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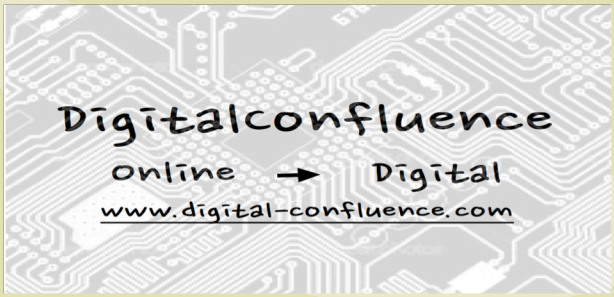

Big Data Led Innovation in the Credit Marketplace

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August 2014

Introduction

The way small business lenders interact and get loans in the United States is changing. Some of it is driven by the way the market has changed since 2008 when traditional lenders like Banks and Credit Union moved upstream to bigger, safer businesses and potentially higher risk adjusted profits; basically leaving many Main Street business owners out in the cold. The way we leverage technology like Google, Social media, and Big data has changed the way consumers and small businesses act, while many banks are still fundamentally doing business the same way they were 60 years ago.

Innovation in Lending is taking place both at the Small Business level and also in the consumer level with peer-to-peer basis. It is a small group of non-bank lenders that are innovating and it is growing slowly that it is in the Bank's radar.

The two technology paradigms that are driving innovation in lending are 1) Big Data or the ability to learn, infer and analyze multiple forms of data and predict outcomes with greater accuracy then before and 2) Digital technologies that extend the reach and the make the process of getting a loan the same as a buying a book on Amazon.

We believe that this trend will continue and the traditional lending and originations methods at Banks will undergo a sea change in the coming years.

In this paper, we highlight our collective experience from working in the Banking and non-Bank lending ecosystem in the United States leveraging our experience in Data Science and Technology. We discuss the multiplying impact of such lending practices on the Economy in emerging and fast developing economies due to increased access of credit to the innovation ecosystem and venture capital funded startups.

Traditional Small Business Lending Approaches

The total volume of small business lending (loans of $1 million or less) in the US in 2012 was about $587 billion according to Small Business Administration (sba.gov). Assuming a credit spread of about 5 to 10% the aggregate gross margin potential for Small Business loans is anywhere between $30 to $60 Billion. Alternative lending or Big Data based lending is relatively a small albeit rapidly growing segment. Table 1 below provides a summary of the key players in this space:

	Loans Originated (in US $m)	**Capital Raised (in US$m)**	**Customer Segments**
OnDeck	1000	409	Small Business
Kabbage	500	465	Small Business

Paypal (more known for its eCommerce and Payment offerings) and Lending Club (more known for its consumer peer-to-peer lending) are also offering this type of credit for their small business customers. There are several other smaller companies operating in a niche like Upstart (focusing on younger college graduates without credit history), Better finance (specializing in SBA loans), Lenddo (providing social media based credit decisioning in emerging markets).

Traditional small business lending by Bank involves standardized credit score evaluation (FICO), business plan and other information review by the underwriter. The process entails submission by the borrower a variety of information from tax records, assets and liabilities to business plan. The underwriter has to review the information and often time seek clarification. The lending process favors past record and does not factor in future prospects (either negative or positive). FICO scores depict the borrowers record on repayment of loans and does not indicate their earning potential or repayment potential based on that earning potential.

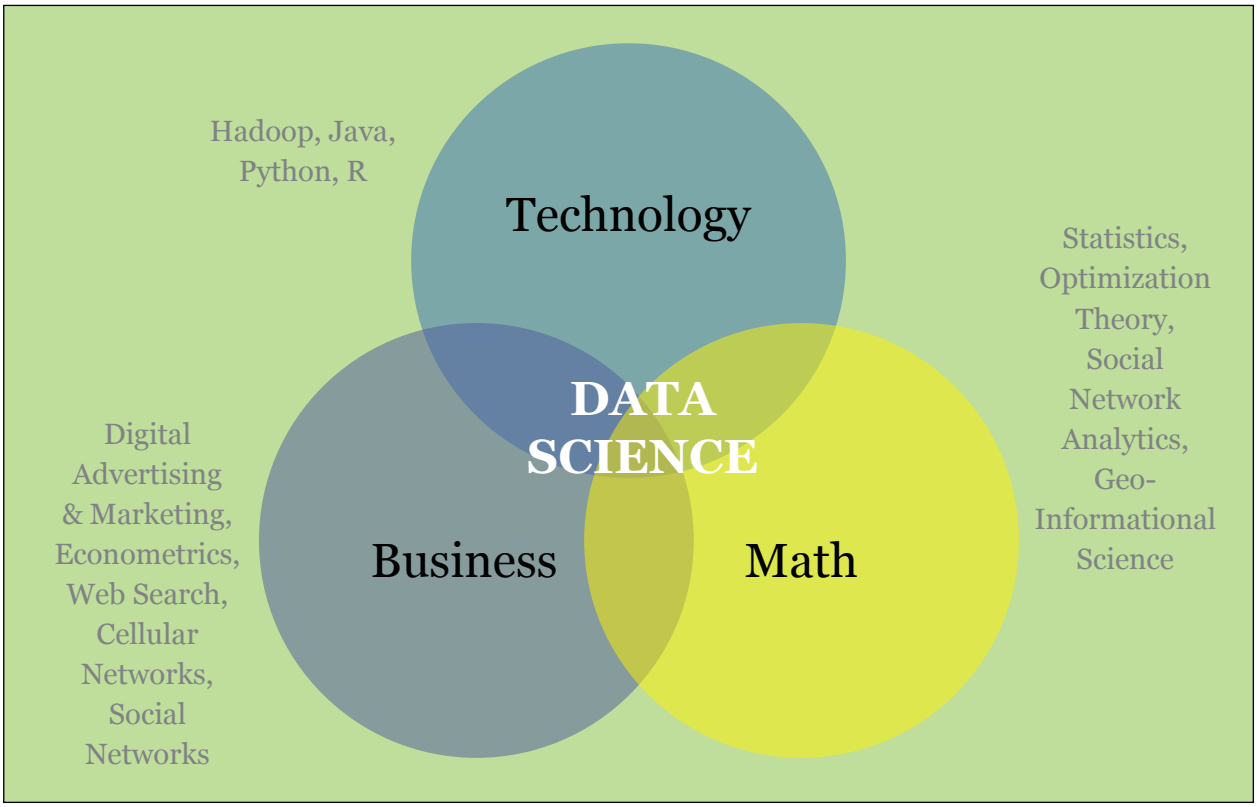
These traditional lending approaches used by Banks to lend to small business not only leaves money on the table for banks in terms of not able to lend to potential good borrowers but also reduces the credit availability to businesses that is critical for the growth of the economy esp. in innovation segments. The latter point becomes very critical for developing economies where there is increased focus on developing a Silicon Valley type entrepreneurship ecosystem.

In summary, the challenges of the traditional lending methods are: First, they leave out certain segments such as new businesses, innovation businesses or venture capital funded companies, young entrepreneurs. Second, the process is onerous and time consuming. Typical borrowers are focused on their business and prefer the “Google” or “Facebook” or “Amazon” experience when it comes to borrowing money. Third, it is expensive and inherently not scalable for a bank without added cost. A Digital and Data based lending process can scale significantly better than the current traditional methods. Fourth, a broader evaluation and sophisticated models results in a more individualized assessment of credit risk rather than the current look-back view of credit scores.

It is our belief that this Digital and Data model of innovation in small business lending (and also to some extent in consumer lending) is here to stay and despite periodic turmoil in financial markets and the economy. Most developing economies in Asia, Latin America and Africa need to take a close look at these models and partner, develop or support development of these capabilities as it will be a fundamental catalyst to a vibrant innovation and entrepreneurial ecosystem.

The Big Data Sciences Leverage

Big Data Sciences is a combination of technology, business and mathematics that increasingly impacts every facet of daily life. The combination of traditional disciplines of data extraction, data intelligence, data analytics, data modeling, data warehousing, and reporting along with statistics and predictive analytics can be referred to as Data Sciences as illustrated in the diagram below.



A natural way of visualizing the various components of the Data Sciences hierarchy is shown below, taking it from data extraction at the bottom all the way to applications to specific verticals at the top., with the one specific to credit and loan markets as a focus in this context

- Targetted Fintech lending/credit Solutions
- Lending/Credit Service Modeling (action-based)
- Realtime (Scoring, AB Testing, DOE, Event logging)
- Visualization +UI (Dashboards, Admin Tools, Reporting, ad creation and targeting)
- Customer/Bank Analytics (Profiles, Machine Learning, Artificial Intelligence)
- Data Store (HSFS/RDBMS/Real-time Stores)
- Customer/Bank Large Scale Data Capture (social networks, public information, social graphs)

Based on the framework, which we have developed and put into practice on real case studies, specific credit transformational models will be highlighted.

Transformation of Credit Process with Data and Digital

Here we look at some of the methods that are being used for building data based intelligence for credit decisioning.

Using Social Media information. As the old adage goes, a man is known by the company he keep. Certainly true as research has found when it comes to defaulting on loans. People or businesses who are connected on social media to good borrowers are likely to be good borrowers themselves. Small businesses that have better reviews on Yelp (a social media tool for reviews) or have a positive sentiment on their facebook page are likely to do well with their customers. Big Data technologies can be used to build social graphs or do semantic analysis of comments on Social media of borrowers in real time to discern information. The prospective borrower authorizes and provides information about their Social Media usage that is analyzed by the lender. This is a good indicator but cannot be used alone to make a credit decision. The context and the interaction of data is key

Business Performance Data and Income Potential

Business performance data and trends are a good indicator of a business' ability to repay a loan. Business performance data provides information on the business' potential of future earnings rather than the traditional methods that focus on repayment of previous loans. While history is a good indicator of the creditworthiness of a business or an individual, not having history does not necessarily make them bad-borrowers.

Business performance data includes a number of customers and growth of customer base, revenue trends, depth of transaction volume, cash flow and cash flow trends, shipping data (such as UPS/ Fedex data) expenses. Lenders are able to, with borrowers permission, retrieve and analyze Bank Transaction information about the borrower and make inferences about the credit-worthiness. Lenders are able to customize credit products on repayment schedule and price based on this information.

Big Data can be used to predict future income of a small business' or individuals to assess loan repayment potential The future income is predicted by assessing multiple variables and sophisticated decision science models need to be developed for predicting income potential in disruptive or innovation scenarios.

Customer Acquisition and Periodic Review

Financial Institutions and other businesses typically use look-alike analysis and customer lifetime value of Customers for micro-segmentation and targeted marketing. Big Data can be used to determine which Customers are ideal candidates for loans by analyzing various business performance and external public data such as change in management or timing of venture funding and competitors information. Periodic review of the small business credit information provides a more dynamic view of the Customer's needs and risks associated for optimal management and Customer experience.

This type of credit decisioning can be used for for all kinds of businesses – online/ecommerce type, offline like a restaurant or disruptive innovation companies like a venture-funded startup. A combination of machine-driven decisioning with human support in critical for successfully addressing certain black-swan type cases. Algorithms can be developed for detecting or predicting black-swan events that would require human intervention and review. For examples, there are about 28 million small businesses in the US and at anytime a few million are in need of credit.

Take Aways and Proposal

A review of the developments in the credit marketplace since the financial crisis of 2008 reveals significant changes in how small business (and some consumer) loans are originated and decisioned. Furthermore, the growth (Compounded Annual Growth Rate (CAGR) of these alternative credit models are very high growing at 100+%. There is strong evidence that such credit innovation has strong correlation with business activity in the region that such credit is available esp. when it comes to ecommerce and innovation companies.

There functions performed by the companies in this ecosystem vary and here we provide a short summary (non-exhaustive) of the companies currently operating in this space:

Business	Type of Offerings	Type of Credit
Ondeck	Full service Digital non-bank lender Recent partnership with BBVA Compass for using innovative underwriting process	Small business
Kabbage	Full service Digital non-bank lender	Small Business
Better Finance	Full service Digital non-bank lender Partnerships with Banks for in-store	Small Business
ForwardLine	Full service non-bank lender	Small Business
LendingClub	Full service non-bank Recent Partnership with Union Bank of CA	Consumer and Small Business
Paypal	Short term loans for Customers only	Small Business

Digital Confluence LLC and Xona Partners have deep expertise in the field of Banking, Technology led business transformation in Banking as well as in Big Data Science models. We believe that this innovation in credit marketplace as described in this whitepaper is a critical capability for developing economies that want to create a healthy business climate for ecommerce and innovation. Established Financial institutions can partner or develop such capabilities to expand their small business credit portfolio and increase profitability. Digital Confluence – Trusted

Partners for Digital Transformation

Digital Confluence LLC are a group Banking and Finance Technology professionals with real world experience of building transformative solutions. Our technology advisory services combine strategic thinking with technology expertise in Digital, Big Data, Social and Cloud Technologies to deliver accelerated outcomes. We provide strategy development and technology advisory for Financial Services firms and help technology companies build and enhance their Financial Services vertical with product strategy and go-to market support. We operate out of San Francisco Bay area and the Silicon Valley.

About JP Nicols

Recognized as a leading voice for leadership and innovation for the future of financial services, JP Nicols, CFP® is the founder and CEO of Clientific. He brings to Clientific more than 20 years of experience in banking and wealth management as an advisor, a manager and a senior leader, combined with a fresh perspective on combining high-tech with high-touch. His passion is helping great people build great businesses. He is also the co-founder of the Bank Innovators Council, and serves on the advisory boards of NextBankUSA and Advizr. He previously served on the advisory board of Balance Financial and in various leadership and innovation roles at top financial institutions, including as the first Chief Private Banking Officer for a top five U.S. bank.

Xona Partners (Xona) is a boutique advisory services firm specialized in technology, media and telecommunications. Xona was founded in 2012 by a team of seasoned technologists and startup founders, managing directors in global ventures, and investment advisors. Drawing on its founders' cross functional expertise, Xona offers a unique multi-disciplinary integrative technology and investment advisory service to private equity and venture funds, technology corporations, as well as regulators and public sector organizations. We help our clients in pre-investment due diligence, post investment life-cycle management, and strategic technology management to develop new sources of revenue. The firm operates out of four regional hubs which include San Francisco, Paris, Dubai, and Singapore.

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