Technology towards 2035

The future of lending and supervision

In short The digitalisation of the world is clearly transforming the financial sector. For this exploratory study, the AFM starts from the technological possibilities that digitalisation may bring in the coming years and then shapes a vision for the future of the lending sector, focusing on mortgages and consumer credit. With this vision, we aim to identify the long-term opportunities and risks associated with potential developments in the sector as well as the impact on our supervision. This paper also aims to encourage a discussion with stakeholders, in order to reduce the future risks associated with digitalisation while also taking advantage of opportunities to improve products and services for consumers.

Authors: Mark Teunissen, Bart Zwartjes, Tomas Bolscher, Jules van de Ree and Joshua Meijer

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AFM

Contents

OCCASIONAL PAPER

AFM

Introduction

In the AFM Strategy 2023 - 2026, we identify three long-term, fundamental trends that affect the functioning of the financial markets and will impact the AFM's course and supervisory approach. One of these trends is digitalisation.

2026 is approaching. The world and our supervision are changing. What impact will digitalisation have in the longer term on an important supervisory theme – consumer lending? In 2023, we focused on the insurance sector. This report focuses on the lending sector and more specifically on mortgages and consumer credit. Again, digitalisation is the central theme, and we look ahead ten years to 2035.

Scope and approach

In this study, we have not been limited by current and upcoming legislation. We started from the technological possibilities that digitalisation may bring in the coming years. We then applied that analysis to the lending sector, and to the opportunities, risks and dilemmas that may arise – both for the sector and for us as a supervisory authority. It is a thought experiment on the possibilities and implications of digitalisation, focused on mortgage and consumer credit, without directly anticipating all possible future measures and regulations that are currently known or even unknown.[1] The insights from this study come from literature research and from discussions with stakeholders, both from within and outside the sector.

Purpose

With this exploratory study, looking at the world up to 2035, we aim to:

- Map out the opportunities and additional risks of digitalisation for a specific sub-market, including the dilemmas that arise from it.
- Initiate a dialogue with the industry, regulators, supervisory authorities, policymakers and other stakeholders, with this study serving as the basis for this conversation.

Reading guide

After the executive summary, we will discuss the most important technological trends (chapter 1), followed by opportunities and possibilities that they offer (chapter 2). The report concludes with the issues for supervision and the sector (chapter 3).

1 Consider, for example, the second Consumer Credit Directive CCD II and the AI Act. Although some parts of this study point out key limitations of the use of data in lending that follow from this new regulation, our description of possible developments is not intended to be an exhaustive analysis of the regulation that may affect it.

Executive summary

Digitalisation will have an impact on consumer lending in the coming years. The way in which credit is offered, but also, for example, the forms of credit and the parties involved in lending may change under the influence of technology and digitalisation.

Technological trends

Important technological trends are the ever-increasing amount of data, the associated boom in data analysis and in particular artificial intelligence (AI). Data is the foundation on which the digital system is built, and data sources continue to expand. Open finance legislative initiatives in the European Union (EU) are also creating opportunities for lenders to access data held by other organisations.

AI can be used in many processes of the lending chain. Access to more and more data points of an individual and the increased possibilities of data analysis allow extensive segmentation of customer groups. Protecting digital security is becoming essential – after all, cybercrime cuts across all levels of the digitalising world.

Impact on lending

Even more than 2025, 2035 will be the time of 'one click away': it will be possible to do everything anywhere and directly, interactively and digitally. **Lenders will work towards one click away as much as possible**. The credit process will be further digitalised and become more personalised and interactive. For consumers, this will lower the access threshold and increase ease of use. This will have positive effects, such as early detection of payment problems and low-threshold payment solutions. However, it will also have negative effects, such as habituation to debt.

By using source data in combination with a digital identification wallet, the credit acceptance process can be further digitalised. The consumer no longer provides documents with the credit application. With the customer's permission, a third party – or the lender itself – retrieves all source data from source parties (such as the Employee Insurance Agency or the Tax Administration) and shares it with the lender.

Lenders can use an AI-driven document management application. The application builds up a credit file in line with European laws and regulations. This potentially makes the process less error-prone and more cost-efficient. For example, the software issues warnings if data is incorrect or inconsistent or if documentation is missing. Improvements in digital ID verification technology and the use of source data can also contribute to secure lending with less consumer fraud. At the same time, there will be more risks of spoofing, phishing and other forms of hacking.

Because of the European data market developments mentioned above, parties in the supply chain increasingly have more and diverse types of data at their disposal to determine the creditworthiness of the consumer accurately, intricately and rapidly. Payment transaction data provides insight into spending patterns, payment behaviour and repayment history and hence into customers' current net disposable income. Potentially, lenders can also use alternative data sources to map out someone's creditworthiness, and thus their risk profile, in detail. Technically, it is possible to consider a consumer's future income outlook predicted by models in the credit assessment – something that is already common in business lending.

Through deeper insight into the customer's personal financial situation, the credit offer can be further personalised in the long term. This could manifest itself in personalised pricing. In addition, customer-specific risks can be translated into the pricing of credit, in personalised marketing and advice and in personalised product propositions, for example for specific niche situations. This may align with the society in 2035, in which consumers expect personalised solutions and services to meet their individual requirements and needs.

AI can play an increasingly significant role in customer contact, initially to support the adviser, but potentially also in a more comprehensive role. Customers are then guided through the process of granting credit, for example via a mortgage advice portal. In principle, the customer travels the customer journey autonomously and digitally, but the adviser is on standby at every stage. The adviser is available if the customer indicates that he or she needs personal advice. Technology offers opportunities to follow the customer in a more targeted way in the period after the credit has been issued, in order to better anticipate changing circumstances and major life events.

Technology can promote the development of innovative credit propositions. It also seems plausible that embedded lending – consumer credit integrated into non-financial products with the aid of digital solutions – will take off.

Issues for supervision and the sector

As the conduct supervisor for the lending sector, the AFM will continue to supervise the principle of giving central priority to the customer's interests in 2035, with sufficient safeguards and duty of care towards the consumer. This also requires supervision that will have to anticipate further digitalisation and the changing lending context. In addition to the opportunities that technology offers for better consumer lending outlined above, risks also arise for consumers.

For the AFM, adequate management of these risks is paramount. Therefore, we will be alert to these risks and the extent to which they may harm the customer's interests. However, we continue to recognise the opportunities that digitalisation offers to improve the quality of – and access to – financial services for consumers. This requires a balance between providing scope to take advantage of these opportunities and mitigating potential risks.

Against this background, the AFM will pay explicit attention to a number of issues that emerge from this study in the coming years. The first question concerns instant credit. Easier access to credit offers opportunities for consumers, such as more ease of use and greater self-reliance. At the same time, a gradual cultural change may occur from 'credit is the exception' to 'credit is the norm'. Immediate access to new credit propositions in a digital environment increases the likelihood of impulse purchases financed with credit, and the likelihood of debt accumulation. The use of digital applications also increases the risk of fraud by dubious parties, especially among customer groups that are less digitally savvy.

A second issue is how to protect consumers from risks of exclusion from credit without sacrificing opportunities for greater accessibility. Although digitalisation can lead to underserved groups gaining more and/or better access to credit, it is possible that a more data-driven credit assessment will lead to the exclusion of customers with a different risk profile. Another risk is that digitalisation will hinder access to credit for people who are less digitally savvy, or that people who still want to do everything offline will eventually receive less favourable conditions (such as an interest surcharge) for services that are in principle comparable.

A third issue focuses on how to deal with the risks resulting from the personalisation of the credit supply. Digitalisation can lead to the personalisation of lending and thus responds to the needs of consumers. But this is inextricably linked to dilemmas around privacy and ethics. Consumers may be willing to share more personal data with the lender with the aim of obtaining a more favourable offer compared to customers who do not wish to do so. This can lead to risks of division and unequal treatment among consumers. The trend towards personalisation may also make credit products more complex.

There is also a risk that opaque credit markets will emerge – markets with non-transparent, highly personalised pricing and terms. The risk cannot be ruled out that the customer will eventually pay too much or receive an unattractive offer.

A fourth issue is the growing challenge of maintaining adequate supervision of an increasingly complex and interconnected lending ecosystem. The lending value chain will increasingly involve diverse and heterogeneous players, some of which will also be located in different countries inside and outside the EU. The activities, roles and responsibilities of traditional lenders are shifting to other actors. This makes the chain more complex, diffuse and interwoven. As a result, behavioural and operational risks may arise outside the scope of supervision. Moreover, many of these parties fall outside the mandate of supervisory authorities. Digitalisation is also changing the starting point of lending supervision. For example, supervision will have to focus more on testing whether algorithms are adequate. This will place different demands on supervision.

Finally, some of the technological trends outlined also require us to think about how these trends relate to existing laws and regulations in the field of conduct-of-business supervision and privacy. The discussions held during this exploratory study show that the current progress in digitalisation and standardisation, and the extent to which innovation is embraced in the credit chain, seem more limited than what is technologically possible. For example, in several parts of the lending process, there seems to be a possible tension between the current regulations and the opportunities that technology and digitalisation already offer. This raises the question of the extent to which some existing rules are still future proof. This tension is particularly evident in lending standards; it results from the potential of technology and the possible use of source and payment data. In addition, this study outlines a number of privacy issues that are primarily the domain of the Dutch Data Protection Authority.

In the coming years, we will have to align our supervision as much as possible with the aforementioned developments. In addition, we call on the sector, as well as other supervisors, regulators and policymakers involved, to think about the possible future perspective outlined in this study and the issues that arise from it, based on their role and responsibility. This is to reduce the risks of digitalisation in the future and at the same time to take advantage of opportunities to improve products and services for consumers. The AFM would like to enter into further dialogue on this.

1. Technology trends

1.1 More and more data is available

Data is the foundation on which the digital system is built, and data sources continue to expand. Every action and interaction in the digital world is recorded in the form of data. This data arises from interactions with, or actions of, the customer in the organisation's digital environment (internal data), or from cooperation agreements or publicly available data sources (external data). Until recently, organisations mainly had access to data that they had built up themselves. Legislative initiatives in the EU, such as PSD3 and FIDA in the context of open finance, are creating opportunities to access data held by other organisations – in addition to the growing public data sources. However, existing legislation, such as the GDPR and the requirements regarding purpose limitation and data minimisation, must be complied with.

In a digitalising world, almost everything can be recorded in data. For lending, it is important, among other things, to estimate the risk of financial problems and payment arrears as accurately as possible. As more and more organisations are becoming digital, more relevant sources are becoming available to make such estimates increasingly accurate. It will be essential to determine where relevant data is available, what data is relevant and how to access it. Being able to access all relevant data also offers ease of use and reduces lead times for potential customers.

Permanently determining the relevance, quality and reliability of data will be a challenge for the future. Data may become outdated or wrong. The highest data quality and reliability will be necessary to guarantee the quality of the models. Wrong outcomes can have major consequences.

Data comes in many forms and the value of data is not limited to just text and numbers. Advanced techniques make it possible to translate audio to text, analyse photos and videos at pixel level and translate biometric input to an identifiable person.

The trend may shift from data maximisation to data minimisation. At present, there is a need to collect data for in-house analyses or as a basis for new propositions. It is not inconceivable that in the near future, partly due to the importance of privacy, it will be possible to use more aggregated data. Take, for example, the concept of 'zero knowledge proof', where an organisation does not need a date of birth or proof of identification for age verification but asks an institution (for example a government agency) whether a consumer is over 18 years old.

1.2 Data ecosystems provide data storage and access

Cloud

The cloud will be the epicentre from which new data, connections, analysis methods and propositions are developed, tested and accessed. The cloud is not only where the data is stored; it is also the place where standard and custom analyses, computing power and access options are offered. This can be done from the central cloud or by means of edge computing, to relieve the central line. For organisations, this offers all kinds of advantages to increase agility and effectiveness, and to be able to make rapid use of new technological possibilities (cloud computing services). The cloud service providers facilitate the cloud space, but also offer more and more standard

analysis services specifically for financial services. At the same time, they offer a highly secure environment that can meet the ever-increasing requirements of regulation.

Digital twin

Creating a digital twin offers potential for monitoring immovable property but also for monitoring consumer behaviour. A digital twin is nothing more than a digital copy of an object or individual. With the digital copy, analyses can be conducted to determine the impact or behaviour of the digital copy on a changing situation. This offers opportunities to assess various fictitious situations in the real estate portfolio or among customers, in order to determine how to respond to them.

Application programming interfaces (APIs)

APIs are software interfaces that allow different applications to interact easily with each other. APIs can be used to easily share data and integrate entire services into your own environment. This forms the basis for the development of embedded financial services, among other things. For example, Buy Now, Pay Later (BNPL) services can be integrated into the payment screen of a web store by means of an API.

1.3 Data analytics and AI in particular are booming

The word 'AI' has been around since the second half of the twentieth century, but in recent years this technological development has taken off. In the coming years, AI will enable market participants to respond more proactively (predictively and preventively) to all kinds of situations. AI has potential in many processes of the chain, with optimisation as the main goal.

Themes such as explainability and ethics will gain attention. The modelling method and the fact that the models' foundations often contain historical data continue to give rise to key considerations such as the chance of extrapolation of historical patterns, the awareness of biases and the fact that models are always a simplification of reality. Issues of explainability and ethics remain relevant to every step in the process (input, throughput, output). The AFM, in collaboration with DNB, recently drew attention to this in the report entitled 'The impact of AI on the financial sector and supervision'.

The availability of more and more data points of an individual offers opportunities for segmentation at the micro level. Given the increasing interaction in the digital world and the fact that behaviours in the physical world are also converted into data, it becomes possible to analyse and track behaviour at an individual level. This creates opportunities to personalise and respond to explicit and possibly implicit needs of individuals. At the same time, it also becomes possible to respond to and influence an individual's weaknesses.

Generative AI offers all kinds of applications for process optimisation. The full potential of generative AI – and more specifically large language models (LLMs) – is not yet clear. It is clear, however, that it can lead to all kinds of new applications. In addition to process efficiency in customer service and translations, opportunities are also emerging to automate interactions with consumers.

1.4 Protecting digital security becomes a top priority

The focus on cybercrime, and the potential risks that follow from it, will increase. Everything that is linked to the internet is potentially susceptible to hacks. For the time being, hackers appear to be focusing their attention on data environments, because of the value of data. Disrupting systems or processes by modifying data or AI models is also possible.

Organisations have only partial control over the security level of the digital environment. The interconnectedness and growing complexity mean that organisations no longer have everything in their own hands. This creates a mutual dependence between operators when it comes to cyber security.

Generative AI makes it difficult to distinguish 'real' from 'fake'. The development of generative AI is making it increasingly difficult for consumers and organisations to distinguish between real, authentic information and fake information. In the case of consumers, this could involve phishing messages, for example. In the case of organisations, it could involve fraudulent identities or documents.

1.5 Smart contracts in the form of code can be used to earmark agreements

Smart contracts can be used to set restrictions in advance to ensure that agreements are complied with. Currently, many systems are set up to check retrospectively to what extent the pre-established agreements have been met. Smart contracts record the agreements digitally. Once the pre-defined criteria in the contract are met, an action or transaction can be triggered – without verification from a third party.

1.6 Digital identity provides a new means of identification

In a digitalising world, the current form of identification is under pressure. While many processes have now been digitalised, a copy of the identity document is still often requested for identification. Nowadays, the onboarding process for many financial services requires a photo of the identity document, combined with personal identification by means of a short video or photos of various angles of the face.

In the future, there will be more solutions for digital identification. For example, it will soon be possible to use a digital identity, where a trusted party can confirm the identity of an individual. This may also lead to the trusted party sharing only the relevant data, such as a person's age or address, instead of full personal data.

2. Impact on lending

In this chapter, we describe how technology and digitalisation can manifest themselves in the lending markets. We do this by looking at the impact on the lending process, i.e. the customer journey (2.1), on the players and propositions in the market (2.2) and on the emergence of new dependencies (2.3). This chapter focuses on the possibilities that technology offers for lending. Chapter 3 then discusses the issues that arise from this for supervision and the sector.

2.1 Process of lending

For a clearer overview, we 'divide' the process of lending, or the customer journey, into three chronological phases. These phases are:

- Customer acquisition, loan application and the collection, processing and verification of loan documentation (*phase 1*);
- Creditworthiness assessment, including the valuation of the home in the case of mortgage credit and the loan offer to the customer (*phase 2*);
- Aftercare and management phase (*phase 3*).

See Figure 2.1 for a summary overview.

Phase 1: Customer acquisition and loan application & documentation

Gradually, many parts of the lending process, supported by digitalisation, are becoming more streamlined. The credit process will be further digitalised, more personalised and more interactive. Mortgage lending may take only a few hours in the future instead of weeks. Applications for consumer credit could go from hours to almost real-time.

Accelerating the process of lending with short lead times is in line with the dynamics of society and the expectations of consumers. A short lead time in a mortgage application reduces the buyer's legal and financial uncertainty about his or her mortgage. If it leads to the consumer gaining faster confirmation and insight into the financing, bidding subject to financing would no longer be necessary in the long term.

AI and the use of alternative data sources provide opportunities for the lender to develop individualised processes for identifying and approaching potential customers. For example, in the case of mortgages, banks can identify customers who may be able to buy a house and give them a personalised mortgage offer by tracking the spending and saving patterns within their clientele. These institutions can also identify patterns in data that may indicate that existing mortgage customers can refinance their loans. Mortgage providers can use data from third parties to find people in a certain phase of life or people who have just experienced a life event and approach them with a mortgage offer. Examples are newly married couples or young families who may be looking for a larger home. With the help of AI, the mortgage provider can also analyse broader trends in terms of demographics and behaviour and sentiments among potential mortgage customers. This allows the provider to conduct targeted marketing campaigns. The provider uses AI-developed personalised content for search engines. Websites, e-mails and advertisements can be adapted to micro-segments, and possibly even tailored to the individual. This can lead to each individual seeing a slightly different web page, where both the visual and textual characteristics of the information are adapted to the preferences of individuals.

The customer submits a digital application for a mortgage via an online portal at, for example, a mortgage lender or via a special mortgage app. The mortgage lender uses chatbots to interact with potential customers ('first response tool') – for example, if the customer stops filling in the questionnaire, the chatbot asks how it can help.

Example
Digitalisation in mortgage lending

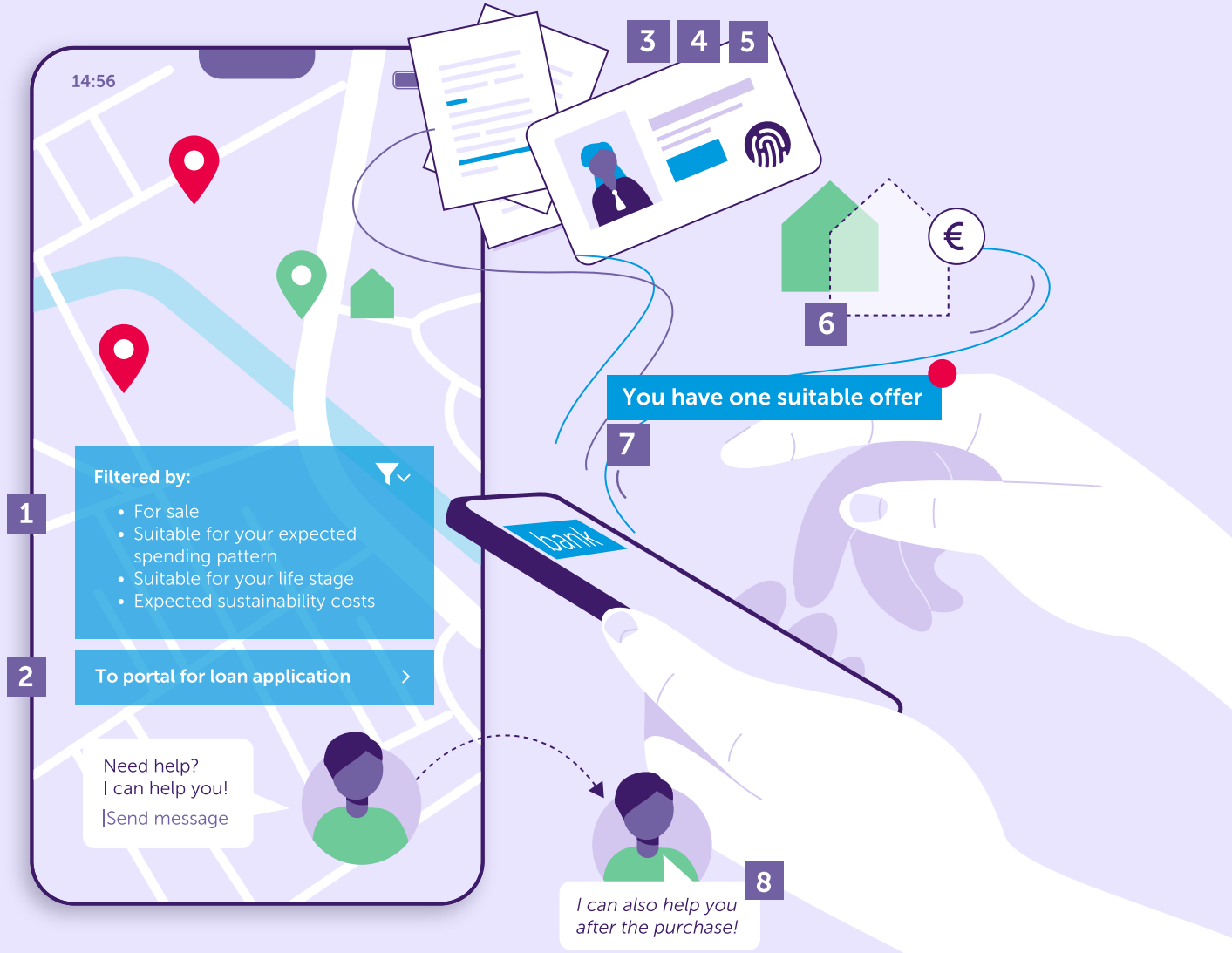
1 Customer acquisition
With the aid of AI:
- Identification of specific customer groups.
- Personalised approach to customers.

2 Loan application
Loan applied for digitally through online portal or app. Interaction with chatbots.

3 Collection of loan documentation
Customer no longer supplies documents directly. Lender uses source data (digital ID verification) with customer's permission.

4 Processing and verification
AI-based document management application produces credit file compliant with laws and regulations.

5 Credit assessment
More data of different kinds, possibly including customer's future situation, allows more granular credit assessment.



6 Valuation of collateral
For mortgage loan: real-time, digital valuation of collateral becomes possible, e.g. through use of digital twins, partly based on sustainability data.

7 Credit offer
Hyper-personalised credit offer (sum, form, term, price). Adviser is supported by AI.

8 Aftercare and management
Digital, automated management phase to support customers proactively.

Figure 2.1 Impact of digitalisation in the different phases of the lending process

Consumers can already apply for a mortgage or credit without having to provide paper documents. Whereas previously consumers often had to submit scanned documents (digitally), now, partly thanks to the development of open finance, a third party – or the lender itself – can retrieve all source data or answers to specific questions from source parties (such as the Employee Insurance Agency, the Tax Administration, a pension administrator, NHG or DUO) with the customer's permission and share them with the lender. Source data is data that, with the consumer's consent, is retrieved directly from the place where the original data is stored online. Several operators in the Netherlands are now offering this functionality.

Nevertheless, the use of source data still poses challenges. Not all information and documentation required for the application is currently digitally accessible, such as the deed of sale. Source data is not always up to date and therefore not always usable. The underlying source organisation may also suffer from malfunctions and therefore be inaccessible. As a result, BNPL companies, for example, with large transaction volumes could immediately run into problems.

Lenders can use an AI-based document management application that builds a credit file in line with European laws and regulations. This process may therefore be less error-prone and more cost-efficient. For example, the software issues warnings if data is incorrect or inconsistent or if documentation is missing. Examples include an expired passport, a discrepancy between the employer's statement and payslips, or a discrepancy between a divorce agreement and the receipt of alimony in the payment account.

Further technological improvements in digital ID verification can help ensure more secure lending with less consumer fraud. Automated computer systems with statistical modelling have been used for some time, with growing use of machine learning applications and biometric identification. This is to gain a better understanding of the risk of the mortgage application containing fraudulent information (and to identify the parts concerned). Algorithms are used to analyse transaction patterns and consumer behaviour. This is to detect potential fraudulent activity early in the credit process.

Phase 2: Credit assessment: More granular credit assessment

Partly due to open finance regulations (PSD3, FIDA), operators can gain access to data stored by other parties, with the approval of the consumer. First, this involves more financial data about consumers. Access to the payment account and credit card is especially important here – many insights can be gained from payment data. This transaction data provides insight into customers' spending patterns, payment and savings behaviour and repayment history and therefore their net disposable income. In particular, fixed costs, such as utility and telecom payments, childcare costs, but also previous rent payments can help to gain a better insight into a person's spending habits. Information on pension accrual and investments provides insight into the customers' financial position. Another example is sustainability-related information in mortgage financing; information that can influence the long-term valuation of the home as collateral, such as information on the quality of the foundations, the level of groundwater, flood risks and the energy label.[2] In the long term, it is even possible that – provided the consumer gives explicit permission and the regulations so permit – the customer's online and social media footprint, for example, will also be used.

A greatly improved data position – in combination with the use of AI-driven models – could potentially lead to more opportunities to determine the creditworthiness of the consumer and the value of the home accurately, intricately and rapidly. By using source and transaction data, income and expenses can be determined in detail for each loan applicant. This makes it possible to calculate both the financial capacity of a consumer and the maximum credit amount that can be provided responsibly.

2 See also AFM Trend Monitor 2024.

Real-time digital property valuations, partly based on climate and sustainability data

An appraisal report from an independent appraiser is common in the Netherlands when purchasing a house. At present, appraisals are mainly carried out physically by an appraiser. In practice, an appraisal can also increasingly be conducted on the basis of models.

In the future, property valuations may increasingly be conducted using automated valuation models. Such valuations seem feasible especially for comparable houses, such as apartments in a larger housing complex or terraced houses. For example, photos of all living spaces could be taken to measure the state of maintenance and level of finishing. Satellite photos of the outside (roof, garden, street, neighbourhood) could also be used to estimate flood risks, for example. All this information can then be used by AI applications to value the collateral. This would not only shorten the duration of the valuation but could also improve the reliability and accuracy of individual ratings.

Ultimately, more and more sustainability and climate data can also be included in the valuation of the collateral. Examples include the energy label, energy consumption behaviour, the groundwater level and the quality of the foundation of the house. Foundation risks are important in this respect, because it is currently difficult to observe or value these risks. The available data is still insufficient for reliable results for all individual homes. At the same time, more data is becoming available, such as land subsidence maps.

The use of blockchain technology for real estate registrations and transactions can also speed up the transfer of ownership. Blockchain technology makes it possible to decentralise real estate transactions. Smart contracts can streamline and simplify the current processes in real estate transactions – which involve multiple parties. Once all the conditions in the transaction between the buying and selling party have been met, ownership can be transferred.

Personalised credit offer

In the long term, lending can potentially be much more personalised. Market participants can meet customers' latent needs more fully by gaining deeper insight into their personal financial situation. For example, text mining and machine learning algorithms could soon be used to filter relevant personal data from documentation. Such data can be used to carry out the customer's credit assessment and issue a personalised credit offer. This can lead to more personalised product propositions for specific niche situations, but also, for example, to a personal offer aimed at increased sustainability. Personalisation of the credit supply can also be reflected in the pricing ('personalised pricing'). After all, risks differ at the customer level, such as the risk of default or mortgage financing in terms of the risk of exposure of the collateral to climate risks.

It is possible that some consumers – more than others – will be willing to share more personal data with the lender due to the need for tailor-made credit products. This may offer opportunities from the consumer's perspective. For example, a customer may be able to receive relatively better service if the deeper insight that has emerged from the shared data leads to a more favourable risk profile. Better service can then mean a wider product range, more personal product options than the standard range or even more favourable rates. Conversely, a less favourable profile can also lead to less favourable conditions. After all, the lender can make a better assessment of the risk profile, creditworthiness and needs of this customer.

In 2035, it is conceivable that a prediction of a customer's future financial situation will be included in the assessment of a customer's creditworthiness. More data and increasingly better, technologically advanced calculation models can enable the lender to estimate the future situation of borrowers and their behaviour. In the future, it is possible that the credit offer will be based not only on the customer's current situation but also on their future (financial) situation – as predicted by an AI model. For example, when assessing a customer's future creditworthiness, an estimate could be made of his or her future liabilities and cash flows, based on payment data. Another example

is an assessment of his or her future career development based on the level of education and the sector in which he or she works, for example a doctor in training or a junior accountant. Technically, this is possible: microcredit in other parts of the world and business (payday) loans are already provided on the basis of more data and predictions than just the current payment capacity. At the same time, this also creates all kinds of ethical and privacy dilemmas: do consumers want to receive this information and estimates? And what are the consequences of an incorrect assessment of the future?

A hybrid mortgage customer journey, where advice remains available, supported by AI

AI can increasingly support the adviser in mortgage lending. For example, AI can help with the development of discussion minutes, convert this information into a draft advice, calculate different scenarios and offer data-driven help with tailor-made mortgages based on multiple data sources. AI can therefore assist advisers, enabling them to concentrate on the quality of the advice.

It is conceivable that AI can play a more prominent role and thus change the role of the adviser. Customers are guided through the lending process by means of a mortgage advice portal. This digital portal includes tools, personalised information and guidance and the possibility of communicating with the lender or intermediary by means of chatbots. The customer journey is therefore in principle digital and the customer travels this journey autonomously. But at every stage of the process, the adviser is available on call if the customer indicates that he or she still needs personal advice.

Phase 3: Aftercare and management

Technology offers opportunities to monitor the customer in a more targeted way – eventually even in real-time – and thus anticipate changing circumstances and major life events. Examples are changes in spending patterns, the birth of children, an increase in income due to a new job or a decrease in income due to redundancy. Other changing circumstances may include changes in the collateral, such as renovations, unexpected home maintenance and sustainability investments. Here, too, technology can make customer contact more efficient, for example if the customer periodically provides access to his or her financial data and situation by means of source data.

The result would be proactive support for the customer, both in the event of favourable and unfavourable developments in creditworthiness. The support could involve, for example, offering different conditions, temporarily reducing mortgage costs, providing a different form of credit or a larger loan.

With consumer credit, it is becoming increasingly common for customers to manage their credit in an app. Customers then have insight into things like payment terms and costs and receive real-time information. There is a lot of payment flexibility due to the choice of payment options, such as pay in one go, deferred payment over more instalments and payment holidays. The customer can choose and switch during the term. The app shows the real-time impact on repayment and costs when changing payment horizons. The customer can also easily refinance and combine loans.

Finally, the use of blockchain – smart contracts – creates new opportunities for consumer lenders. Currently, a lender cannot predict in advance whether a consumer credit will be used, for example, for the purchase of a caravan or for daily shopping. Smart contracts make it easier to track assets. This would allow so-called object-specific financing to take off, because the credit offered can only be spent on specific items, such as a kitchen or a car.

2.2 New propositions, new players

A diverse range of operators are expected in the credit chain in 2035 – even more than in 2025. New legislative developments allow existing and new operators to acquire a lucrative position in the value chain. It is possible that more operators will be located abroad. A high degree of technology adaptation and data skills gives parties a comparative advantage to differentiate themselves. This can be reflected in a higher risk tolerance, a corresponding greater willingness

to lend to non-standard higher-risk customers and a less standard product offering, with differentiated terms and maturities as well as greater ease of use.

The distribution of credit products will also become increasingly diverse due to digitalisation, with a greater role for peer-to-peer lending platforms, for example. Currently, market participants still offer confidence to consumers because of their licence. The combination of blockchain and AI could make it possible to lend money to complete strangers, as in the case of crowdfunding. Intermediaries are superfluous. After all, the blockchain contains the borrowing history of individuals, which can eliminate all or part of the uncertainty for lenders.

Technology promotes specialisation and niche targeting. Consumer credit providers, for example, are increasingly engaging in credit segmentation. In doing so, they cluster consumer credit buyers into different segments, for example based on income and consumer preferences. They serve the different customer groups with personalised products.

Technology can promote the development of innovative products, such as hybrid credit propositions. Consider, for example, a combined consumer credit-insurance product. In this case, the insurance premium (for default) gradually decreases as the consumer loan is repaid. Another example is a flexible mortgage that evolves with the consumer's personal life in terms of conditions, payments and term. This may mean that the consumer will automatically pay less in the event of a drop in income as a result of, for example, unemployment or illness.

Digitalisation can create the possibility of a digital mortgage comparison site. In addition to the intermediary channel, a digital mortgage comparison tool could also play a more important role. As well as interest rates, such a tool could also compare all mortgage conditions, on the basis of which advice or information could be sent to the customer. If the digital mortgage comparison site is given access to the source data of a prospective customer, it can make a much more specific comparison and present him or her with the result.

Mortgage propositions may emerge focused on real-time data sharing. In the insurance sector, there are already car insurance propositions where the premium is determined on the basis of real-time data concerning driving behaviour. Similar propositions can arise for mortgages, where the sharing of data is central. As indicated earlier, this can lead to a lower risk profile and a discount on interest rates, for example. It can also lead to the acceptance of consumers who are currently excluded.

As a result of a number of trends, embedded lending – consumer credit that is integrated into non-financial products with digital solutions – may take off further. Examples are the growth of e-commerce and the rise of the 'subscription economy'. After all, more subscriptions can contribute to spread payments and embedded solutions. Another example is the declining coverage of health insurance. This provides opportunities for financial products integrated into healthcare, such as loans and insurance. This is a further reinforcement of the trend from 'loan as a sum of money in the account' to purchase financing (BNPL, financial lease). Traditional credit as a 'sum of money in the account' may only be important for large expenses that cannot be directly linked to a specific product. Examples include renovations, study or travel. The emphasis will then be more on consumption, with the credit transaction relegated to the background. This may increase the risks of excessive lending.

2.3 New dependencies

An increasingly interconnected ecosystem around lending will emerge. As mentioned earlier, an ecosystem comprising a growing number of increasingly varied operators is emerging in the market. These operators are often also located in different countries and are strongly interconnected. This creates contagion risks in the event of outages, with services failing due to operational disruptions or cyber attacks, or if crucial operators in the chain go bankrupt.

Intensifying the use of algorithms based on external data creates a dependency on data access and data reliability. Various causes can lead to interruption of data access, such as a malfunction or

the withdrawal of consent by the consumer. In the event of such an interruption, the algorithm in question cannot be used or can only be used to a limited extent. The same risk exists if the data quality of the external data source deteriorates or if a format change is made without the knowledge of the user – in this case the supervised institution. These risks can potentially cause harm to the customer during the credit process.

Control of data quality and access becomes even more fragile if a dependence on software solutions arises in the chain. The supervised institutions use many software solutions that contribute to better processes. The many links and solutions in the chain with the dependencies on other data sources mean that a potential error in the data or algorithm can remain unnoticed for a longer period of time in a supervised institution, with all the consequences that entails.

3. Issues for supervision and the sector

In 2035, the AFM will continue to give central priority to the customer's interests, with safeguards and a duty of care towards the consumer. Supervision will therefore have to anticipate continuing digitalisation and the changing lending context. Good supervision is not static but must continuously respond to changes in the market, and to trends and developments. The previous chapter shows that the impact of technology and digitalisation on lending is visibly creating opportunities to improve credit products and services to consumers. At the same time, risks also arise for consumers.

For a conduct supervisor, adequate management of these risks is paramount. Therefore, we will remain alert to these risks and the extent to which they can harm the customer's interests. At the same time, we will continue to monitor the opportunities that digitalisation offers for improving the quality of and access to financial services for consumers. This requires a balance between on the one hand providing scope to take advantage of these opportunities and on the other hand mitigating potential risks. Against this background, the AFM will pay explicit attention to a number of issues that emerge from this study in the coming years. These are explained in more detail in this final chapter.

Some of the technological developments outlined also require us to think about the way in which these developments relate to existing laws and regulations on conduct-of-business supervision and privacy supervision. From the discussions held during this exploratory study, the picture emerges that the current progress with digitalisation and standardisation and the extent to which the credit chain embraces innovation seem more limited than they could be given the technological potential. For example, in several parts of the lending process, there seems to be a possible tension between the current regulations and the opportunities that technology and digitalisation already offer. This raises the question of the extent to which some existing rules are still future proof. This tension is particularly evident in lending standards due to the potential afforded by technology and the use of source and payment data. In addition, this study highlights a number of privacy issues, which are primarily the domain of the Dutch Data Protection Authority.

In the coming years, we will have to align our supervision as much as possible with the aforementioned developments. In addition, we call on the sector, as well as other supervisors, regulators and policymakers involved, to think about the potential future prospects outlined in this study and the issues that arise from it, based on their role and responsibility. This is to reduce digitalisation risks in the future while at the same time taking advantage of opportunities to improve products and services for consumers. The AFM would like to enter into further dialogue on this.

3.1 Instant credit

As the analysis in the previous chapter shows, faster lending offers clear opportunities for consumers. One important opportunity is greater ease of use for consumers. Society is moving towards a time of 'one click away': everything must be direct, interactive and digital. Consumers are becoming increasingly critical, demanding and wanting everything as quickly as possible. Instant gratification, where needs must be met immediately, seems to be becoming the norm. Lending is responding to this through online applications, direct and fast approval, and digital management of transactions. This provides more speed and ease of use for customers. Digitalisation can also make it easier for consumer credit providers, for example, to increase the quality of services for smaller loans.

Accelerating the mortgage lending process in particular brings other advantages. Digitalisation can deepen liquidity in the Dutch housing market, by allowing more and faster transactions, with potentially positive spin-off effects on other sectors, such as real estate developers and investors.

At the same time, this trend towards accelerating lending also entails risks. For example, it is possible that a gradual switch will occur from 'credit is the exception' (only for large expenses) to 'credit is the norm' (a mini-credit being taken out for every small consumer expenditure). This results in an increased risk of excessive debt accumulation.

In addition, there is an increasing risk of impulse purchases on credit. Immediate access to new digital credit propositions in a digital environment, and in particular short-term and expensive forms of credit, leads to inherent risks for consumers. The customer can purchase a financial product within a few moments, possibly embedded in the purchase of a regular product. There is a real risk of undesirable control due to changes in the choice environment. Providers can cater to human tendencies, such as a focus on the short term. This increases the likelihood of impulse purchases on credit. This is not necessarily problematic in itself, but the ease with which consumers come into contact with credit in the digital environment and the low threshold for taking out credit entails a risk of debt accumulation. This is where multiple loans are taken out from different lenders without a complete overview of the individual's debt position. Moreover, consumers themselves can lose sight of their overall position due to all the possible ways in which credit can be used.

An increasingly digitalised credit chain therefore places higher demands on the design of the choice environment and the prevention of improper behavioural influence on consumers. It is important that the choice environment is designed in such a way that the consumer is guided to the appropriate product, given his or her needs, knowledge, skills, preferences and risk preference. It is also important to make it easier for consumers to obtain clarity about the risks, conditions and level of protection of digital financial products and services. Market participants can also be motivated to use their digital choice environment in such a way that lending serves consumers' long-term interests and promotes proper use.

Focusing on effective information provision also remains important. Developments such as embedded lending and instant credit suggest convenience and speed at the expense of oversight and insight. Clearly setting out expectations for effective information provision based on behavioural insights and field testing can help to prevent consumers from opting for a loan almost unwittingly, without having an overview of the risks and possible additional costs of the service.

Another risk in a rapidly digitalising world is that the use of digital tooling increases the risk of fraud by dubious parties, especially among customer groups that are less digitally savvy. Developments in AI offer opportunities to use AI applications for fraud. Scammers can pretend to be a representative of a financial institution by imitating images, voice or messages (deepfake) that customers cannot distinguish from the original. Fraud can also take place on the consumer side. It is quite easy, for example, to create falsified salary slips.

3.2 Access to credit

Digitalisation can give underserved groups greater access to lending. The assumption behind this is that by using more and alternative data and technology-driven models, a more accurate and granular assessment of creditworthiness can be made – one not only driven by income or the past. This offers opportunities for consumers who are not currently eligible for credit.

In this sense, a higher rate of technology adoption among lenders could lead to a higher percentage of approved mortgage applications. A more accurate risk assessment because of technological applications would then also ensure a greater willingness to serve potentially higher-risk customers.

Digitalisation and open finance can also contribute to greater customer self-reliance. Consumers can gain more and better insight into their personal current and future financial situation through new services made possible by digitalisation (e.g. dashboards and cashbook-like programs). This can contribute to greater self-reliance through more responsible smoothing of income and consumption over time. Greater insight may also influence consumer demand for credit – for example more purchases on instalments by people with insufficient salary.

At the same time, it is possible that digitalisation will lead to risks of exclusion from lending. For example, a better assessment of creditworthiness may lead to the exclusion of customers with a less favourable risk profile. This includes customers in a non-standard situation, such as customers with irregular income, self-employed people or customers with an unfavourable credit history. In the background, there is also the problem of algorithm biases: credit scoring algorithms can lead to unfair or even discriminatory outcomes. AI can also get it wrong sometimes. Incidentally, the European AI Act will offer a certain degree of protection against exclusion. This is because AI systems used for creditworthiness tests are classified as high-risk. This means that further requirements will apply to the development and use of these AI applications.

Another risk is that an increasingly digitalised credit process will hinder access to credit for less digitally savvy people. It will be difficult for a group of people to connect well with digital processes. It is possible that people who still want to do everything offline – for example, those who want to supply paper documents or receive in-person advice – will eventually receive less favourable conditions (such as an interest surcharge) for comparable services.

3.3 Credit personalisation

The personalisation of the credit offer fits in with today's society, in which consumers expect increasingly personalised services. The social trend has shifted from standard products for everyone to a personalised offer – with consumer groups increasingly being individuals having specific requirements and needs and looking for solutions that meet those needs. In lending, this is reflected in personalised pricing, a more granular creditworthiness assessment and personalised provision of information, advice and product propositions.

But a personalised credit offer comes with dilemmas around privacy and ethics. For example, collecting, storing and using extensive personal datasets with the consumer's consent poses inherent privacy risks. Consumers may be willing to share more personal data with the lender in order to obtain a more favourable offer than customers who do not want to do so. This can lead to risks of division and unequal treatment between consumers, with consumer preferences prevailing over privacy protection. In the future, a customer's creditworthiness may be assessed partly on the basis of the prediction of the customer's future financial situation and behaviour. This also raises all kinds of ethical and privacy dilemmas: do consumers want to receive this information? Or do consumers want financial institutions to perform such analyses?

There is an increasing risk of 'data short-sightedness and gamification' among consumers. If the consumer knows in advance that the AI model will look back one to two years, he or she can anticipate this and temporarily adjust the spending pattern or temporarily enter permanent employment, with the aim of obtaining higher credit. The risk then arises that the data used is not representative of that consumer's actual financial position.

Errors can also occur in the source data, for example when incorrect income has been recorded. On this basis, consumers can become unintentionally overindebted or excluded from credit ('computer says no'), and this is not easy for the consumer to correct. The upcoming eIDAS 2.0 legislation will respond to this: each data attribute will then receive a stamp from the issuing institution, giving the consumer a starting point to report incorrect data.

The desire for personalisation may also make credit products more complex. Responding to the specific individual situation of customers may lead to credit products and propositions becoming more complex due to the use of technology. For example, it may become less complicated to structure a loan in several parts and refinance them in the interim. This creates opportunities for consumers. But more complex products also raise questions about transparency and comparability. In line with this, there is a risk that opaque credit markets will emerge with non-transparent pricing and highly personalised pricing and conditions. This poses the risk that the customer will eventually pay too much or receive an unattractive offer.

Finally, when personalisation in the credit product range increases and the provision of information is adapted more precisely to the individual or to customer segments, the diversity of communications and credit products increases sharply. A possible proliferation of personalised information, offers and credit products poses new challenges for the AFM's supervision.

3.4 More complex and interconnected lending ecosystem

There will be an increasing number of diverse and heterogeneous players operating in the chain, often also located in different countries. This will make the credit ecosystem more complex, diffuse and interconnected. The activities, roles and responsibilities of traditional lenders are shifting to other actors in the chain. This makes it more complex, diffuse and interconnected. As a result, new behavioural and operational risks may arise outside the scope of supervision. Examples include the increased interdependence of data access and software solutions in the chain, the risks of services failing due to operational disruptions or cyberattacks. Other examples are the risks of a mistake somewhere in the chain, for example involving a crucial operator, or the risk that such an operator may even go bankrupt.[3]

Moreover, the necessary operators (such as data suppliers and software vendors) fall outside the scope and sometimes outside the mandate of our supervision. Lenders are responsible for conducting sound business operations. But it can be difficult to fully understand third parties in practice. Apart from this, the growing complexity and interconnectedness in the chain makes it more difficult for the AFM to keep track of which operators in the chain play a crucial role and should receive our attention.

Moreover, as a result of digitalisation, the starting point of lending supervision is changing. Supervision focused on outcomes (for example, by researching large numbers of mortgage advice files) remains necessary. At the same time, supervision will have to focus, for example, on testing whether algorithms are sufficient to overcome potential biases. This places different demands on supervision.

3 The entry into force of the EU Digital Operational Resilience Act (DORA) is an important step forward in ensuring that financial organisations better manage their IT risks and thus become more resilient to cyber threats, among other things.