The Application of Large Language Models in The Workflow of the Chinese Internet Credit System and Accountability Analysis

Cheng Sun

School of Management and Economic, The Chinese University of Hong Kong (Shenzhen), Shenzhen, 518000, China

121090495@link.cuhk.edu.cn

ABSTRACT

This study commences with the challenges and shortcomings faced by traditional Chinese internet credit systems in an information society as a point of departure, examining the rationale behind the necessity for these enterprises to leverage large language model technologies. By dissecting the operational processes and logic of Chinese internet credit companies, the research delineates the methods and advantages of applying large language models across the front-end, mid-end, and back-end of workflows. Furthermore, it investigates the impact of such technological adoption on corporate risk management and accountability issues.

KEYWORDS

Large Language Models; Internet credit; P2P lending; AI application

1. INTRODUCTION

In recent years, with the progression of online finance, internet credit has emerged as a manifestation of the loan, a financial product within the sphere of digital finance in China. It has naturally inherited the role of stimulating market dynamism and expanding the process of reproduction, thus occupying a significant position within the realm of online finance. In fact, as early as 2005, the first online lending website named Zopa was launched in the United Kingdom. This was followed by the proliferation and popularity of online credit platforms worldwide. From the perspective of demand, during that period in China, due to the imperfections in the financial system, the market faced a severe credit rationing phenomenon, with a robust demand for financing and loans. However, traditional commercial banks were unable to meet this demand efficiently and broadly. Against this backdrop, China's online credit platforms experienced explosive growth. Accompanying the refinement of China's national policies and the shift in citizens' perceptions towards loans, internet credit has increasingly become a common sight within the public domain (Zhang, 2022) [1]. However, traditional internet credit still exhibits numerous systemic and non-systemic shortcomings, such as inadequate data utilization, antiquated risk assessment models, and low efficiency in risk management (Du et al., 2021) [2]. Against this backdrop, it is particularly imperative to improve the efficiency and risk management of internet credit.

Regarding the integration of internet credit risk assessment methods and machine learning technology, previous researchers have conducted detailed studies. In terms of optimizing risk assessment methods, Fan et al. (2020) [3] proposed the establishment of an extreme gradient boosting tree for the risk assessment of borrowers to enhance the accuracy of evaluations. In addressing financial fraud

incidents, Xiong et al. (2022) [4] suggested the use of BP neural networks to monitor financial fraudulent activities, thereby further improving the reliability of loan behavior assessment methods. Additionally, the combination of big data technology to refine the credit system has been discussed, achieving a more comprehensive data application system and avoiding the one-sidedness of data utilization (Yang, 2022) [5].

However, the aforementioned studies predominantly elucidate from a technical perspective, lacking a detailed, multifaceted, and textual rationale or written analytical report in the assessment of borrowers and internet credit risks. This implies that when confronted with outcomes generated by various algorithms, additional analysis and report writing by relevant personnel are necessitated. The fitting results of various algorithms demand a high level of data processing and analytical skills from personnel, which, on one hand, compromises assessment efficiency and elongates the evaluation cycle; on the other hand, it raises the entry standards for related professions, hindering the democratization of internet credit enterprises. Concurrently, in today's information society, the modes and requirements of regulation also need to be updated in tandem with the reforms in enterprises' digital operations. How to hold businesses accountable for their actions under the guidance of large language models is an unavoidable aspect.

In response to these issues, this study aims to analyze the feasibility of applying large language models within the workflows of internet credit enterprises, elucidate the role and advantages of these models during the work process, and attempt to offer suggestions for the subsequent development of the relevant enterprises, addressing the identified gaps. Moreover, it discusses the considerations and principles regarding compliance and accountability in the wake of introducing new technologies.

2. RESEARCH QUESTIONS

This study will primarily revolve around the following questions: How do large language models (LLMs) impact the processes of Internet credit workflow? What are the advantages brought to internet credit workflow by LLMs? How to enhance accountability in the context of LLMs adoption?

3. METHODS

In the context of the Chinese market, this study collects application examples related to large language models from various internet credit platforms, and elaborates in detail the mechanisms and advantages of large language models in each stage of the complete workflow (including front-end, middle-end, and back-end). Additionally, this study gathers relevant regulations to propose suggestions for enterprises on how to address supervisory responsibilities following the adoption of new technologies.

4. RESULTS

4.1. Overview of the Role of Large Language Models in Online Lending Companies

Large language models, with their excellent understanding capabilities, multi-threaded information processing capacity, and efficient data application capabilities, can optimize the base layer, empower technology, and enhance the application layer (as shown in Figure 1). Here, the entire workflow of an online lending company is summarized into three parts: front-end, middle-end, and back-end.

4.4.1. Front-end

This primarily refers to the part that directly interacts with customers, providing services such as consultation, loan product introduction, and application process guidance, and collecting user information for subsequent evaluation.

4.4.2. Middle-end

The main work at the middle-end involves processing data collected from the front-end, conducting assessments, analysis, and handling. This includes credit assessments of customers, risk management for enterprises, and driving the approval process.

4.4.3. Back-end

The main tasks at the back-end focus on the post-disbursement, repayment, and credit management stages, providing management and support for the entire repayment process. It also involves collecting related information, optimizing financial products, and evaluating the credit level.
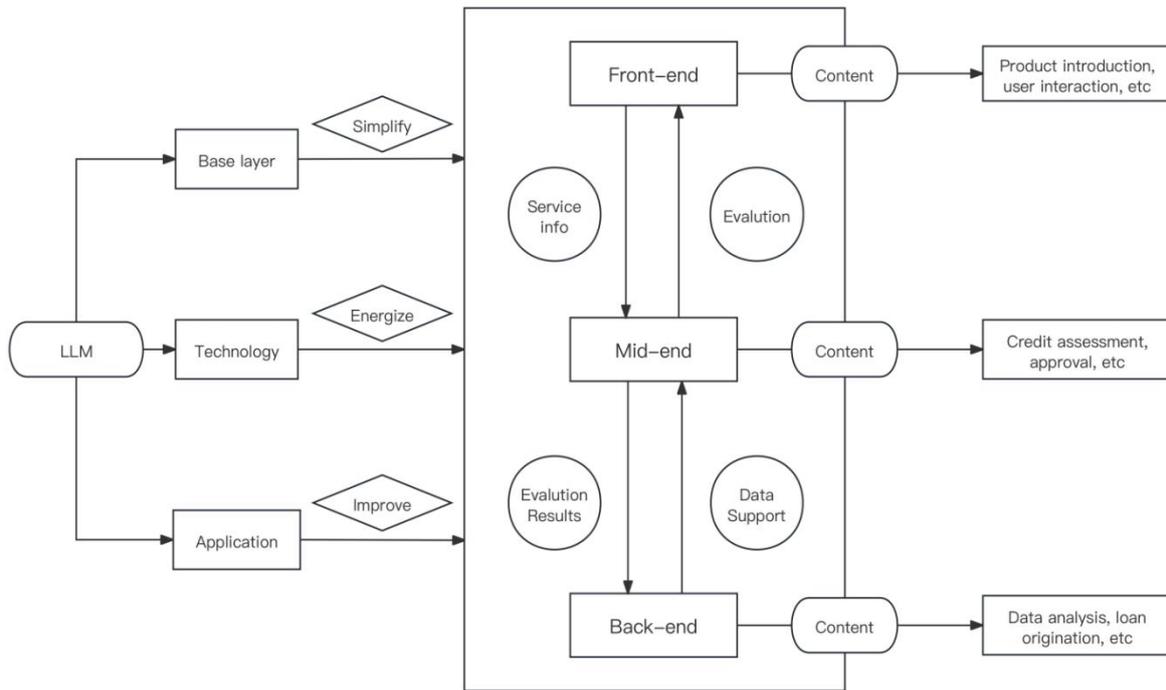

Figure 1. Large language model application diagram

4.2. Advantages of Applying Large Language Models at the Front-End - AI Customer Service

Compared to traditional human-operated customer service, Large Language Models (LLMs) offer a substantial enhancement by streamlining customer service operations and ensuring availability around the clock. By leveraging advanced natural language processing and understanding technologies, AI customer service systems provide intelligent, responsive support and consultation. These systems are adept at handling inquiries regarding a wide range of financial products, services, and policy-related questions efficiently. This capability significantly reduces the need for customers to endure lengthy waits for human operators or to be constrained by the limited working hours of traditional customer support centers, thus providing immediate assistance and detailed guidance whenever required.

In the context of serving a diverse clientele, the AI-powered customer service excels at offering customized marketing strategies and recommendations that are significantly more precise and personalized than those typically managed by human operators. In the midst of dynamic, real-time conversations with clients, these intelligent systems can quickly discern individual customer needs and directly associate these needs with appropriate financial loan products available from the company. This process allows for the provision of highly tailored advice and product recommendations specifically suited to each customer's unique circumstances. Unlike human operators who may require more time to manually compare different options, AI customer service

can swiftly conduct extensive comparisons across a broad spectrum of data, ensuring a superior match between customer demands and the products on offer. This ability extends to assembling customized product packages that address client needs more comprehensively right from the initial interaction.

Moreover, AI customer service systems enhance future transaction potential through the use of deep learning algorithms that actively learn from ongoing user interactions and feedback. This continual learning process enables the system to develop a deeper understanding of individual customer profiles, including their financial needs, preferences, and behavioral tendencies. Over time, this knowledge allows AI customer service to predict future customer needs with greater precision and provide even more personalized recommendations tailored to specific financial scenarios.

Another significant advantage of AI customer service is its capability to rapidly assess the legality and compliance of consultation services. For users, this means that while the AI system matches their needs with the available offerings, it also conducts parallel compliance checks. These checks help in identifying any potential legal risks or discrepancies at an early stage, thus facilitating prompt advice and corrective measures. On the enterprise side, AI customer service proves invaluable in analyzing patterns in applicant behaviors and the data they submit. By identifying deviations from standard behavior patterns and the factors influencing default risk, the system can flag these actions as potential risk indicators (Yoon et al, 2019) [6]. This capability not only improves the detection efficiency of possible fraudulent activities but also enhances the financial institution's ability to respond effectively to these risks. This dual approach not only secures the customer interaction but also fortifies the institution's regulatory compliance posture, safeguarding against financial and reputational damage.

4.3. Advantages of Applying Large Language Models in the Middle-End - Assessment Analyzers

In the study by Zhou, Zhang, and Luo (2018) [7], it is noted that, "In terms of credit risks, in order to maximize the capacity of batch processing with the internet and big data technology, many transactions on the P2P platform adopt an unsecured mode of credit loans, and the biggest risk comes from the borrower's credit risks." Therefore, conducting a more comprehensive credit assessment of users becomes particularly crucial. From the borrower's perspective, a reasonable and accurate credit score makes it easier for borrowers with healthy assets and credit to secure successful financing (Herzenstein, 2008) [8]. Addressing this issue, large language models can integrate traditional loan credit scoring factors (such as repayment history, debt levels, years of credit use, etc.) with non-traditional data (such as social media behaviors, online shopping habits, etc.), to create a more comprehensive and precise credit scoring model. This model can provide a more detailed analysis of customers' credit status, thereby enhancing the accuracy of credit assessments. Additionally, large language models can perform in-depth analysis of extensive historical loan data and past user behavior. By identifying and learning patterns and trends from historical data, these models can understand complex credit behaviors of users and apply these insights to the credit evaluation of new customers, helping platforms to better advance business progress and improve assessment accuracy (as shown in Figure 2).
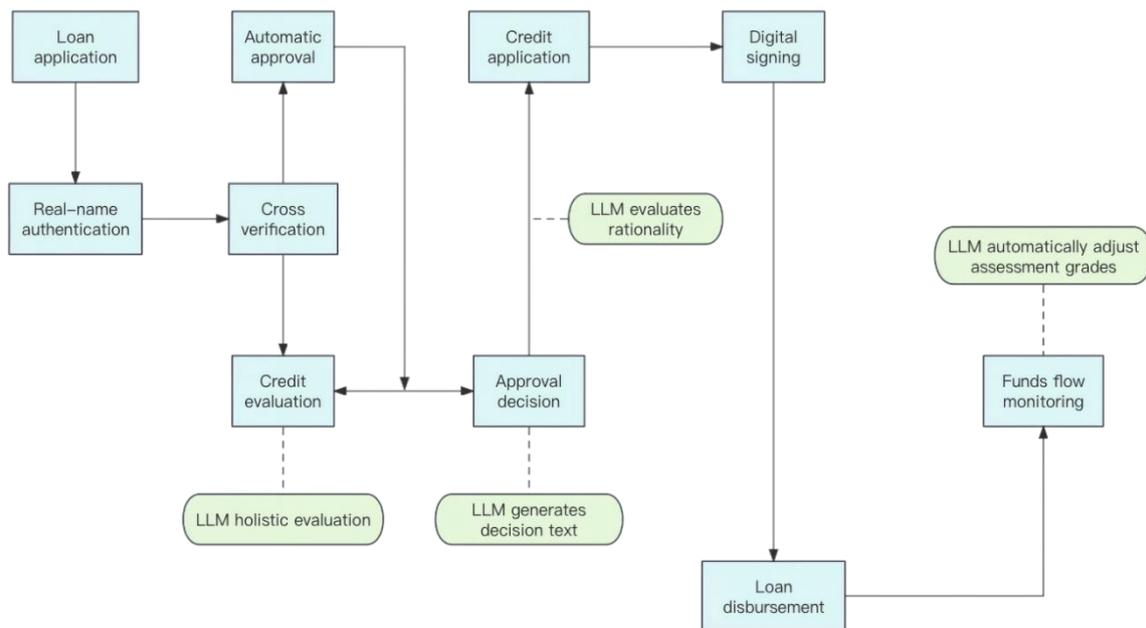
Figure 2. LLMs application in mid-end

Additionally, in another aspect of middle-end operations—information transmission—large language models possess inherent advantages. By utilizing sophisticated natural language processing (NLP) technologies, these models are adept at automatically identifying and extracting diverse user information collected at the front-end. This includes handling a wide range of data formats, such as text from online forms, spoken words from customer service calls, and even handwritten notes that might be digitized during the initial customer interaction phases. The ability of large language models to process these varied data types is particularly crucial in a digital finance environment where quick data interpretation and conversion to usable formats are key.

Once collected, this multifaceted data is then seamlessly transformed into structured textual information, which is far more suitable for processing and analysis. This conversion is critical for subsequent steps in the loan processing chain, as structured data is easier to analyze, store, and retrieve, which in turn supports more advanced data manipulation tasks such as sorting, searching, and implementing complex business rules.

Furthermore, regarding the transmission of this structured information, large language models enhance efficiency and quality by significantly reducing the errors and delays typically associated with manual data handling. Through automated processing, these models not only expedite the flow of information but also ensure its accuracy, thereby preventing common pitfalls such as data misentry or the overlook of critical information during manual reviews. This level of precision and speed in information transmission directly impacts the responsiveness of the loan approval process, enabling decisions to be made more quickly and based on more reliable data.

This enhanced speed and reliability in data processing and transmission foster a substantial improvement in the overall operational efficiency and service quality within the lending workflow. As a result, not only is the pace at which loans can be processed increased, but also the customer experience is significantly improved, as clients receive faster feedback and updates regarding their loan status. In essence, the integration of large language models into the information transmission phase effectively streamlines operations, reduces the scope for error, and provides a smoother, more dependable workflow that benefits both the lender and the borrower. This makes large language models an invaluable asset in the increasingly competitive and fast-paced field of online lending.

4.4. Advantages of Applying Large Language Models in the Back-End - Data Processing Assistance

In the back-end operations of online lending companies, there is often a need to process and store a large amount of data, while offering different types of loan combinations tailored to various users, which demands flexibility in back-end processing. In such environments, the Robotic Process Automation (RPA) technology commonly used for automating routine tasks often falls short of requirements. This gap necessitates significant human and time resources for data handling, which can frequently lead to inefficiencies and bottlenecks. The research by Desai et al. (2021) [9] sheds light on a solution by discussing the integration of artificial intelligence with RPA: "Together they have facilitated Intelligent Document Processing (IDP), which uses machine learning technology for classification, extracting data from documents into structured data. The use of this generated structured data helps in automating more processes." This underscores the pivotal role that large language models can play in enhancing classification efficiency and increasing the degree of automation in back-end data processing at online lending companies. By leveraging such advanced technologies, these models not only streamline data processing but also refine the overall structure and workflow of the back-end operations. This allows staff to divert their focus towards more critical activities, such as optimizing data systems and developing new functionalities, thereby boosting overall operational efficiency and creating a virtuous cycle that continuously improves data processing quality.

Moreover, regarding the production requirements of back-end loan products, large language models excel at conducting sophisticated cross-analyses between vast amounts of customer information and needs, and efficiently re-integrating existing feedback data. This capability enables them to autonomously extract detailed insights into the borrowing needs of customers at every financial level, which in turn facilitates the creation of more precisely targeted loan products. Within the framework of universal product offerings, large language models display remarkable agility in adjusting product and service content to accommodate the specific requirements of customers with unique needs. By providing such personalized services, these models ensure that each customer receives precisely what they need, which not only enhances customer satisfaction but also significantly improves service delivery. This tailored approach helps in meeting a wide array of customer demands, thereby fostering greater customer retention and loyalty. Over time, this adaptive and customer-centric strategy not only bolsters the company's reputation for customer service excellence but also drives its long-term growth and development in the competitive field of online lending.

This integration of large language models into the back-end processes thus serves multiple crucial functions: optimizing data processing, enhancing product customization, and ensuring a high degree of customer satisfaction—all of which are essential for maintaining a competitive edge in the rapidly evolving landscape of financial services. Through such innovations, online lending companies are better equipped to manage the complexities of modern financial transactions, resulting in more efficient operations and a stronger alignment with customer needs and market demands.

4.5. Enterprise Regulation Issues

Research by Brownsword and Somsen (2009) [10] has indicated that there is an inherent delay in the update of laws and regulations, inevitably lagging behind real-world developments. Due to the intelligence and autonomy of large language models, if problems arise in the operation of enterprise models, establishing the responsible entity becomes quite ambiguous, namely, whether artificial intelligence can be held accountable remains an urgent issue. Thus, when applying large language models in online lending enterprises, it is particularly important how the enterprise itself avoids regulatory issues and how relevant departments regulate and supervise the enterprise.

Internally, the focus should be on establishing a robust compliance system. Enterprises should actively communicate with governmental bodies, strictly adhere to existing laws and regulations;

develop legalized digital transformation processes and subsequent workflow procedures, and enhance training and supervision of relevant personnel to ensure the implementation of the system. Simultaneously, enterprises should establish transaction data channels with government departments that do not involve personal privacy, facilitating supervision. From the user perspective, with the introduction of new technology, enterprises should focus on enhancing user trust and acceptance. Enterprises can improve user trust by making workflows transparent, allowing users to understand the new workflows under the application of large language models and introducing related advantages, and by developing related mobile applications to share loan process progress and display information security management standards.

From the perspective of supervision, in facing new technological applications, the formulation of new regulations needs to address both enterprise development and responsibility implementation.

In the "Notice on Strengthening the Management of Commercial Banks' Internet Loan Services and Improving the Quality and Efficiency of Financial Services" officially enacted by the China Banking and Insurance Regulatory Commission on July 12, 2022, it is explicitly stated: Regarding commercial banks in internet lending... they should strictly fulfill their principal responsibilities in loan investigation, risk assessment, credit management, and monitoring of loan funds. They must also rigorously implement the requirements set by financial regulatory authorities concerning credit reporting, payment services, and anti-money laundering, to prevent the "hollowing out" of loan management. Regarding the determination of the responsible party, as profit and platform providers, online lending companies need to ensure the accuracy and compliance of artificial intelligence algorithms, and naturally, they should take responsibility when accountability is pursued and accept regulation and correction. Furthermore, according to accountability principles, artificial intelligence developers or technology companies should also ensure the accuracy and legality of their AI products and need ongoing supervision and maintenance.

From the perspective of developmental needs, regulation should not be excessively stringent. Due to the inherently restrictive nature of regulation, incorrect regulatory approaches can constrain the growth of the online credit industry and hinder its capacity for innovation (Verstein, 2011) [11]. Therefore, relevant authorities should establish or revise laws, regulations, and market rules in a manner that encourages innovation and supports the management of online credit enterprises under new development structures. This approach should also address risks arising from the adoption of new technologies and the introduction of new processes (Lin et al., 2015) [12]. Such a balanced regulatory framework would ensure both the facilitation of innovation and the fulfillment of fundamental risk control capabilities.

5. CONCLUSION

This study has thoroughly examined the integration of large language models (LLMs) within the operational frameworks of Chinese internet credit companies, highlighting the transformative impacts these technologies offer across various stages of business processes. By incorporating LLMs, these enterprises can significantly enhance their operational efficiency, improve risk management, and streamline customer service interactions, ultimately fostering a more dynamic and responsive digital finance environment.

The analysis provided herein underscores the substantial benefits of adopting LLMs in the internet credit sector. At the front-end, LLMs revolutionize customer interactions by offering round-the-clock service and personalized financial advice, thereby enhancing customer satisfaction and engagement. In the middle-end processes, these models bring about a paradigm shift in how data is processed and analyzed, facilitating more accurate risk assessments and faster loan approval processes. Furthermore, at the back-end, LLMs contribute to more effective data management and product tailoring, enabling companies to meet diverse customer needs more efficiently.

Moreover, the discussion on regulatory challenges and compliance underscores the need for a proactive approach in governance and oversight. As the deployment of LLMs becomes more widespread, it is crucial for regulatory frameworks to evolve in tandem, ensuring that these technologies are used responsibly and ethically within the financial sector. This involves both the establishment of robust internal compliance mechanisms and the active engagement of regulatory bodies to oversee and guide the integration of these advanced technologies.

The implications of this study are far-reaching, suggesting that LLMs not only have the potential to redefine the operations within internet credit enterprises but also to reshape the broader landscape of financial services. Companies that successfully integrate these technologies can expect not only to enhance their operational capacities but also to gain a significant competitive edge by meeting customer expectations more effectively and adhering to regulatory standards more diligently.

In conclusion, as LLMs continue to evolve and their applications become more refined, it is imperative for companies to stay abreast of these changes, ensuring that their adoption of such technologies aligns with strategic business objectives and regulatory requirements. Future research should focus on longitudinal studies to track the long-term impacts of LLM integration and to further explore the ethical dimensions of AI in financial contexts. This ongoing assessment will be crucial for maximizing the benefits of LLMs while mitigating potential risks associated with their use in sensitive financial operations.

REFERENCES

[1] Zhang, B. (2022). Application of Innovative Risk Early Warning Model Based on Big Data Technology in Internet Credit Financial Risk. Journal of Information Technology Research (JITR), 15(1), 1-12. http://doi.org/10.4018/JITR.299920

[2] Du, G., Liu, Z., & Lu, H. (2021). Application of innovative risk early warning mode under big data technology in Internet credit financial risk assessment. Journal of Computational and Applied Mathematics, 386, 113260. https://doi.org/10.1016/j.cam.2020.113260

[3] Fan, S., Shen, Y., & Peng, S. (2020). Improved ML-based technique for credit card scoring in internet financial risk control. Complexity, 2020, 1-14. https://doi.org/10.1155/2020/87062852

[4] Xiong, T., Ma, Z., Li, Z., & Dai, J. (2022). The analysis of influence mechanism for internet financial fraud identification and user behavior based on machine learning approaches. International Journal of System Assurance Engineering and Management, 13(Suppl 3), 996-1007. http://doi.org/10.1007/s13198-021-01181-0

[5] Yang, G. (2022). Research on Financial Credit Evaluation and Early Warning System of Internet of Things Driven by Computer-Aided Technology. Comput. Aided. Des. Appl, 19(S6), 158-169. https://doi.org/10.14733/cadaps.2022.S6.158-169

[6] Yoon, Y., Li, Y., & Feng, Y. (2019). Factors affecting platform default risk in online peer-to-peer (P2P) lending business: an empirical study using Chinese online P2P platform data. Electronic Commerce Research, 19, 131-158. https://doi.org/10.1007/s10660-018-9291-1

[7] Zhou, G., Zhang, Y., & Luo, S. (2018). P2P network lending, loss given default and credit risks. Sustainability, 10(4), 1010. https://doi.org/10.3390/su10041010

[8] Herzenstein, M., Andrews, R. L., Dholakia, U. M., & Lyandres, E. (2008). The democratization of personal consumer loans? Determinants of success in online peer-to-peer lending communities. Boston University School of Management Research Paper, 14(6), 1-36.

[9] Desai, D., Jain, A., Naik, D., Panchal, N., & Sawant, D. (2021, May). Invoice processing using RPA & AI. In Proceedings of the International Conference on Smart Data Intelligence (ICSMDI 2021). http://dx.doi.org/10.2139/ssrn.3852575

[10] Brownsword, R., & Somsen, H. (2009). Law, innovation and technology: before we fast forward—a forum for debate. Law, Innovation and Technology, 1(1), 1-73. https://doi.org/10.1080/17579961.2009.11428364

[11] Verstein A (2011) The Misregulation of Person-to-Person Lending., November 21, 2011, SSRN, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1823763

[12] Lin, Z., Whinston, A. B., & Fan, S. (2015). Harnessing Internet finance with innovative cyber credit management. Financial Innovation, 1, 1-24. https://doi.org/10.1186/s40854-015-0004-7