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TRENDS IN THE FINANCIAL SERVICES INDUSTRY

- Decimalization
- Straight Through Processing (STP)
- Trade Date Plus One (T+1)

A Thesis

Presented to

The School of Business

Quinnipiac University

In Partial Fulfillment

Of the Requirements for the Degree

Master in Business Administration

by

**Antimo F. Palmieri
September 2000**

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Trends in the Financial Service Industry

Introduction - Proposal

Topic:

The focal points of my proposed thesis include three issues that have come to the forefront of the financial industry. I will research how the implementation of *decimalization, straight through processing (STP)* and trade date plus one ($T + 1$) will be accomplished, what issues and effects it would have upon trading, settlement, system processing, market data and other vendor services.

Background:

Decimalization: In order to make pricing more easily understood, more compatible with global markets, and to provide savings to investors through narrower bid-ask spreads, the SEC has mandated that the securities industry move from the quotation, trading, and settlement of equities and options in fractions to decimals by April 1, 2001. The Securities Industry Association (SIA) has communicated to its members that this directive, mandate will require significant changes to securities related computer systems as well as overall firm processes and infrastructure. Various systems, operations, and user changes due to the move to decimals need to be considered and addressed.

The New York Stock Exchange (NYSE) was the first major exchange to test decimalized trading. On August 28, 2000, six companies listed on the NYSE began to trade in decimals for the first time. Hence, the stocks would be priced in dollars and cents instead of fractions. The six companies are:

Company Name	Company Symbol
Anadarko Petroleum Corp.	APC
FedEx Corp.	FDX
Forest City Enterprises Inc.	FCE
Gateway Inc.	GTW
Hughes Supply Inc.	HUG
MSC Software Corp	MNS

On September 25, 2000, another fifty two companies will begin to trade as decimals. Then NYSE will evaluate the test results, focusing on the impact of liquidity, trading patterns and system capacity. Following that, a decision will be made on when to extend decimal pricing to all NYSE listed stocks.

STP & (T+1): At the present time, internal and industry-wide systems are straining to manage the rapidly growing volumes resulting from an explosion of self-directed investments and the advent of electronic communication networks (ECN's) and electronic trading. This strain will intensify with the planned expansion of trading hours and the impact of decimalization.

The Institutional Transaction Processing Committee has proposed a model to re-design the current post-trade processing model. In conjunction with the results of other SIA groups addressing industry obstacle to T+1, the proposed solution will point the way to achieving greater levels of straight through processing, volume insensitivity and enhanced risk management for the U.S. securities market. While these changes are essential to achieving T+1, it should be noted that the goal to shorten the settlement cycle is not imminent and may not ever materialize. Hence, industry-wide involvement and support is needed for the goal of a seamless, automated, and integrated transaction trade process to survive volume growth and positions.

Finance companies will be effected by the securities industry's move to decimalization and faster settlement of trades (T+1) in 2000. Therefore, establishment of a formalized committee and plan to address issues related to this initiative should include implications of decimalization on internal systems, processes, and vendor systems and services.

Trends in the Financial Service Industry

Decimalization

Since the New York Stock Exchange (NYSE) opened its doors in the 1792, U.S. equities have been traded in fractions and priced in increments of eighths of a dollar, and therefore had as many as eight price points on any given trade. In 1997, markets began trading in sixteenths offering as many as sixteen price points and is the current denomination that equities are traded in today.

Change, however, is right around the corner. It was inevitable for equities to adopt decimals as the next trading increment, because most modern currencies are exchanged in decimals. Hence, the Securities and Exchange Commission (SEC) mandated that markets gradually lower their trading increments from sixteenths to nickels and eventually to pennies. Under new rules, equities would be traded using the following example: IBM stock selling for 103 and $\frac{3}{16}$, would sell for 103.19 (Chapter Seven, exhibit one). These changes were slated to be implemented in the summer of 2000 and all equities companies must comply. However, due to information technology problems and volume constraints, total decimalization of all equities has been delayed until April 1, 2001. This will effect various systems, operations, and user changes due to the move to decimals that need to be considered and addressed.

Through April 1, 2001, the responsibility for converting to decimals lies with the various exchanges themselves. Before brokers can trade on equities priced in decimals, the exchanges offering these equities must convert prices to decimals. This process should be adequately accomplished by current computer systems that read fractions as decimals, but the issue is simply reprogramming systems to display decimals instead of fractions.

Stock exchanges are not the only entities that need to prepare for decimalization. Brokers will have to fix their systems too. This could require significant changes to system code. Because many broker systems are programmed to accept data only in fractions, brokerage information technologists will need to reprogram proprietary systems to understand and accept prices in decimals. This can be complicated because any trade could theoretically have an infinite number of decimal points. Programmers will need to establish limits so that their systems read just the first two or three decimal points of every price (Chapter Seven, exhibit one). Additionally, these proprietary front-end trading systems usually feed other proprietary subsystems and modules, such as back-office reconciliation, general ledger, clearance and

settlement, and risk management systems. Therefore, the reprogramming of brokerage houses is going to be time consuming and costly. The decentralization and wide spread use of in-house and custom built software packages utilized throughout the finance industry acts as a bandage attempting to hold various operations together and function properly. Thus, when industry-wide initiatives like decimalization to be implemented time consuming and effectively, it causes the transition to be more complicated. It is not only more time consuming but also more expensive than if only one system needed to be fixed. Chapter Three describes such an undertaking, called Straight Through Processing (STP), which essentially operates as a single point of entry for all transactions. STP passes trade information seamlessly to all front and back-office applications in a transaction's life cycle.

Testing of decimalization is required of all exchanges, markets, service bureaus, clearing corporations and market data vendors. Testing will include U.S. equities and listed options, dividend processing, order processing, trade processing, reconciliation, settlement, reporting, real time market feeds from exchanges and markets, and end-of-day pricing. Testing will be performed during the year of 2000

and include both point-to-point bilateral testing of communications and extended point-to-point integrated test of a single complete trade day cycle. (Internet Source: www.products.nasdaq.com/decimalization/) Therefore, firms must be in a position to test both decimal and fractional data simultaneously.

SEC Chairman Arthur Levitt said, "Decimal trading will benefit investors by allowing greater competition and making it easier to compare prices. It will also bring about consistency with foreign markets, which now trade in decimals..." (Internet Source: www.sec.gov/news/decimals.htm) Hence, some of the benefits that decimalization is expected to provide investors include the following: prices that are easily comprehensible, more compatible with global markets, and ability to foster savings to investors through narrower bid-ask spreads.

The spread is the difference between the bid price of a stock and the ask price of the same stock. There is an increased savings potential for investors if decimal pricing leads to smaller price increments. Professional traders, called "market makers" on the NASDAQ and "specialists" on the NYSE, buy shares from one investor and sell them to another,

collecting income from the spread. They also profit from other moves in the stock price. Currently, most stocks rise or fall in increments of 1/16 of a dollar, which works out to a minimum spread of 6.25 cents. In contrast, with decimalization, there is the potential to trade at a nickel and eventually a penny increment. When stocks start trading in decimals, though, most prices will be quoted in nickel increments, cutting the minimum spread to five cents (a twenty percent savings). Eventually stocks will trade in whatever increments the market dictates, and spreads could shrink to as little as a penny. At a penny increment, investors could save up to 5.25 cents per share (Chapter Seven, exhibit one). This translates into the investor's ability to buy stocks just a little bit lower and sell them just a tad higher, each time they trade and the difference comes out of the trader's income. Consequently, narrower spreads mean investors could save money as they are able to achieve a more precise price for their trades.

Conversely, spreads are also likely to drop in trades of highly liquid stocks, as it is easier for a broker to match buyers and sellers. Also, spreads should shrink the most where the markets are busiest and thus offering the greatest opportunity to match buy and sell orders. That frequently

happens with small trades of a few hundred shares or less. Therefore, big blocks of stocks should be broken up into smaller pieces for greater matching frequency and profitability.

Additionally, because spreads will narrow, trading volume levels should increase. Investors are likely to become more comfortable trading dollars and cents and be able to match the buy and sell prices with greater ease. In decimals, stock pricing is easier to understand. A step is eliminated as the conversion of fraction increments into decimals is no longer necessary. Ultimately, this should increase investor interest and in turn increase market volume throughout the various exchanges.

However, electronic communications networks (ECNs), other markets, and regional exchanges like the Chicago and Pacific stock exchanges are causing the New York Stock Exchange (NYSE) concern about loss of market share and volume. Electronic Communications Networks (ECNs), for example, accounted for over thirty percent of all NASDAQ trades in May of 2000, and contributed to stagnation of NYSE's market share. Additionally, the NASDAQ has recently upgraded its Computer Assisted Execution System (CAES) and has given market maker

status to ECNs and alternative trading systems, providing ECNs with the ability to participate in the NASDAQ InterMarket, and display limit orders in listed stocks on the Consolidated Quote System and trade through the Intermarket Trading System (Internet Source: www.sia.com/decimalization/index.html/).

Therefore, if an ECN competitor of the NYSE introduced decimal pricing first, a large brokerage house, such as Merrill Lynch, could decide to send all of its orders to that ECN system. This could result in various exchanges losing market share at a rapid pace.

Another issue poised to effect the financial markets is the capacity problems regarding market data and its effect on the consumer. The conversion to decimal trading creates an enormous increase in equity and option related quote traffic over an already congested infrastructure. Because this information is supplied on a real-time basis, it must be delivered without delay and the capacity within the current infrastructure must be able to handle the anticipated increase in volume. Hence, a surge in stock quotes and messaging traffic because of more price points for every individual stock needs to be remedied to prevent the passage of stale data. Insufficient capacity could also cause information breaks or delays when receiving important messages or quotes.

This issue perhaps poses the greatest risk to the decimalization trading effort. Readiness in this area is necessary if the markets wish to run smoothly and without delays before, during, and after the conversion. The chart below reflects some of the issues effecting the decimalization initiative.

Issue	Description
Trading	Review trading strategies (i.e., spread, order size) and profitability considerations. It is anticipated that liquidity will be dispersed across more price intervals, bid/ask spreads will be lower, average trade sizes will decrease, and reduction in revenue and increased competition.
Systems Processing	Convert each system that currently computes, compiles, stores, or displays fractional pricing to accommodate decimal pricing and have the capability to process in both decimals and fractions.
Market Data/Other Vendors	Determine compliance of vendors and coordinate testing (i.e., Pricing, FACTSET, OASYS, Custodians, ADP, and ECNs).
User Interface	Reformat system screens, reports, forms, and written materials.
Network Capacity	Review network capacity due to an increase in messaging traffic from

Issue	Description
	decimal points lowering to a penny (.01).
System Security Master Files (SMFs)	Configure SMFs to be able to support equities and options trading in decimals, while other securities still trade as fractions.
Corporate Actions	Incorporate the change from fractions to decimals over the transition period into systems' dividend and split logic.
Orders	Determine how to approach unfilled limit orders as well as open and unconfirmed trades through the transition period.
Employee, Client and Counterparty Awareness:	Educate traders, floor specialists, portfolio managers and operations individuals. Communicate and coordinate with clients/counterparties.

(Deloitte & Touche Internal Article: Antimo Palmieri; Rick Borelli)

The time has come for the U.S. equities and options markets to convert to decimals as the Canadian market did in 1996. The entire transition effort took six months as all the major Canadian exchanges simultaneously began the conversion to decimal pricing on all equity and option securities. The conversion was successful and no major problems were experienced. However, since the Canadian markets are more illiquid than the U.S. markets and do not have entities such as ECNs that compete with Exchanges the conversion methodology and implementation may differ. Decimal pricing will help to

keep the U.S. markets competitive with those abroad that already trade in decimals. In doing so, the conversion will secure and solidify the U.S. financial markets' presence and help to position it as the financial center of the world.

Trends in the Financial Service Industry

Straight Through Processing (STP)

Straight Through Processing (STP) is a term used in the financial services industry to describe the automated process of seamlessly passing financial information to all parties of a trade from execution to settlement without manual intervention or redundant processing. Conceptually, a trade is initiated by the retail customer, and all parties involved in the transaction life cycle, including the broker dealer, clearing agent, exchange, depository and custodian electronically receiving the data they need to execute, clear, settle and book the trade. Hence, STP implies that data is entered into a single system once and then sent through interfaces to multiple downstream systems throughout the processing cycle. It is apparent that all systems need to interact seamlessly with each other. In order for this to occur, systems should process information using a consistent data structure and communication protocol, which ensures that each organization in the processing chain has the ability to translate data received from systems of other organizations.

The global securities industry spent most of 1990s focusing on efforts to improve the operational efficiencies of transactional processes. The industry now faces the ultimate challenge of expediting increasingly numerous and complex transaction processes in less time. The industry must adapt

to a new technology-driven environment, creating faster and smarter operation processing theories and systems.

The gradual aging of the world's population, fueling demands for public pension reform, is placing greater emphasis on performance and increased intensity on the financial industry. Today's trade processing environments are often characterized by manual procedures, incompatible databases, a lack of standardization, relatively high error rates, extensive costs and expensive trade failures. Increasing volumes, larger trade sizes and greater complexity are causing delays in allocation and settlement instructions. Automation is often piecemeal, with widespread manual intervention, reworks, repairs and investigations.

Today's sorry state of affairs, with as many as 15% of trades failing to settle by their due date, is sometimes attributed to historic vested interests. However, the regulators have no doubt that the greater time elapsed between execution and settlement of the trade, the greater the financial risk to all parties concerned (Internet Source: www.dtcc.com). It is evident that no single market participant can mandate the necessary global change effort to enable the trade process to flow seamlessly between all the

relevant counterparties during the transaction life cycle. A revolutionary approach, inclusive of all market participants and constituencies, is needed. However, market participants are themselves challenged mostly on three fronts: investors and brokers need access to liquidity sources to fend off tight spreads; market consensus on the need to increase efficiencies by reducing cost and risk; and ability to modify processes, culture and behavior to allow business growth.

First, from the front-end perspective, investors are demanding greater control. Markets are becoming more decentralized with the advent of the internet and scaleable trading channels including ECNs, as mentioned in Chapter Two. Investors are therefore looking for market access and immediacy, but there are significant risks of liquidity, standards and technologies that need to be addressed during post trade processing for straight through process to exist.

Secondly, from an operational cost perspective, the desire to eliminate manually intensive processes and multiple points of entry need to be addressed as well. Current cost concerns range from high fixed costs pertaining to proprietary software and multiple databases, to high variable costs from reengineering and staffing. From a risk mitigation

perspective, the goal is to reduce both failed trades and the need for fail financing within shorter settlement cycles (i.e. T+1). With more emerging markets open for business, fund structures, instruments, complexity, volumes, trade sizes, volatility, and lack of standards, it is evident that many financial firms are exposed to countless risks. As the industry moves to reduce the settlement cycle from trade date plus three (T+3) to trade date plus one (T+1), there is an urgent need to rethink the current process flows to ensure adequate settlement cycle procedures (Chapter 7, exhibit two).

Third, the delays in securing affirmations or counterparty trade acknowledgement and allocations during the post trade signals a break in STP. Therefore, the leaders in the finance industry must collectively analyze current operations to pinpoint deficiencies. They also need to tackle environmental changes (i.e. poor integration between order management and the back office operations), transactional changes (i.e. valuation to be measured in decimals), and behavioral changes (i.e. improved communication between front-office personnel, trade support staff and sales representatives) (Business Article: Stephen J. Conway, Northern Trust).

Straight-through-processing will affect all participants in the financial markets: retail customers, investment managers, broker dealers, clearing agents, exchanges and custodian banks. Many firms have already concluded that unless STP is adopted, they will neither be able to integrate new electronic channels nor cope with increasing volumes. Furthermore, if such firms persist with their current systems infrastructure, they face the threat of significant financial and reputational risks associated with: failed trades, reduced market liquidity, manual processes, error corrections, and loss of client base to competitors.

Broker dealers complain that they find themselves having to run sub-optimal processes, which are often client driven. Most cannot cross communicate with their client's custodian bank. Many have to maintain old legacy platforms and incompatible databases operating on different vendor data standards. Not surprisingly, the consequence results in manual intervention with relatively high error rates leading to expensive trade failures. Custodian banks do not fare much better as a result of receiving late and often times incomplete trade instructions. This leads to little or no time to minimize fails effectively and in a timely manner.

Investment managers fare worst of all because they are caught in the middle of the delivery cycle (Chapter Seven, exhibit three). Despite being the originator of the decision to trade, the lack of adequate enforceable standards and consistent methods of delivery severely impact trade settlement efficiency. Hence, with multiple markets to adhere to, multiple databases to run, and multiple delivery channels to their clients, the investment manager encounters perhaps the most manually intensive exposure to overcome on route to straight through processing. The situation only worsens in times of market stress; as investment managers are caught in the middle and forced to do more in less time as a result of settlement cycles shortening (i.e. T+1).

Real changes are likely to occur in the products that participants and members of the vendor community bring to market. The speed of settlement driven by reduced settlement cycles may require different approaches to product pricing and profitability. Hence, expedited settlement periods, ease of international trading, a successful decimalization conversion and technology savvy infrastructures are all required for leading financial firms to remain competitive. The chart below reflects some of the current STP issues.

Issue	Description
<i>Participant Automation</i>	Trade data is often manually re-keyed into several systems leading to a greater chance for error. Manual intervention results from participants' use of internally developed proprietary systems or vendor systems, which fail to adhere to a common standard or fully support the life cycle of a trade.
<i>Standards</i>	Lack of universally accepted messaging standards or communication protocols across the industry (i.e. SWIFT, FIX and ISITC). To date, there is no broad-based agreement among market participants, utilities and vendors as to which standards should be universally adopted for the post-trade process.
<i>Inefficient Use of Data</i>	Current practice requires the manual enrichment of missing data fields and standing settlement instructions leading to errors and unmatched trades.
<i>Insufficient Management Information</i>	Inability to view the status of trades along the transaction cycle or to conduct real-time trade monitoring of end-to-end processing through disparate systems in the post-trade processing cycle limiting the prevention of fails.

(Deloitte & Touche Internal Article: Antimo Palmieri; Rick Borelli)

Firms are implementing STP solutions to reduce risk, cost, and provide better services to clients and

counterparties. However, the industry as a whole must meet several challenges for STP to be successful, as listed below:

- Establish and conform to industry standards
- Create interconnectivity between and within participant infrastructures
- Share common transaction data without compromising competitive edge
- Purchase the best solution versus built-in-house
- Provide increased communication between the front-office and the back-office through order management systems

The Global Straight Through Processing Association (GSTPA) is responsible for increasing the level of communication between trading parties and for automating many of the historically manual tasks that are a direct cause of failed trades. However, a standardized messaging format must be agreed upon for global use. The top messaging vendors throughout the financial industry are competing to become the new universal standard. Unfortunately, each new standard has a shortcoming, and the debate over which standard to employ will continue.

The global standard will depend largely on the software industry, because STP involves automatic preparation and trade

entry, based on a once only entering of the transaction. Firms may consider developing software in-house, but the better alternative is to purchase a software application based on the global standard. Typically, applications developed in-house will use a single messaging standard that is not compatible or flexible to communicate with other entities. Furthermore, in-house applications are often built to focus on requirements of defined entities and defined standards leaving gaps on other industry entities and standards. Since it has been a popular trend to build applications in-house or to acquire application development companies, many financial service firms are currently faced with this problem. Hence, firms are trying to fill the gaps apparent in one in-house application with yet another in-house application. This creates confusing and ineffective patch solutions that can be extremely costly over time. Chapter Seven, exhibit four, provides a list of vendors that are competing to become the new STP messaging standard.

Proactive vendors have introduced open platforms that integrate existing products, support multiple standards, and provide electronic connectivity to systems on the front and back end, including competitor systems. These platforms have the ability to interface with other products owned by vendors

like settlement instruction databases, trade confirmation applications, matching products, and reporting applications.

Multilateral interconnectivity could be the backbone of the solution, linking all parties to a trade at the earliest juncture in the trade life cycle. An open architecture solution is essential, enabling the existence of many vendors and standards in an environment of virtual cohesiveness. In addition to supporting efficiency and cohesiveness, reinforcement is required whereby current theories are poised to impact the Buy and Sell sides. These are: (Internet Source: www.sia.com)

- *Decreasing Settlement Cycles* - driven by regulatory mandates to reduce risk, and increase market place transparency.
- *Outsourcing* - All levels of the business community are searching for efficiency and cost effectiveness.
- *Service Provider Unification* - The financial services industry has changed over the last few years finding overlapping services offered between banks, brokerage, insurance companies and pure investment managers.
- *Individual/Institutional Endorsement* - The progression of internet technology has provided both individual and institutional investors increasingly faster and

unlimited information anytime anywhere, which will continue to be in high demand.

- *Data Repository* - Third party providers of marketplace information and official market institutions will provide information related to securities validation and access to regulatory compliance rules. (e.g. securities reference information, counterpart identification codes, etc.)
- *Value Added Services* - As the concept of STP matures, providers such as custodians will need to continually expand and differentiate services offered. These services span fund accounting, investment analysis, decision support and performance analytics.

Since the finance industry began focusing on STP in the last few years, much of the attention and resources have been focused on improving and streamlining key back office functions like portfolio accounting, trade allocation and confirmation, and clearance and settlement. As significant improvements have been made in back office activities, firms have begun concentrating their efforts on more front office activities, such as order creation, order management and order routing. This is reflected in the growth in the use of order management systems and the increased demand of more sophisticated functionality.

Industry efforts like the Global Straight Through Processing Association (GSTPA) are focusing on improving post-trade activities like trade allocation, confirmation, and clearance and settlement. Yet, true STP cannot be achieved unless the key function of trade order management is integrated closely with other trade activities further in the trading chain. For this reason, firms are focusing their attention on automating key activities in the pre-trade process and then integrating these activities closely with other functions toward the end of the trade lifecycle. While global trading, increased trading volumes, and greater emphasis on lowering trading costs are forcing firms to focus on automating key middle office activities like order entry, intraday order management, and allocation.

Buy side order management systems have changed the balance of power on Wall Street. A buy side trade order management system is a front to middle office application that helps to electronically create and route orders, manage order during the day, and provide portfolio modeling capability and compliance verification. Order management systems connect to a number of other systems throughout firms. On the front end, an order management system connects to market data and pricing

feeds as well as portfolio accounting and portfolio management systems. On the back end, the order management system connects to broker dealer systems, routing networks, execution venues (ECNs, crossing networks, etc.), portfolio accounting, and reporting systems. The order management system may also link to allocation and confirmation systems like the Depository Trust Company's (DTC) TradeSuite and Thomson's OASYS. (Business Article: Dushyant Sharharwat, Tower Group)

Order management systems are used by traders on both the buy and sell side to manage order (Chapter Seven, exhibit six). At a buy side firm, an order management system is used by traders to receive orders from the firm's portfolio managers, consolidate individual orders into block orders, and then route them electronically either to broker dealers or to execution venues such as electronic communication networks and exchanges. At a sell side firm, there are two types of traders: sales and proprietary. The sales trader is similar to the buy side trader and receives orders from the clients and executes them at exchanges. The proprietary trader does not interface with clients and manages the firm's proprietary or principal positions. Therefore, a sell side order management system must serve both the sales trader, routing smaller orders directly to exchanges, and the proprietary

trader that needs to manage the firm's decision to buy or sell securities. (Business Article: Dushyant Sharharwat, Tower Group)

Considering the range of functionality that an order management system provides and the extensive connectivity it maintains with other systems, it is a very important system in a firm's trading and money management infrastructure. Order management systems provide four basic kinds of functionality: order creation and routing, intraday order management, portfolio modeling and compliance reporting as listed below. (Business Article: Dushyant Sharharwat, Tower Group)

- *Order Creation and Routing:* These systems provide portfolio managers the ability to electronically create orders within the trade blotter and route them to the buy side trader. The order management system enables the buy side traders to consolidate individual orders received for each account, then route them either to broker dealers or directly to execution venues.
- *Intraday Order Management:* Order management systems also help manage orders during the day, calculate portfolio values, and perform cash calculations periodically. Traders can view the order blotter to track the status of

open, filled, and partially filled trades. Orders can be split, merged, and blocked based on different criteria.

- *Portfolio Modeling Analytics, and Benchmarking:* Portfolio managers use the system to rebalance portfolios against active portfolios using industry guidelines to generate necessary buy and sell orders.
- *Compliance and Reporting:* Compliance ensures that the firm's portfolio holdings comply with the rules governing the portfolio or with particular customer requirements.

Additionally, these systems provide greatly expanded connectivity and market access, enabling traders to access multiple brokers, ECNs, exchanges, and alternative trading systems (ATS). Access to these markets has forced brokerages to price more competitively, use capital more wisely, provide quicker access to research, open access to analytical tools, and has generally forced them to be more responsive to investment managers' needs.

Within the investment community, competition among firms to manage investor assets has intensified. Firms are competing not only on the basis of portfolio performance, but also on their ability to use technology to manage assets efficiently and provide superior service. To succeed in this

environment, firms will need to leverage technology to meet clients' objectives, while maintaining an effective infrastructure to manage increasing assets and trading operations. Budget pressures and competitive forces will motivate firms to automate basic processes and force their attention on leveraging technology to deliver products and services over the Internet and other channels. Survival and success depend on streamlining key processes, implementing suitable systems, adopting industry standards, and applying network and Internet technology to better serve clients.

Unless firms automate order management and other processes, transaction costs will increase commensurate to trading volumes and may begin to adversely impact earnings. Hence, the focus on lowering processing costs and reducing errors is forcing firms to automate processes using technology driven solutions (i.e. order management systems). Many firms are beginning to realize that an effective approach in reducing transaction costs is the "Straight-Through-Processing" concept. Therefore, a firm's trading strategy must utilize technology that will reduce trading costs in an environment that is cultivating ever-increasing trading volumes. In addition, the pressure on buy side firms to reduce costs and improve net earnings is likely to increase as

competition to manage client funds intensifies and more global asset managers enter the US market and compete against domestic financial institutions.

As more firms engage in cross border trading and major financial companies open trading desks in foreign markets, they will need systems that can manage order flow across all trading desks around the world. Firms that need to trade globally on a twenty four hour basis will need a technology friendly STP environment for continuous and simultaneous support. With greater trading of international securities, firms need systems that will support multiple currencies and all asset classes. In this environment, order management systems will need to be more scalable and able to support multiple trading desks simultaneously.

To meet the securities industry's goal of T+1, it will become essential for firms to manage trading operations in a real time environment. Order management systems will also be expected to support multiple interfaces in real time. As the Global Straight Through Processing Association (GSTPA) and similar industry efforts promote global STP the pressure to make front-office applications flexible, open and real time will only increase. The quest for STP, the drive to reduce

transaction costs, and the need to effectively manage growing trade volumes is driving the growth of STP processing systems. Firms are finally addressing the need to automate key middle-office functions revolving around trade order management and integrating the systems they adopt with other trade processing applications on route to STP and eventually T+1.

Trends in the Financial Service Industry

Trade Date Plus One (T+1)

Since Y2K is no longer an issue and preparation for current initiatives such as decimalization and straight through processing, described in Chapters Two and Three, are nearly complete, the impending move to trade date plus one (T+1) has begun to attract more attention within the securities industry. The SEC is communicating to the financial services industry that the target for achieving T+1 is mid-2002.

The settlement cycle is described as the amount of time after a transaction has been executed for a trade to settle. Unfortunately, there is no single settlement cycle standard for all financial instruments. For example, equities settle on T+3, meaning that three days after the trade has been executed, cash is exchanged for the securities by the clearing agents. Prior to settlement, trades must be matched by all counterparties or the trade will fail, meaning that settlement does not occur because trade details cannot be agreed upon by both sides of the trade. Conversely, repurchase agreements, options, and government short-term securities settle on T+0 or T+1, meaning that on the trade date or one day after the trade date, cash is exchanged for the securities by the clearing agents.

T+1 refers to a trade settling one day after the trade date. It is also known as next day settlement. The shorter settlement cycle will decrease the number of days between the trade date and the date that payment is due (settlement date), thereby increasing the liquidity in the market. Since the cash settlement period will decrease by two days, the concentration of money will flow into the market faster than under current practices. Under the current settlement cycle, an investor can maintain a cash account apart from their broker dealer and mail a check or money order containing the transaction balance for investments made. With the move to T+1, settlement will occur the next day. It is essential for investors to maintain cash accounts at their broker dealer containing sufficient cash levels for investment purposes or the account must be setup as a margin account.

For domestic trades originating overseas, settlement instructions are often received late because of time differences and therefore, fails and late settlements are common. Overseas communications between the broker dealer and the clearing agents are already largely automated due to a messaging standard called SWIFT, as are the communications between the global custodians and the sub-custodians. If the speed and quality of information flowing among counterparties

can be increased, then the timeliness and quality of the information flows between the foreign markets and the United States will also significantly improve.

It is important to note that post trade information flows do not deal only with fundamental trade details. As a trade is executed, additional trade related information, such as trade allocations and settlement instructions become vital pieces of information for managing risk, calculating portfolio values, and most importantly maximizing the chance of timely settlements. In the future, many markets will experience shortened settlement cycles. This adds to the long list of reasons why information has to be exchanged, matched, and enriched in a matter of minutes rather than days for T+1 to be successful (Chapter Seven, exhibit seven).

The Institutional Transaction Processing Committee of the Securities Industry Association (SIA) has proposed a model to redesign the current post-trade process for United States delivery vs. payment (DVP) of institutional trades. The proposed model is based on a virtual matching utility concept. (Internet Source: www.sia.com/tradedateplusone/) This radical redesign of the trade process will address capacity constraints, systemic and operational risk issues, as well as

cost and business controls. The objective is to design a flexible, adaptable infrastructure that accommodates anticipated volumes, eliminates redundancies of both systems and processes as well as reduces the number of manual steps required to settle a transaction.

The SIA has also communicated to its members that these changes will require significant modifications to securities related computer applications as well as overall firm operational processes and system infrastructure. Various systems, operations, and user changes due to the move to T+1 need to be considered and addressed. At the present time, industry-wide settlement systems are straining to manage the rapidly growing trade volumes. These have resulted from an explosion of self-directed investments and the advent of electronic communication networks (ECN's) and electronic trading. This strain will intensify with the planned expansion of trading hours and the impact of decimalization.

Since the technology change must be radical in order to make T+1 possible, the system infrastructure should focus on business process and operational order handling efficiencies. Additionally, the framework should also enable integration of value added modules that constitute straight through processing and the reduction of multiple points of entry. A

successful solution will provide reliable, accurate, flexible and responsive data to meet the demands of customers and other counterparties. The chart below reflects some of the current (T+1) issues.

Issue	Description
Participant Automation	Trade data is often manually re-keyed into several systems leading to a greater chance for error. Manual intervention is due to participants' use of internally developed proprietary systems or vendor systems, which fail to adhere to a common standard or fully support the lifecycle of a trade.
Standards	Lack of universally accepted messaging standards or protocols across the industry (ie. SWIFT, FIX and ISITC). There is not yet any broad-based agreement among market participants, utilities and vendors as to which standards should be universally adopted for the post-trade process.
Inefficient Use of Data	The current process requires the manual enrichment of missing data fields and standing settlement instructions throughout the process, leading to errors and unmatched trades.
Insufficient Management Information	Inability of viewing the status of trades along the transaction cycle, real-time trade monitoring of end to end processing through unlike systems in the post-trade processing cycle is not possible, limiting the prevention of fails.

(Deloitte & Touche Internal Article: Antimo Palmieri; Rick Borelli)

In a recent interview, Dennis Dirks, the president of the Depository Trust and Clearing Corporation (DTCC) and newly elected president of the National Securities Clearing Corporation (NSCC), explained that since the move to T+1 will require extensive effort, it merits a thorough cost-benefit analysis. While DTCC continues to see the value in next day settlement, the final decision lies in the hands of the regulators and the industry. "It's not a question of whether we should move to T+1," he said. "It's really a question of how fast we should push there, given the expected costs and benefits". (Internet Source: www.sia.com/tradedateplusone/) T+1 indirectly relies upon the success and acceptance of other initiatives such as decimalization and straight through processing.

According to Dirks, one of the specific issues that will be addressed is whether DTCC should provide aggregation of trades for institutional settlement along with an automated stock lending facility. This concept is already being performed by the National Securities Clearing Corporation (NSCC) for many larger brokerage trades. Customer satisfaction may be an issue for those who want to continue to trade in physical certificates. Convincing the industry that there is an inherent value of moving past the confirm and

affirm process to the use of a standardized matching facility still needs to be accomplished. Dirk also said, "We will look at how processing systems at DTCC and NSCC will have to change in order to support the industry under T+1. We want input from the Street on all their issues." With that said, most broker dealers and banks will have to reengineer their clearance and settlement processing systems, since most of them are currently using batch systems. T+1 will force most financial services firms to review their own systems to evaluate the changes needed.

As described earlier, the use of new technology with innovative capabilities to settle transactions one day after trade date is paramount for T+1 to occur. This is further reinforced by Dirks, "we are committed to providing flexibility in bringing and introducing new products and services that reflect industry changes and needs. We will do this by working to bring a continuous stream of new products to market sooner and at the same time, making sure they are the right products". Examples of new products and areas under development are: the Global Corporate Action Hub and identification of ways to leverage Internet capabilities to streamline customer processing services. The hub is geared to reducing the risks custodian banks and broker dealers assume

in holding securities for their customers. It will provide a centralized communications mailbox for custodians to deliver reorganization and other corporate action notices to investment managers for whom they hold securities.

Although far from being implemented in 2002, the concept of T+1 is perhaps one of the biggest technological undertakings since Y2K. Therefore, the financial industry, ranging from regulators to broker dealers, must not delay. The deadline is soon approaching. Unlike the infamous Y2K deadline which was a race against time, the T+1 deadline is moveable upon approval of federal regulations.

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Conclusion

New opportunities and roles will force all financial services firms to find new ways of competing. Firms that survive will undertake a major strategic review of the exact businesses they are in and necessary modification to become more effective. Technology considerations will play an important role in determining future business direction. Each organization must examine its technology needs, developing a plan for seamless communication and linkage with clients, business partners, competitors and industry utilities. The technology change has to be radical in order to make decimalization, straight through processing and T+1 possible; today's proprietary in-house systems would render this impossible.

The conversion to decimal pricing will help to keep the U.S. markets competitive with those abroad that already trade in decimals. In doing so, the transition to decimalization will secure and solidify the U.S. financial markets' presence and help to position it as the financial center of the world. This becomes crucial as foreign emerging markets, modeled after the methodology and framework of the United States financial market, gain an increasing market share of investment capital each day.

Every firm must build or acquire new systematic capabilities to deliver products and services from multiple channels utilizing electronic delivery and settlement resources offering straight through processing, real time and event driven architectures, application integration and customer connectivity. With such automated systematic capabilities, the concept of straight through processing can facilitate an environment for trades to settle in a T+1 time frame without human intervention or multiple points of manual entry.

The concept of T+1 is perhaps one of the biggest technological undertakings since Y2K. The financial industry as a whole ranging from regulators to broker dealers must not waste time, because the deadline is soon approaching. However, the biggest advantage is that the deadline is not immovable and can be postponed unlike the infamous Y2K deadline which was a race against time.

With adequate time and resources the financial industry should be able to accomplish without major problems or delays all three initiatives: decimalization, straight through processing and T+1. Except for decimalization, these initiatives are far from being implemented and tested. As a

result, there may be unforeseen problems or critical side effects to the financial services industry that were not previously considered. Hopefully, a smooth transition to decimalization in the upcoming months will represent a successful model for straight through processing and T+1.

Chapter

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Chapter
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Appendix

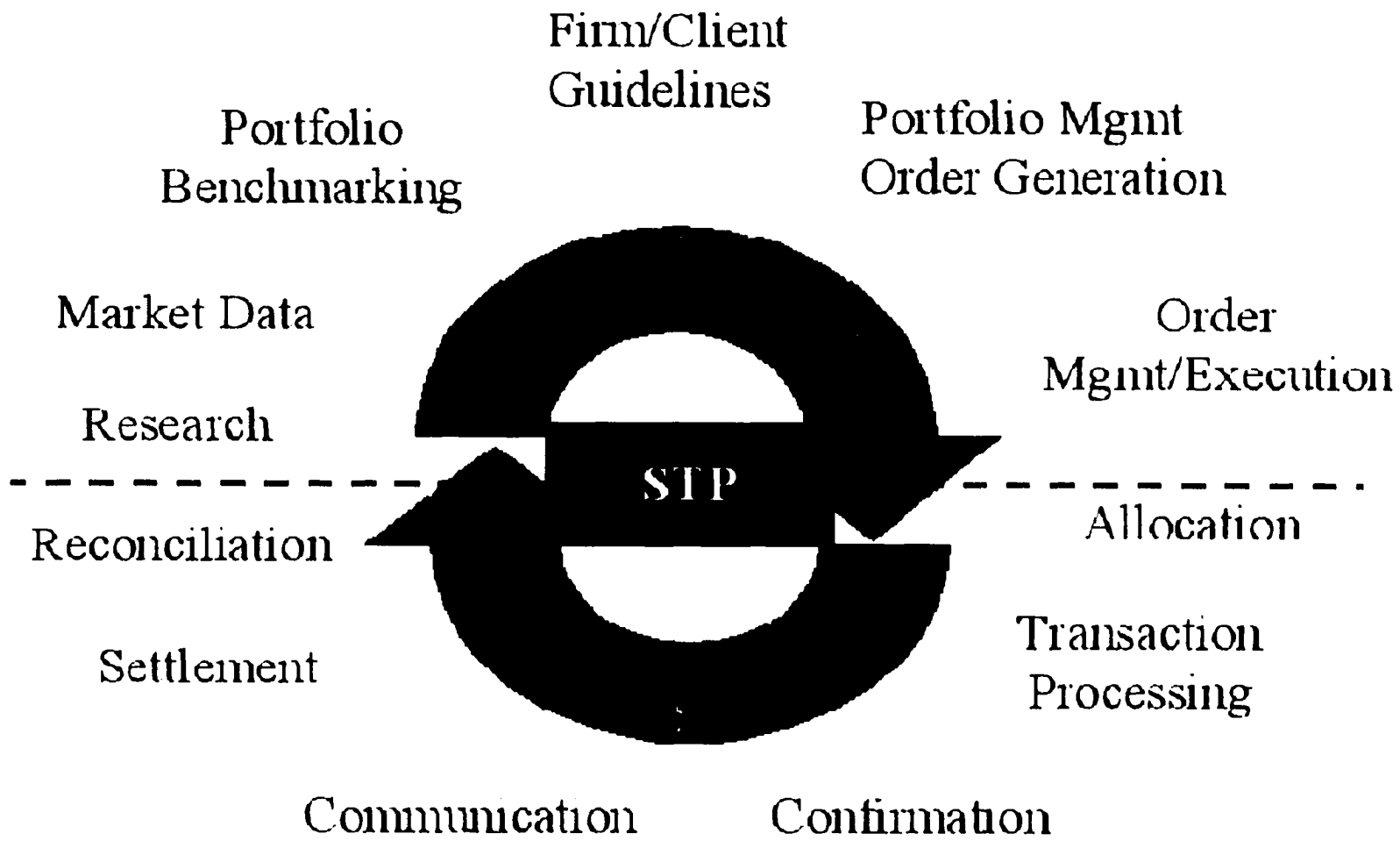
Exhibit 1: Decimal conversion chart (source: www.nasd.com/news/Decimalization/)

Purpose: This table lists decimal equivalents to fractions

Example 1: For example, the fraction $\frac{3}{8}$ is equivalent to the decimal 0.375

Example 2: The fraction $\frac{2}{32}$ is equivalent to the decimal 0.0625

Numerator	Denominator					
	8	16	32	64	100	256
1	0.125	0.0625	0.03125	0.015625	0.01	0.003906
2	0.25	0.125	0.0625	0.03125	0.02	0.007813
3	0.375	0.1875	0.09375	0.046875	0.03	0.011719
4	0.5	0.25	0.125	0.0625	0.04	0.015625
5	0.625	0.3125	0.15625	0.078125	0.05	0.019531
6	0.75	0.375	0.1875	0.09375	0.06	0.023438
7	0.875	0.4375	0.21875	0.109375	0.07	0.027344
8	1	0.5	0.25	0.125	0.08	0.03125
9		0.5625	0.28125	0.140625	0.09	0.035156
10		0.625	0.3125	0.15625	0.1	0.039063
11		0.6875	0.34375	0.171875	0.11	0.042969
12		0.75	0.375	0.1875	0.12	0.046875
13		0.8125	0.40625	0.203125	0.13	0.050781
14		0.875	0.4375	0.21875	0.14	0.054688
15		0.9375	0.46875	0.234375	0.15	0.058594
16		1	0.5	0.25	0.16	0.0625
17			0.53125	0.265625	0.17	0.066406
18			0.5625	0.28125	0.18	0.070313
19			0.59375	0.296875	0.19	0.074219
20			0.625	0.3125	0.2	0.078125
21			0.65625	0.328125	0.21	0.082031
22			0.6875	0.34375	0.22	0.085938
23			0.71875	0.359375	0.23	0.089844
24			0.75	0.375	0.24	0.09375
25			0.78125	0.390625	0.25	0.097656
26			0.8125	0.40625	0.26	0.101563
27			0.84375	0.421875	0.27	0.105469
28			0.875	0.4375	0.28	0.109375
29			0.90625	0.453125	0.29	0.113281
30			0.9375	0.46875	0.3	0.117188



Understand the Whole Problem End-to-End

Exhibit 2: Flow of Information in an STP environment

Exhibit 3: Transaction Life Cycle Flow Diagram (source: www.sia.com)

The following chart details the set of functional processes in the life cycle of a trade for either domestic equities or corporate/municipal bonds initiated and settling in the U.S. domestic market:

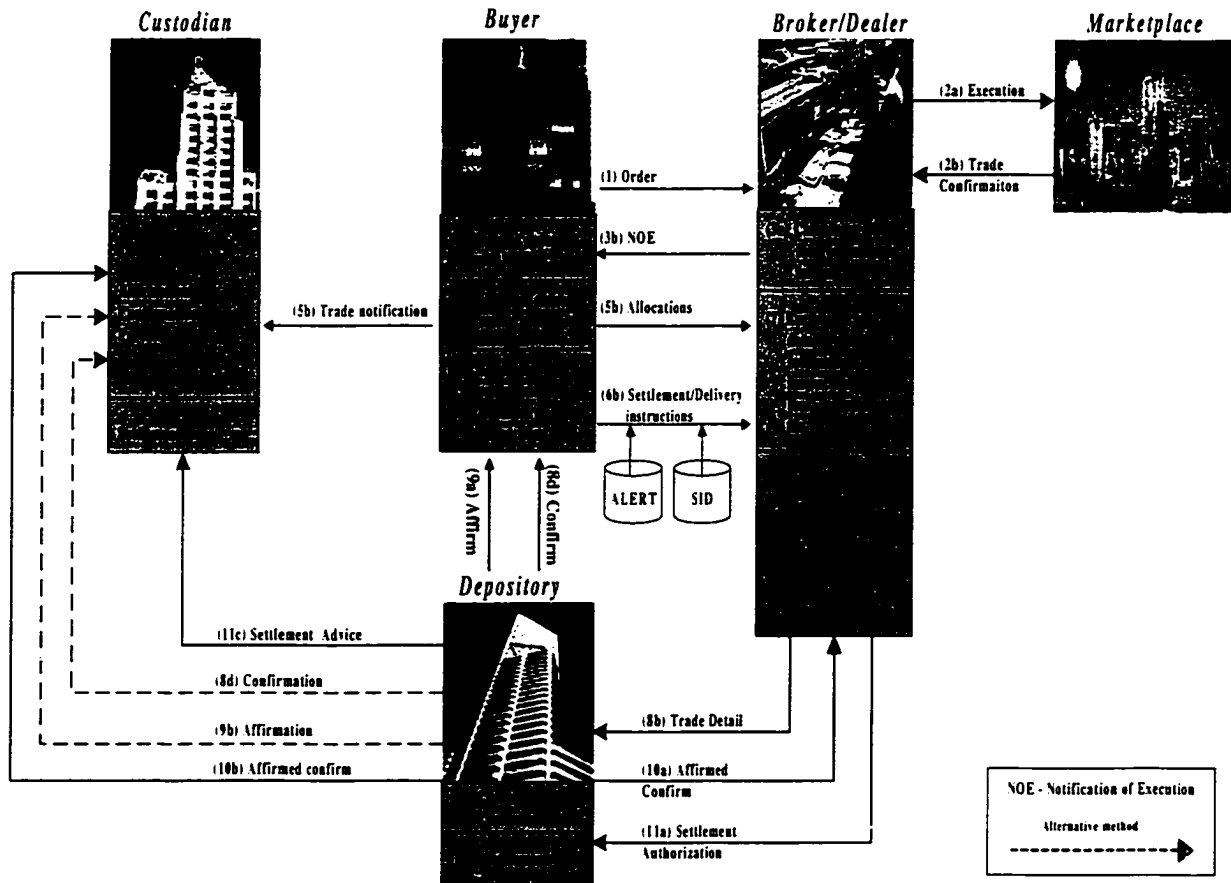


Exhibit 4: Listing of Order Management Systems (Source: www.towergroup.com/)

The table below is a detailed listing containing the client base of major order management system vendor products.

Vendor	Active Clients	Representative Clients
Advent	372	Merrill Lynch, Wells Fargo, US Bancorp, Piper Jaffery
Charles River	15	Loomis Sayles, Nations Bank, Investment Advisors Inc., Janus
Decalog	30	Warburg Pincus, Citibank, AXA Sunlife, Credit Lyonnais
Eze Castle	50	Fleet, Tudor, Vinik Asset Management, Independence Asset Management
FMC	6	Lombard Odier, Santander Global Advisors, Canada Trust
LongView	50	Baring Asset Management, State Street Bank, TIAA-CREF, Prudential Investment Advisors
MacGregor (Predator)	25	State Street Bank, UBS Brinson, Lazard Asset Management, Van Kampen Funds
MacGregor (Merrin)	50	AIM, Mass Financial, T Rowe Price, GE Investments
SS&C	40	Moore Capital, National Asset Management, GE Investment Corp, JP Morgan & Co
Thomson Financial	40	Schroders IML, Davis Advisors, Deutsche Morgan Grenfell, Handelsbanken

Exhibit 5: Benefits of Straight-Through-Processing

The chart below illustrates the Buy-Side (Fund Manager) benefits and Sell-Side (Broker/Dealer) benefits.

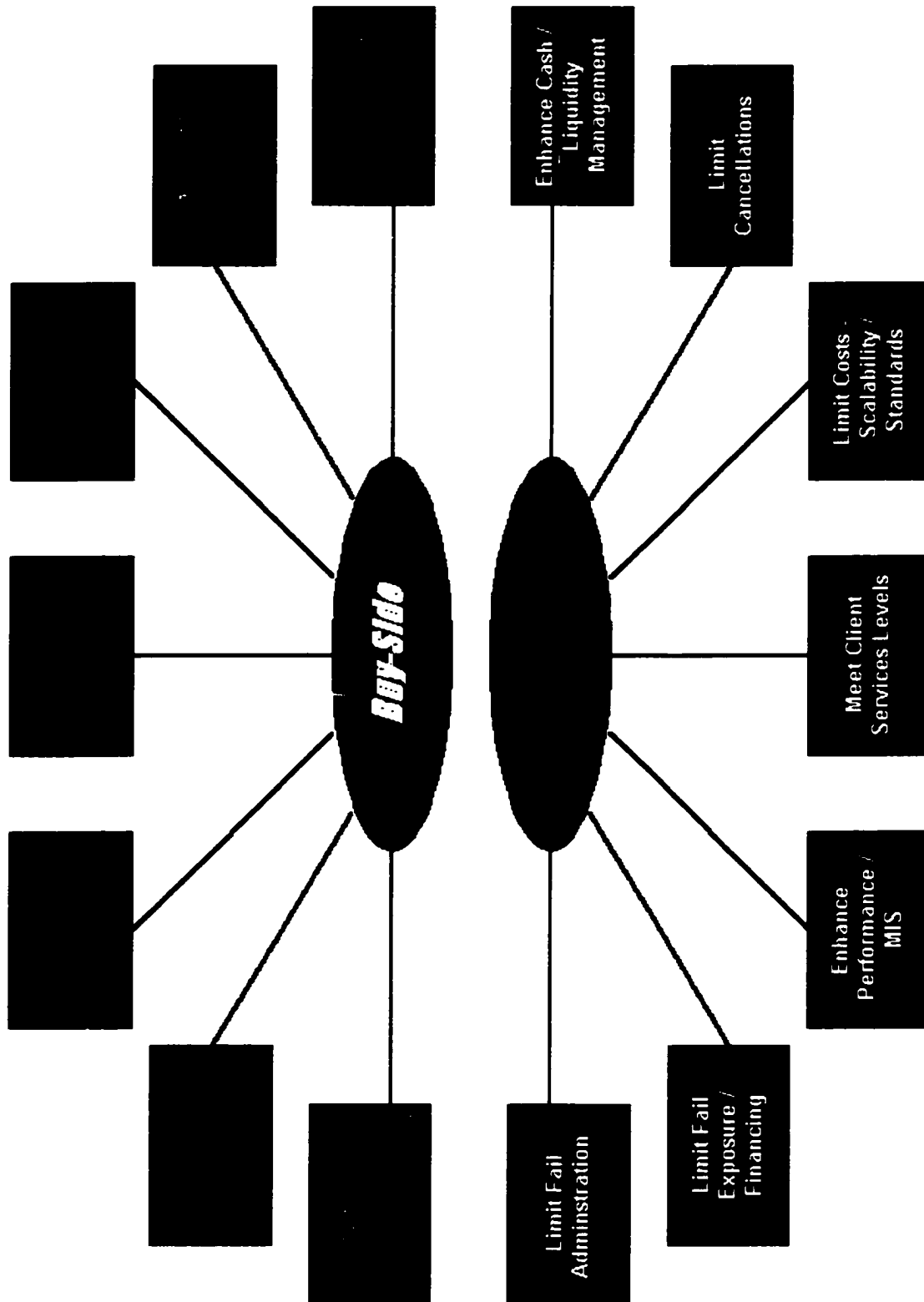


Exhibit 6: Activities an Order Management System can perform (Source: www.bloomberg.com/)

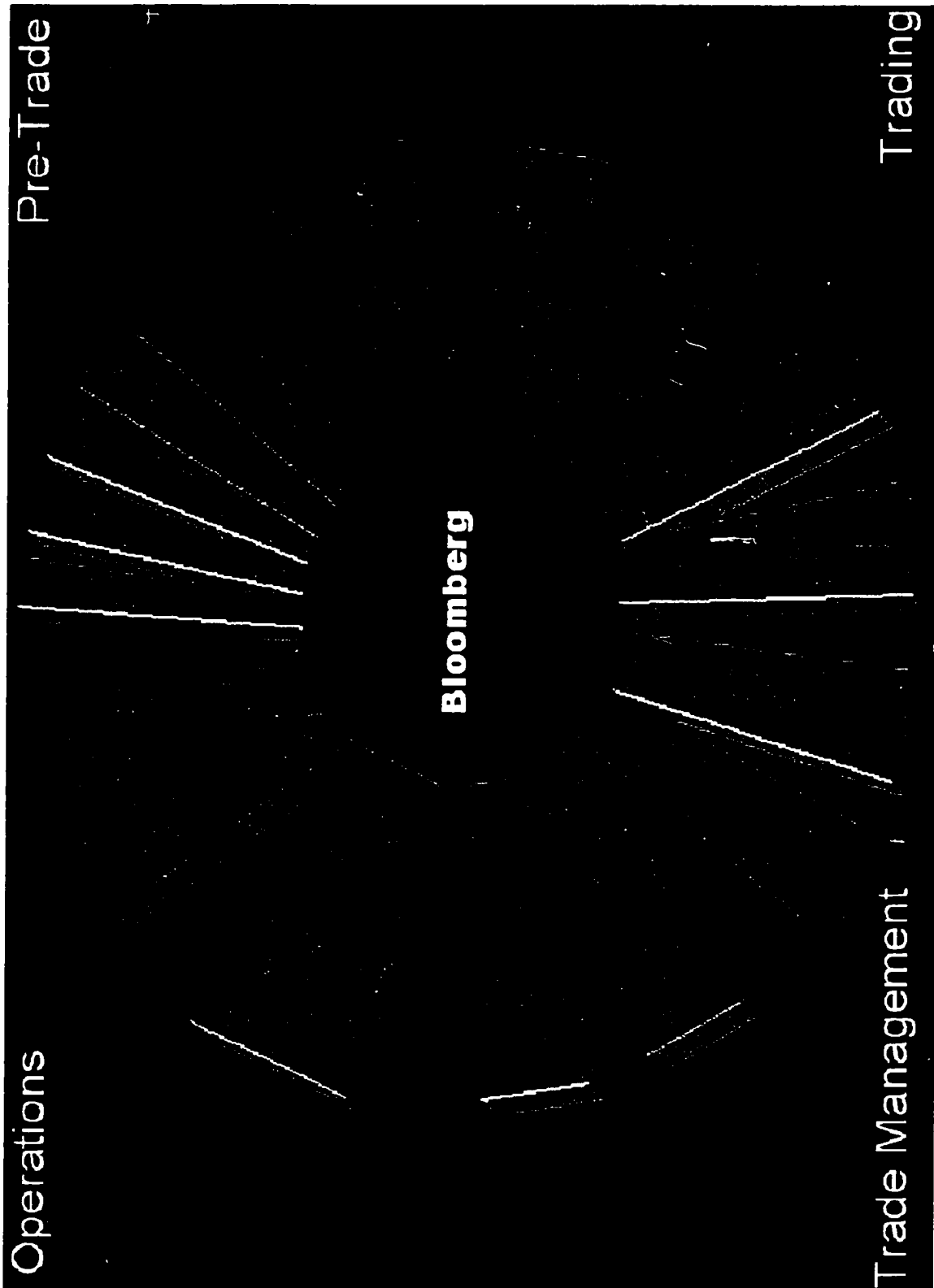


Exhibit 7: Trade Date Plus One (T+1) Summary

The diagram below illustrates who is impacted by the transition to T+1 and identifies which entities within the financial services industry will profit or are at risk.

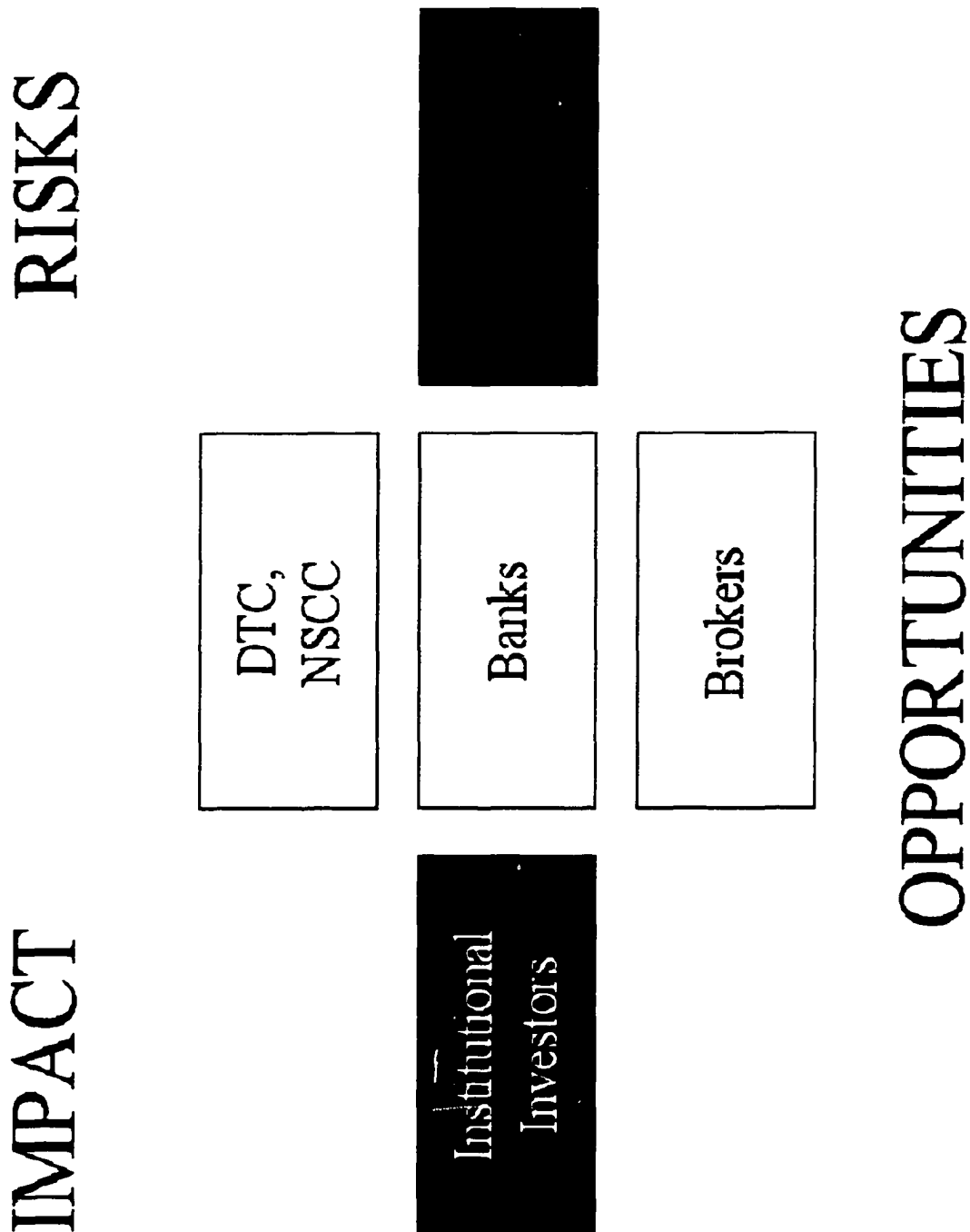


Exhibit 8: Glossary of Terms

Decimalization: is the conversion of all securities industry systems from fractional to decimal pricing –that is, in dollars and cents the way nearly everything else is priced.

Straight-Through-Processing: is a term used in the financial services industry to describe the automated process of electronically passing financial information to all parties of a trade from execution to settlement without manual intervention or redundant processing.

Trade Date: is the day that a trade is initiated by the buyer.

Settlement Date: is the third day after trade date and signifies when a trade has been affirmed and settled to match both counterparty transaction instructions.

Settlement Cycle: is the time frame that a single trade takes to settle (three days).

Trade Blotter: is an instrument that traders utilize to document and maintain a detailed list of all trades bought and sold on a daily basis. The trade blotter usually is an excel spreadsheet that is passed to operations personnel for manual entry into a portfolio management system.

Electronic Communications Network: are private electronic communication networks that automatically match buy and sell orders.

Financial Institution: An institution that uses its funds chiefly to purchase financial assets (deposits, loans, securities) as opposed to tangible property.

Broker Dealer: Any person, other than a bank, engaged in the business of buying or selling securities on its own behalf or for others.

GSTPA: The Global Straight Through Processing Association is an industry association open to all Investment Managers, Broker/Dealers and Global Custodians involved in the processing of cross-border trades.

DTCC: The Depository Trust & Clearing Corporation, established in September, 1999, is a new holding company that oversees two principal subsidiaries – The Depository Trust Company (DTC) and the National Securities Clearing Corporation (NSCC). These two firms provide the primary infrastructure for the clearance, settlement and custody of the vast majority of equity, corporate debt and municipal bond transactions in the U.S

NASD: National Association Of Securities Dealers, a self-regulatory organization with jurisdiction over certain broker-dealers. The NASD requires member brokers to register, and conducts examinations for compliance with net capital requirements and other regulations. It also conducts market surveillance of the over-the-counter (OTC) securities market. NASDAQ is a subsidiary of the NASD which facilitates the trading of approximately 5,000 of the most active OTC issues through an electronically connected network.

NASDAQ: was the world's first electronic stock market when it debuted in 1971, the Nasdaq is one of three major US stock exchanges.

NSCC: National Securities Clearing Corporation, is the world's leading provider of centralized clearance, settlement and information services to the financial services industry.

NYSE: The New York Stock Exchange traces its origins to a founding agreement in 1792 and is one of three major US stock exchanges.

SEC: Securities And Exchange Commission, an independent agency of the U.S. government consisting of five members appointed by the President that administers comprehensive legislation governing the securities industry.

SIA: Securities Industry Association, was established in 1972 through the merger of the Association of Stock Exchange Firms (1913) and the Investment Banker's Association (1912). SIA member-firms (including investment banks, broker-dealers, and mutual fund companies) are active in all U.S. and foreign markets and in all phases of corporate and public finance.

SWIFT: A message writing system that connects worldwide participating banks. It is used primarily for the purpose of communicating payment information. Frequently, the SWIFT message is only part of an international payment process which might also employ other systems to fully implement the transaction.