer in most cases, each of these firms has attempted both organizational and technological approaches to bridging these silos. Merrill Lynch alone has mounted three such efforts just in the last ten years. Sophisticated, mainframe based data bases were once thought to be the solution. Later, client-server architectures promised the answer. It may be telling that each of these firms is repeating the same attempt by employing Internet technology. The basic strategy remains to integrate the product silos in order better to serve – and exploit cross-product marketing opportunities among – clients. This is in stark comparison to the strategies of the new challengers, who uniformly appear to be dis-integrating service offerings and specializing entirely on select links in the client value proposition. **The fundamental question may be whether the web itself – or net-enabled software agents – will be able to provide the integrating layer of the client interface and therefore render single-firm integrative strategies ineffective.** (More on this later.)

This early and primary focus of incumbent activity has been to enable web-based access by the firms' clients to their internal systems and information. Beyond this necessary and largely defensive move, these firms also envision these efforts as providing a technology platform from which to extend into more strategic directions. Two common themes for these new directions emerge:

- 1) How to use the platform to modify bundling and pricing of various offerings? The essence of this planning is to modularize the value chain and then seek new, creative ways to repackage services into offerings that can sustain a premium price. Again, the key question will be whether any given firm can be more effective at packaging (and branding) an integrated offering than the web-market place will be.
- 2) What new business models can e-enabled by the platform?

Underlying these strategies are two key assumptions:

- 1) The overall collection of client relationships, capital, and access to information which represents today's leading investment bank will continue to be a hugely valuable and irreplicable resources in the Internet world;
- 2) An integrated technology platform with a robust web interface is the best way to exploit that value

Market Analysis and Client Segmentation:

Underpinning each of these efforts to "webify" the client interface and to build product delivery platforms for new business models is a great deal of experience and market research. Within the context of the MIT-Merrill Lynch Partnership Agreement, Merrill Lynch Direct Markets head Michael Packer has generously shared much of the market research and internal strategic thinking behind the MLDM effort.¹⁷ This section draws heavily upon that material.¹⁸

¹⁷ The Merrill Lynch-MIT Master Collaboration Agreement was entered into in March of 1999. The agreement calls for ML to provide up to \$15 million in support of a joint research projects initiative and \$5 million in support of a financial technology education initiative over a five year period.

¹⁸ The market analysis that follows was commissioned by Merrill Lynch Direct Markets and performed by a combination of internal Merrill resources, The Cambridge Group, Greenwich Associates and others. Specific data are attributed by source, wherever possible. However the conclusions, as well as the data constitute information which is proprietary to Merrill Lynch, Inc.

In order to analyze these competitive threats and opportunities as well as to organize its vast resources, it was helpful for Merrill to segment existing and potential clients along several axes. At the first level, ML divides itself between retail, which it calls Private Clients, and corporate/institutional business. The latter group is the domain of the Corporate and Institutional Client Group ("CICG"). A third group at ML provides Asset Management services, a competitive offering to some of CICG's core money manager clients. (Note: MSDW and Goldman are organized along similar lines, with the notable exception that Goldman does not have a developed retail sector business. The capital markets are both the focus of this paper and the central business of CICG.

It is helpful to further classify CICG clients into seven types of actors and into three tiers of size. (see table below). For the purposes of this research, MLDM has classified clients into seven business sectors: Insurance Companies, Pension Funds, Fund Managers, Broker-Dealers, Banks, Hedge Funds and Corporations. For the most part, the first three are investors, the next three are "traders", and corporates are users of capital, although this simplification ignores a substantial amount of cross-over activity among all the groups. Merrill then stratified each client-type into 3 tiers. Tier I is defined as containing the top 20 firms in each sector based upon total spend on financial services, plus any firms in the ML top 200 client list. Tier III firms are defined as all firms with total spending on financial services in the bottom 20%. Tier II names are "in the middle", identified as spending substantial fees for financial services and hypothesized to be under-served by both ML and the market. Research performed in house by Merrill has estimated the number of potential clients in each sector and strata, as illustrated below.

| Number of potential client firms in each sector and tier: | | | |
|--|---------------|----------------|-----------------|
| | Tier I | Tier II | Tier III |
| Insurance: | 30 | 287 | 3,383 |
| Pension Funds | 23 | 329 | 20,148 |
| Fund Managers | 78 | 622 | 14,031 |
| Banks | 25 | 232 | 8,543 |
| Broker Dealers | 10 | 33 | 435 |
| Hedge Funds | 22 | 110 | 1,096 |

The market study also identified that up to \$30 billion is spent by Tier II names on financial services, with the bulk of spending centered among Fund Managers (\$10 billion) and broker-dealers (\$5 billion). These

client groups have not historically been targeted by Merrill's business model and client focus efforts, which have centered upon Tier I, top 300-500 names in the industry. Merrill already has hundreds of relationship rep.'s and sales people dedicated to this Tier I focus and carries a consequently high expense burden. While potentially attractive, this \$15 billion potential revenue source is spread among 650 prospective clients.

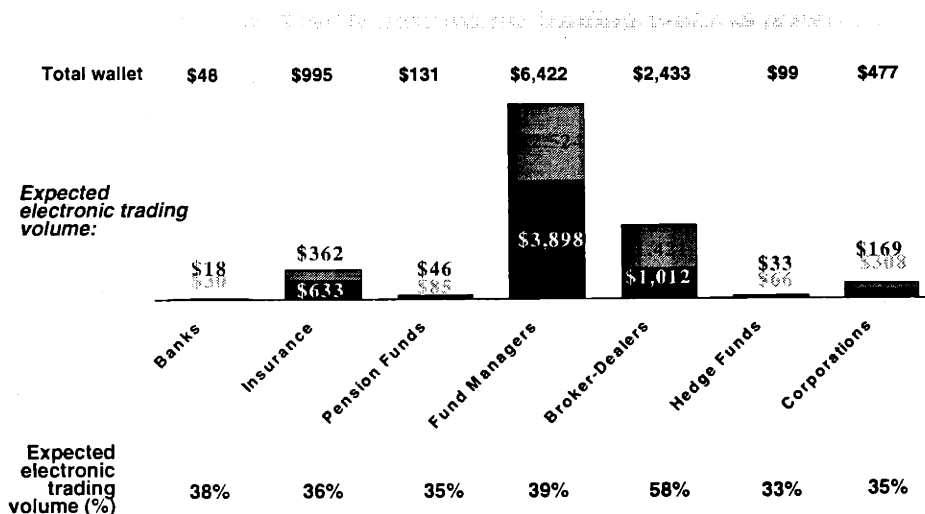
| Spend on Financial Services by sector and segment (\$ billion) | | | | |
|---|---------------|----------------|-----------------|---------------|
| | Tier I | Tier II | Tier III | Totals |
| Insurance: | 1.1 | 2.2 | 2.2 | 5.5 |
| Pension Funds | 0.9 | 1.6 | 1.9 | 4.4 |
| Fund Managers | 12.4 | 9.9 | 23.4 | 46.0 |
| Banks | 1.3 | 2.2 | 2.9 | 6.4 |
| Broker Dealers | 3.3 | 6.0 | 6.8 | 16.1 |
| Hedge Funds | 0.7 | 1.0 | 1.8 | 3.5 |
| Corporations | 3.6 | 10.2 | 4.4 | 18.2 |
| Totals | 23.3 | 33.1 | 43.4 | 100.1 |

Addressing the second tier segment with the existing service model would be prohibitively expensive and ultimately unprofitable. These potential clients are currently served by a network of smaller broker-dealers with lower cost profiles, and increasingly by electronic brokers and exchanges. However, Merrill hypothesized that an electronic based window to the capital markets, built on a relatively "low touch", high volume business model might appeal to and capture much of this segment. Building this window and capturing this income has been a primary strategic objective of the MLDM effort. While the dollar spend figures in aggregate are also large for Tier III clients, the number of clients involved remains prohibitive at this stage in ML's evolution. However, it is not difficult to imagine the extension of a highly automated, web-based service offering capturing some of these revenues as well.

Having identified Tier II clients as a potential target for a web-based service model, MLDM's marketing group then examined the potential spend on electronic trading specifically within this segment. The marketing methodology included preliminary one-on-one interviews with 70 Tier II professionals,

followed by a survey questionnaire of 530 participants. This examination yielded the following “wallet” analysis:

Tier II firms will spend \$4.6 billion in a year on electronic trading services

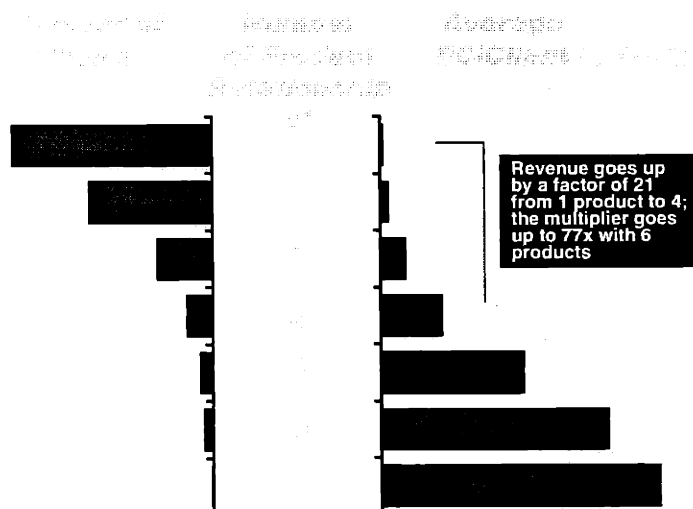


(*) Trade volume expected online one year from now. Source: MLJ Pract Segmentation Study, July 1999; The Cambridge Group. Estimate based on Survey Results

In addition to suggesting the opportunity to reach a broad and attractive tier of currently “under-served” clients, the web-based portal also offered the opportunity to more efficiently cross-sell Merrill’s broad product base to their existing clients.

The suggestion by Merrill’s research that a web-based portal strategy could deliver both a broad and attractive new group of clients as well as increased productivity through cross-selling to existing clients became an important tool for marketing the project internally at Merrill. Both opportunities involve new revenue sources rather than the likely cannibalization of existing flows. In an organization dominated by sales forces whose livelihoods are tied directly to the existing flows, this distinction between new and cannibalized revenue was perceived to be crucial. The following data was used internally to illustrate this point.

Cross-selling could potentially have a huge impact on revenue



As Merrill continued to do research into how a web-based electronic offering might appeal to Tier II, as well as Tier I clients they identified four “easily identifiable” segments classified as to propensity to adopt Internet technology for their institutional trading activity.

| Segments formed from attitudes to e-commerce: | | | | | |
|---|------------------|----------------------------|---------------------------------|------------------------------------|---------------------------------|
| Segment | % of Respondents | Typical Attitudes | Typical Firm Type | Individual | Max. Time to widespread e-usage |
| Enthusiasts | 30% | Hungry for Ideas | Broker/Dealers | Equity Portfolio Manager | < 1 year |
| Pragmatists | 22% | Self-reliant | Hedge Fund Insurance Co. | Portfolio Manager | 1-2 years |
| Skeptics | 33% | Pro-personal Relationships | Pension, Corporate, Banks | Fixed Income Portfolio Managers | 2-3 years |
| Traditionalists | 15% | Anti-change | Pension, Corporate | Equity Traders | 3+ years |

Source: ML Direct Segmentation Study, July 1999; The Cambridge Group

As noted earlier, ML commissioned market research by The Cambridge Group and also Greenwich Associates to explore how individual clients in each sector evaluated the service they are currently receiving from their investment banks in general, (i.e., not specifically Merrill Lynch). The results varied somewhat across sectors but illustrated great consistency on the most important themes. First, investors rate execution of simple trades, research, and “general support” as the most important service factors in their relationships with their investment banks. For most investors, personal relationships ranked near fourth place. Lower on the scale, but still important to investors were market color, complex trades, asset servicing, analytics, capital commitment, opportunity to invest in new issues, structuring solutions and cash margining (trade financing). Prima facie, these results make a strong case for offering an electronic capability through which simple trade execution, research and general support can already be delivered quite effectively (and efficiently), for these appear to be the service attributes which clients value most.

Perhaps more alarming to incumbent investment banks, and accordingly encouraging to e-startups, is consistent feedback that investor clients feel under served on these critical dimensions. The Cambridge/Greenwich survey plotted average responses of satisfaction versus importance for each service attribute. Average responses which fell below the 45 degree line were deemed to represent unsatisfactory service, while those above the line were said to illustrate more than adequate service. The survey results indicate that the investment banking industry is over-providing such uncritical yet high cost activities such as complex trades, structuring and sophisticated analytics while under-performing on the more basic offerings. This is an interesting result, as most investment banking rivals have during the 1990’s relentlessly worked to build their capabilities and enhance their offerings at the highly structured, complex end of the market. Presumably margins remain higher at this end and perhaps fall less precipitously than more commoditized offerings like simple execution and research.

Finally, the market research study found that despite what appears to be enormous potential to meet clients’ needs via a web-based service offering combined with the appearance of the ECN’s, and online brokerages and exchanges, actual on-line trading by institutional clients was still quite low at the time. The table below describes on-line activity adoption segment for pre-trade, execution and post-trade activities. In no case does Internet usage – even among enthusiasts – for institutional trading services exceed 7% of the respondents. Combined with the service satisfaction data, this suggests that an enormous opportunity to provide web-based trading and support had yet to be captured by any of the contenders.

| On-line Trading Activity Today | | | |
|---------------------------------------|------------------|----------------|-------------------|
| | Pre-Trade | Trading | Post-Trade |
| Enthusiasts | 6.9% | 3.7% | 5.0% |
| Pragmatists | 6.1% | 3.4% | 4.4% |
| Skeptics | 4.9% | 2.7% | 3.8% |
| Traditionalists | 5.4% | 2.5% | 3.5% |

Source: ML Direct Segmentation Study, July 1999, The Cambridge Group

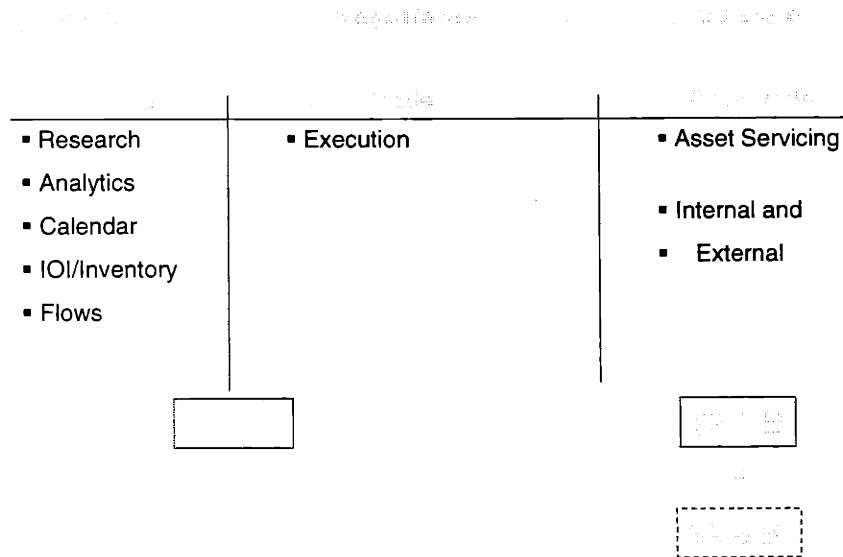
Upon looking more closely at these segments, ML concluded, “Enthusiasts (are) most often on line, but Traditionalists have the most money to spend”.¹⁹

When asked “Overall how important will providing a rich set of E-Commerce services be in ensuring that one of your “core” brokers stays in that position?”, five out of six Tier II respondents said that it was at least somewhat important.²⁰ The research also showed which aspects of the value chain are particularly well suited – in the view of professional investors – for electronic delivery. Interestingly, professionals saw both pre-trade information gathering activities and post-trade servicing as best suited for a web-based service. For the critical link provided by execution, however, the research suggested that professionals still would prefer the assistance of a human, personal interface.

¹⁹ Mathews, Tim, “Tomorrow’s World Today”, © Merrill Lynch, Inc., August 1999, page 4

²⁰ Ibid., page 3

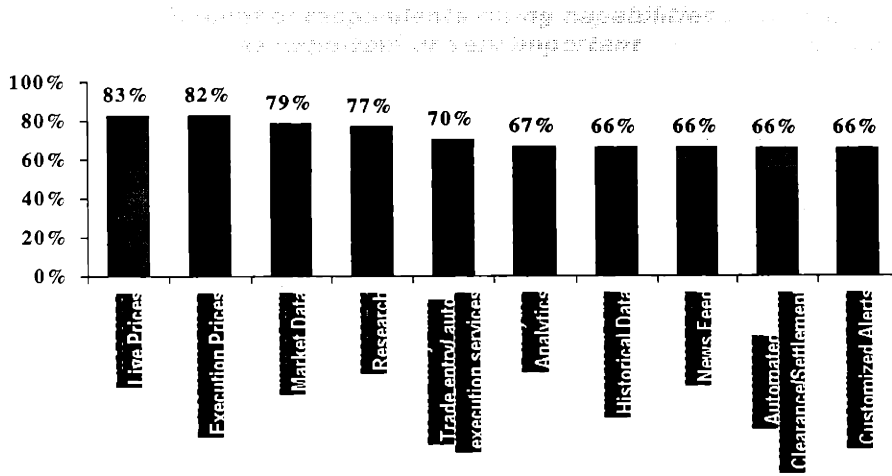
Will trades always need the human touch?



This finding may be confusing. On the one hand, it suggests that the construction of highly automated, Internet-based tools which leverage and facilitate the human relationship between investor and dealer may be an appropriate and non-cannibalistic strategy. On the other hand, it fails to explain the remarkable rise of automated exchanges (ECNs) who are capturing a significant share of this link. The answer to this confusion may lie back in the ATM analogy. Traders will use automated solutions for vanilla transactions, and will prefer them if they are cheaper and/or more efficient. Yet, in order to guarantee service for large, complex, or otherwise sensitive trades, professional money managers will continue to rely on trust based, human agents. Merrill's own conclusion was "Simple trade execution and research are top "E" needs, but don't lose the personal touch."²¹

²¹ Ibid., page 3

Real-time quotes and execution prices are rated most important



Source: E-Commerce offering much more linkages (5-point disagree/agree scale) MLD Next Generation Study, July, 1999, The Cambridge Group

VII

Scenario Development and Analysis

The formulation of incumbent strategic responses to these rapid and dramatic changes is complicated by the uncertainty associated with how the industry will be reconstituted by the advent of the Internet. To a great extent, both incumbent investment bankers and new challengers alike must be prophets of the future and at the same time make huge bets, in terms of financial investments, scarce human resources and even the identity of the firm, on the accuracy of their forecasts. However, neither the capital markets nor the Internet are all casino. In formulating its strategy ML and others have articulated multiple market scenarios for the development of the industry. Rather than gambling the firm's future on the unfolding of any one scenario, this approach allows each firm to formulate a strategic response that might be expected to be successful and robust under a wide range of possible outcomes. The practice of scenario planning was first and most extensively developed as a discipline at Royal Dutch Shell and widely publicized by Peter Schwarz's book The Art of the Long View.²²

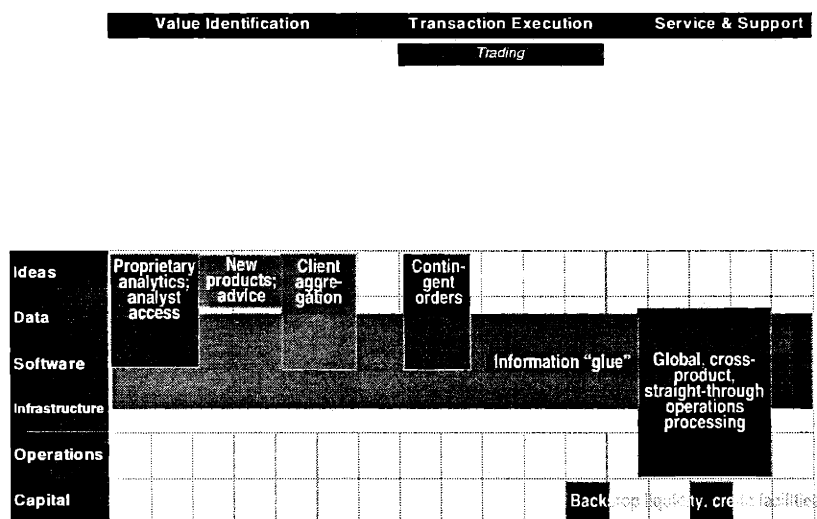
Merrill's scenario planning begins by speculating as to where value will be added within the institutional financial services value chain in the future. ML CIG leaders identified 17 services within the value chain and have arrayed them across six domains: Ideas, Data, Software, Infrastructure, Operations and Capital. As illustrated by the graphic below, they identified six areas of activity that they believe capital markets participants will value – and presumably pay for – in the future:

- Research analytics and access to top research analysts
- New Product advice
- Client aggregation
- Contingent orders
- Global, cross-product, straight-through operations processing
- Backstop liquidity and credit facilities

In the domains of data, software and infrastructure, ML also identified value – or perhaps the prerequisite requirement – for an architecture of “Information Glue” across the entire value chain.

²² Schwartz, Peter, The Art of the Long View, Doubleday, 1991

ML Suggests significant value will remain in seven areas



This is the driving assumption behind the effort within MLDM to build and implement a comprehensive, client-oriented product platform across all of the firm's product and service offering range. From this matrix, ML has continued to develop its scenarios for the evolving market. Each scenario is driven by speculation about client needs and how the industry will self-organize to compliment and compete in each domain.

Scenario Analysis Summary Table:

| Scenario: | Characteristics | Driving Events | Potential Responses |
|---|---|--|--|
| Scenario I: Status Quo | <ul style="list-style-type: none"> No fundamental change in the way clients and dealers operate. | <ul style="list-style-type: none"> Clients don't see value beyond cost and error reduction Large clients already have one-off solutions Registry barriers slow ECN's Internet speed and reliability problems | <ul style="list-style-type: none"> Same as today with better cross-product pricing, and/or Operate industry service & support utility, and/or Invest in PR & emerging e-commerce vehicles |
| Scenario II: Dealer-specific Portals | <ul style="list-style-type: none"> Major players construct proprietary portals for their products and services | <ul style="list-style-type: none"> Clients want integrated, cross product & -function connectivity Industry data standards (e.g., FIX) hard to implement across dealers | <ul style="list-style-type: none"> Create leading client portal for all firm products and services Operate Industry service and support utility |

| | | | |
|---|--|---|--|
| Scenario III: Industry Consortium | <ul style="list-style-type: none"> • A consortium of major players (dealers, banks, software firms, etc.) creates a crossing network or utility and drives volume to it | <ul style="list-style-type: none"> • Clients demand cross-dealer integration • ECN's fail to expand product scope or gain critical mass liquidity • ESC/Fed encourage common utility to reduce industry risk | <ul style="list-style-type: none"> • Take lead role as operator of joint utility • Drive industry discussions • Work to limit reach of open networks • Try to protect brand value |
| Scenario IV: Client Software Agents | <ul style="list-style-type: none"> • Clients use front-end software to integrate multiple markets and dealers | <ul style="list-style-type: none"> • Clients demand cross-dealer integration, but no ECN/utility emerges • Software vendors provide integrated capability: analytics, operations, best price trading, etc. | <ul style="list-style-type: none"> • Invest in or buy software vendors. Drive toward use of open standards to facilitate connectivity, and/or • Operate industry service and support utility |
| Scenario V: Open Network | <ul style="list-style-type: none"> • Investors and issuers cross directly on ECN's and 3rd party Internet sites | <ul style="list-style-type: none"> • ECNs take market share for execution • Clients unbundle advice and transactions | <ul style="list-style-type: none"> • Innovate in price bundling/unbundling. Shift payment from transaction to value identification and servicing • Operate industry support and service utility. Capture client information to find value opportunities. |

Source: Merrill Lynch Market Research, 1999

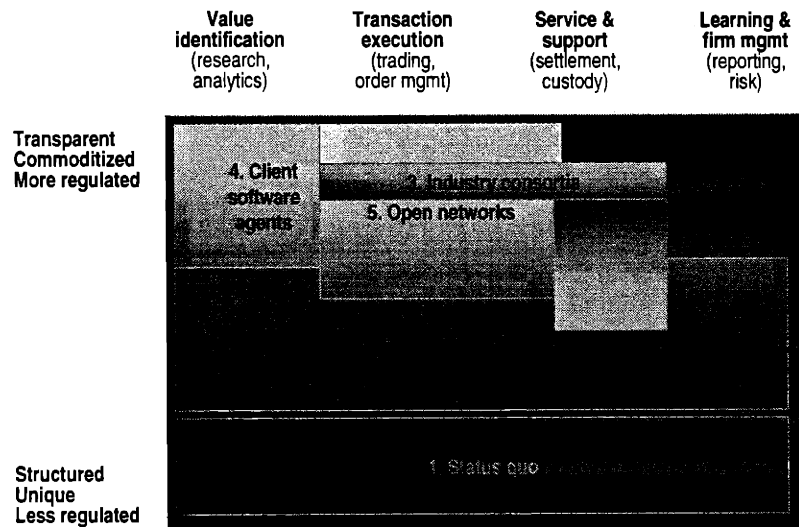
These scenarios are likely to play out unevenly across the spectrum of capital markets products and services. While open networks and client software agents are likely to make large inroads into the most liquid product segments, they will have more difficulty optimizing for their clients in less liquid and/or more structured product. This suggests that a one-size fits all strategy will not be successful across all products, and that new challengers will be able to successfully exploit product-service niches. Incumbents will have to decide whether to fight on all fronts, make strategic withdrawals from selected segments, or perhaps develop complex alliance strategies to defend their franchises. The analysis also suggests substantial scope for the development of single-dealer portals to support a wide band of limited-liquidity products. Overall, the scenario planning exercise suggests a broad migration of the value proposition of major investment banks in the capital markets arena. From primarily serving as interim providers of liquidity and capital on a product-by-product basis with a pay-per-transaction revenue model, the value proposition - and capture - seem likely to move toward new roles for financial intermediaries as:

- Interpreters of a broad base of proprietary knowledge

- Aggregators of order flow, using information for client as well as proprietary trading
- Operational processors also providing financing
- Integrators and disseminators of information
- Transformers and distributors of risk²³

As Merrill's planners worked to solidify these scenarios into the foundation for a robust business and technology plan, it became important to distinguish across the value chain between product-service areas which were likely to become more commoditized, transparent or regulated and those which were likely to remain less transparent, less regulated and more structured. Importantly the plan that emerged was not to abandon the former, apparently less attractive areas of the market but rather to design target – differentiated – solutions and business models for each segment.

One likely end-state



One evident aspect of all the leading incumbent strategies is the construction of a cross-product, highly automated, web-interfaced technology platform for institutional capital markets clients. This effort is essentially the cornerstone of these Internet strategies because it is expected to enable the execution of a range of strategic initiatives that may be further identified and refined as the market evolves.

²³ "Direct Markets Update – October 1999, Merrill Lynch

A schematic representation of the emerging design for an electronic connectivity platform looks like this:

| Platform Architecture "Layers" | | Examples |
|---|---|---|
| Advanced Differentiation | | <ul style="list-style-type: none"> • Deep personalized ideas • Personalized "Premier Pages" |
| Product Specific Implementations | Asset Servicing & Consolidated Reporting | <ul style="list-style-type: none"> • Cross-product, cross-currency settlement, collateral & margin mgmt. & reporting |
| Core Product Functions (Pre-Trade, New Issue, Trading, Mid-Office) | | <ul style="list-style-type: none"> • New Issues • Futures and Options Middle-office • Interim U.S. Equity, municipals |
| Core Site Functions and Content | | <ul style="list-style-type: none"> • Navigation • "Push" Information • Language preferences • Contact Info., FAQs, etc. |
| Core Infrastructure | | <ul style="list-style-type: none"> • Hardware, Software • Security • Operational Mgmt. • Client Services • Marketing Ops and editorial process |

Source: Merrill Lynch, "Direct Markets Update, October 1999"

Essentially the product platform or "electronic window" strategy is an investment in options for the future. Applying loosely the real options framework developed during the 1980's by several academics and practitioners and described by Tim Leuhrman in a *Harvard Business Review* article in 1998, we can better understand the rationale for large investments in integrative technology.²⁴ These platforms may pay for themselves simply by driving costs from the processing flow, much as Dell or Cisco have rationalized their value chains with intense, Internet based information automation. However, the compelling expected value from the investment in platforms is the option value in enabling a wide range of possibilities, including:

- Enabling the expansion of revenue bases into the Tier II client segment by reducing the required level of human-based service;

- Building a standard, cross-product interface capable of porting with any number of ECN's, exchanges or other single-dealer portals which may arise;
- Creating the possibility of a platform to offer transaction processing and service as a third party utility service;
- Facilitating the disaggregation and rebundling of service pricing and enabling new pricing models.
- Underpinning a general ability to shift from a high-touch, high-cost business model to a straight-through, automated, self-service framework

A critical feature of all options is that they tend to increase in value, all other things being equal, the greater the uncertainty or volatility of the expected outcome. Given the level of ferment we have already seen in this market, an option-heavy strategy may be the most prudent.

One interesting lens through which to consider this strategic initiative is that of Process vs. Product innovation. Fundamentally, the integrated platform initiative, as well as the "client window" customer implementation, are both innovations in process rather than product. (In an industry where process often is the product, we should be careful here, but I think the distinction remains valid). Work by Utterback and others suggests that this may indicate innovative activity at the mature and incremental end of the technology "S" curve. However, when viewed as a product platform enabling a range of options for the future, the initiative begins to look more transformational, and may be seen as an architectural realignment of various components into a series of truly differentiated and innovative product offerings. We have yet to see if this is in fact how the client window and similar industry efforts will evolve, but the speculation as to a period dramatic, disruptive innovation is not unfounded.

²⁴ Leuhrman, Timothy A., "Investment Opportunities as Real Options", Harvard Business Review, July-August 1998, pp.51-67.

VIII

Managing the Technology Resources

To recap, the fundamental tenets of the incumbents' responsive technology strategies have been to:

- Build a single, cross-product, client-oriented "electronic window" which integrates across all of ML all of the product and service information now confined to various product silos.
- Build straight-through automated processing capability into the platform
- Enable the Merrill client-network to "plug and play" with the multitude of ECN's, exchanges and other dealers in the market.
- Use the new platform and network to enable and drive new business models

Of the first initiative – the integrated client window - most of the effort is internally focused, with only the client-interface and data standards externally dependent. While this allows firms some flexibility in doing most of the development work "behind the scenes", the task is an enormous one. Largely as a result of silo-based organizations, and also due to uneven rates of change and technological development across different products and markets, the firms' technology systems infrastructures have evolved as organic networks of largely independent databases, processes and interfaces loosely knit together in a complex and delicate state of flux. Some people call this the systems "hairball". The key to untangling and resorting this web is the design and fabrication of a consistent data architecture that allows each system to communicate efficiently with the network. The degree to which an elegantly architected solution can be implemented, however, depends to a great extent on the time, as well as the resources, available. In a Panglossian world, leaders might seriously opt to discard the entire hairball and begin anew with a network-based architecture designed from the start to interact efficiently across products and processes. This is a critical advantage enjoyed by the new electronic entrants to the market and a serious hindrance to incumbents. This competitive gap might even suggest that incumbents spin-off the technological re-architecture project completely, allowing a separate entity to build a new infrastructure from scratch. To my knowledge, no incumbent has yet to take this drastic a step. The sunk costs of the legacy systems – and perhaps the transition risk and costs – appear to be prohibitive.

Having decided upon a re-work of the existing systems, the development team faces a fundamental trade-off between speed and elegance. Building for the future – even on top of an old platform – suggests investing time and resources into the design and construction of sophisticated and robust underlying

architecture. Yet the urgency of the challenge, the speed with which the market is changing, and the demands of existing business line managers to get something, anything, to the market undermine this principle. In a world of infinite opportunities, the team with the best priorities wins. The driving priority is to get the tangible benefits of a front-end technology platform into clients' hands as fast as possible, while deferring until later the required rework of legacy infrastructure systems wherever possible.

The second priority - straight-through automated processing - is critical to any initiative to aggressively scale clients and volume, for example to pursue the second tier opportunities identified by Merrill's marketing research. Without a more efficient system to supply research, process orders, and return post-trade information, sales forces would be overwhelmed by the increased traffic. Lower margins and profit per client can also be expected from this expansion, and a more efficient processing system will be required to drive costs from the end-to-end process and preserve profitability.

The third priority recognizes the inherent supremacy of the market and also the inherent uncertainty as to how it will unfold. Size of distribution, access to liquidity, and broad sources of customer activity will all be critical to maintaining profitable scale. In order to preserve options, as well as to enable it to influence the design of the future, all three leading incumbents are building open connectivity into their platforms, thus hedging for the future by enabling connectivity among any of the eventual winners.

Fourth, these firms hope to use the new platforms and network connectivity to develop new business models. The picture is still emerging as to what these may be, but we can expect continued ferment in the market around the unbundling and re-aggregation of product and service attributes into new value offerings to continue to evolve. One explicit option that both Merrill and MSDW are considering is the provision of third party or "white label" processing capacity for both clients and competitors.

A final issue for technology development strategy is the question of buy vs. build. The obvious answer is a mix of both, but managing the mix turns out to be the tricky part. Given the fundamental decision to re-architect and build from the existing legacy systems, firms are largely dependent upon their legacy, in-house development teams. Yet building a cross-product, Internet-based technology platform proves to be a huge project, requiring over 150, full time dedicated coders in the case of Merrill Lynch. And many of these developers retain their other responsibilities and priorities. Also, the Internet era calls for cutting edge technology skills that are in short supply everywhere, and especially in a large investment bank. Competition for top programming talent is famously intense, young talent is increasingly drawn to the entrepreneurial aura of new start-up ventures, and mature investment banks do not have the advantage of

high growth start-up stock and options to spread around. And they are in a hurry. ML's answer has been to turn to several vendors or "body shops" to supply most of the team of 150. This has provided a great jump-start to the effort, but has also brought the obvious management challenges of integration and coordination.

Technology Coopetition Strategy: Alliances, JVs, Acquisitions and Investments

The era of hyper-growth that has characterized the IT, Internet and E-commerce revolution has also seen a dramatic increase in the rate of acquisitions, joint ventures and alliances among competitors and complimentors. Traditional rationale for combinations and alliances include expected economies of scale and/or scope or the need to acquire complimentary technology or capabilities that exist in the market place but may be difficult to build internally. The naked desire to reduce competition, real or potential, should also not be ignored. Increasingly important as a driver of coopetition, however, is the perception that speed is the only real competitive advantage in the information era. Firms which might otherwise have been content – or even preferred – to grow organically feel compelled to accelerate their growth through alliances and acquisitions. The primary motivation is the perception of network externalities that underpin the Internet. In a networked world, presumed to be governed by Metcalf's Law, early mover advantages and economies of scale combine to produce exaggerated tipping curves and the threat of "winner take all" markets.

Coopetition strategy is centered upon the acquisition of capabilities and partners in three distinct, but related areas:

- **Technology:** acquiring either tools, know-how or completed technology modules which are required to build the Internet product platform;
- **Content:** securing sources of content which will enrich the offerings of the platform; and
- **Networks:** ensuring that the incumbent firm is not left behind but rather has a voice in shaping the development of whichever networks thrive or become dominant in the e-world.

Traditionally, investment banking technology strategies have been characterized by a proprietary, insular approach to both technology and content. An anecdote will help to illustrate the industry mentality. There are approximately 50 major banks and investment banks that constitute the top tier of the global foreign exchange market and trade among themselves more than \$1 trillion each day. Each of these banks has invested – and continues to invest – tens of millions of dollars each year to build, maintain and enhance

proprietary, in-house systems which support and process all of this trading. At the margin, perhaps 1% of this mountain of computer code provides any proprietary differentiation among the various systems. Yet each and every firm has, until very recently, insisted upon the need to build 100% of the system in-house. Somehow, and despite encouragement by their regulators, neither the banks themselves nor an outside entrepreneur have been able to crack this wall and introduce a standards based, generic FX processing “engine” or platform to solve this magnificent inefficiency. This same scenario plays out again and again across every product line in every firm. Huge inefficiencies create huge opportunities, and we might well expect the Internet to become the force of change here as elsewhere.

Investor clients have access to and rely upon multiple sources for research and market advice. In fact, preserving this variety of sources is a major reason why investors avoid the concentration of all their business with any single broker-dealer (price comparison is the other key reason). If broker-dealers could aggregate and deliver content from various sources they could both enhance the stickiness of their channel by reducing investor incentives to shop elsewhere and also enhance the access of their own traders and sales people to market information.

To date, investments by broker-dealers in emerging ECN's and electronic exchanges appear to be largely reactive, driven by fear of being left behind when a dominant model emerges. As a result, each leading firm has investments in several rival electronic networks (refer to chart on page 36).

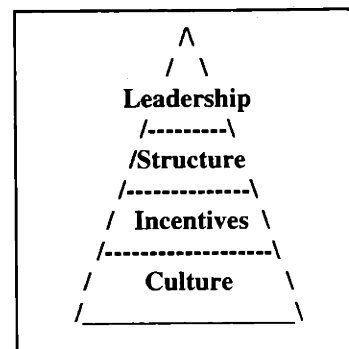
More focused strategy for alliances has emerged at some of these firms, which strive actively to:

- Leverage resources for both technology and content through partnerships;
- Achieve speed by modularizing and outsourcing development of both content and technology;
- Acquire capabilities that provide a competitive edge.

IX

Organizational Capacity, Strategy and Structure

The greatest challenge facing each of the leading investment banks at the turn of the century may be neither getting the technology right nor figuring out the best business model. The greatest challenges are likely to be organizational. In her Technology Strategy class at MIT's Sloan School of Management, Professor Rebecca Henderson addresses the organizational issues of managing technology with the mnemonic hierarchy represented here. While the research for this paper did not specifically seek to analyze organizational issues, many issues have been illuminated by the examination and bear brief discussion here.



Leadership: The Leadership of the three leading Wall Street firms may prove to be the single most powerful asset in this battle. Merrill's David Komansky, Goldman's Henry Paulson and Morgan's Phillip Purcell are among the most talented business professionals on the globe. More importantly, the depth of the management team at each of these firms is extraordinary. One possible explanation for this apparent depth of management talent is the extremely competitive, meritocratic and Darwinian nature of leading investment banks.

Yet the leadership of these firms have all been criticized as slow to grasp the implications of the Internet and to adjust their strategic course accordingly. Most famously, in the retail equity segment, it was only after e-brokerages like E*Trade, Ameritrade and the reinvented Charles Schwab gained close to 30% of the retail equity market that Merrill and Dean Witter responded with a serious online trading offering. By comparison, Charles Schwab had moved quickly to create a separate electronic offering and to allow it to compete directly with its traditional business. In very short order, the offspring consumed the parent and the two are reintegrated. The incumbents' hesitancy might possibly have been based upon a poor reading of market trends, but was certainly influenced by fears of cannibalizing existing business. As we know, these fears of cannibalization reflect a misunderstanding of sunk-costs and a fundamental failure to recognize that the market will move to consume existing business if we do not. Only when cannibalization will significantly accelerate this process, thus unnecessarily curtailing a period of profitability might it make sense to delay the act of cannibalization.

None of these firms appears likely to consciously make the same mistake again in the institutional capital markets. However, one might well ask whether the firm's leaders are moving primarily from a sense of fear rather than one of strategic opportunity. The culture of some of these firms, especially at the top, appears to be based upon consensus and conflict avoidance. In contrast with the high-conflict, high respect cultures we find in many successful firms, Merrill's culture in particular is characterized by its own leaders as one of low-conflict and, we might say, uneven or mixed respect. It appears to have been difficult for any visionary or maverick to buck the trend and advocate cannibalization in the retail sector. Ironically, it may be just as difficult for skeptics to resist the wave of movement toward the Internet. There are clearly drivers within the organization championing the rapid move to e-platforms and e-models, but others may be cautiously following rather than leading together. It is unclear into which group Komansky, Paulson and Purcell fall.

Structure and Processes: Each of these three firms, and most other Investment Banks as well, face a common structural challenge to their Internet-based business strategies. Industry competitiveness is driven primarily by intellectual capital. This in large part has led to very specialized concentrations of expertise within well-segmented product teams. Additionally a primary foundation of process design in the financial industry is one of control over financial assets. The objective of control, as well as a competitive need for efficiency, both favor decentralized, product-focussed organizations. The result in nearly every Wall Street firm is an organization built around vertical product silos. These silos may be vertically oriented to greater or lesser extents, depending upon how much of a firm's various infrastructure functions are decentralized to the business/product lines, but in every case the power to set strategic direction lies primarily with the product silo. The resulting architecture is closed and proprietary. Not only does each firm pursue proprietary architectures for organization, for information, for technology, even for human resources, but each product line may do the same within the firm.

By comparison, the Internet tends to a horizontal architecture with open, non-proprietary standards. The potential for network technology to solve the age-old challenge of breaking down silos and enabling truly integrated, cross-product client solutions is apparent to all. Yet the reality is that the new information architecture often clashes with the old organizational architecture.

This phenomenon is aggravated by the politics of power and amplified by the uniquely profitable period now being enjoyed by the industry. As noted at the very beginning of this paper, these firms have recently enjoyed unprecedented prosperity. The credit for that performance generally accrues to the business line

managers with profit and loss responsibility on “the front line”. So to goes the power within firms. While the web may promise the possibility of repeating or even improving on the returns to the existing model, realization of that potential will certainly involve deep and dramatic organizational change. Such changes produce winners and losers in terms of power. At the same time the evidence that existing business models cannot continue to produce attractive returns may be less than compelling, or perhaps less than urgent. These dynamics make it very difficult for organizational change to proceed unimpeded.

There is, however, another, positive perspective to this dilemma. One must recognize that existing successful business models are in fact successful. If cannibalization is inevitable, than surely it should be pursued. However, it is also imprudent – foolish – to kill cash cows too early. This particular point concerning the preservation of existing sources of earnings while seeking dramatic organizational and strategic change, is emphasized by MIT’s Professor Henry Weil in his classes on Corporate Strategy.

Christensen addresses this issue directly – and now famously – in The Innovators Dilemma. The answer, says Christensen is to segregate from the organization those new efforts to exploit potentially disruptive technologies. Only by severing the initiative from the greater organization can management protect it from the natural organizational antibodies that are likely to stifle its progress. A telling example of the tension between aggressive change and more gradual evolution is reflected in Merrill’s organizational structure and choices. The Innovator’s Dilemma has entered the vernacular at Merrill. Nearly every interviewee mentioned it, and Amazon.com lists it as the number one best seller in ML’s “purchasing circle”. Christensen also sits on MLDM’s advisory board. Initially, Merrill set up its institutional Internet initiative as largely independent and autonomous unit within its corporate and institutional business division. At first, ML sought to give Direct Markets the autonomy and resources to move fast and be flexible enough to compete in the Internet arena. One manager said, MLDM is “as independent a thing as I’ve seen in my six years at Merrill”. MLDM occupied its own premises in a separate building a few blocks from corporate headquarters. The group had dedicated resources for technology development, operations, finance, legal, etc., and it had a very substantial budget as well as autonomy on how that budget is spent. In order to give the group organizational integrity and its own immediate P/L, a number of profit centers were incorporated. These profit groups also served as laboratories for the implementation of Internet initiatives. There was an attempt to create a Silicon Valley environment, with casual dress, foosball tables, pizza Friday’s and children’s hand-painting on the wall.

On the other hand, Direct Markets remained very much beholden to Merrill’s traditional businesses and structure. MLDM Head Michael Packer reported variously to the Heads of Global Debt Markets, Global

Equity Markets and Global Institutional Sales. These three in turn reported to the head of CICG, who reported to the CEO. Packer also owed deference to ML's head of technology and even to the corporate marketing office. Priority setting in this environment appeared to be a highly politicized process, as MLDM became the single conduit – and therefore potential choke point – on any Internet-based initiatives within the CICG division. From an outsider's perspective, the system appeared to lack discipline and accountability. While everyone had a say in the process, responsibility for the results did appear to be consistent with authority to commit resources and make strategic choices.

The result was an initiative and organization which struggled to establish an identity and to play a role somewhere between new business initiative and corporate technology utility. Direct Markets could neither establish a truly independent identity nor did it fit well with the legacy organizational architecture. Over time, ML elected largely to reject Christensen's advice and to pull Direct Markets back into the legacy organization. Merrill management cites one primary reason for this reversal. There is a strong consensus that the institutional portal must have access to proprietary product and inventory. Pure aggregators and exchanges will be limited by absence of product in all but the most liquid markets and among all but the most price sensitive traders. Management continues to believe that risk capital and inventory that ML brings to the table are critical success factors without which Direct Markets cannot thrive. The message that comes through is that Internet strategy is to build a new channel for Merrill's existing business products and model, rather than a new or competing business model.

By comparison, Morgan Stanley and Goldman Sachs have chosen to rely primarily on their business/product silos and management organization to generate new business models and opportunities based upon emerging technologies. Each firm has established a cross-organizational committee to facilitate information sharing and to head-off duplicative or conflicting efforts, but the initiative lies primarily within the traditional structure. In each case, the initiative to build the client portal has resided with the corporate technology group, which has had responsibility for integrating legacy, silo-based systems.

Incentives: Within the investment banking industry, compensation has typically been performance based, with a relatively large percentage of total individual compensation linked to the productivity of the individual as well as the financial success of the firm and relevant business unit. However, this strong incentive basis has been much more pronounced in front-office revenue producing jobs like sales and trading than in technology and support roles. By comparison, developers and systems architects have had more standard pay packages where salary was the major component and was established on the basis of

seniority and rank as much as on skills and productivity. When these standards were designed, most technologists and support staff worked in large bureaucratic organizations far from the source of revenues. In the Internet era, these people have become the hottest commodity on any market, and their contributions have been directly and dramatically linked to financial rewards. We know at MIT-Sloan and at top business and technical schools throughout the country that the Investment Banks and Management Consulting firms which used to draw the top talent are all losing share to silicon-valley start ups. These new competitors offer low base salaries but enormous potential equity-based upside. (Increasingly the salary differential appears to be closing as well.) Incumbent, even mature, firms have no hope of promising the same kind of growth in share prices and therefore must struggle to devise attractive incentive packages.

One model that was the subject of a Harvard Business School Case Study and presented in Professor Henderson's Technology Strategy class is that of Xerox Technology Ventures (XTV) in the early and mid 1990's. Faced with an unsatisfactory record of exploiting its own technological breakthroughs and the steady defection of its brightest people, Xerox created XTV to spin-off new ideas in a type of new business incubator. The XTV model sought to provide innovators with the incentive of equity ownership in their designs and products, while somewhat mitigating the risks of failure associated with a true stand-alone start-up. By contrast, leading investment banks may have created an environment in which the risk-reward prospects are unattractive to the most innovative technologists. By retaining their Internet business development initiatives within the legacy organization they have precluded the incentive of significant upside equity growth. At the same time, the risk of failure remains largely with the employees, who are likely to be downsized in the event of failure or change in strategic direction. In the short-run, these firms paying dearly to "rent" the necessary talent to build its platform by contracting development to "body-shops" and paying guarantees to key managers. This model may be effective in jump-starting development programs and getting an initial product out the door, but is ill suited to building core capabilities and franchise value. If and as these programs thrive – and are perceived within the firm to be successful - it will be easy to attract top talent from throughout the organization. However, the challenges in competing with high-growth competitors will be less tractable.

Another aspect of the incentive challenge facing these firms was suggested by the discussion of cash cows vs. new, cannibalistic business models. The unprecedented profitability of capital markets trading and sales groups over the past decade or longer has left many of the professionals who drive these groups very wealthy. Where high levels of performance-based compensation have been reinvested into hugely buoyant equity markets the results are even more impressive. One consequence is that many of these individuals

are able to retire much earlier than might have been expected. An increasingly common refrain heard around trading floors is the plan to “ride the bull” for as long as the current wave of good times lasts, and then cash out to a less intense and more relaxing life, or perhaps a second career in .com land. The obvious risk to the firms that employ these people is the risk of an accelerated talent drain in the event of a downturn. The more subtle issue is one of risk-aversion. Too many metaphors most ungraciously, “while the gravy train keeps rolling, don’t rock the boat.” Simply put, the incentives within these organizations to generate great change that poses any risk to the existing model, appear to be under-powered.

Culture: The leading slogan of Merrill’s brand campaign in the 1950’s through 1970’s was “Where Wall Street meets Main Street”. More apt today perhaps should be “Where Wall Street meets the Information Highway”. In the 1970’s Merrill Lynch was a pioneer in joining retail and wholesale; now it has become the model for MSDW, Solomon-SmithBarney and the industry. Both Morgan Stanley and Merrill carry the burden of a cultural chasm between retail business and the institutional business. Goldman Sachs is free of this schizophrenia, having thus far opted to avoid the retail sector entirely. The new culture challenge is now Wall Street vs. Silicon Valley. The latter culture is one of tremendous speed and innovation, of breaking old rules and inventing new business models, of first mover advantages and huge network externalities, of increasing customer power and more rapidly eroding margins. The new, nwt-savvy, change-oriented leaders within each of these firms are aggressively embracing this culture. Their peers and superiors in legacy-mode are struggling with the challenge. However, there is remarkable consensus that the revolution is inevitable. Even the traditionalists, while resisting the change, seem aware that their efforts can only delay the inevitable.

There is one aspect of this new culture about which leaders should be cautious. With the need for speed and the desire to foster an innovative environment, there have been pockets of success in creating a freewheeling culture. At the moment, bureaucracy appears to be on the retreat and pragmatism rules. Formal business plans appear to be minimal, roles and responsibilities appear fluid and organic, standards and metrics of performance yet to be developed. Yet these are leading global financial institutions that transact hundreds of billions of dollars each day. There are very sound reasons for the rules and controls that govern the traditional business. There is a theory that a somewhat chaotic and uncontrolled atmosphere is requisite for innovation and speed. However, there is also a substantial risk that the theory becomes an excuse for simply sloppy business practices. Whatever one’s opinion of Microsoft, it is clear that the Redmond based machine has managed to achieve (or engender) tremendous innovation and

financial success without sacrificing the controls of good business discipline. Investment banks seeking to operate at “Internet speed” might do well to take a page from this book.

At a 1999 seminar with MIT-Sloan’s management of Technology class, Kodak EVP and CTO Carl Kohrt discussed Kodak’s response to the challenge of digitization in the imaging business. Kohrt suggested that there are three levels to bringing about change in organizations: 1) Technology, 2) Business Models and 3) Culture. He then proposed that the technology is easy, the business models a bit harder, and the culture the most difficult to change. Leading incumbent investment banks face the same dilemma – in spades. They will undoubtedly get the technology they need – either internally or through effective alliance strategies. There is perhaps somewhat more of a question as to whether their business models will succeed. While having all the advantages of incumbency, the question of how value will be captured for the shareholders is still unanswered. Finally, changing each firm’s strong and long held culture of high touch, low tech relationship banking will be a daunting task. These firms move like battle ships in the new era of cruise missile warfare.

IX

Strategy Prescriptions

In summary, the competitive outlook for incumbent investment banks in the institutional capital markets arena is a harsh one. The industry has entered a period of great ferment in which many of the established bases of competitive advantage may no longer be valid. Searching for, distributing and filtering information have all reached levels unprecedented levels of efficiency on the Internet, shifting a large weight of power in favor of buyers of all products and services. The trend is acute among the professional and retail investors who are buyers in the capital markets. The consequent reduction in the economic friction of financial markets is fast leading to the elimination of the efficiencies on which intermediaries thrive. The price trend for providing information on the net is an accelerating decline toward zero. New agents in the markets are attacking traditional product bundles with hyper-efficient, specialized offerings. The promise of a steady inflow of narrow specialists facing low barriers to entry and employing exceptionally lean cost models threatens to compete economic rents to zero, and lower. The unbundling of integrated product-service offerings has become the standard, and rebundling into novel packages is fast emerging as a next stage response. To a great extent, dis-integration and modularization of the industry appear inevitable, and in fact are already somewhat advanced. The key remaining questions are:

- 1) How far and how fast will this dis-integration proceed?
- 2) Which will emerge as the newly dominant designs?

The implications for incumbents are stark, but in many ways clear.

- Incumbent investment banks need urgently to redefine their product-service offerings. The legacy models are fast becoming obsolete.
- The legacy cost structures that support existing business models are already obsolete and threaten to drag down even the most successful firms. Personnel-heavy distribution models, proprietary legacy technology system and high-touch, low-automation processes are competitive boat anchors. Only the unprecedented bull market of the 1990's combined with

superficial cost reductions achieved through industry consolidation have masked the critical effects of outdated cost structures until now.

- Closed, proprietary systems architectures are obsolete. The construction of open-standard portals to the web is a prerequisite to remain in the game. Yet opening these doors also exposes firms to the threat of aggregation by independent agents.
- Business and pricing models that depend upon the continuation of market or other information efficiencies are doomed. Investors and issuers alike will get access via the net to complete information. Profitable firms will be required to add real value rather than simply intermediate information.
- All this has happened really, really fast. The pace of change will only accelerate from here.

The fundamental question facing business leaders is, how to earn an acceptable, or even superior, return for shareholders, as well as enable growth for the future. Our suggested course is the dis-aggregation and reconstruction of the investment banking value offering. The suggestion is to adopt a view of the firm which is diametrically opposed to the trend toward integration of the past several decades. This is not to imply that leaders should break up their firms. But they must break up their value chains. A deep and objective analysis of existing products and services might yield the following categorizations:

Truly value-enhancing client services which build and in turn are dependent upon sticky relationships, process learning, trust, etc. The objective of business components such as these is to create and nurture positive feedback loops where value to both supplier and client continues to grow with repeated iterations. This dynamic is analogous to the economic concept of switching costs, but in contrast emphasizes the positive feedback and value creation of relationships rather than the negative, cost-based view of switching costs. Strategic advisory services such as M&A and structuring; risk management advisory, truly collaborative sales relationships are examples. One defining feature is the achievement of – or opportunity – a trusted-agent relationship with the client. Information efficiencies may be eliminated by the web, but information overload will be a growing issue. Trusted agents and advisors will be valued and will be able to get paid for the value they create.

Natural monopolies that can be secured and defended with the effect of generating economic rents. Two types of natural monopolies may be achievable in the capital markets industry: those created by scale efficiencies and those made possible by network economics, or “tipping curves”. In any given segment of traded security, the advantages of superior liquidity should lead to 100% concentration of volume in a single market “place”. Only if the monopoly market exploits this advantage to the extent of inviting new

challengers is this natural equilibrium disturbed. There is evidence of long periods of stability where the group that controls the market earns superior returns. The NYSE is the most prominent example. It may be too late for any single firm to capture this position in the U.S. equity markets. However, a consortium of leading broker-dealers might well do so. More likely, individual firms and/or small consortia may well be able to capture the market place for other less developed and less liquid product segments. MSDW, Goldman, Merrill and Citi are attempting to do this with BondHub.com. Others are trying to isolate and dominate such narrow segments as the collateralized loan obligation market.

The other type of natural monopoly is based on scale efficiencies that are practically unlimited. Back office processing and custody services are the most obvious examples. When combined with the beneficial cost effects of technology and process learning curves, as well as aspects of trust and stickiness created by superior service models, a powerful, sustainable and profitable model may emerge. Both The Bank of New York and State Street Bank have had remarkable success during the 1980's and 1990's in transforming relatively unattractive commercial banking franchises into processing (and money) machines.

Loss-Leader offerings may be required to stay in the game and attract clients to positive-margin products and services. Both incumbent and challenging firms must, however, explicitly recognize the profitability dynamics involved. In some cases, bundling of unprofitable and profitable offerings for the customer may make sense, as for example research and underwriting have for so long. Yet the bundle must be entirely transparent internally; management, sales people and accountants must all be precisely clear as to where true costs and revenues lie. This again suggests the dis-aggregation of bundles into their various components. Where loss-leader products are perceived to add value overall, one requirement is to minimize the drain on earnings by minimizing total cost. Of course, the trick is to do so without sacrificing quality. A useful tool may be to recall Christensen's graphs of desired performance among clients. Managers should ask whether they are spending scarce resources to further augment losing products that already exceed client needs. The more powerful solution to loss leaders is obviously to reinvent them into value-recognized products for which clients will play. Multex appears to have done this with its aggregated research offering, for example.

Cash Cows must not be sacrificed too soon. Cannibalization may indeed be both inevitable and desirable as companies reinvent their offerings. Great change is certain to be disruptive. Yet existing earnings and cash flow are required to fund new opportunities. This is particularly acute for successful, leading firms. Charles Schwab did not kill off the legacy broker business to build the online service. It fostered both until

it was clear which would dominate. Even then, Schwab leveraged the online service to augment, rather than destroy its legacy franchise. This prescription may seem obvious to managers. Yet firms compete in the context of scarce resources. Most often the scarcest resource is human talent, particularly leadership, management and innovation. The temptation when facing the challenge of great change is to “take our best people and reassign them” to the new opportunity. It is difficult indeed to keep the legacy engines running while building the new craft of the future.

Other strategies for surviving the transition to the Internet economy include competing through innovation, either by achieving first mover advantages or by creating an capability for sustained innovative advantage; also seeking protection or at least delay in erosion of margins and market share through alliances, further consolidation.

There is little if any new wisdom in each of these suggestions above. However, the power of rethinking these issues may lie in the approach taken. My suggestion is that managers break away from the legacy of thinking that product integration will drive success. On the contrary, I suggest that a truly modular, disaggregated approach to business planning and execution is called for. Christensen and Overdorf argue that firms must segregate autonomous units from the larger institution in order to recognize and capture the opportunities in discontinuous innovation.²⁵ One reason for this is that large firms with huge revenues are prone to overlook emerging – and initially small – opportunities. Another is that customers are unable to ask for discontinuous advances. The most powerful reason, however is that the priorities, processes and politics of the larger organization are very likely to suffocate the emerging business before it proves its worth.

The problem with spinouts is that they forego the close expertise that comes from competing in the established market on a daily basis. This may be an advantage for discovering “white space” solutions and truly novel ideas - discontinuous innovations if you will - but can be a disadvantage in achieving more consistent and predictable results. There is the additional challenge of fragmenting and diluting organizational talent.

My suggestion for investment banks is that change initiatives targeted at creating new business models for the capital markets should be launched well down inside the organization, at the specific level of product or service being offered. Innovation should be pursued at a modular level, not at the integrated platform

²⁵ Christensen, Clayton and Michael Overdorf, “Meeting the Challenge of Disruptive Change, Harvard Business Review, March 1, 2000.

level. This is where the challengers are fermenting. This is the level at which the competitive battles are now being fought. Other, small groups, sponsored at the corporate level, may seek opportunities in the “white space” between silos or in entirely unconventional areas. This scale of inquiry is more manageable. Like a venture capital firm, the approach favors a portfolio of many, relatively small, bets.

XI

Conclusion

The fundamental challenge facing leading investment banks at the turn of the millenium is the question of how to reap the benefits of highly automated and efficient supply chains to reduce costs without being themselves dis-intermediated or losing the ability earn economic rent. The result of this renewed period of ferment will certainly be the emergence of new business models, as well as new winners and losers. The challenges of building or acquiring competitive technology and of designing winning business models are enormous, but the greatest challenge is that of achieving the organizational transformations that will be required. This paper suggests that one response to these challenges is to abandon the legacy course of increasing integration in financial services and to design a modular architecture for both product-service offerings and for organizing the firm's resources. The re-integration of modular offerings into new bundles and new business models should logically follow, but only as a second-order activity.

The stated intention of this thesis was to examine the institutional capital markets industry at the end of the 20th century in the context of the academic literature on technological innovation and its potentially disruptive impact on legacy industry structures. Tushman's and Clark's work suggests a distinction between competency enhancing and competency destroying technologies, where the former favor the continued success and dominance of leading incumbent firms, while the latter tend to catalyze the rise of new firms and the demise of incumbents. While the outcome of this dramatic change in financial services remains in question, it appears clear from the preceding discussion that the Internet represents a potentially strong force for destroying traditional competencies in the areas of distribution and information intermediation ("infomediation"). Utterback's work on the emergence of dominant designs and the consequent consolidation among industry competitors is entirely consistent with the recent history of financial services in general, and investment banking particular, during the past several decades. His theory of process innovation replacing product innovation as the dominant form of technological innovation as industries mature appears also to be clearly repeated in this industry. What appears to be taking place now, however, is the initiation of a new period of technological ferment, punctuated by the appearance of many novel, varying, and competing business models, and a renewal of product innovation. We might expect from Utterback's analysis of other industries to see this period lead to a new period of

consolidation following the emergence of the next “dominant design.” In fact many industry observers are already predicting a massive shakeout and consolidation among the ECNs following the imminent emergence of a central limit order book. In our view, this outcome seems likely.

Next we consider the projections from the work of Christensen and his colleagues, including notably Verlinden. The central thesis of Christensen’s The Innovator’s Dilemma is that disruptive technologies, by definition, pose extreme challenges to leading incumbent firms. We have demonstrated how the Internet constitutes a dramatic example of such a disruptive technology in the capital markets industry. Using Porter’s “Five Forces” framework, we were able to demonstrate how each of these dynamic factors first drove consolidation and integration in the industry but of late have been substantially altered by the rise of the Internet in general and ECNs in particular. Rivalry has intensified; barriers to entry have fallen; suppliers and buyers are both enjoying increased power; economies of scale are threatening to become dis-economies; and a whole new breed of complimentors has appeared.

In terms of service quality and cost models, these new challengers have emerged in the classic “attack from below” pattern described by Christensen. As predicted in The Innovator’s Dilemma, the response by incumbents appears to have been blunted by fears of cannibalization of existing earnings streams. Christensen’s and Verlinden’s more recent work on modularity vs. integration in the evolution of technology driven industries appears to be extremely relevant to the analysis of institutional capital markets. Again, the outcome of this period of ferment has yet to unfold, but it is already clear that competition has expanded significantly from a systemic bias toward integration and consolidation toward viable challenges from dis-aggregated and modular business models and service offerings.

Finally, we consider the teaching of Henderson in the area she calls “Actually Doing Tech. Strategy”. Despite both the recognition of the challenge facing them as well as the remarkable concentration of intellectual talent, financial resources and market position enjoyed by the leading incumbent investment banks, it is clear that major obstacles to success and continued dominance are largely organizational. As best illustrated by Merrill’s attempts to organize its resources to confront the new challenges and opportunities of the Internet era, issues of leadership, organizational structure and processes, incentive systems, and corporate culture all pose critical problems for leaders.

Suggestions for Further Study

- Re-pricing of various components of the bundle: The issue of how the traditional value chain for institutional financial services will be dis-aggregated and reconstituted is fundamental to the outcome of this structural revolution. At the heart of this question is how these components will be priced. As various services are first unbundled and then commoditized, pressures on profitability – and on cost models – will be intense. A longitudinal study of pricing over time may provide valuable insight into the industries essential competitive dynamics.
- Future of ECNs and exchanges: Will the ECNs survive? This is a critical question and has as much to do with regulatory decisions, and perhaps global developments, as it does with economics.
- Organizational Dynamics of the migration from old to net-based business models. We have only touched on this topic here, but there is surely ample material in Internet revolution to sustain scores of PhD theses on the human side of technological innovation and changing business models.

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Interviews:

In addition the published and other written materials cited above, face-to-face interviews were conducted with the following individuals:

| | | |
|---------------------|---------------------------------------|---|
| Buchalter, Lawrence | Partner, Goldman Sachs | 4 Feb., 2000 |
| Chandler, Jeffrey | MD, Debt Markets, ML | |
| Crosby, Suzanne | Director, Marketing Operations, MLDM | 5 Nov., 1999 |
| Gallagher, Daniel | Principle, E-Commerce, MSDW | 15 Mar., 2000 |
| Gandhi, Vikram | MD, Head E-Commerce, MSDW | 10 and 15 Mar., 2000 |
| Gwydir, Tom | Director, Technology, MLDM | 5 Nov., 1999 |
| Helm, John | VP, Research & Dev., MLDM | 17 Nov., 1999 |
| Jacobson, Keith | MD, COO Global Debt Markets, MLDM | 19 Nov., 1999 |
| Joyce, Thomas | MD, Head Equity Market Structures, ML | 3 Feb., 2000 |
| Martarano, Kathleen | Director, Bus. Mgr. Global Debt., ML | 5 Nov., 1999, 26 Jan., 2000 |
| Martin, Kelly | MD, Head of Global Debt Markets, ML | 9 Nov., 1999, 26 Jan., 2000 |
| Mattews, Timothy | MD, Head of Marketing, MLDM | 17 Nov., 1999 |
| McDade, Wesley | Principle E-Commerce Group, MSDW | 26 Jan., 2000 |
| O'Brien, Dermott | Director, Human Resources, MLDM | 5 Nov., 1999 |
| Ollwerther, Robert | Director Finance and Admin, MLDM | 5 Nov., 1999, 4 Feb., 2000 |
| Packer, Michael | Managing Director and Head of MLDM, | 11 Oct. and 5, 19 Nov., 1999 Jan., 3 Feb. 2000 |
| Pandit, Vikram | MD, Head of Equities, MSDW | 15 Mar., 2000 |
| Parent, Maggie | Principle, E-Commerce, MSDW | 15 Mar., 2000 |
| Pellicane, Jim | MD, Debt Products, MLDM | 16 Nov., 1999, 4 Feb., 2000 |
| Rodman, Sandra | VP, Product Development, MLDM | 4 Feb., 2000 |
| Rosenberg, Jill | VP E-Commerce, MSDW | 15 Mar., 2000 |
| Rhyne, Trey | MD, Equity Products, MLDM | 5 Nov., 1999 |
| Schafer, John | EVP and Chief Admin. Officer, MSDW | 15 Mar., 2000 |
| Tosi, Laurence | Director, Bus. Dev., MLDM | 17 Nov., 1999, 3 Feb., 2000 |
| Van Anden, Steven | Director, MLDM, | 4, 5 and 16 Nov., 1999, 26 Jan, 2000 |
| Zonino, Lisa | Principle, Risk Management, MSDW | 15 Mar., 2000 |