

Evaluating Technical Feasibility: Lessons from the Madoff Scandal

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The Bernard Madoff Ponzi scheme scandal is another cautionary tale for investors in businesses and projects based on sophisticated mathematical concepts.

Introduction

Harry Markopolos' testimony to the House Committee on Financial Services on his failed attempts to expose the Bernard Madoff Ponzi scheme makes both fascinating and alarming reading¹. In particular, Markopolos describes how the investment strategy described in Madoff's marketing materials could not have worked and produced the reported financial results. It is important to understand that Madoff's claimed split-strike conversion strategy, although complicated by the standards of most ordinary investors, was relatively simple and did not involve the sophisticated mathematical methods involved in the financial models implicated in the current financial crisis (and some previous derivative securities fiascoes such as the Long-Term Capital Markets hedge fund collapse)². Financial professionals with appropriate derivatives experience or for that matter anyone with good mathematical knowledge should have been able to determine that the split-strike conversion strategy was unworkable. Nonetheless Madoff apparently raised \$50 billion from thousands of wealthy, presumably sophisticated investors.

Madoff apparently relied on his gold-plated resume as former head of the technology-laden NASDAQ and networking in the Jewish community in the US and among the old aristocracy in Europe. Presumably the investors failed to conduct a technical feasibility assessment of Madoff's investment strategy which would surely have revealed a problem or they were lead to believe the split-strike

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conversion strategy was a smokescreen for a secret proprietary strategy that did work and they failed to perform an adequate technical feasibility assessment of the actual strategy.

Venture capitalists and other sophisticated investors often claim to invest in people rather than ideas³. This certainly seems to be the case with Madoff and his investors. The Madoff scandal illustrates a problem that has recurred many times with investments in businesses and projects based on sophisticated mathematical methods (or other advanced technologies). There are many cases where the officers, directors, and staff of a company or project based on a sophisticated mathematical method *that did not work* had gold-plated resumes, impressive credentials, advanced degrees from top schools, and so forth. The Long-Term Capital Markets hedge fund turned out to be an example of this, although there is no evidence of intentional fraud or misconduct that I am aware of. The Lernout and Hauspie speech recognition company which collapsed in a major financial scandal is yet another. The history of both artificial intelligence and data compression is littered with companies and projects like Lernout and Hauspie that either claimed or implied breakthrough technologies that they did not have and raised substantial amounts of capital from ostensibly sophisticated investors.

In these cases, the ideas count. It is important to independently evaluate the technical feasibility of the underlying mathematical method or, more generally, advanced technology. Gold-plated resumes are not a reliable indicator as scandals like the Madoff Ponzi scheme or Lernout and Hauspie illustrate.

Why Gold-Plated Resumes Fail

Finding a trading strategy that consistently beats the averages as Madoff's strategy claimed is comparable to a major scientific discovery or technological invention. Such discoveries and inventions usually require many years (at least five) of detailed conceptual analysis of the problem and large amounts of trial and error. Luck almost certainly plays a significant role in many, perhaps all, cases.

Our culture attributes major inventions and discoveries to extreme intelligence (e.g. an IQ of 200) and often academic prowess. This has probably grown since World War II with the professionalization of research. Yet, most super-geniuses and academic prodigies do not make major scientific discoveries or inventions (Malcolm Gladwell's recent book *Outliers* contains two fascinating chapters on this)⁴.

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Although discoverers and inventors are usually above average in intelligence, they are often not extremely intelligent. The opportunity – time, money, and so forth – and the motivation to work on a problem for many years performing many experiments or trials as well as just plain luck plays a substantial role.

What this means is that it is *very* hard for people with gold-plated resumes to make actual major scientific discoveries or inventions. This is particularly true in the corporate environment with its short term focus. Corporations, for example, are currently obsessed with their quarterly earnings and other short term financial metrics⁵. The corporate research and development laboratory fad of the 1960's is long over and many labs have been eliminated, cut back, or focused on short term immediate "practical" projects⁶. It is a lot easier to claim to have made a breakthrough, whether sincerely or fraudulently, and raise money.

Conclusion

In general, evaluating the technical feasibility of a technology requires an independent evaluation of a working prototype of the technology, ideally by a technical expert familiar with the issues. There is no substitute. Gold-plated resumes, personal recommendations, impressive credentials, advanced degrees from top schools, and so forth are not enough. This rule does not apply to genuine research where the technology is not yet proven. However, the investor should be clear that they are funding research and that the technology is not yet proven. The business or project proposer should be up front and clear that genuine research with its substantial risks is required. It is clearly a red flag when a genuine research project is pitched as a proven technology. Where the technology is supposedly proven and working as in the Madoff Ponzi scheme, an independent evaluation of the technical feasibility is essential.

About the Author

John F. McGowan, Ph.D. is a software developer, research scientist, and consultant. He works primarily in the area of complex algorithms that embody advanced mathematical and logical concepts, including speech recognition and video compression technologies. He has many years of experience developing software in Visual Basic, C++, and many other programming languages and environments. He has a Ph.D. in Physics from the University of Illinois at Urbana- Champaign

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¹ Testimony of Harry Markopolos, CFA, CFE (Chartered Financial Analyst, Certified Fraud Examiner) before the U.S. House of Representatives Committee on Financial Services, Wednesday, February 4, 2009, 9:30 AM

² Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management*, Random House, New York, 2000

³ A. David Silver, *Venture Capital: The Complete Guide for Investors*, John Wiley and Sons, New York, 1983

⁴ Malcolm Gladwell, *Outliers: The Story of Success*, Little Brown and Company, 2008

⁵ Alex Berenson, *The Number*, Random House, New York, 2003

⁶ Robert Buderer, *Engines of Creation*, Simon and Schuster, New York, 2000