

: *Did decision automation cause the subprime mortgage crisis?*

by Daniel J. Power

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Actions of greedy and naive people caused the crisis. People built and implemented the computerized decision systems that made "bad" loans resulting in high loan default rates. Decision automation facilitated the fast, simplistic decisions and provided an aura of rationality for the "new" instant Web-based lending. Too many people believed the "hype" that automated lending decision making would be both beneficial and effective. Also, the apparent inevitability of competitors automating decisions blinded managers to the risks of adopting cleverly designed and poorly understood software systems. Let's review the facts about what happened.

A number of companies including Countrywide Home Loans and DeepGreen Financial used automated decision technology to make fast home loan lending decisions on their websites from approximately 2000-2007. Other lenders and financial institutions used computer software to create derivative financial products to package those home loans for resale. During this period, many people were pushing for faster lending decisions using web technologies and for managing risk by creating new sub prime financial products.

So what happened to Countrywide Home Loans and DeepGreen? Both companies' were ultimately financial failures. Bank of America acquired Countrywide during the 2008 financial crisis and has incurred many unexpected costs associated with Countrywide's risky lending decisions. In March 2004, DeepGreen was acquired by LightYear Capital.

How is and should a home loan lending decision be made? Ideally when reviewing a home loan application, an underwriter examines the applicant's credit history, the property's value, and the applicants debt-to-income ratio. These are often the main factors used to evaluate a mortgage applicant. This analysis results in a determination of a perceived level of risk for a loan. Perceived risk is supposedly used by an underwriter to make or reject the loan application and to set the interest rate. With decision automation in the web-based systems the underwriter was removed from the decision process to increase the speed of the lending decision and to process more loans successfully. Making loans faster rather than verifying facts and managing risk became the goal of the managers and automated decision systems.

In a Summer 2005 MIT Sloan Management Review article, Tom Davenport and Jeanne Harris lauded the "coming of age" of automated decision making. They "hyped" the technology, but did note that managers must closely monitor risk levels and must develop robust processes for managing exceptions in programmed decision making. A major decision they identified for when automated decision software was appropriate was bank credit and home loan lending decisions.

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Who built the decision automation and analytical systems? Technologists or "Quants" including mathematicians and computer programmers were hired by managers of "innovative" financial organizations to design new financial products and decision automation systems. There were some concerns publicly stated on the new developments. For example, Warren Buffett supposedly said "Beware of geeks bearing formulas." His caution and metaphor alluded to the Trojan Horse gambit or ruse from Greek legend. There was however no deception just blind optimism and greed. Quantitative analysts were the geeks with rules, formulas, multi-criteria models and computer algorithms to automate lending decisions. In a June 2013 Forbes article, "quants" were characterized as the rocket scientists of Wall Street. The article notes "As financial securities become increasingly complex, demand has grown steadily for people who not only understand the complex mathematical models that price these securities, but who are able to enhance them to generate profits and reduce risk." Don't just blame the quants.

In 2003, Countrywide Home Loans was a leading nationwide mortgage lender, processing more than 100,000 loans per month. Each loan applicant was evaluated for income, employment, credit history, assets and liabilities, the appraised value of the home, local market conditions, and government regulations and limitations -- and these variables were compared against Countrywide's own loan products and lending policies. Countrywide Home Loans deployed MindBox's rules-based decisioning software as a key component of their CLUES underwriting system "to ensure that customers received timely and consistently high quality loan decisions even in a climate of rapid interest rate changes and constant market fluctuations." This was a "sophisticated" system in 2003.

According to Angelo Mozilo, Chairman of Countrywide Home Loans, Countrywide used "its constantly evolving technology as a key, long-term, competitive advantage." He noted in a MindBox press release (2003) that "one example of this is our CLUES underwriting system, which uses MindBox's ARTEnterprise software. Supporting our loan agents, the CLUES system has reduced our on-line underwriting time to 15 seconds per loan."

Effy Oz in his 2009 Management Information Systems text book included a discussion of DeepGreen Financial. Oz noted "This bank is actually a computer program. To apply for a mortgage loan customer's go to the company's site (www.deepgreenfinancial.com) and fill out an application, which takes no longer than five minutes. A DSS retrieves the customer's credit report, engages a scoring formula, accesses an online valuation of the property to be mortgaged, examines fraud and flood insurance conditions, and produces a decision on the loan (such as full amount requested or a smaller amount, with what down payment, and at what interest rate). Eighty percent of applicants receive a response within two minutes. The system also selects a local notary public. All that is left for the applicant is to select a closing date. Although many loan applicants still find it strange to think of an online information system as an equity lender, between 2000 (its inception year) and 2007, DeepGreen extended more than 65,000 loans totaling \$5 billion. An increasing amount of decision making in the financial services and many other industries are made this way: automatically and in realtime. This saves many hours of labor and ensures speedy service for customers (p. 354)"

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According to Davenport and Harris, DeepGreen originated loans in 46 states through its Web site and through partnerships. It also offered home equity lending services and home equity lending technology and fulfillment services. From 2000 to 2004, DeepGreen processed more than 325,000 loan applications and originated more than \$4.4 billion of home equity lines of credit. "DeepGreen created an Internet-based system that makes credit decisions within minutes by skimming off the customers with the best credit, enabling just eight employees to process some 400 applications a day. Instead of competing on the basis of interest rates, DeepGreen's drawing card is ease of application and speedy approval. The company provided nearly instantaneous, unconditional decisions without requiring traditional appraisals or upfront paperwork from borrowers. Customers can complete the application within five minutes, at which point the automated process begins: A credit report is pulled, the credit is scored, a property valuation is completed using online data, confirmations are made concerning fraud and flood insurance and a final decision is made on the loan. In about 80% of the cases, customers receive a final decision within two minutes. (In some cases, DeepGreen is only able to offer a conditional commitment because some of the information — usually the valuation — is not available online.) After approval, the system selects a notary public located near the customer's home and the customer chooses a closing date. All the loan documents are automatically generated and express-mailed to the notary."

What happened to DeepGreen Financial? A search using Google on 9/14/2018 for DeepGreen Financial yields 362,000 results. The first search result returned from Bloomberg states "As of February 15, 2007, DeepGreen Financial, Inc. went out of business." The result from a Better Business Bureau page that states "DeepGreen Financial is Believed to Be Out of Business!" The Company's former web site <http://www.deepgreenfinancial.com> is a URL owned by Network Solutions that is "not attached to an active Web site". A search for LightYear Capital (<http://www.lycap.com/>) suggests DeepGreen is no longer in business. On January 31, 2007 Housing Wire (<http://www.housingwire.com/>) reported that Cleveland-based DeepGreen Financial Inc., an online home equity lender, had stopped operating. In 2004, DeepGreen received the Inman Innovator Award in the Mortgage Technology category, recognizing the company for its technology platform. MortgageStats (<http://mortgagestats.com/>) reported on January 31, 2007, **DeepGreen Defunct** "Second-lien originator DeepGreen Financial, Cleveland, has gone out of business, according to officials close to the situation. Owned by Lightyear Capital, a New York-based investment fund, DeepGreen's telephones no longer answer, and its website has been shut down. Lightyear Capital -- headed by former PaineWebber chief Don Marron -- declined to comment. In late 2003, Third Federal Savings and Loan of Cleveland sold the online lender to Lightyear for an undisclosed sum. DeepGreen's president was mortgage industry veteran Sy Naqvi, who once headed PNC Mortgage. Mr. Naqvi could not be reached for comment. Since its inception in 2000, DeepGreen funded \$5 billion in loans."

We have **NOT** seen the "coming of age" promised for automated decision making. Rather we have seen the dark side of decision automation. Davenport and Harris argued in 2005 that "The widespread availability of data in many industries is hastening the move to automated

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decision-making systems. The more data that exist, the greater the potential there is for automation. New decision-making applications will continue to proliferate and will have substantial implications for organizations and the people who work in them." Big data and analytics are perhaps a more sophisticated approach to exploiting what we know about decision support technologies, perhaps not.

Deceitful people played a part as well in the mortgage crisis. It was easy for people seeking loans to lie and stretch the truth and the lending decision systems did little or nothing to verify the facts. Investopedia.com explains there is "a category of mortgages also known as low-documentation or no-documentation mortgages that have been abused to the point where the loans are sometimes referred to as liar loans. On certain low-documentation loan programs, such as stated income/stated asset (SISA) loans, income and assets are simply stated on the loan application. On other loan programs, such as no income/no asset (NINA) loans, no income and assets are given on the loan application form. These loan programs open the door for unethical behavior by unscrupulous borrowers and lenders (cf., http://www.investopedia.com/terms/l/liar_loan.asp)."

In 2018, the consensus seems to be "banks provided risky subprime mortgages to questionable borrowers, packaged them into securities and sold them to investors. When housing prices started tumbling, homeowners could no longer refinance their loans to avoid higher payments and millions defaulted. That left Lehman and other large investment banks with billions of dollars in mortgage-backed securities whose values were plummeting." (Davidson, 2018)

What can we conclude now from the "go-go" automated lending of the 2000s? It is important that automated decision making systems be **both** efficient and effective. Don't believe the hype rather use decision automation when appropriate. Evaluate each opportunity to move to automated decision-making systems carefully and consider all the risks. Then and only then, if research and analysis shows decision automation is appropriate, design "excellent" systems with appropriate decision logic. Always remember that faster decision making is not always better decision making. A bad decision made quickly remains a bad decision. Keeping people in the decision loop does have benefits in many decision situations, especially high risk situations.

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Press Release Lightyear Capital

Lightyear Capital Completes DeepGreen Bank Home Equity Lending Acquisition

NEW YORK, Feb. 10, 2004 /PRNewswire/ -- Lightyear Capital, a private equity investment firm that manages \$2 billion in assets, said today that it has completed its previously announced acquisition of DeepGreen Bank's ("DeepGreen") home equity lending platform and operations from Cleveland-based Third Federal Savings and Loan Association, MHC. The U.S. Office of Thrift Supervision (OTS) has approved the transaction.

Under terms of the agreement, Lightyear has acquired the lending business, technology, infrastructure and management team that run DeepGreen's home equity loan origination and servicing business. DeepGreen's lending platform, which will remain in Cleveland, has been renamed DeepGreen Financial. It will continue to offer its unique, totally online home equity programs nationwide. As part of the transaction, DeepGreen's deposits moved to Third Federal, the company said. Other financial terms of the transaction were not announced.

DeepGreen is the leading totally online home equity loan originator and servicer in the United States. Over the past three and a half years, the company has originated more than \$3.5 billion in home equity lines of credit and loans to approximately 50,000 customers nationwide. DeepGreen's state-of-the-art home equity lending platform combines a simple-to-use application engine and a completely automated underwriting and origination system, enabling nearly instantaneous, unconditional credit approval. DeepGreen reaches customers online, through strategic partners, like LendingTree and Ellie Mae, and through more than 2,500 mortgage brokers in its GreenSource channel. In 2004, the company will also offer outsourced home equity programs and servicing to financial services companies and community banks.

"DeepGreen operates in a large, addressable market with excellent growth potential. The current interest rate environment, which has dampened the refinance boom, should create significant demand within the home equity sector. The company is uniquely positioned to take advantage of this opportunity, especially through its new high-volume mortgage broker channel," said Donald B. Marron, Lightyear Capital's chairman and chief executive. "Our capital, counsel and relationships will also help DeepGreen as it launches its

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new financial services outsourcing business."

"Lightyear's broad experience in the financial services industry and their commitment to grow this business will help us realize DeepGreen's enormous potential," said Jerome Selitto, DeepGreen's chief executive officer. "We thank our customers for their confidence, our associates for their hard work and commitment and Third Federal for their past and ongoing support."

About Lightyear Capital

Lightyear Capital (www.lycap.com) is a private equity investment firm based in New York City that manages \$2 billion in assets, including The Lightyear Fund, a \$750-million private equity fund. The Lightyear Fund invests in leveraged buyout, recapitalizations and growth capital opportunities in financial services and other selected industries in North America and Europe. Lightyear's approach to investing centers on partnering with skilled management teams who lead quality companies with significant potential for growth, either organically or through acquisitions.

About DeepGreen

Established in 2000, DeepGreen (<http://www.deepgreenfinancial.com>) is a leading online home equity lender targeting high-credit quality borrowers. The company's proprietary technology provides almost instant, unconditional decisions without traditional appraisals and requires no upfront paperwork from the borrower. DeepGreen originates loans in 47 states through direct-to-consumer channels, affinity relationships and mortgage brokers. Since its inception, DeepGreen has originated more than \$3.5 billion in home equity products -- entirely online.

SOURCE Lightyear Capital

<http://www.prnewswire.com/news-releases/lightyear-capital-completes-deepgreen-bank-home-equity-lending-acquisition-58955667.html>

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