

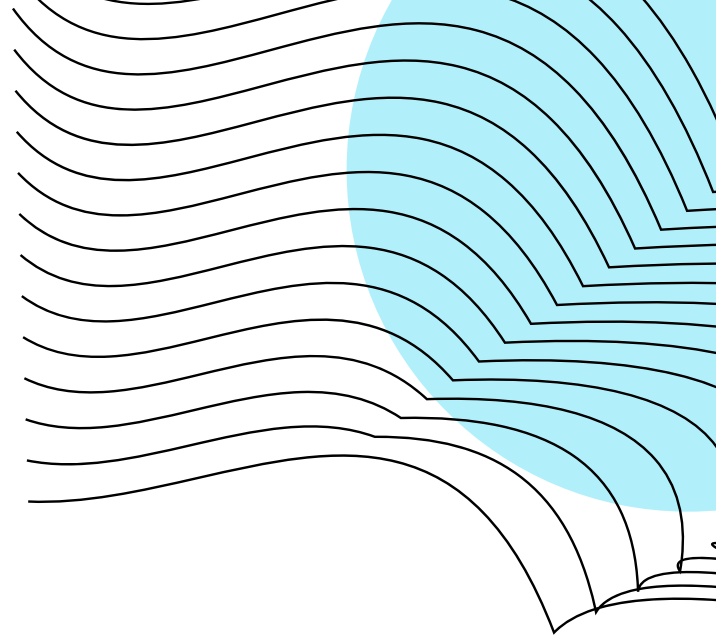
RESEARCH PAPER

Digital Loan Delivery

Wolfgang Spiess-Knafil
European Center for Social Finance

FEBEA - European Federation of Ethical and
Alternative Banks and Financiers

DECEMBER 2024



Index

| | |
|--|----|
| 1. Introduction | 3 |
| 2. Typical workflow | 5 |
| 3. Aspects of digitalization | 7 |
| 4. Data Science | 8 |
| 5. Dealflow management and data collection | 9 |
| 6. Due Diligence and Credit Scoring | 11 |
| 7. Loan management and portfolio analysis | 12 |
| 8. Conclusion | 12 |
| 9. References | 15 |

The paper is based on the workshop “Digital Loan Delivery” which was implemented under the Social Inclusive Finance Technical Assistance (SIFTA) programme managed by the EIB and funded by the European Union under the InvestEU Advisory Hub. It took place online on October 14th, 2024.

The insights from the discussion and the presentations from Panagiotis Tournavitis (Cooperative Bank of Karditsa), Muriel Ronsse (Credal), Alessandro Di Maio (Data Scientist Expert), Lukas Wellen (FERN) and Theofanis Mesolongitis, (NATECH) are integrated in the background paper.

Introduction

Let us share three thoughts which will inform our thinking on the digitalization of the lending process. We will start with a 4,000-year-old clay tablet exhibited at the New York MET and end with the 5Cs to illustrate what has changed in the last decades.

Stable underlying mechanism

Banking has a long and well-documented history. Many of the earliest writings are basically tablets documenting transactions. The New York Metropolitan Museum of Art has a 4,000-year-old clay tablet on display which is essentially a loan documentation. It was found in Anatolia and

“documents the discharge from debt for a silver loan owed to Ashur-taklaku. The cuneiform text, which reads from left to right, indicates that the loan of silver has been paid, and any further claims are void. Witnesses are listed in the text, and their seals appear on the clay envelope or case which contained the tablet”



Figure 1: Cuneiform tablet: quittance for a loan in silver
Source: The Metropolitan Museum of Art (2024)

It is an interesting artefact. It is easy to imagine how the transaction took place. It is only easy to imagine as the underlying business of lending did not change significantly. [1]

[1] David Graeber (2014) has written an interesting book on the 5,000 years history of debt. One of the insights is that debt has been much more widely used than previously thought. Throughout the history there have also been interesting phenomena. The "jubilee" year is one such example where every 50 years all debts were forgiven.

Many inputs, one single criterion

Banks have access to an abundance of data. Clients have bank accounts that contain information on how much they earn (salaries or revenues), which recurring costs they have, who their counterparts are and if they are paying their invoices on time. At the same time, banks can use all these data points to predict if clients will repay their loans.

We have thus an interesting data relationship:

Banks have hundreds of data inputs, but only need to manage one relevant measure.

All these data points can and are often used by banks to predict the repayment ability of their lenders which is the single most important measure for banks.[2] If banks fail in keeping the default rate low, it might put the bank in a crisis.

5Cs

There are different ways to think about the decision-making process in lending. One framework is based on assessing the 5Cs:[3]

→ The character of the person — do you know the person or their family?

→ The capital — how much is being asked for?

→ The collateral — what is the applicant willing to put up from their own resources?

→ The capacity — what is their repaying ability. How much free income do they have?

→ The condition — what are the conditions in the market?

[2] Equity investors typically focus on the expected returns of their investments which works remarkably well as the rise of quantitative hedge funds over the last decades has shown.

[3] A good overview of the history and current methods was written by Thomas in 2000 in a paper titled “A survey of credit and behavioural scoring: Forecasting financial risk of lending to consumers”.

At least, the knowledge of the character implies deep embeddedness in local communities and a deep understanding of the economic ecosystem. However, it was also deeply unfair to those without a good reputation and disadvantaged socio-economic status.

The current banking processes rely much more on statistical analysis, which has benefits but also drawbacks which we will discuss in this background paper.

Typical workflow

At least If we consider the typical workflow related to the provision of a loan we can see the following steps:

- 1** First contact: A new or existing client will approach the bank and ask for an offer for a specific loan. That can be done via the branch network, phone, e-mail or the website.
- 2** Document collection: The loan department will ask for details concerning the use of proceeds and will require a set of documents such as income statements and balance sheets, personal income statements, tax returns, and list of assets which could be collateralized.
- 3** Due diligence and decision: The next step is an analysis of the repayment ability of the potential lender and the preparation for the decision-making process. While some decisions can be made fully automatic, it will be different for larger and less standardized loans.
- 4** Issuance of contract and signature process: Once the loan department takes a positive decision, it will issue the contract which has to be signed by both parties.

5

Loan disbursement: The signature of the contract leads to the disbursement of the loan.

6

Management of payment schedule: The borrower must pay interest, typically every three months, along with any additional payments like a related savings plan or down payment on the principal.

7

Closing of loan: At the end of the loan period, the account has to be closed.

These steps are shown in the illustration below.

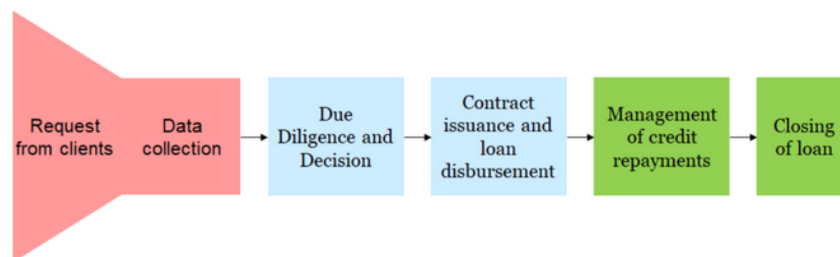


Figure 2: The banking workflow

Source: Own illustration

Aspects of digitalization

Let us now discuss the benefits of digitalization and why it might make sense to digitalize the lending process.

Some of the key insights were shared in the workshop by Panos Tournavitis (CEO of the Cooperative Bank of Karditsa and Vice President of FEBEA) on 'Digital loan delivery'.

He highlighted the differences between the traditional and digital processes. The traditional loan delivery process involves visiting the bank, filling out paper applications, and providing supporting documents, taking several days or even weeks to complete. In contrast, the digital loan delivery process is fully online and can be completed in a matter of hours, making it faster, more efficient, and more convenient for customers.

In his presentation he focused on 3 key aspects which will be outlined below:

- 1 Better customer experience
- 2 Increased efficiency
- 3 Accessibility for customers in rural areas

Digital solutions improve the loan delivery process, making it more convenient for customers and reducing the time it takes to process loan applications. The automation of the loan delivery process increases efficiency, allowing the bank to process more loan applications more quickly and accurately.

Moreover, the digital solution will make the loan delivery process more accessible for those in rural and underserved communities, giving them access to financial services that they may not have had before.

Of course, there are no limits in the digitalization process. Iansiti & Lakhani discuss in their book "Competing in the Age of AI" the example of a Chinese bank which is following a 3-1-0 system. The customer should only need 3 minutes to apply for a loan, which is approved in 1 second and has 0 human interactions. Obviously, this works only when the financial intermediary has enough data points on the individual lender and the process is highly standardized.

While the benefits of digitalization in loan delivery are undeniable, it is important to recognize the limitations and the potential pitfalls of an overly standardized, automatic approach. As FEBEA, we will always emphasize the human dimension, ensuring that financial processes remain deeply connected to the social fabric and rooted in societal values.

Data Science

Data Science is the process of analyzing the data which is generated in the lending process which was introduced by the speaker Alessandro di Maio in his presentation.

He introduced the different approaches to analyzing data which can be categorized in the following way:

- 1 Descriptive analysis (something happened)
- 2 Diagnostic analysis (why something happened)
- 3 Predictive analysis (why something will happen)
- 4 Prescriptive analysis (this approach suggests actions taking into account what might happen in the future)

Data is collected at every stage of the lending process. Alessandro di Maio was discussing some of the questions about how the data can be used:

- Where does the client come from and how did the client contact the bank: That helps to understand the success of marketing campaigns.
- Is the client paying on time: These data points help to understand the health of the underlying portfolio and could be used to predict potential defaults. For example, there might be a time lag between the time transport companies and construction companies declare bankruptcy.
- Which clients were paying on time: This information helps the bank to better understand the characteristics of the lenders and change the risk models.

Let us now move on to the question of how to work with data and highlight only one example. Researchers typically use tools where the data is shared with third parties. That can be a large language model, cloud-based platforms to execute code or other online tools. However, that is usually problematic as sensitive financial data should not be shared freely with other parties in line with data protection standards.

The speakers also highlighted the need to clear and verify data. Even simple data sets like postal codes from clients has usually issues as they might be wrong or unknown due to typos or simply in a format which is not suitable for analysis.

Dealflow management and data collection

The first step is the collection of data from the clients, which is a recurring topic in the webinars organized by FEBEA.[4] The table shows the amount of data some fintech companies collect on their clients. Obviously, there is a business case to include this data, but it also leads to a range of ethical considerations. For example, should friends on Facebook be used to assess the creditworthiness of a client?

[4] In May 2023, FEBEA organized a webinar and published a research paper on “The role of Artificial Intelligence in Social Finance” which can be found following this link: <https://febea.org/publication/the-role-of-artificial-intelligence-in-social-finance/>.

| Company | Main region | Digital footprint usage |
|-------------------------|------------------|---|
| Klarna | Europe | Uses time-of-the-day in its scoring model, states that it collects e-mail host, device type, browser settings, operating system, and screen resolution to evaluate which payment methods to make available |
| Admiral Insurance Group | UK | Drivers applying with a "Hotmail" e-mail address are charged higher insurance fees, as the company finds that some e-mail domain names are associated with more accidents than others |
| Sesame Credit | China | Sesame Credit gives users a score based on five dimensions of information: personal information, payment ability, credit history, social networks and online behaviors. |
| LenddoEFL | Emerging markets | Uses variables, such as smartphone data, form-filling analytics, text length, browser data, mouse data, Wi-Fi networks used, or, even, phone battery life. |
| ZestFinance | United States | Applies machine learning and "Google-like math to credit decisions" on thousands of potential credit variables including proper spelling and capitalization in online application forms, time of day making online purchases. |
| Branch International | Africa | Uses mobile phone data, including grammar and punctuation in text messaging, time of day of calls to evaluate potential borrowers. |
| Cignifi | Emerging markets | Partnering with leading global Telco brands, including Telefónica, AT&T, Globe Telecom, and Cignifi, uses mobile phone data, call duration, time calls are made, numbers frequently called, who initiates calls, or the frequency of adding airtime credit on prepaid phones. |
| KrediTech | Emerging markets | Uses artificial intelligence and machine learning, processing up to 20,000 data points per application. Simple variables, such as device data and operating systems, are used. Also, different behavioral analytics (movement and duration on the Web page), or even the font installed on the computer, the time spent filling out the online application or whether the customer copy and pastes input data play a role in the scoring model. |

Table 1: Use of digital footprints for credit-related decisions

Based on Berg et al. (2020)

Due Diligence and Credit Scoring

Let us first start with the history of credit scoring. It is somewhat surprising that credit scoring was only introduced in the 1960s for credit cards. Financial intermediaries quickly realized that automatic lending decisions lead to significantly lower default rates. The US Equal Credit Opportunity Act even outlawed discrimination unless they can be statistically justified. This led to the use of statistical methods for the approval of personal and business loans.

In the 1980s, logistic regression and linear programming were introduced in optimizing the process of providing loans. Logistic regressions remain a standard tool for credit scoring and evaluating the credit-worthiness of borrowers (Dastile et al., 2020). In the last years, machine learning algorithms haven been more widely used (Spiess-Knafl, 2022).

Banks have 5 different outcomes for their clients. Banks need to reject bad applications and accept good applications, while also reducing the proportion of good applications which are rejected. These outcomes are shown in the figure below.

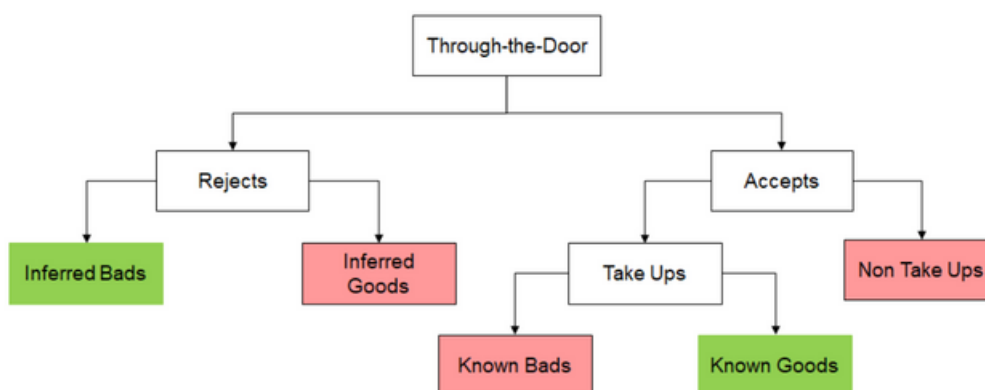


Figure 3: Different outcomes of credit-related decisions
Own illustration based on Dastile, Celik, and Potsane (2020)

In the webinar, Panos Tournavitis shared how the Cooperative Bank of Karditsa introduced an automated credit assessment and approval to optimize its lending processes. It uses advanced algorithms to assess customers' creditworthiness and automate a part of the loan approval process.

Loan management and portfolio analysis

The last step is the loan management which involves the collection of payments (interest and principals) as well as the monitoring of defaults and potentially the use of proceeds.

For example, one of the speakers spoke about the requirements of some guarantee programmes to collect annual data from the lenders.

These topics were also covered by the two guest speakers which presented the software packages developed by Natech and Fern. The main challenge is the integration with the core banking systems and a high level of reliability which adds to the costs of the systems.

In general, financial intermediaries need to track the payments, monitor the use of the proceeds if required and close the loan.

Conclusion

The speakers shared many interesting insights throughout the webinar which will be outlined below.

Resistance from customers and employees

Every bank has a set of clients which prefers to visit the bank and make their transactions in person. That is completely understandable, and a certain share of clients will therefore object to the digitalization of the banking services.

There might also be issues with digital literacy among staff and clients. One of the speakers added that it is a good practice to include key performance indicators such as customer satisfaction, processing times and cost savings to keep track of the general satisfaction.

Significan costs

A typical retail store can have a complete software package for inventory management, cash management and "Point of Sale" software for as little as €30 per month. Costs for financial intermediaries are a multitude of orders higher and the costs for implementation can reach a few hundred thousand Euros.

The software is more expensive given the smaller number of clients, regulatory requirements as well as the need to have an internal team to manage the tools. Financial intermediaries should therefore compare different solutions and take decisions on the trade-off between customization and standardization. Vendors typically offer set-up demos to better understand the strengths and weaknesses of different systems.

It is also important to keep in mind that technologies change over time. One of the speakers spoke about decisions which were taken a few years ago, which would have been taken very differently today.

One of the worst things which can happen to a financial intermediary is the loss of customer data. Data should not be shared with third parties, stored on the premises with security measures implemented. That is different to the management of inventory levels of a retail store.

Project success key factors

Muriel Ronsse shared a list of key factors to consider. Leadership is important to finish the project on time. She advised having a strong involvement of the management team and to appoint an in-house project leader. There should be regular meetings and communication with the suppliers, but also the teams which will be using the software. This approach is important to ensure an alignment with the mission of the bank.

One of the most important aspects is to limit the scope and to not allow an expansion of feature requests as those obstruct the progress. Muriel Ronsse also stressed the fact that software is ever changing. Therefore, there should be a dedicated IT team for support, continuous training and the ongoing development of the system.

Lukas Wellen from Fern added that it is important to simplify the processes before starting the implementation and limit the data entry points to decrease the fraud risk.

FEBEA members could also benefit from exchanges with their peers and learn how they manage the relationship between benefiting from digitalization and keeping the human aspects of the business models as a priority.

References

- Berg, T., Burg, V., Gombović, A., & Puri, M. (2020). On the Rise of FinTechs: Credit Scoring Using Digital Footprints. *The Review of Financial Studies*, 33(7), 2845–2897. <https://doi.org/10.1093/rfs/hhz099>
- Dastile, X., Celik, T., & Potsane, M. (2020). Statistical and machine learning models in credit scoring: A systematic literature survey. *Applied Soft Computing*, 91, 106263. <https://doi.org/10.1016/j.asoc.2020.106263>
- Graeber, D. (2014). *Debt: The First 5,000 Years, Updated and Expanded*. Melville House. https://books.google.com/books?hl=de&lr=&id=lliTBQAAQBAJ&oi=fnd&pg=PP12&dq=debt+graeber+review&ots=KNTVqkRYd7&sig=ykSSNmpJWDVMAI_uhFjy5DMAcbQ
- Iansiti, M., & Lakhani, K. R. (2020). *Competing in the age of AI: Strategy and leadership when algorithms and networks run the world*. Harvard Business Press.
- Spiess-Knafl, W. (2022). *Artificial Intelligence and Blockchain for Social Impact: Social Business Models and Impact Finance*. Taylor & Francis Ltd.
- The Metropolitan Museum of Art. (2024). *Cuneiform tablet: Quittance for a loan in silver*. <https://www.metmuseum.org/art/collection/search/325857>
- Thomas, L. C. (2000). A survey of credit and behavioural scoring: Forecasting financial risk of lending to consumers. *International Journal of Forecasting*, 16(2), 149–172.



EUROPEAN FEDERATION OF ETHICAL AND
ALTERNATIVE BANKS AND FINANCIERS
FÉDÉRATION EUROPÉENNE DES FINANCES
ET BANQUES ÉTHIQUES ET ALTERNATIVES

FEBEA - the European Federation of Ethical and Alternative Banks and Financiers - is a non-profit association based in Brussels. It gathers 34 financial institutions whose aim is to finance social and solidarity economy (SSE) and projects with social, environmental and cultural value in 17 European countries, serving more than 700,000 people.

Its objective is to support the exchange of experiences and promote cooperation between social economy and social finance practitioners.

Each FEBEA member is integrated in the SSE Sector in its country, focusing on mobilising savings and equity from responsible citizens and using these funds to finance sustainable development and local communities. FEBEA is member of GSEF, the European Commission's expert Group on Social Economy and Social Entrepreneurship and of Social Economy Europe, the main European network of social economy practitioners.

FEBEA members finance:

- The creation of jobs, social employment in particular;
- Social enterprises and social economy;
- The non-profit sector and participatory economics;
- New forms of social entrepreneurship;
- People or groups of people who are victims of social or professional exclusion or are unbanked;
- Sustainable development: renewable sources of energy, organic farming, biodiversity, etc.;
- International solidarity and fair trade.

© Copyright FEBEA 2024

Rue des Alexiens 16/B - 1000 - Brussels - Belgium

 febea.org

 @FEBEAethicalfin

 FEBEA page