

# Before the Digital Screen: Analysis of Challenges and Limitations of Analog Stock Market

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**Abstract:** In the history of finance, the introduction of computers for use in the stock market stands as the very moment that reshaped the entire trading practices and the market. From the old traditional methods, ticker tapes and labor-intensive manual record-keeping, computer oriented technology accompanied in a new era of accessibility, efficiency and innovation. This paper explores the ways used in the stock market before the early adoption of computing technology, the problems faced by the traders on trading floors, the procedures used by financial institutions and the world of finance in the stock market. The paper also provides a brief summary at the end of each old traditional way explanation that how the computers made the tasks easier. The paper provides a historical analysis of stock market ways and compares those methods with the modern techniques being used.

**Index Terms – Digital Technology, Stock Market Transactions, Stock Market and Computers, Digitisation of Stock Market, Manual Operations in Stock Market.**

## I. INTRODUCTION

In the vast history of financial transactions and the stock market, the computing technology played a very important role to transform one era of old traditional methods of trading to the modern more sophisticated methods of trading. The stock market procedures that start with ticker tapes and manual record-keeping practices, the introduction of computers as affected the other parts of the world, also affected the ways the stock market procedures. This digital computing technology automated the manual methods of buying, selling, analyzing and managing the stocks with more precision, efficiency and versatility. This paper puts a light on the traditional practices used in the stock market to perform financial transactions; along with brief discussion that how computers provided much more efficient ways to do the same tasks in very less time. The paper explores the open outcry trading, manual record-keeping, ticker tape machines, floor brokers and specialists, limited market access, how these tasks were performed without computers in the traditional ways, how cumbersome those tasks were for traders as well as stock market staff members, and how the introduction of computers made their life easier.

## II. OPEN OUTCRY TRADING

Open outcry trading is a conventional method used in stock market before the invention of computer technology. The method was used in many exchanges for stocks, commodities and futures contract notes. The system provides a ring at the floor of stock exchange, called trading pit where all the traders gather to communicate physically and verbally for the execution of trades. Each trading pit was further divided into sub-sections for separate securities of commodities where the pit traders or floor brokers gather.

The trading pit creates a dynamic and vibrant atmosphere where the traders used hand signals, physical gestures and verbal calls to buy or sell their stock. Many exchanges employ specialists or market makers who perform a very crucial role in smoothly running the trading procedures by maintaining liquidity through providing continuous bid and ask prices [1].

Price discovery is the basic aspect of stock market trading and it is discovered by the demand and supply interaction in the trading pit. The price depends on the willingness of traders to buy or sell at some specific price, their interaction results in the price discovery. When some trader agrees at a certain price, the details are communicated using hand signals or verbally, which are recorded and executed by the stock exchange operation staff present at the floor.

The clearing and settlement procedure is very crucial process of a stock exchange, the exchange verifies the trade, checks for fulfillment of obligations by both the parties, transfers the ownership of securities or commodities, and settles any financial obligations.

Although open outcry trading provided a very efficient way in those times, but with the advent of computing technology, open outcry trading seems to be very time consuming, limited access and highly costly. The digital technology provided a global market access with faster execution and at much reduced costs [2].

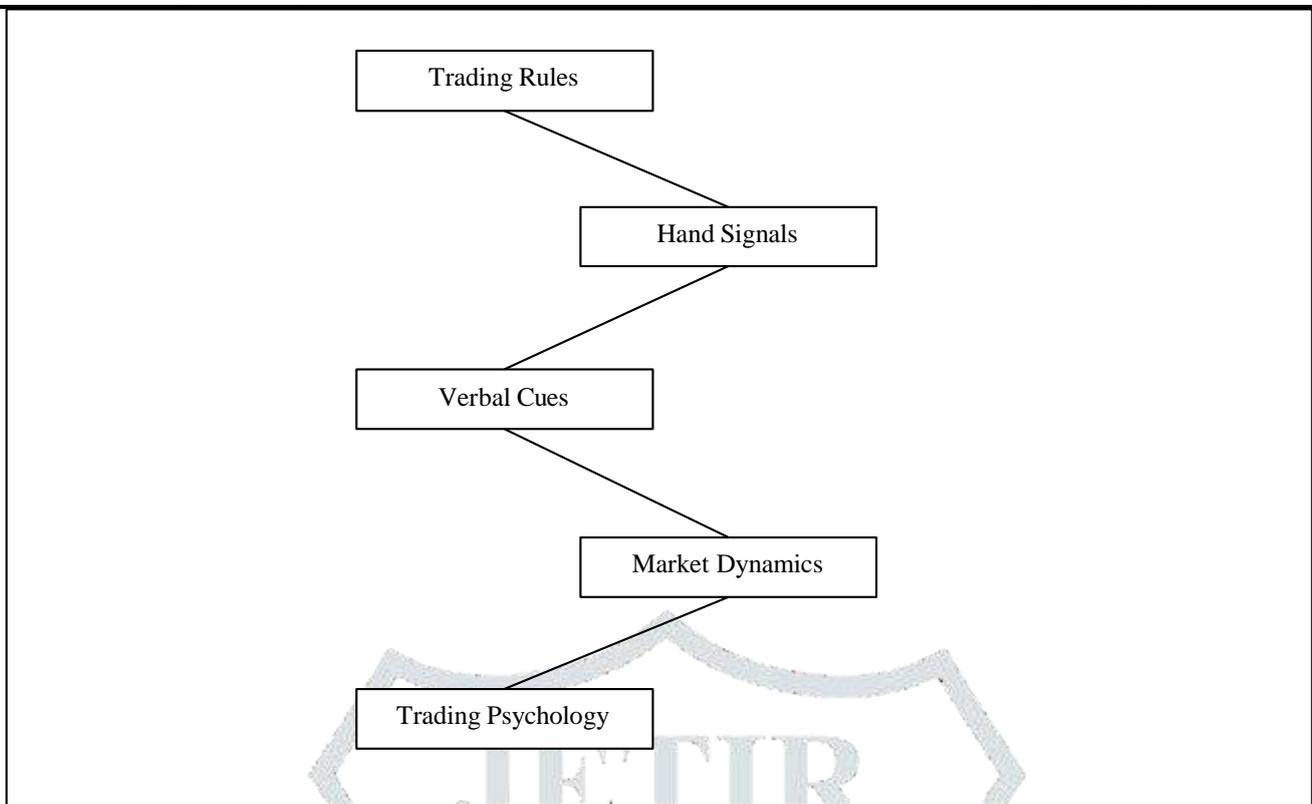


Figure 1. Open Outcry System

### III. MANUAL RECORD KEEPING

Thinking about record-keeping without the use of computers, seems to be very cumbersome task, but it was done by recording the transactions in journals and ledgers by the stock exchange clerks and floor traders. The whole responsibility lies with those clerks and floor traders to accurately document all the details of the trade such as the stock quantity bought or sold, the names of the buyer and seller, the transaction price and the execution time of transaction.

The manual record keeping used paper-based ledgers to record trading activities. Each entry in those ledgers was made by hand and the ledgers were organized by date and security. When the trading volume increases, the paperwork to record that volume of transactions also increases, so requires extensive storage methods to maintain [3].

Paper based record-keeping is very time consuming and error prone process. When the records are entered manually, there are chances of misinterpretation, omission or transaction error which results in discrepancies in trading records. Such discrepancies may result in misunderstandings and disputes among the traders and exchange staff.

So, the traditional manual record-keeping methods were inefficient for the stock market. Instead the use of computer systems for record keeping provided a more efficient way to keep error free records with more safety procedure and for longer periods of time. The computers automated the record keeping process provide faster recording and accessing time [4].

### IV. TICKER TAPE MACHINES

Ticker tape machines performed a very crucial role in the operations of stock markets before the introduction of computer systems. These machines provide real-time market data of stocks to the market participants. The machines were electromechanical devices which use narrow strips of paper to print continuous streams of stock prices that are then disseminated to market participants.

These market data strips were disseminated to the traders and financial institutions including brokers so that they can access the real time data from the any location on the trading floor. This information was very much crucial to the market participants in order to maintain transparency and also to provide the facility to the market participants so that they can take proper decisions [5].

The market participants were dependent on these printed ticker tape machine strips to monitor real time market price movements and check the performance of their selected stocks. The strips help the market participants to track any trends and patterns in the stock movement so that they can take decisions using the market sentiments

But the ticker tape machines were manual operated which results in the delay between the trade execution and the printing of price information of that trade on tape. The computer systems provide time critical real time data to the market participants without such delay that helps the participants to take decisions quickly [6].



Figure 2. Ticker Tape (Source: <http://wwwFOUNDATIONSFORSCIENTIFICINVESTING.COM/>)

## V. FLOOR BROKERS AND SPECIALISTS

The stock market operations before the introduction of computers were operated by floor brokers and specialists. These essential figures played very important roles in trade operations and market order maintenance.

On the trading floor, floor brokers acted as middle layer between sellers and buyers, hence they execute orders on behalf of associated participants, they transfer buy and sell instructions including performing roles in negotiations and transaction completion.

The communication among market participants is performed with the assistance of floor brokers. Their responsibilities include transmitting bid and ask prices, information about market sentiments and other valuable insights thereby providing help to take informed decisions.

Specialists had a very crucial role in completing the trading operations smoothly and without disruptions. They balance the orders by quoting adjustment and facilitating the demand and supply mismatch with their own capital.

Specialists have assigned securities for which they were responsible for monitoring the trade activities, identifying the irregularities and finding any violations of rules and market abuses. They were reporting to the regulatory authorities and exchange officials for compliance enforcement and market integrity maintenance [7].

## VI. LIMITED MARKET ACCESS

Before the computers were being used in stock market, the access to the stock market was very limited as compared to now days, due to the operations performed by only physical exchanges and brokerage firms.

The physical exchanges were the primary venue for buyers and sellers to gather and execute their transactions. The exchanges were responsible for providing infrastructure for stock market operations; the brokerage firms help individual investors to get stock market access. The licensed brokers of the firms act as dealers among investors and exchange and on behalf of their clients they execute trades.

The brokers were responsible to execute trade on behalf of investors, so the investors has to call the brokers via telephone or meet in-person for any buy or sell instructions. The brokers were also helpful to the investors for investment advice, insights into the market and to assist for any other complexities. The trust of investors in brokers works for making any informed decisions in investment.

The real time data access was very limited when the computers were not available for this task. The participants were not able to get financial information, news and the most important live price quotes. They often get delayed information in the form of market reports. They were not able to directly get access to the market data online and were not able to execute their trades online as it is done today. They were totally dependent on brokers for order placement and portfolio management [8].

## VII. CONCLUSION

The stock market operations before the introduction of computers were using totally different way. The origin of digital age totally transformed the procedures that were followed in the traditional times. The trading in the era proceeding the digital age, was very much manual and laborious work having shouting on trading floors in open outcry system, sound of ticker tape machines and huge physical work performed by human resources. With the introduction of computer systems, the electronic trading platforms are evolved that transformed the whole stock market machinery to provide almost unlimited accessibility to the market around the globe. Without any doubt, the computers changed the trading practices, but how in the pre-digital era, the stock market was managed and operations were performed without any disruptions, is remarkable. The traditional markets were faithfully run by floor brokers, brokerage firms and specialists successfully without the use of modern technology, it is not an easy task as it seems to be. Now the markets can be access from anywhere even using a mobile phone and the orders can also be placed on our own using the same mobile phone within seconds. No doubt, computers provided a revolutionary transformation to the stock market.

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