

## **Mary Jo Moccia, the pioneer of automated markets**

By Tom Haller

Many books have been written over the years about the big Wall Street movers, shakers and disruptors, the technology drivers and business innovators. All of them making their marks in the 1990's and later. But none of these books give credit to the person who started it all. Her name was Mary Jo Moccia.

Mary Jo joined the Chicago Stock Exchange in 1972, then known as the Midwest Stock Exchange (MSE). At that time, all of its shares were traded manually on a trading floor. Soon after joining, she became the driving force behind the Exchange's move to computer automation.



Mary Jo's first big automation project was the Odd Lot Execution Service (OLES). This would automate the execution of odd lot orders for the specialist on the trading floor. That system became a gold mine for the exchange. The success of this product helped to ease the fears of the specialist with respect to automation. Mary Jo wrote OLES pretty much single handedly in VAX BASIC on the PDP 11 in 1979.

One of the key design elements of OLES was that all transactional data was held in memory. That was revolutionary in 1979.

OLES became the core of MAX (Midwest Automated Execution), which Mary Jo started working on in 1981. MAX was Mary Jo's vision for automating all trading at MSE. This time she brought in consultants from Digital Equipment Corp. to help with technical architecture. It was a huge effort and the team worked long days and weekends to make it a reality.

MAX was launched in early 1982. It had a few startup problems and the team pulled a few all-nighters cleaning up messes from the trading day to get ready for the next. In the early days, there were a lot of complaints from the trading floor. But, as the kinks were worked out, the specialists began to tolerate an occasional glitch. Over time, many of them loved it and gave MAX credit for facilitating MSE's steadily increasing trading volumes and profitability.

Once MAX matured, Mary Jo offered her technology for sale to foreign stock markets also interested in automation. She hand-picked members of the exchange staff and created an international business development team. This team went on to automate the Amsterdam Stock Exchange, the Securities Exchange of Thailand, Makati, Quito, Johannesburg, Tel Aviv, Athens and others.

In 1990, at age 55 while leading the automation of the Securities Exchange of Thailand, Mary Jo succumbed to a heart attack in Bangkok. It would take years for Wall Street to see another leader that could fill her shoes, and all of them, whether they knew it or not, were standing on her shoulders.

After Mary Jo left us, I spent the next 10 years reverse engineering everything she did so I could carry on her mission. Here are a few things that I learned from her.

## **The Technology**

When I began working on the exchange team in June of 1987 I could not understand Mary Jo's obsession with simplicity and performance. I thought she was a bit over the top. Then, on Monday morning, October 19, 1987 I came to work, sat down at my desk overlooking the floor of the Chicago Stock Exchange and didn't leave for the next 32 hours. This was "Black Monday." The first electronic "flash crash." The market dropped 22%, mainly from orders generated by a computerized portfolio management system. When the market took a small dip, this triggered sell orders on these electronic systems, which triggered more systems to sell and so on, creating a domino effect. Volume was through the roof, but Mary Jo's system handled it all. The exchange team stayed on all night to up-size the system for the next trading day, in case things got worse.

Since exchanges make their revenue from executions, CHX had a sudden influx of cash due to the market volatility. While most exchanges were licking their wounds, apologizing to customers for errors and paying out on those errors, we were gaining market share and cashing bonus checks.

At that point, I fully understood Mary Jo's technical methods and motives. The extreme performance goals finally made total sense. You always need extra performance to turn that bad day into a gold mine.

Mary Jo's technology rule #1: KEEP IT SIMPLE. Simplicity leads to faster running software, code that's easier to enhance and maintain, and projects that finish on time.

'Fewer' machine instructions will generally run faster than 'more' instructions. If a business problem can be solved with code that compiles down to fewer machine instructions, it will be quicker. But how much speed do you need? In most development shops, code performance is secondary. It's a "nice-to-have" feature, but don't spend too much time on it. And definitely don't waste time counting clock cycles.

On Mary Jo's team, we would compile our code and dump the assembler to a separate file. Then we would read the assembler line by line, and make sure our application code was as efficient as possible, counting every clock cycle.

Engineers have a natural tendency to over-engineer things. It makes sense to them since they are intelligent people and want to show the world how smart they are by developing elaborate architectures. They also want to pad their resume with complex technical achievements. When presented with business problems, they will instinctively over-engineer a solution.

Mary Jo had zero tolerance for this practice. All solutions needed to be very simple. She would even preface the file names of her code with "qdp\_". This stood for "quick and dirty programming." This was a rule that you didn't violate. Her goal was to write code to run a business, not pad resumes with trendy buzz words.

## **Division of Labor**

In the book, *Wealth of Nations*, by Adam Smith, Smith describes the increase in productivity gained by a proper division of labor. He uses the example of a factory that makes straight pins. A straight pin has three parts; the point, shaft and the head. He starts out with one factory worker making all three parts to complete one pin. If this worker is able to complete 1000 pins/day and he wants to increase productivity to 3000 pins/day, he needs to increase his staff to three. At this point he makes a discovery. If he allows each worker to specialize in making one part of the pin, then these same three workers can suddenly produce 10,000 pins/day. By understanding where this division of labor should be made as well as how to build the right structure around these divisions, great gains can be made in productivity.

Talent also has a huge impact on productivity. If you have ever worked on a team with talented people, you know that a person with a talent that matches their job requirement is many times more productive than another person without that specific talent. When all else is equal (intelligence, education, experience, effort...), the person with talent will outperform the other person by several orders of magnitude. This is true in the arts, sports, technology, business... everywhere.

Now, let's take it to the next level. When combining Adam Smith's division of labor with a focus on raw talent, the increase in team performance is off the charts.

Mary Jo had this figured out. When she assembled her International Business Development team, she was able to hand-pick the members of her new team from the Chicago Stock Exchange staff. Since she was a hands-on leader, she knew the talent requirements for each role, since she was already doing this work herself. This included designing the systems, business, sales and technical documentation and writing the code. Once assembled, this team became an unstoppable force.

### **No Glass Ceilings**

If talented, hard-working and marketable employees feel their heads bumping against a glass ceiling, they will begin looking for opportunities elsewhere. Once people are positioned based on their talents, they must have growth opportunities within their talent zone.

In a traditional corporate structure, talent requirements can completely change as you move up the org chart. The classic example is an engineer or software developer becoming a project manager. This is the next step up the ladder, so when an engineer wants to move up, and the best ones do, project management will be their next job. Since the talent requirements are completely different here, this usually doesn't end well on many levels.

First, you take a very valuable engineer and risk turning them into a below-average project manager. Second, you send a destructive message to the rest of the engineering team. The message is that your job is not that important. And third, this sets up animosity between the technicians and project management.

Keeping people in their talent zones as they move up the org chart takes away the glass ceiling and the turnover problems that go with it. Mary Jo created senior positions for all key talent zones - opening up a growth path for everyone.

### **Business and Technology are One**

In her role as a senior executive, Mary Jo's business knowledge was on par with any business expert or trader. She could also put her fingers on the keyboard and code what they needed. She expected this from her team. Don't just know your job, but completely understand the business behind your job and understand the customers that pay our bills.

Often in a traditional shop, there is a disconnect between the business people and technicians. The business people don't care to learn the technology since those jobs are below them on the org chart, and the engineers are only interested in learning the technical buzz words that recruiters are looking for.

On Mary Jo's team, there was no disconnect between business and tech. We did everything.

### **Leadership Style**

From Dale Carnegie's book, *How to Win Friends and Influence People*, there were three guidelines that made up the core of Mary Jo's leadership style.

Number 1: "Give everyone a reputation to live up to." Mary Jo always spoke very highly of her team members. Since she positioned talented people in a zone where their talents were extremely effective, all she needed to do was to point out their productivity. It wasn't flattery, although, occasionally, she would exaggerate to give us something to reach for.

Number 2: "Make others feel important." Mary Jo was a visionary who saw the future of automated trading before almost anyone else. She was out to achieve big goals and reshape the securities industry. She treated everyone equally, regardless of job title, and we all had a role in her vision.

Number 3: "Arouse an eager want." Mary Jo was on a mission and her passion was contagious. She was the hardest working person on the team. Everyone reported up to Mary Jo and since most people aspire to become a top leader, we all wanted to follow her example and work just as hard.

On Mary Jo's team, there were no bosses, only leaders who led by example. People will always follow actions more than words. Her actions spoke loud and clear. On her team we all rolled up our sleeves, grabbed a piece of the business and got to work. Since she was hands-on, she was able to set a fast pace. No one questioned whether it was possible to deliver product that quickly because she was doing it. Since we all wanted to be a part of that success story, we kept up.

And even though we were working very hard, she made it fun. Mary Jo treated her team like family. She paid close attention to our personal and family needs and kept the work environment friendly and fun.

### **Her Legacy Lives On**

I am one of many who owe their success in exchange automation to Mary Jo. Her finger prints are all over the systems that powered Archipelago's ArcaEx, ARCA Option, AMEX Options, NYSE's exchange products, the Universal Trading Platform (UTP) used for all of

NYSE Euronext systems and NYSE Technologies trading products in the U.S and across Europe. Mary Jo's influence has now moved into the crypto world in Blockchain.com's high speed cryptocurrency exchange.

Mary Jo Moccia will be long remembered in the financial technology world, and we thank her.