Business Model Mapping: A Social Lending Case Study and Preliminary Work

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Abstract

Transformation in the financial industry as a result of the financial crises, changing customer behaviors, constant innovations based on information technology, the Internet, and financing services offered by non-banks is here to stay. “Web 2.0” or “Social Web” further redefined the ways users enlist for services. It is now easy to be influenced to make choices of services based on recommendations of friends and popularity amongst peers. Information technology is leveling the playing field for new participants, who are capable of causing disruptive changes, in every industry. These inter-playing reasons have led to the critical reception of nontraditional peer-to-peer financing models to counter the effects of the rigid lending practices of conventional banking. Lenders can now pool their resources together online and make them available as loans at a premium to borrowers who need it. This increases the efficiency of the financing process by reducing the rigor experienced from traditional banking. Little is known about peer-to-peer (P2P) lending. This paper maps the value chain activity of the peer lending space and identifies future work with respective implementation using agents.

Keywords
Peer-to-peer lending, social lending, business model, agent based simulation.

1. Introduction

Information technology (IT) has transformed the way services are delivered to the customer. The internet has produced new avenues for the creation of wealth. Forrester Research (http://www.forrester.com/) forecasts that US ecommerce driven sales will reach $370 billion by 2017, up from $262 billion in 2013, an amount that equivalent to a 10% compound annual growth rate (CAGR). Electronic markets have revolutionized ticket reservation, online shopping, online trading and many other industries. The proliferation of tablets and smartphones is a major contribution to this trend. Business owners are also investing in their online sales divisions. These disruptive techniques have replaced traditional distribution channels and reshaped the customer-supplier relationships [1]. Processes can now be automated to eliminate the middle man and minimize unnecessary overheard. The 21st century customer is more informed and demands more transparency.

Peer-to-peer (P2P) lending has arisen to meet the needs of customers for better returns on their money. P2P lending sites seek to replace the high overhead and complexity involved in traditional banking with faster and smarter ways of banking. The participants in loans made through P2P lending are the investor (or lender), the borrower and the P2P lending platform [2]. The lending platform serves as an intermediary between lenders and borrowers. These intermediating P2P platforms generate revenues via service fees, closing fee, amortization fees, late payments and so on [3]. Loans can be funded by multiple investors. “Web 2.0” or “Social Web” enables close interaction among consumers. The P2P industry is rapidly evolving and has seen a lot of changes since its inception. Regulatory environment for P2P lending is also evolving. Investors are able to decide if to fund a loan based on financial characteristics also called hard-factors and demographic characteristics and group intermediation also known as soft-factors provided on the platform [4].

Loans offered are unsecuritized thereby exposing the lender to a risk of default by the borrower. As a consequence, high risk borrowers pay higher interest rates than low risk borrowers. Risk is indicated by the loan grade computed by the platform using proprietary technology to assess creditworthiness and interest rates. Borrowers are attracted to lending sites because interest rates are lower than that of banks and credit cards.
In this paper we first present an overview of the peer-to-peer industry, briefly touching on its adoption. We then proceed to give the business model of our chosen case study while highlighting the profitability and costs involved in the model. We analyze the current business environment of the case study. Finally we present our preliminary efforts of simulation of the business model using Agent Based Simulation.

1.1 Peer-to-Peer Lending Industry
Proliferation of peer-to-peer lending sites occurred during the Web 2.0 era. Web 2.0 such as social networking sites, blogs, wikis, user reviews, et cetera, enables interaction and collaboration among users in social media using dynamic content creation. The internet is used to connect individuals willing to lend out money with those needing the loan. Expansion in the United States (U.S.) social lending industry began in the early 2000s when CircleLending was incorporated. CircleLending, which became Virgin Money in 2007, specialized in facilitating private loans and mortgages between friends and family.

Zopa ([http://www.zopa.com/](http://www.zopa.com/)) was launched in 2005 in the United Kingdom (U.K.) and its U.S. site (now defunct) two years later. Zopa connected interested borrowers with lenders by acting as a clearinghouse, screening borrowers and requiring lender diversification [5]. Risk diversification is done by requiring that loans be spread across several borrowers. Zopa operated a depository model. It had a partnership with credit unions which enabled acceptance of lender funds and in turn giving lenders federally insured deposits (CDs). The lender funds allowed the credit union to then issue low interest rate loans to borrowers.

Prosper.com was the first P2P platform launched in the U.S. in 2006. The following year Lending Club ([https://www.lendingclub.com/](https://www.lendingclub.com/)) launched its platform. Since the P2P lending was still at its inception, there was no standard operational model across the companies. Although players take slightly different approaches in their modes of operation, the underlying principle is largely similar. Prosper ([http://www.prosper.com/](http://www.prosper.com/)) used an auction-type model to link lenders to borrowers [5]. Borrowers post the amount they wish to borrow and the highest interest rates they are willing to pay while lenders filtered through profiles of borrowers and bid to fund the loans by indicating the lowest interest rate they are willing to receive on their investment. Lending Club’s approach was similar in some ways to both of Prosper and Zopa. Lenders had the option to select the loans they wanted to fund and this promote the concept of building a community. Figure 1 below gives a breakdown of P2P loan mobilization in millions of US dollars across P2P companies worldwide in the second half of 2013.

![Figure 1: Graphical representation of P2P lending funds mobilization (in millions U.S. dollars) from June 2013 to December 2013](http://www.wiseclerk.com/group-news/)
The innovative model of peer-to-peer lending is extending the application of information technology to banking. Prosper Inc. and Lending Club make available to the public all non-sensitive data collected on their websites. This creates a great potential for rich research subjects that is gradually attracting scholars in the fields of business, engineering and social sciences. This paper attempts to fill in conceptual gaps by seeking to identify the business model of the case company, Lending Club, and to describe preliminary agent-based modeling approach to optimizing the business operations.

2. Business Model
In order to be able to understand the business model of Lending Club, a brief overview is given of the process of borrowing and lending via the company platform.

2.1 Lending Club Operations
The flowchart in Figure 2 summarizes borrower and lender activities of Lending Club. The proliferation of social media such as Facebook, Linkedin, Twitter, MySpace, Pinterest, and so on has bolstered the adoption of peer-to-peer lending.

Figure 2: Flow Chart of Borrower and Lender Activities

Potential borrowers interested in a loan fill out an approval form to specify the amount requested and the purpose for the loan. Borrowers are evaluated based on certain pre-conditions they have to meet such as their credit history and capacity to repay. Lending Club requires a FICO score of 640 and at least 1 year of credit history. The borrower
should also have no ongoing delinquencies, concerns of bankruptcies, inquiries from collections, or unpaid taxes. The borrower’s capacity to pay is evaluated by a debt-to-income ratio of less than 25%. If the borrower met the pre-conditions, all other information was used to determine the best interest rate the borrower could get per Lending Club’s pricing model. Borrowers had to be able to accept the loan conditions, which depended on the current economic conditions. If approved the borrower would have a profile with the amount of money being requested and why they need the money. Lenders have access to the borrower’s profile and decide which of them they would like to fund. Pre-approved borrowers are usually approved for a 36 month fully amortizing loan. After a consensus of loan amount and interest rate, the borrower’s profiles are posted on the platform as pending approval phase. Lending Club then ensures proper underwriting to identify inconsistencies or potential frauds.

After successful income and identify verification, the lenders could setup a secure and seamless way, via an in trust for (ITF) account with Wells Fargo, to fund loans. With only a 1% service fee throughout the life of the loan, lenders had the flexibility to choose as many loans as they wish to fund or go with Lending Club’s proprietary search-engine generated portfolio, known as LendingMatch.

### 2.2 Lending Club Business Model

The objective of a company’s business model is to exploit a business opportunity by creating value for stakeholders [6]. Amit and Zott [7] developed a model that suggested that the value creation potential of e-businesses are interdependent on efficiency, complementarities, lock-in and novelty. Lending Club’s success can be traced to distinguishing elements of its business model. The business model is developed using lessons learned from research in microfinance and strategic management. According to Gary Hamel, a business concept is made up of the customer interface, core strategy, strategic resources and value network [8]. The structure of P2P lending takes into consideration how to link borrower and lending activities, how risk assessment is to be done, and the possibility of inclusion of a secondary market to monetize loans. P2P lending targets a virtual market in which direct costs of economic transactions are decreased by circumventing or dis-intermediating banks.

The customer interface element of the business model describes how the company reaches its customers. This is made up of the following sub-elements:

- **Fulfillment & Support** describes channels employed to reach customers. This is done via the Internet, word of mouth, social media, search engine marketing and public relations. Consumer transactions are performed through the website. Borrowers are able to monitor as their loans become funded until the entire amount is accounted for.

- **Information & Insight** describes knowledge collected and utilized from customers. Lender applications are collected to evaluate their worthiness. Each borrower is given a rate based on the grade or sub-grade and term life per their application. Lenders are then given access to approved borrower’s profiles.

- **Relationship Dynamics** describes the nature of interaction with customers. Interaction is done online or via phone calls. Lenders make decisions on who they want to fund based on the borrower’s profile. Customers are processed through the firm’s platform. Being the broker and servicer of the loans, Lending Club interfaces directly with the borrower and lender, but gives some transparency to the lender of the borrower’s situation.

- **Pricing Structure** details how and who Lending Club charges for its services. The pricing structure is both on flat- or percentage-based service along with amortization fees. A flat 1% fee is applied for the lender and between 0.75% to 2% fee for the borrower, depending on the size of the loan [9]. Interest rates are based on borrower’s credit history and pricing model. Borrowers are charged a small fee for processing the application for general information such as background check and credit check.

The core strategy element of the business model describes the essence of how Lending Club chooses to do business. It is made up of three sub-elements:

- **Lending Club’s business mission** is to make credit more affordable to consumers and businesses by replacing the high cost and complexity of bank lending with a faster, smarter way to borrow and invest [10].

- **Product or Market Scope** describes where the company competes. Lending Club started as a Facebook app in 2006. Lenders are able to invest in 30 states while borrowers can source for loans in 52 states of the US.
Basis for Differentiation describes how the company competes differently. Lending Club uses algorithms and automation to give fairer interests in an “eBay of loans” manner. Interest rates are set via a pricing model, instead of an auction as done by its main competitor Prosper Inc. To reduce rate of default, the platform is picky in screening applicants. Risk management is done using the 5cs of credit philosophy i.e. collateral, credit/character history, capacity (debt-to-income), capital and condition [9].

The strategic resources enlist specific resources related to the company. These are:

Core Competencies is what the firm knows how to do well. For example, Lending Club uses analytical processes to quickly verify the borrower risk and match them with lenders based on the borrower’s conditions.

The Strategic Assets sub-element of the strategic resources element describes what the firm owns. It is strategically located around Silicon Valley giving access to state of the art technology. The lendingclub.com website is user friendly while the LendingMatch proprietary loan matching search engine helps connect lenders to borrowers.

Core Processes describes what the employees of the organization do. Core processes are focused more on activities rather than assets. Lending Club’s organization Structure is managed by the CEO, COO, Director of Product Strategy and Vice President of Technology. Business activities undertaken include extensive approval, due diligence, underwriting processes of promissory note loans.

The value network element describes the connections that benefit all stakeholders. This is made up of: Suppliers including investors and lenders, Wells Fargo and the Fair Isaac Company to provide FICO scores. Partners include WebBank and Automated Clearing House (ACH) while WebBank is also a Coalition.

3. Understanding the Environment (MOC)
The Matrix of Change was developed jointly by the Center for Coordination Science and the Center for eBusiness at the Massachusetts Institute of Technology [11]. The matrix of change is a graphical representation of how a
company would be able to transition from an existing state to a desired future state also known as target practices. In this study, we utilized the MOC to study the current state of Lending Club and identified the gaps present in its business model.

The major practices and sub practices for Lending Club of existing states are shown in Figure 4 below, where the “+” symbol represents reinforcing interactions while “-” symbol represents a weak interaction between processes. The matrix of change also prioritizes each sub practice with an importance rating and this is the number value next to each sub practice. The importance rating could be a +2, +1, 0, -1, or -2. Higher number value importance ratings typically mean that the practice is a higher the priority. The negative ratings typically indicate that there may be an aspect of the current of future state that needs to be changed or revised.

![Figure 4: Lending Club Existing State]({})

### 3.1 Existing Practices: Marketing

Currently Lending Club utilizes 2 types of financial incentives to attract new lenders. They offer a referral bonus to those that successfully get friends and family to sign up for a lending club account. This referral bonus could be from $100 to $300. Lending Club sometimes run promotion to attract new members that are able to invest a certain starting amount. Lending Club targets consumers with good credit to minimize the default rate. They advertise and broadcast the company's purpose through both traditional and social media outlets. While its traditional media communications are able to reach a large audience, Lending Club is also aware of the importance of social media communications, and has strong and active presence on Facebook and Twitter. Though they are still a young company they have a good platform with which they communicate with their customer base, that as they grow in
popularity, their information would also the target audience. The growth in awareness, brand and subsequent building of credibility is aimed at promoting company growth over time.

3.2 Existing Practices: Finance
The total value of loans that Lending Club has serviced since its inception is close to $3.4 billion [10]. The credit market for personal loans is approximately $2.4 trillion, so market saturation is not yet a concern. The lender is able to invest in a borrower’s loan via notes that are anywhere between 36 to 60 months. Lenders interested in cashing in or reselling their notes do so using FolioFn secondary market within the company’s online platform. Lending Club loans are not available nationwide. Some or all services are available to investors and borrowers. Current earnings come from lender and borrower fees. Lending Club charges the lender a 1% service fee and they charge the borrower a fee from .75% to 2% to acquire a loan from them. Lower operating costs mean that the company is able to charge their customers small fees. They are able to maintain an operating to expense ratio of less than 2%, whereas traditional banks usually have an operating to expense ratio of around 5% to 7% [12].

3.3 Existing Practices: Operations
Lending Club’s approach to loans and investment on the online platform is an example of business model innovation. The advantage of having an online platform is that customers can get a loan or become investors from their home computers. Customers get quicker processing times than their local banks. Investor base is comprised of institutional investors, retail investors and individual investors. For individuals interested in investing but lack familiarity with how to go about it, Lending Club has developed a proprietary tool called LendingMatch that is able to match up risk tolerance with a set of open loans. Lending Club performs all the underwriting and processes the loans further simplifying the role of the borrower and the lender.

4. Preliminary Agent-Based Simulation and Projections
The activity map, as illustrated in Figure 5, shows the interactions among the suppliers, distributors and customers.

![Activity Map for Lending Club](image-url)
The lender has a dual role of being the supplier and the customer while the borrower is also the customer. WebBank serves as lender and assign loans at closing. The advantages of virtual companies such as Lending Club is low capital investment, flexibility and speed. Cost reductions are due to lower overhead achieved by avoiding of retail branches and utilizing automation technology for the transactions and approval processes. Lending Club’s overall strategy is that of low cost of loans and quick response to the demands for loan. Activities of the supply chain involve cost cutting, financing, marketing and operations. Information about the borrower’s income, credit grade, debt-to-income ratio, etc is available to the lender to enable him make educated financing decisions. Lending Club’s notes are lower risk hence potentially a stable alternative to higher performing stocks that are more volatile and tied to uncertain economic conditions. The risk of the 3-year note commitment is mitigated by having employing a secondary market to liquidate the notes.

Simulation helps to model complexity and uncertainty [13]. Pure statistical approach is no longer suited to all needs of research and practice but is often used as a complementary tool in decision making. A system modeled by a collection of interacting entities called agents that are capable of making decisions independently based on a set of rules. Agents can be used to model physical objects and also for highly abstract models. Agent Based Simulation is used in social science, engineering and business fields to study individuals and groups in dynamic and adaptive systems [14].

Maximizing and optimizing business performance is critical to profitability of a dynamic supply chain management business [15]. It is important for companies to be able to respond quickly to market opportunities. Webservices and intelligent agents can be used to represent and model the distributed and interoperable nature of the collaborative economic environment. Smeureanu et al. represented supply chains as networks composed of functions of an autonomous business [15]. Participants of the supply chain are modeled using agents.

Agent-based simulations are implemented by using an object-oriented framework, allowing for detailed modeling of the different elements. The simulation of this business model and the environment will combine several agents, define their relationships, and observe their resulting interactions over time. There are different types of agents: Resource/System-Agents, Process Agents, Market Agents, and Decision-Maker agents.

Decision-Maker Agents are agents that make decisions. These agents include the common representations of discrete-events such as queues and clocks, finite state machines, differential equations, and others. They also include constructs to make decisions such as expert systems, neural networks, and other mechanisms from operations research. We have to investigate the most important actors in the business model and their interactions (e.g., messages, reporting, hierarchies, and collaborations) with other agents.

Resource/System Agents utilize differential equations, continuous models, and discrete-event flows in order to simulate their behavior, aging, and availability/serviceability. They represent important systems. Process Agents are agents that utilize mainly discrete-event flows such as discrete-event simulation using discrete-event lists and/or state charts. They can have environments and are important to represent the different phases of the life cycle or the different steps of a complex process. Other agents can be an active part of the phases and collaborate with other agents using that specific phase/environment.

The simulation platform selected is AnyLogic (http://www.anylogic.com/). An “Agent” in AnyLogic is a unit of model design that can have behavior, memory (history), timing, and contacts. Agents can represent people, companies, projects, assets, vehicles, cities, animals, ships, products. AnyLogic has classes for developing agents as it has all necessary properties to define variables, events, state charts, System Dynamics stock and flow diagrams [13]. In this simulation, the performance metrics are interest rates and profit made from transaction costs. Design of an agent typically starts with identifying its main drivers and interface with the external world. The decision-maker agents can use ports as agent interface points. In case of large number of agents with dynamic connections (agents can communicate by calling methods of each other or through the environment).

5. Conclusion
This paper described the business model for a Peer-to-peer lending company. The business model detailed how the case company provides value to its customers. It also presented preliminary efforts to simulate the business model using agent-based modeling and simulation approach to evaluate how the adoption of P2P lending can impact
interest rates offered to customers. While P2P does not render traditional banking models obsolete, financial institutions can leverage their complementary assets to reinvent their business models by taking a cue from the blossoming success of the P2P financing model.

We are working in the development of an agent-based simulation environment in order to replicate this business model and to model the interactions between borrowers, lenders and decision-makers. This can provide excellent insight in the different issues of this environment and the future of this new business model.

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