



Embracing Technology

Technology touches nearly all aspects of our lives with the obvious exception of voting methods used for electing U.S. Presidents. This election, however, provides an excellent example of why technology is important and what challenges its many uses face. Wouldn't it make sense to use a touch pad screen for selecting candidates? The software, or intelligence of the booth, could make sure you only select one candidate and the choice would be clearly highlighted. Better yet, why not just log on to myprecinct.com and vote electronically from a secure web site? This site could not only have the capability to check how many people you voted for, but also descriptions of the candidates with details of their views on key issues. This might be especially helpful for the parts of the ballot that some people skip due to lack of information. You could vote wherever you have access to a computer. Also, you could take as much time as you need as long as you hit the submit button by 11:59 pm on election Tuesday. At 12:00 am, the winner, with an exact vote count, would be known.

Maybe in the election of 2080 this will happen, but in 2000 there are too many potential problems with this system. Who would pay to create such a web-booth? Who would program it? Would the programmer be a Democrat or Republican? How could we be sure the system couldn't be hacked? Hackers recently broke into mighty Microsoft computers, so you know no system is completely safe. What happens if 20 million voters hit the submit button at 11:59 pm? How would the program tell that you are the person who hit the submit button and not some partisan computer lackey using your social security number to steal your vote? And if the software could tell it's you, how could you be sure this information won't be sold to some entertainment conglomerate in search of targeting its products to your political profile? The list could go on and on. The point is that technology can solve real world issues. Unfortunately, technology is often expensive and other peripheral issues usually arise. Most of the issues work themselves out over time so that in the end, a system that works faster and at a lower cost than the present system emerges.

At Sigma, technology issues are discussed frequently to help achieve two primary objectives: maximizing investment returns and maximizing our ability to serve our clients.

Investing in technology companies is challenging. New technology has a tendency to quickly obsolete old technology. This makes it difficult to forecast cash flows for any given product. Also, companies with new technology usually have very high growth rates for a period of time making their stock price very volatile and highly sensitive to changes in growth rate assumptions. For example, assume a stock is priced as if the company can grow at 50%/year for 10-15 years. Now assume some news comes out that makes it clear the growth rate will slow to a very respectable 40%/year instead. Without boring you with the math, that decline in the growth rate assumption will lower the intrinsic value (stock price) 70%!

Though a 70% decline sounds awful (and it is), here is a different twist to that story: Would you rather have an investment that grew 15% for ten years, or one that grew 50% for 9 years and then lost 70% of its value in the tenth year? A \$1,000 investment that grew at 15%/year for 10 years would be worth \$4,046. That same \$1,000 investment growing at 50%/year for 9 years, and then collapsing 70% in year 10 would be worth \$11,533! Clearly, the second scenario is better,

but you still might be very upset that you didn't sell in year nine when it was worth \$38,443. It isn't difficult to see why emotions can run high when investing in these types of securities. For the first nine years, an investor feels like a very smart person – much smarter than other participants in the stock market. In year ten, that same investor is ready to quit his job for a much safer work environment – like counting election ballots by hand. This example may seem far-fetched, but it describes what actually happened (though not as severe in year ten) to six technology stocks with which you may be familiar: Microsoft, Cisco, Oracle, AOL, Dell, and Intel. From 1990 to 1999, these stocks climbed on average 48.5% per year. This year, they have fallen on average 36%. A \$1,000 investment in 1990 would be worth \$22,476 today. Compare that to a \$1,000 investment in the S & P 500 index that grew on average 15% per year during that period and would be worth \$4,046 as in the example above

The key to finding an investment with a high growth potential is to find a company that has a technology that is so revolutionary that it will change the way the world works. Think about how the world worked before the personal computer or the Internet, and you will understand the type of revolutionary product that is needed to produce such extraordinary returns. In the early years of such a revolution, the market tends to resist these changes as in our electronic ballot example mentioned earlier. Also, there will exist competing technologies that will try to accomplish the same objective. Then, after the market for such products works through the inevitable peripheral issues, usually only one of the competing technologies will emerge as the “winner-take-all” leader. The others will still sell products, but usually only just enough to keep the Department of Justice off of the leader's back. So, all you have to do is find that one leader that produces a revolutionary technology, and 50% returns are achievable.

Needless to say, finding the right technology *and* the right company *at* the right time is not an easy task. Imagine you were one of the first people to correctly identify that a graphical user interface on a personal computer (now known as Windows) would change the world. You would have invested your money in Xerox, not Microsoft, as this now ubiquitous technology was first invented in a Xerox laboratory. Xerox saw no use for it and basically gave the technology to Apple. Microsoft later copied (in a legal way) the idea for use on an “IBM compatible” machine and benefited the most. Microsoft was able to do this because of what is now called a network effect. A network effect is a virtuous circle of value creation whereby a product becomes more valuable as more people use it. For example, when Microsoft created an operating system that worked on an affordable “open” system, more programmers could afford to create other software products that worked on top of it. As more software was created, the value of this open system grew so more people bought it. The more people bought it, the more incentive there was to improve the open system. These improvements made it possible for new software applications to run on top of it. Eventually, Microsoft and the other five companies mentioned before took over the entire circle. Our goal at Sigma is to find companies within these circles.

Technological advances also have a practical application at Sigma. We have programs to help us select stocks, monitor stocks, report client positions, calculate performance, highlight variances in a portfolio's asset and equity allocations from our models, create electronic trade tickets, submit trades electronically, and confirm the execution of those trades while automatically updating the portfolio's positions. To illustrate how dramatically technology improves our efficiency, consider this example. Twenty years ago analysts had to buy semi-log graph paper, look up hi-low-close prices on the stock in a newspaper every morning, and use a ruler to draw a line representing those values on the paper to monitor a stock. The program we have now has charts going back 30 years on thousands of stocks. Not only does it plot daily and monthly prices, but it also can graphically plot earnings per share and other financial statement information and can compare those values to other stocks or indices. We can screen this universe of thousands of stocks to find purchase candidates that satisfy certain “quality” criteria. Thus, in a relatively short amount of time, technology has greatly enabled us to better serve our clients.

Still, many of the same issues that arise when investing in technology surface again when trying to use the technology. Outdated technology might be only three years old. How often should our systems be updated so that we can balance the gain of improved performance versus the loss of time and effort to learn the new system? What value can our in-house programmers provide and what systems should be outsourced? We frequently revisit these questions, moving forward with current answers. This year, in addition to the stock program mentioned above, we improved our web site and have created many new technology tools to help our portfolio managers invest our clients' portfolios. One such tool compares a model portfolio created by the decisions of our investment committee with a client's portfolio and calculates where the portfolios differ. It then highlights stocks that are under-weighted in the portfolio and that the investment committee deems extremely undervalued or over-weighted and considered richly priced. The computer calculates the trades that will adjust the portfolio to reflect the investment committee's views. The portfolio manager can accept or reject all or parts of the buy/sell program generated by the computer taking into consideration other factors unique to each investor such as tax consequences. With one more click, the portfolio manager can produce a trade ticket.

Sigma will start the new millennium with a few more major technology changes. Early next year, as part of our periodic ongoing upgrades, we will add some improvements to our back-office system. This software application will enhance the backbone of our information system. Our in-house programmers then will be able to create programs on top of this semi-open system to enhance its capabilities. These changes will enable us to provide more informative reports to our clients. In addition, we will be able to diagnose potential problems and take corrective action on all of our client's portfolios in a very cost effective, efficient manner.

Technology will continue to rapidly change, and Sigma will strive to predict these changes and plan accordingly. There are three fundamental laws of technology:

1. Nearly everything is possible.
2. Nearly everything is difficult.
3. Nearly everything changes rapidly so don't waste too much time worrying about current technical hurdles.

By focusing on what is possible, Sigma will continue to use technology to better serve our clients and hopefully find superior technology stocks in the process.

Written by: Anthony J. DiGiovanni, CFA

The information provided in this report should not be considered a recommendation to purchase or sell any particular security. There is no assurance that any securities discussed will remain in an account's portfolio at the time you receive this report or that securities sold have not been repurchased. The securities discussed do not necessarily represent a client's entire portfolio and in the aggregate may represent only a small percentage of a client's holdings. It should not be assumed that any of the securities transactions or holdings discussed were or will be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the performance of the securities discussed.