



Modernise the
financial
function of your
organisation

Master thesis
Wouter Rameckers

Colophon

Mynance:

Modernise the financial function of your organisation

Master thesis

MSc Strategic Product Design
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Preface

In front of you is the final deliverable of my Strategic Product Design master thesis for the TU Delft in collaboration with INNOPAY. It is the result of a six-month design project that allowed me to dive into a completely unknown topic. Discovering new ways of research and design and combining different methods to make sense of something so unfamiliar. This was a truly fantastic experience that has changed my way of working for years to come. I could not have done this all by myself, and I am incredibly grateful that I had such friendly, engaging, and intelligent people to surround myself with.

Ruud, thank you for letting me think critically and letting me revisit ideas when I believed they were all thought out. "Ga je dat gewoon zo aannemen?" were scary words in the beginning but have turned panic into motivation.

Sander, thank you so for hammering me down on my argumentation and my writing. Educating me to push myself to a higher academic level of writing even though "het is geen academisch stuk wat je schrijft, maar toch".

Luc, thank you for introducing me to INNOPAY in the kindest way possible. Helping me with all my Open Banking questions throughout the project to keep the quality of information high. Also pushing back on ideas and asking "waarom?" helped greatly.

Vincent, thank you for helping me get things done and teaching me that 'de aanhouder wint'. Get what you need from people, they will not bring it to you.

I would also like to thank INNOPAY's colleges for intelligent conversations and the teamwork during all phases of this project. Thank you for all the Friday afternoon borrels at the Blue Angle, the lunches at Canteen and the enjoyment during the rest of my days. It has been a great pleasure!

Furthermore, I would like to thank all the participants of the interviews as well as the generative session. Without you, I would not have been achieved the result I achieved.

My Parents, thank you for the weeks I was allowed to work from Bussum and take a bath every night after 14+ hours of staring at a screen. The cooking and not having to help with the washing up also helped to get the writing done.

Janine, thank you for not killing me in my sleep when I was too busy to give you any attention. Even though you graduated during my final weeks of writing this. I can imagine that must have been 'ongezellig', but you stayed positive and raised me up to push till the end.

I am proud to introduce my master's Thesis.

Enjoy reading and take care!

Wouter Rameckers

Executive summary

INNOPAY

INNOPAY is an Amsterdam based consultancy that focusses on 'transactions. They are founded in 2002 with financial transactions as their main focus. Today, they have shifted their core business to 'data' as every form of transaction. INNOPAY is led by the belief "everything transaction" which is translated into an award-winning same-titled management book. They believe collaboration and data sharing to be the end-goal for finding the highest value-added for all (data) transactions.

The challenge

The objective of this thesis is to find use cases for the business clients of banks that would be enabled by Open Banking. There are two reasons for the need for such use cases. First, there are no specific use cases directed at open banking at this moment. Second, creating innovative products is becoming the new standard to differentiate for banks. INNOPAY will be able to use this thesis and the use cases that it brings forth to illustrate the benefits of Open Banking to a large variety of different (potential) clients.

Thesis Context

The user

The business clients of banks share touchpoints through the financial function of businesses. The financial function of a business handles the financial aspects and their interactions. The financial function is a group of functions, tasks and dynamics that are set up differently for every business. This thesis analyses this complexity and describes how financial tasks between businesses are similar and can be used to analyse the financial function consistently.

There is a definite shift in the tasks of the financial function in the last couple of years. The financial function is moving from an operational set of tasks to a more strategic set, actively participating with the (corporate) strategy.

The current financial function has low affinity

Change in the financial landscape

Four elements are driving transformation in the financial product and service industry.

1. Technology

Technology has been at the forefront of disruptive innovation for multiple decades. Technology is contributing to faster ways of gathering, analysing and securely transferring data anywhere on the planet. Bringing financial professionals together and growing businesses to never before seen sizes.

2. Competition

Competition is increasing as challenger banks, and Fintechs are joining the financial product and service industry with new and innovative user-friendly products and services.

3. Customer expectations

Consumers are surrounded every day by products and services tailored to their specific needs. Consumers expect user-friendly, fast and intuitive designs. This expectation is no different for business users.

4. Regulation

The regulation on the forefront of this changing landscape is Payment Service Directive 2 (PSD2). PSD2 is the first regulation in the world to focus on opening up the banking system. PSD2 mandates the opening up three banking data and functionalities previously monopolised by banks themselves.

These three data and functionalities are:

1. Payment initiation services (PIS)

Allowing a third party (TPP) to initiate payments from your account

2. Confirmation of availability of funds (CAF)

Reviews the current account to see if enough funds are available for the required transaction

3. Account information service (AIS)

Allowing a third party (TPP) to access your account(s) information

PSD2 opens up three data and functionalities, Open Banking opens up the rest. Open Banking is defined as a business approach in which value creation results from sharing, providing and leveraging access to bank resources. Data, processes and other business capabilities of banks are made available to an ecosystem of Third Parties (e.g. Fintechs, technology vendors, corporate customers) through application programming interfaces (APIs). Meaning,

The groundwork

Business banking

- The competition on the financial product and service landscape is picking up between Incumbent banks, challenger banks and fintech.
- Collaboration between financial product and service providers is believed to be the most constructive method of creating value-adding products and services.
- Banks will need to focus more on their customer as user expectations are shifting.

Open Banking

- For banks to gain a competitive advantage, it is essential to open up data and functionalities while creating innovative use cases.
- Leveraging Open Banking enabled data, potentially with non-financial data, could result in products unexperienced by financial professionals.
- An increase in Open banking adoption is required as it is currently low. This increase can be achieved by creating inspiring use cases and promoting the concept of open banking.

The Financial function

- The financial has little affinity with Open Banking as it is still in its early adoption phase. To increase this adoption they need to be educated and inspired.
- The tasks within the financial function are moving from operational to more strategic tasks as more time is freed up primarily due to technological advancements and analytical capabilities.
- The richness of data is essential for strategic tasks to make strategic decisions. While the quickness of data has more influence on the operational tasks.
- The financial function is looking for safe and secure products and services that are easy to use, interoperable with high analytical capabilities that increase efficiency.

The solutions

For INNOPAY to be able to present different concepts to different clients, three concepts are designed. They are all presented in an all-in-one dashboard solution called Mynance. The reason for presenting the concepts through this medium is to combat three reoccurring pain points found during this thesis

1. Customer journey – for the financial product and service industry a lot can be won by focussing on the customer journey as this is currently mostly subpar. Having all products and services in one place would facilitate more user comfort
2. Data infrastructure- The number of products and services offered at this moment have major operability issues. Having an all-in-one solution would alleviate this pain.
3. Privacy and security – If all compliance is under one roof, there is no need to trust multiple parties. It also created the possibility to show the user what data they are sharing from one location.

OutOfOffice

OutOfOffice is a solution for the need for a 24/7 financial function. Instant payments are becoming mainstream and are moving from the consumer to the business realm. This concept relieved the pain for the financial function to be on alert 24/7 as payments can come in and go out after the financial function has gone home. It allows for settings to be predetermined to send a notification when the change in cashflows exceeds a specific limit. OutOfOffice can also be set to undertake actions automatically.

Benchmarking

The Benchmarking is a solution that focusses on the opportunity to use pools of Open Banking data as well as non-banking data to find benchmarks that were previously impossible or extremely difficult to compute, in real-time. Allowing the financial function to critically analyse their position against a variety of segments. Precisely showing a business's weak and strong points to be able to invest time and funds into different essential business aspects efficiently.

Alertify

Alertify uses pools of Open Banking data together with non-banking data to find patterns in business processes. It will then notify the user and recommend future steps. These patterns are extracted from historical data and can either be negative or positive. If a problem is detected, it will recommend as well as if an opportunity arises. This is done through prescriptive analysis. The quality of prescriptive analysis will be enhanced by artificial intelligence and machine learning.

Validation

The concepts are designed to a certain degree of detailing to be able to adjust them to use for multiple purposes. INNOPAY can present these concepts as a whole to demonstrate the 'big picture' or they can choose to zoom in on a particular aspect of a product (e.g. a specific benchmark metrics or business process pattern) to reach their more niche clients. These concepts are made for presenting and are not designed to be made into actual products. Would that be the case, a great deal of additional research would have to be done with regards to the user interface, user experience, and technical aspects like privacy and security.



Mynance

Modernise the financial function of your organisation

“Every great design begins with an even better story.”

Lorinda Mamo

Reading guide:

Font for chapter titles

Font for sub-topics

Font for appendix indication

Quotes will be writin in this font

Figures, tables and charts will be indicated with this font

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with respective colour indicate:**



= directed at strategic tasks



= directed at operational tasks



= directed at both strategic and operational tasks

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CHAPTER 1
INTRODUCTION

1.0

This chapter introduces INNOPAY as a company, the team under which this thesis is written and the problem this thesis will tackle. It will also introduce the final concepts.

- 1.1 Introduction
- 1.2 Design process Methodology
- 1.3 Research question
- 1.4 The final concept: Mynance
 - 1.4.1 Fintag: OutOfOffice
 - 1.4.2 Fintag: Benchmarking
 - 1.4.3 Fintag: Alertify

1.1 // Introduction

INNOPAY

INNOPAY is a Dutch consultancy founded in 2002. The company started in Amsterdam and has grown to hold two other offices in Germany with plans for further international expansion. INNOPAY is seeing rapid growth in firm size and name recognition in recent years. INNOPAY has created an e-payment scheme for IDEAL, the most prominent payment service in the Netherlands; getting banks to work and create together as one. INNOPAY is now working on an industry-wide logistics collaboration project called iShare in order to boost the Netherlands as “the gateway to Europe.” INNOPAY also worked closely together with different Dutch public transport providers while creating the OV-chipkaart.

INNOPAY is led by the belief “everything transaction” which is translated in into an award-winning same-titled management book by the founders (Liezenberg, Lycklama, & Nijland, 2018). This book explains that humanity is entering a new digital era, the so-called ‘transactional era’ in which data is the new gold. INNOPAY’s main consultancy focus is enhancing this awareness and showing where to dig for the ‘gold.’

They guide clients in this new world of digital transformation with the use of three pillars; trust, collaboration and data sharing. They believe that in this new world, consumers, companies and public institutions should collaborate and share data, only then can maximum value be created for all. For INNOPAY, trust is the number one enabler of the new digital innovations (Nijland & Jansen, 2019; Thomas Scharr & Pfeiffer, 2015). INNOPAY is the leading transaction consultancy in the Netherlands with expertise in banking, Fintech, insurance, logistics, mobility and public services.

Value for INNOPAY

Because of the work they have done INNOPAY is a highly respected transaction consultancy. They are known for creating different tools and overviews of hard to grasp industries. Tools like a monitor displaying the current openness of major banks and a radar of emerging new open banking service providers. INNOPAY allows clients a ‘sneak preview’ of these tools and charges clients for the full view and deeper insights.

The reason INNOPAY hired a designer for this project is to create and design Open Banking use cases they can show their clients. Showcasing more than just insights into the future, namely translations into products and services.

Open Banking team

The Open Banking Team supervises this thesis. This team focusses on the changing financial landscape catalysed by an EU regulation called Payment Service Directive 2. The objective of this team is to leverage the current position of banks, manage upcoming challenges and guide them to exploit new opportunities. They assist by creating strategies, roadmaps and market analyses for their respective clients. They do this with a set of inhouse designed tools and processes.

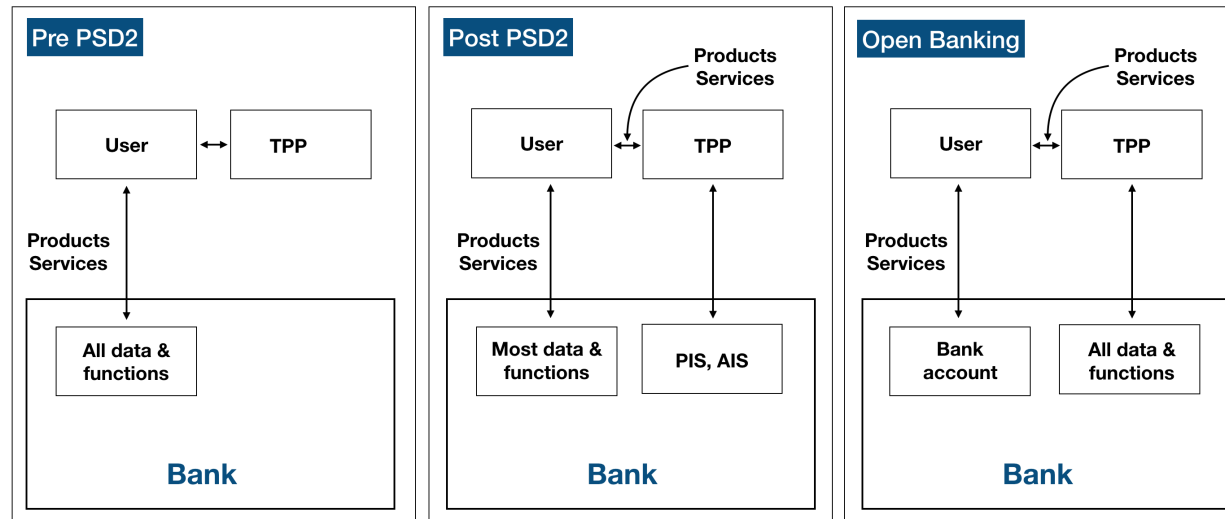
Change in the financial landscape

PSD2 came into effect on the 13th of January 2018. Accompanying PSD2, are regulation by way of technical standards, rules for various levels of customer authentication and requirements to ensure secure data communication. These additions are implemented on 14th of September 2019 (Botta, Digiaco, Höll, & Oakes, 2018).

PSD2 mandates banks to open up account data (transaction history and account balance) and payment functionality (ability to initiate a payment) to licenced Third Party Providers (TPP), for free, with the consent of its users (see figure 1). TPPs create tools that use data and functionality for different end goals. This could, for example, be the aggregation of account data to create an overview or the convergence of data for analytical purposes. These connections will change the relationship between the bank and its customer. Figure 1 shows that the user will have the possibility to use financial products and services through a TPP, potentially reducing the banks interaction with their customer.

The user

The financial department of a business has the relationship with a bank and other financial products and services. The financial department handles the financial assets and their interactions as well as creating financial strategies. Open Banking has implementations for these financial actions and will therefore affect the financial department.



The problem part 1: The uncertain use-case

PSD2 opens up Account Information Services (AIS) and Payment Initiation Services (PIS). Banks can open up more data and functionalities. We call this the concept of Open Banking. Figure 1 shows a simplification of Open banking. Open Banking is a trend that is still in its early phase. Banks are seen opening up their data and functionalities gradually but indicate to need time still. The Open Banking monitor (Cortet, 2019), a tool created by INNOPAY to show the 'openness' and 'adaptability' of individual banks, indicates that most banks are lagging behind in becoming 'masters of openness'. INNOPAY believes a reason for this lag is the lack of innovative use cases (Cortet & Stevens, 2018). Two factors are determined to influence this lack. No useable 'open' data decreases the amount of use case possibilities. Second is risk aversion by banks; more 'open' data leads to more risk potential.

For the for personal and business users, large amounts of licensed PSD2 TPPs are being established. Not as much for Open Banking. A reason for the lack of Open banking use cases is that banks need to open up for a use case to be implemented. The problem is that banks are reluctant to up more data and functionalities than required by PSD2. The reason for the reluctance is twofold.

First it takes time and effort and secondly it could result in more competition and risk as will be explained in this thesis. During this thesis, the aim is to find opportunities for business use cases enabled by Open Banking. Discovering the needs of financial departments and translating these needs into one or more use cases. These will need to be critically validated as they will form the ground on which Open Banking is promoted towards banks and financial product and service providers by INNOPAY.

Figure 1: Pre and Post PSD2 and Open Banking

The problem part 2: The race for innovation

Banks directed at businesses (Business Bank) have four primary forms of generating income. They charge interest on the wealth they lend, they invest, they charge fees for transactions and charge fees for the products and services they offer (DNB, 2018).

Interest rates are dropping (Brand, Bielecki, & Penalver, 2018) competition between lenders is picking up, and transaction fees are under heavy competition and regulation (Cardoso & Astuti, 2014). These developments leave products and services as the new enabler to differentiate and create a competitive advantage.

Creating innovative services can make or break banks in the upcoming years. That is why this thesis is so important. Innovativeness is a vital end goal throughout this thesis. It will be a metric in the decision-making processes. Open Banking experts will help determine the level of innovativeness.

1.2 // Design process methodology

“Designing is a special form of problem-solving. We speak of ‘a problem’ when someone wants to reach a goal, and the means to do so are not immediately apparent.” (Roozenburg & Eekels, 1995)

The double diamond from the UK Design Council (Council, 2015; Nessler, 2016) is used but modified it to the needs of this project (see figure 2). The interviews are split up in two segments due to the complexity of the user. The conclusions of both the interviews and the literature will be used to create a generative session with six Open Banking experts. The first ideation phase uses insights from the session. The session finds topics that requested further research. A multipurpose survey is conducted to validate existing ideas, generate new information and assess the potential market (market validation). The survey resulted in a richness of information, and specific insights are used during the second ideation phase. Selected ideas are turned into concepts. Six people are interviewed during the validation of the concepts.

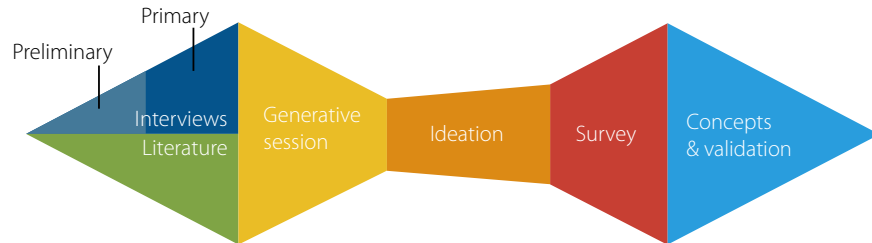


Figure 2: Double diamond alternative

Method Introduction

A variety of tools, techniques and methods are put forward for this thesis. Quantitative and qualitative research methods are used, as well as a literature review for research into the user and the (Open) banking environment.

Literature research

Literature research is a great way to gather substantial data during a design project since the combination of multiple sources allows for a comprehensive overview of a specific topic (Boote & Beile, 2005). Business banking, Open Bank-

ing and the financial department all required separate research since they were so different. The resulting insights are combined, clustered and used during the ideation phases of this thesis.

Qualitative research

Semi-structured interviews are an excellent way of gathering qualitative information as interviewees tend to tell a story around the given answer, creating more context (Seidman, 2006). For this reason, semi-structured interviews are used. To be able to compare data between interviews accurately, a semi-structured interview guide is developed. This interview guide follows the path of expression as described by Sanders and Stappers (2012). The ‘path of expression’ is a technique that allows interviewees to imagine a future by first thinking about the present (1), then the past (2) and by finding connecting layers (3) think about the future (4) (see figure 3).

Interviews are recorded and summarised. Insights are extracted from these interviews and grouped. These groups are further clustered into umbrella terms. Six preliminary interviews are conducted to create a clear view of the jobs, tasks, responsibilities and dynamics of the financial function. Ten primary interviews are conducted to extract insights into pain and gain points. Four interviewees were generous enough to allow both the preliminary and primary interview questions. As more data is gathered the type of emphasis changed, as shown in figure 4.

Analysis of the response from both interviews according to (Schmidt, 2004); summarised, clustered, coded and then grouped, resulting in insights.

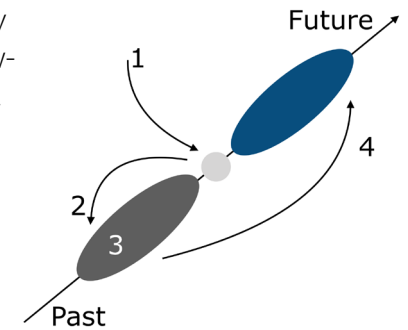


Figure 3: Path of expression (Sanders & Stappers, 2012)

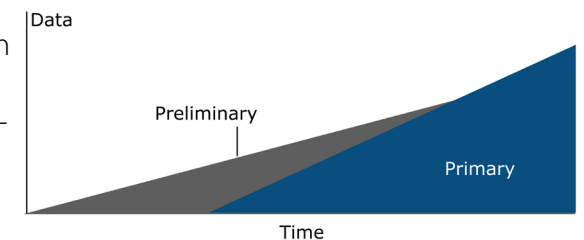


Figure 4: Interview emphasis timeline

Find the photos of the clustering and umbrella results in appendix 1

Find the interview guide in Appendix 2

Find the interview summaries in Appendix 3

Find the insights overview is found in Appendix 4

Generative session

Using generative sessions is a right way of finding latent knowledge as it allows people to use creative tools to visualise their thoughts, which in turn allows them to access a deeper level of knowledge and understanding (Sanders & Stappers, 2012). A session within INNOPAY is conducted to spark creativity and gain more insights into the world of Open Banking. Six Open Banking professionals attend this session. A presentation on the structure of the financial function is given (preliminary insights); then their pains, gains and problems are presented (primary insights). A template is handed out with these insights, and creative tools are used to put their expertise to use. The goal of the generative session was to create future visions (use cases of what is possible) for financial products or services. The expression of desirable future is used to structure the session as this is a structured technique for 'future visioning' (Simons, 2018).

The generative session design and results are in Appendix 5.

Quantitative research

A multipurpose survey is conducted. The survey included three survey methods as analysed by Fowler and Floyd (2013): a classic survey, a generative survey and a product assessment. For analysis purposes, respondents indicated the size of the company they work for, the role they had and a list of tasks they agreed they had in their job description. After came more specific questions. Sherlog research company helped with sampling the respondents and collecting the data (de Jong, 2019). The analysis was done according to Floyd & Fowler's (2013) method which was believed to be a structured and consistent method. The method was structured by summarizing the interviews and extracting important information then grouping these insights and clustering them.

Respondents sampling

With a margin of error of 10% and a confidence level of 95%, any sample size above 100,000 respondents would be enough (Daniel & Cross, 2018). Financial functions accumulate 285,185 (>100,000) jobs in the Netherlands (CBS, 2019). Concluding that 100 respondents is enough to make significant claims about the entire population of financial functions.

The survey, with 152 respondents allows for valid conclusions with a margin of error of 8% and a confidence level of 95%. Kranzbuhler (2019) confirmed that 150 respondents are enough for research into this user group.

The survey results went through an iterative process of analysis, insight, conclusion and meaning for three weeks one time a week in the form of a presentation and discussion with five Open Banking experts (see figure 5).

The survey design in Appendix 6

The survey results in Appendix 7

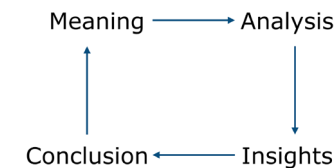


Figure 5: Iterative process of analysis

Decision-making process

Two iterative sessions are conducted after the ideation phases to discuss and enrich ideas. These sessions were meant to spark critical conversation, which aided in the design process. Attributes that are to be used during decision making resulted from these sessions. These attributes are used in a multi-attribute decision making model (MADM model). The multiple attribute decision making (MADM) model is a functional method of making a selection between concepts with numerous attributes (Mahdavi, Mahdavi-Amiri, Heidarzade, & Nourifar, 2008). These attributes are also re-used as a guideline for the validation interviews.

1.3 // Research question

From the problems, the following research question has been formulated and is answered during this graduation project.

What would an Open Banking use case look like for the business client of banks?

Four sub-questions have been formulated to answer the main question:

1. What is corporate open banking (and where is it heading)?
 2. What are the tasks and responsibilities of the user and to what extent are they satisfied with their current situation?
 3. What opportunities can be identified (recognized) for business clients?
 4. What would an innovative use-case resemble?
-

The use case first

The reason for starting with the use case is because both the user and the topic of Open Banking have interesting dynamics of complexity. The user is not one single type of person; it is a group of tasks and roles all with their dynamics. Open Banking is a single trend but surrounded by a variety of trends and industry changes. This complexity has led to a large variety of insights. To understand the link to the insights the use case is presented first, and all the functionalities are explained.

Let us start with answering the main research question: what would an Open Banking use case look like for the business client of banks?

Welcome to Mynance: The financial dashboard created for the business clients of banks enabled by Open Banking.

Introduction to Mynance

The future of financial product and service applications is an all-in-one omnichannel solution because it increases efficiency by having everything assessable in one place, everywhere you wish, together with complete interoperability (Kimber et al., 2018; Microsoft, 2018; n.a, 2018; Prabucki, Neuteboom, Christin, & Norman, 2018; Rana, Duncan, Peers, Kohli, & Phelps, 2019). For this reason, it is only logical to present the chosen products with an interpretation of this future vision.

Mynance is a single point of access platform using a standardised IT infrastructure which enables the needed interoperability (e.g. Berlin standards initiative (BerlinGroup, 2019), regulatory technical standards (EBA, 2019)), allowing for a homogeneous transfer of data between different actors.

1.3

// The financial concept: Mynance

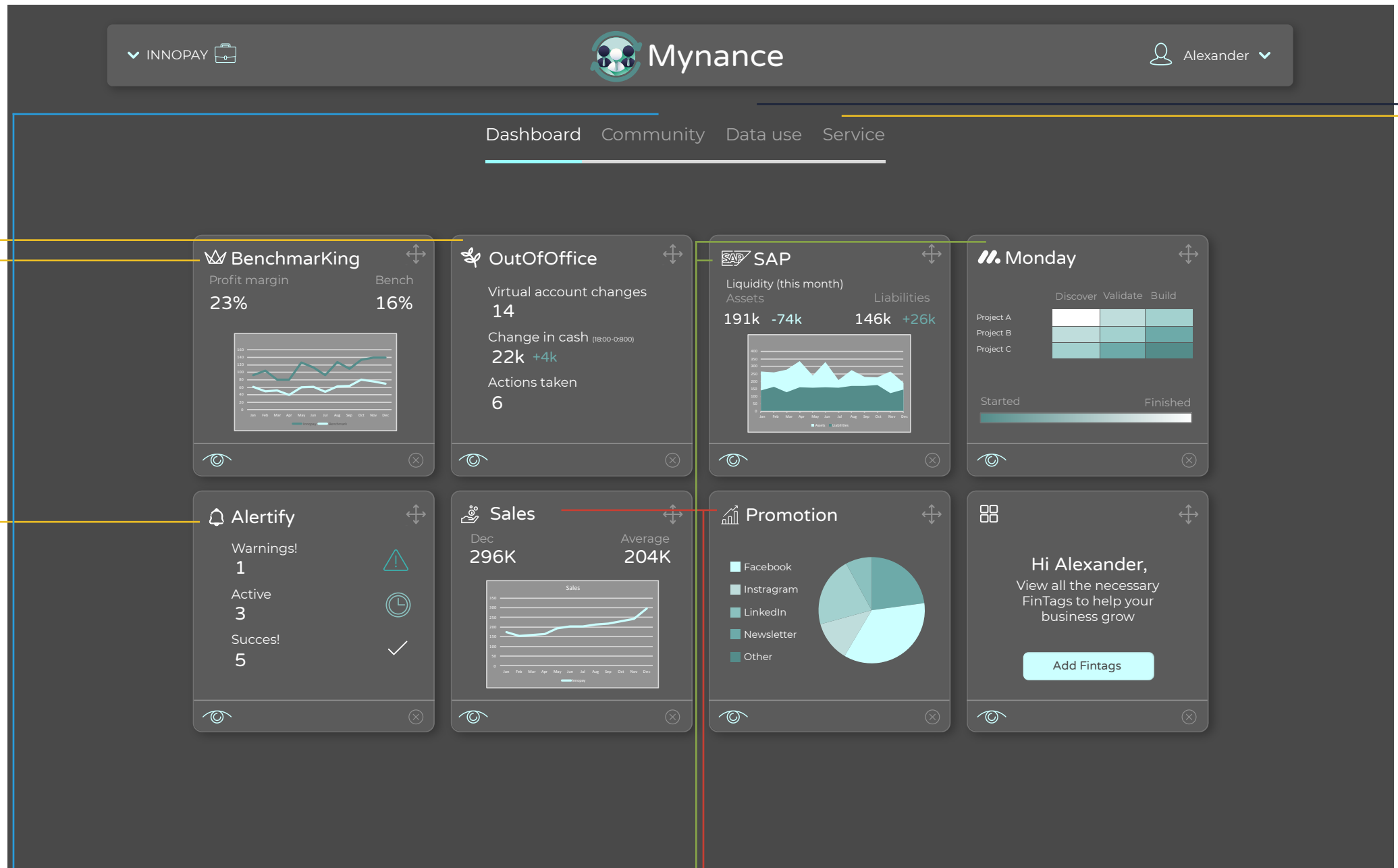


Figure 6: Mynance dashbaord

Dashboard interface attributes

The reason for designing a dashboard comes from insights and selection processes. As will be indicated during this thesis.

A well-designed dashboard interface encourages flexibility through a customisable user interface as every user can personalise it requested (Calitz, Bosire, & Lane, 2012). Every financial function can choose their own personal set up of products, services or company metrics with the use of 'Fintags'. Fintags are widget like mini interfaces designed for the Mynance dashboard. Users can choose what primary information occurs on these Fintags. Clicking on one will take you to that specific product or service. These Fintags are the eight boxes prominently displayed on in the centre of the screen.

The new product offers

The products and services created during this thesis will be displayed on this dashboard for presentation. An explanation of product features will further in the upcoming chapter.

The existing product offers

Already existing products will be able to create Fintags that can be placed on the dashboard. Fintags can be financial and non-financial. Examples of non-financial Fintags are an ERP system Fintag for quick insights into business resources. Alternatively, a customer-relation-tool-Fintag to quickly and easily find your customers details and orders. Or a business process management Fintag to keep track of all your project proceedings.

Company metrics

Having company metrics as a Fintag is a possibility. If one business-metrics needs to be closely monitored a financial function can choose to isolate that metric into a Fintag. Enabling the user to follow every slight alternation closely.

Community

Mynance offers three different community channels. The expert, internal and external communication channel. If consultation is required by an expert, Mynance offers an 'expert community' channel.

Mynance has a build-in internal and external messenger for quick and easy communication between colleges, clients or producers. Securely send pri-

vate files and documents. Increase efficiency by signing encrypted project proposals or contracts anywhere in the world. Call or video call into meetings without having to be in an office.

Agility

The Mynance dashboard enables agility across different business processes. Easily switch between products. Get support where required. Quickly move data around for fast and efficient analyses. Work from a laptop, a tablet or your phone, anyplace anytime.

Data use

In the medical field, the comprehending the usage of data enhances the willingness to share data (Hens, 2019; Kim, Sankar, Wilson, & Haynes, 2017). Ideally, this would also be the case for businesses. This principle translates into the design of a data-sharing overview. Knowing what you are sharing, what you are using, and why those specific components are needed will enhance the willingness to share data.

The overview will enhance awareness of data usage, indicate what is anonymised and give simple toggle options for turning data sources on and off.

Service

Excellent customer service is essential for every product and service (Caruana, 2002); for banking products and services (Broderick & Vachirapornpuk, 2002); for financial products and services (Eisingerich & Bell, 2006). The reason for this is it enhances loyalty, customer retention and product understanding by enabling participation between the customer and the product.

This is why Mynance has a section dedicated to customer education, the management of problems and the service of customers.

1.3.1

// Fintag: OutOfOffice

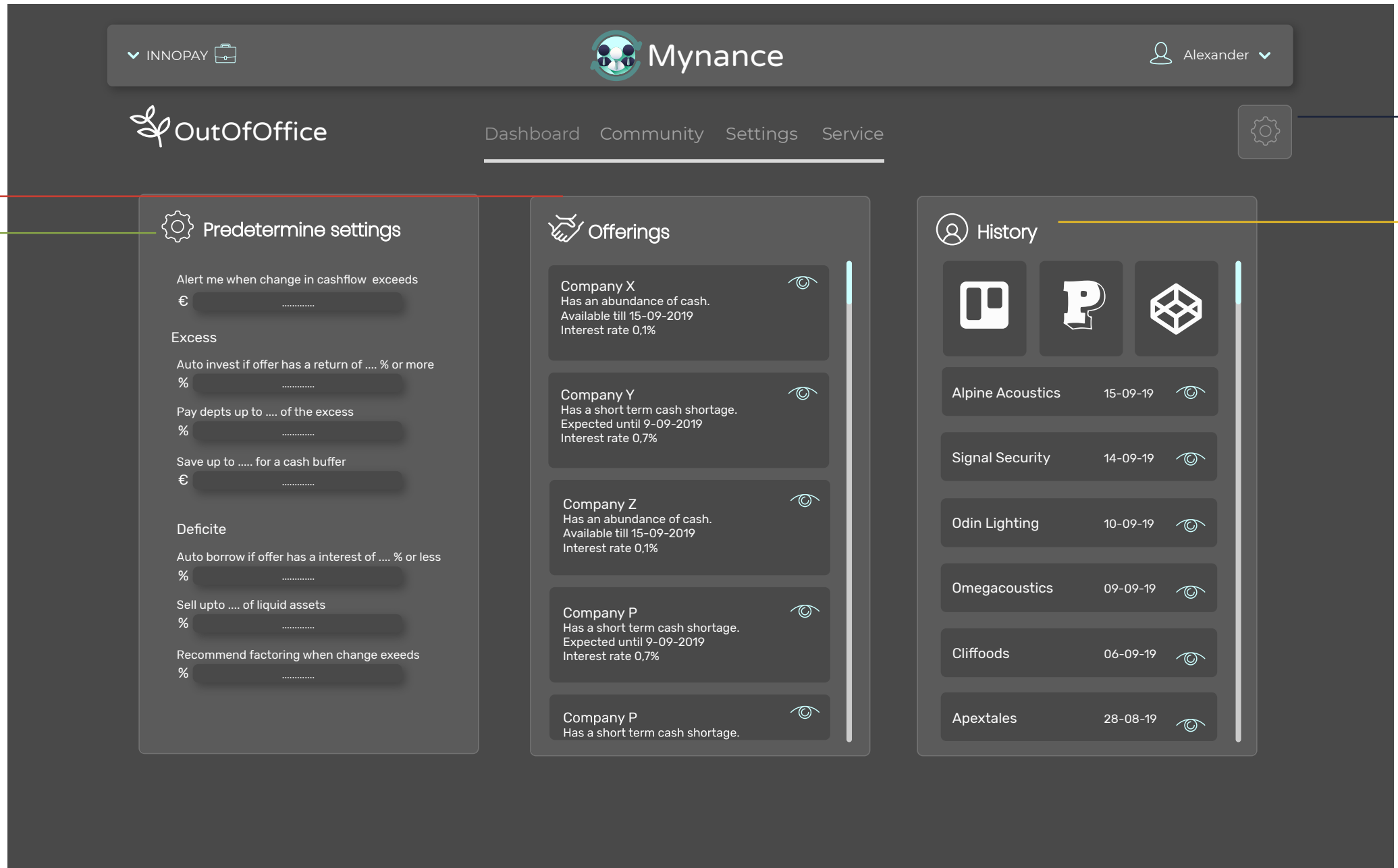


Figure 7: Fintag: OutOfOffice

Introducing the three 'Fintags'

This chapter introduces the three most innovative use-cases. The corresponding product features are explained to create a visual context of the result of this thesis. The use-cases are called OutOfOffice, Benchmarking and Alertify. These use cases can be seen on the left side of the dashboard introduced in chapter two.

Introducing OutOfOffice

The 09:00 to 17:00 transaction culture is changing to a 24/7, real-time and automated future. Even though this is believed to have a significant positive impact on the way business is conducted, it can be a burden for financial function as they are compelled to work 24/7. OutOfOffice helps them relieve this burden. Allowing for automatic liquidity management. If a cash flow changes with a specific limit, a notification is sent with recommended actions, or an action is automatically activated. Allowing financial functions to be active around the clock with minimal effort.

Setting

The primary purpose of this tool is to help relieve the burden of having to be on alert all 24/7. This is done through the use of predetermined settings. The financial function can choose to be notified when the cashflow rises or falls beyond an indicated level. After that, he/she can manually choose from a list of recommendations generated by OutOfOffice. They can also input information to have this tool automatically react to cash flow fluctuations.

Offerings

The middleman in a financial transaction is eliminated more often. The offering is designed to create a marketplace for borrowing and lending between businesses. A business with a deficit of cash can find another business with an excess and vice versa. Helping to promote business to business lending.

History

Keep track of all your transactions enabled by this product. The history gives an overview of all the automatic actions as well as all the actions through notifications. Frequently traded businesses will be locked at the top of the list for quick access.

Options

In the top right corner of the screen is the options button. The options button allows the user to choose what to see on the Fintag dashboard.

1.3.2 // Fintag: Benchmarking

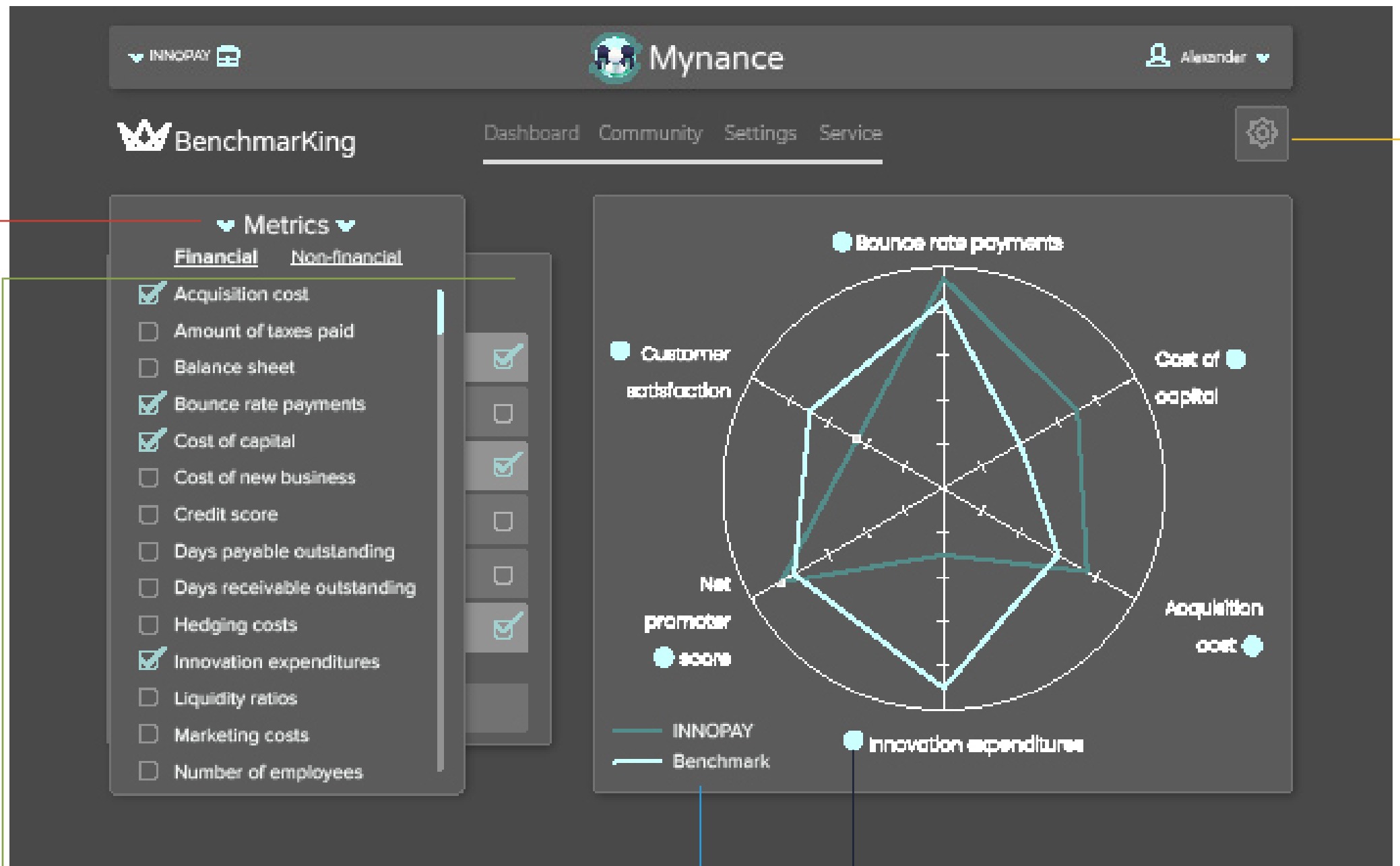


Figure 8: Fintag: Benchmarking

Introducing the Benchmarking

The Benchmarking allows businesses to compare current financial and non-financial metrics to specific segments of the industry. It creates a frame of reference for businesses to analyse their strengths and weaknesses, their pitfalls and their core activities. Enabling companies to combat issues and exploit opportunities accurately. Tracking their progress on the way.

Metrics

Benchmarks metrics can be chosen under the pop down 'Metrics'. This menu gives an overview of either financial or non-financial metrics. It has a search option to quickly and easily find what is needed. Most commonly used metrics are indicated, allowing insights into what others find valuable.

Segments

The preferred industry segment for analysis can be chosen within the segments menu. It is possible to select one or multiple segments depending on how specific the requirements are. An option to 'add/remove other' segments is on the bottom of the menu, making it possible to create a personalised overview of wanted and unwanted segments. (segments screen on page 68)

Overview of metrics

The radar chart displays multiple metrics in one quick overview. Metrics can be dragged around and be placed as desired. Float your cursor over the information button next to the metric name gives a pop-up overview. This overview contains a time chart of that specific metrics. Clicking on it will open up the 'extra information' window.

Extra information

The extra information window displays a detailed time chart of the clicked upon metric. It describes the data used to construct the metric and indicates the chosen segments. These segments can still be altered. There are extra options on this window to enhance the analysis. The period can be changed and to compare, other metrics from the radar chart are includable in the same time chart.

Market

External products can offer their anatomised data pool through the Benchmarking. Allowing customers to purchase a variety of additional financial and non-financial benchmark metrics. Providing financial professionals with an even more detailed overview for more supported decision making.

Options

In the top right corner of the screen is the options button. The options button allows the user to choose what to see on the Fintag dashboard.

1.3.3

// Fintag: Alertify

The dashboard features a top navigation bar with the 'Mynance' logo and user profile 'Alexander'. Below this is the 'Alertify' section with a navigation menu (Dashboard, Community, Settings, Service) and a settings icon. A left sidebar contains 'Options' (History, Advice centre, Tooling, Settings) with a warning icon next to 'Tooling'. The main content area includes a 'Warning' card with a 'Resolve' button, a line chart with a warning icon, and three 'Active' widgets: 'Sales of Product X after implementation tool Y' (line chart), 'Accounts payable open invoice summery' (pie chart), and 'Percentage of social media engagement' (pie chart).

Warning

Warning message: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Do consequat massa quis enim. Aenean leo ligula, porttitor eu, consequat nisi vel augue.

Buttons: Resolve, Ignore

Line Chart

Month	Value
Sept	450
Oct	200
Nov	300
Dec	450
Jan	400
Feb	350
Mar	300
Apr	250
May	200
Jun	180

Active Widgets

Sales of Product X after implementation tool Y

Sales chart showing data from Jan to Dec. Legend: Innopay.

Month	Sales
Jan	150
Feb	150
Mar	150
Apr	150
May	200
Jun	200
Jul	200
Aug	200
Sep	200
Oct	200
Nov	250
Dec	300

Accounts payable open invoice summery

Pie chart showing distribution of accounts payable by days.

Days	Percentage
0-10 days	10%
10-30 days	15%
30-60 days	25%
60-90 days	30%
90+ days	20%

Percentage of social media engagement

Pie chart showing engagement across different platforms.

Platform	Percentage
Facebook	25%
Instagram	15%
LinkedIn	15%
Newsletter	20%
Other	25%

Figure 9: Fintag: Alertify

Introducing Alertify

Using artificial intelligence and machine learning to identify business process patterns will help financial functions actively react to changes faster than humanly possible.

“Most humans seem to want to predict the future” Kalechofsky (2016). There is a lot to be won with prescriptive analytics (Koch, 2015; Nyce & Cpcu, 2007). This new form of analytics creates the ability to see danger or opportunity ahead and forecast a more accurate future.

Warning

A pattern is recognised. This recognition will alert the user and explain the pattern and the effect it has had on other businesses by visualising the forecast in a graph. It will ask whether or not the user would like advice. To which can be replied ‘resolve’ or ‘ignore’.

Active

Alertify displays work-in-process panels to illustrate the added business value of the product.

History

This option keeps track of all the past activities through Alertify.

Advice centre

If a glowing warning sign is flashing next to ‘advice centre’ it means that suggestions are generated. These suggestions are medium or low priority matters and will not trigger a warning notification. The advice centre is also available for matters that are not detected by Alertify. To help forecast new projects, for example.

Tooling

If a glowing warning sign is flashing next to ‘tooling marketplace’ a tool is being recommended. A pattern is recognised, and a tool is determined to be a suitable option to address this issue. There is a possibility to consult the tooling marketplace without a trigger warning. It will show other recommended apps or Fintags or offers for a search feature.

Settings

Multiple settings can be adjusted. Notifications can be turned on and off as well as calibrated (e.g. only high priority or also medium-low priority warnings). The number of ‘active’ panels displayed can be changed together with their content. The alternation of the interface display

Options

In the top right corner of the screen is the options button. The options button allows the user to choose what to see on the Fintag dashboard.

CHAPTER 2
Context

2.0

This chapter introduces the different pieces of context.

The first piece of context is the description of the user for who the concepts are designed. This chapter continues with 'business banks', explaining what they are and what they do and the relationship they have with the user. Finally, this chapter will give the definition of trend 'Open Banking' and explain different elements.

- 2.1 The user
- 2.2 Business banking
- 2.3 The shift of the financial industry
- 2.4 Open Banking

2.1 // The user

This chapter introduces the different pieces of context. The first piece of context is the description of the user for who the concepts are designed. This chapter continues with 'business banks', explaining what they are and what they do and the relationship they have with the user. Finally, this chapter will give the definition of trend 'Open Banking' and explain different elements.

The financial department

To understand whom the use cases are designed for it is crucial to understand the user. This chapter explains who the user is and what they do. A recent switch in roles will be explained, as well as the dynamic structure of the financial department. The specific tasks will be explained and put into context of the corresponding roles.

This chapter will conclude with insights into the present state of Open Banking knowledge, both personal and organisational.

Why the financial department

The financial department of a business has the relationship with a bank and other financial products and services. The financial department handles the financial assets and their interactions as well as creating financial strategies. Open Banking has implementations for these financial actions and will, therefore, affect the financial department.

The change in roles

The financial department is a build-up of four segments: scorekeeper, custodian, commentator and business partner (Jong, Boer, Roest, & Meijerink, 2017; Todorović-Dudić, 2015). Figure 10 shows these segments defined by two axes. Operational roles in the bottom left and strategic roles shown in the top right. In the past, the financial department had a more traditional and straightforward job description, but this position is changing rapidly. The financial department of today is becoming far more strategic (Baumgärtner et al., 2018; Cameron & Cunico, 2017; Microsoft, 2019; Phillips, 1997; Trocme & Svensson, 2018). Even though a duality in financial roles still exists, in the past the financial department was more focussed on upkeeping the books, create the financial reporting and pay and analyse the taxes, nowadays their focus is more on the

future, actively participating in the (corporate) strategy. They are creating strategic plans by thoroughly analysing financial and non-financial data creating more accurate budgets and forecasts and enabling companies to step into the future with more faith and confidence.

The reason behind this strategic shift is primarily due to technological advancements and the availability and speed of data processing (Baumgärtner et al., 2018; Kalatim, 2018; Wyman, 2018).

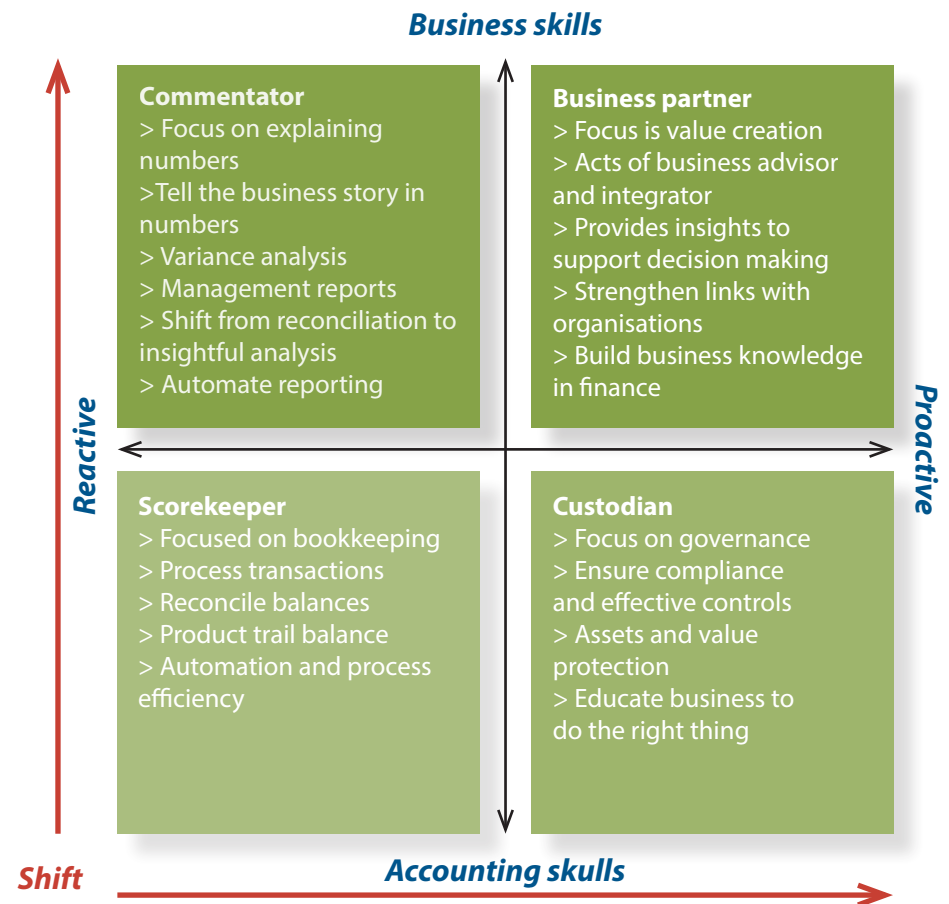


Figure 10: Financial department categories

Grasping the big picture

The financial department of large corporations is analysed (5-Billion-euro annual revenue or more). The hypothesis: to comprehend the dynamic, tasks and responsibilities within a financial department, it is crucial to understand the biggest, most significant picture first. After that, every financial department is just a smaller version.

For this, six high ranking personnel (CFOs, financial managers) are interviewed with varying strategic and operational roles.

Corporate dynamic

The financial department of a corporate is build up out of a set of roles or jobs shown in table 1. The six interviews, conducted within large corporations, brought forth this conclusion. Fan (2019) confirms this structure of jobs and roles. Table 1 shows these functions (Explanations in appendix 8)

Strategic
CFO
Treasurer
Financial planning and analysis
Operational
Controller
Accounts Payable
Accounts Receivable
Tax
Auditor

Table 1: Roles within the financial department

Tasks

Further research and interviews uncover the corresponding tasks. Table 2 shows the summarised version. See appendix 9 for the comprehensive 200+ list of tasks.

Role(s)	Tasks	Operational Strategic
Account payable	Improve the payment process	
	Keep track of all payments and expenditures	
	Pay employees and vendors	
Account receivable	Maintain accounts receivable files and records	
	Maintain the billing system	
	Generate invoices and account statements	
Both payable and receivable	Produce monthly reports	
Audit	Create an audit plan and report	
CFO	Develop and track KPIs that support the company's strategic direction	
CFO/Treasury	Increase profitability and cashflow	
	Risk management/mitigation	
	Develop financial strategies	
Controller	Issue financial statements (e.g. income statement, balance sheet, cash flow statement)	
	Detect financial crime or fraud	
Financial planning and analysis	Produce models to project long term growth	
	Create the annual budgets and forecasts	
	Analyse financial and operational results	
	Budgeting and financial planning	
Tax	Maintain insurance portfolio	
	Forecast future taxations	
	Ensure that taxes are paid	
Tax/Treasury	Ensure that the company complies with all legal and regulatory requirements	Both
Treasury	Forecast borrowing/funding needs	
	Forecast investment opportunities	
	FX management	
	Manage liquidity	
	Total tasks	130/155

Table 2: Summary of roles with respective tasks

Ensuring that a company complies with all legal and regulatory requirements as well as detecting financial crime or fraud is said to be both a strategic and operational task. They both require strategic planning as well as day to day control.

The remaining interviews are conducted at SMEs/smaller corporates. These size companies do not uphold the traditional corporate role structure. The tasks within SMEs and smaller corporates are similar to corporate tasks. Rejecting the hypothesis for the conformity of the structure of the financial department and confirming the hypothesis for the conformity of tasks.

For SMEs or smaller corporates, the financial department is more fluid. A job description is made up of bundles of different tasks instead of having a strict job-tasks structure like with large corporates. The following decisions are made to uphold the conformity of the results:

1. The financial department will be referred to as the financial function as not all business types have the same department-role structures.
2. Tasks will be used for all analysis instead of roles since they differ per business type.
3. Tasks will be separated by their strategic or operational nature (or both)

Understanding the financial profession

The financial function is a heterogeneous group of people with a large variety of tasks, roles and dynamics. This complexness translates into an extensive range in problems and insights. In this chapter, these insights are extracted from the primary interview's and literature research and explained in the respective segments.

See appendix 3 for the interview summaries.

Findings from interviews

The umbrella terms are summed up and given a brief explanation. They are grouped in operational and strategic insights. Corresponding functions from Mynance is indicated.

Operational

Foreign exchange market

The foreign exchange market can fluctuate, causing a warped periodic result. (e.g. If a daughter company in a different country is doing well, but the exchange market is not, the result of that company is negatively reported) "Having different entities show how your business is doing, not reflected in the market. If you have a good business year but with a bad currency market, then that can negatively influence another and vice versa" a CFO of a large corporation said.

Quality control

Internal benchmarking can be unclear or unmeasurable. "a heavy sum of money is paid to be at trade fairs, but it is next to impossible for me to calculate the ROI," said one controller. Another: "There are many different methods of calculating the increased efficiency. Which one is the correct one for us?"

Job repetition

Having financial information (data) come in at set times and having to input that data before certain hours restricts the flexibility of your agenda. My job has become a routine." Said the CFO of a small corporation.

Incremental liquidity data

The financial function is unable to get accurate insights into their cashflow because transaction information comes in in batches. (at different times from different locations). This incremental data creates an inaccurate view of the liquidity position. "For smaller companies, this uncertainty in liquidity can be disastrous or very expensive" a treasury manager of a large corporation explained.

Automation

A significant portion of interviewees has indicated to be actively researching or investing in opportunities to increase automation mostly for the operational side of the financial function.

Time-consuming operational tasks

Operational tasks can be time-consuming as they require manual labour. This can either be from inputting or withdrawing specific data or having to check transactions or other communications manually.

Operational and strategic

Too much software

An organisation usually has multiple service providers and tooling, that are not necessarily interoperable. "If I withdraw data from my ERP to my forecasting tool, I have first to input it into Excel. That removes all the formulas. I have to then manually add them again before I can export it into our treasury management system" said the finance manager of a medium-sized company.

Financial crime

A treasurer cannot always be sure if the payment it receives is 'legal' funds. He/she cannot be sure if they payment he sends out goes to the right person or a legal person or entity.

Strategic

Lack of benchmarking

For companies, a real advantage of knowing your position compared to others is evident, and this insight currently lacks. "If this specific information would be available that would help us strategically."

Regulatory compliance

Even though complying with new regulations is mandatory, it causes a great deal of distress. "The most annoying task is compliance surrounding GDPR," one CFO said, "It takes a lot of time and effort, and you get nothing in return."

Need for reliable forecasting

The forecaster is unable to create an accurate forecast because of lack of data, 'bad' data or other reasons, which reduces the value of the forecast because it contains more uncertainty. "I do not know how accurate the data is that I get. I have to trust the source."

Need for strategic decision-making

The ability to make reliable strategic decisions is limited as a result of the absence of correct underlying data. "When making strategic decisions, I want to be certain that I have taken all known information into account, and I need to know that this information is correct."

2.2 // Business banking

In this chapter, different types of banks are discussed. The four different business banking product and service categories are explained as well as the current relationship dynamic of these financial products and services and its client.

Incumbent banks and newcomers

Banks are categorised into two segments. Incumbent banks are well-known banks that have been around for a longer time. These banks are typically larger than newcomer (or challenger) banks. Newcomer banks are typically younger, smaller banks that are new to the banking industry. While incumbent banks still own the most substantial part of the banking industry, newcomer banks are joining the market with new innovative products and services. Table 3 shows the differences between incumbents and newcomer banks.

Incumbent banks	Newcomer banks
Bigger	Smaller
Older	Newer
Well known	Less known
High market share	Low market share
Slower innovation	Faster innovation

Table 3: Difference between incumbent and newcomer banks

Retail vs business banking

Retail banks are most well-known to consumers. Consumers know business banks less as they are directed at businesses; this thesis focuses on businesses. A business bank is the decided collective name for corporate banks and commercial banks. Table 4 illustrates the key differences between retail banking and business banking (Majaski, 2019).

Retail banking	Business banking
Small scale	Large Scale
A large number of clients	A smaller number of clients
Low processing costs	High processing costs
Medium level relationship	High-level relationship
Lower value transactions	Higher value transactions
The visible face of a bank for the general public	Some not so well known among the general public

Table 4 Differenced retail vs corporate banking (Majaski, 2019)

What is business banking

Business banks are any bank offering products or/and services directed at businesses. Business banks are usually under the same roof as a retail bank. For example, ING (a major Dutch bank) offers retail customers services, but also has a business division called ING Wholesale. Like a retail bank, business banks offer bank accounts, credit cards and loans aimed at businesses, but they also offer more. Business banks offer all kinds of services like managing cash flow, underwriting payments, letters of credit, insurance, treasury products, trade finance, payroll accounts and exchange services. (Thomas Scharr & Pfeiffer, 2015). Every financial action in a business has a wide number of products designed for it. For further explanation, table 5 shows the four business banking product categories (Weston, Val Srinivas, & Jacob, 2016).

:

Product category	Examples
Deposit and other transactional services, financial product services	Checking account treasury/cash management Term deposits Payments Payroll services reporting
Credit and loan products	Line of credit Letter of credit Term loans Working capital loan
Investment and capital market services (corporate-oriented)	Merger and acquisition advisory Underwriting Commodities trading Exchange trading Trade finance
other financial product services	Investment management International banking Retirement solutions Insurance

Table 5: Business banking product and service categories (Weston et al., 2016)

The financial product and service provider landscape

Banks are not the only party offering financial product and services. A large number of players make up the financial product and service scene. The financial software directory exhibits more than 7700 financial product and services created by 3100 providers (Browning, 2019). It comes to no surprise that in a survey conducted by BCG, 75% of the respondents indicated needing help to navigate this complex landscape[of products and services], and are even willing to pay for such guidance (Barbey et al., 2018).

A financial product and service provider is a business offering any product or service bases around financial processes (Reynolds, Primeaux, & Spoth, 2019) ranging from banks to accounting software, from investment solutions to personal financial planners.

Dynamic (see figure 11)

Businesses use a variety of financial products services. For small or medium businesses (SMEs) offerings like liquidity management and credit solutions are more popular, while larger corporations are more likely to use investment tools and enterprise resource programs (ERPs). The offerings are not as important right now as the different dynamics of the systems in which these financial product and services operate.

SMEs

Currently, there is no direct real-time banking connection available for SMEs. Small-medium enterprises or SMEs have one or multiple accounts with their bank. They use financial products or services created by a financial product and service provider. In order for these financial solutions to function, they need bank data. Little to no connection between the bank and a financial product and service provider exist. Some screen scraping solutions are available (extracting human-readable data). Some solutions use downloadable data sheets which are either manually or automatically input into such solutions. What they have in common is that they are not direct connections nor real-time.

Large Corporations

Large corporations tend to have large ERP (enterprise resource planning) systems in place to help them manage their resources a large/massive scale. (Krijnsen & Velthuisen, 2016). This software is designed to help with internal business processes. Financial processes a corporate are managed through treasury management systems (TMS). These systems are expensive to purchase and maintain, and difficult to alter when needed (e.g. merger or acquisition) (Daas, Graaff, Vermeulen, & Koene, 2018). Because of their size, large corporations have significant bargaining power with banks and can leverage this power to create a dedicated private Host to Host (H2H) connections. These connect their software systems (ERP, TMS) to their banks in real-time (ING, 2019). H2H systems are expensive and only lucrative for the largest corporations in the world (Singh-Jarrold, 2017).

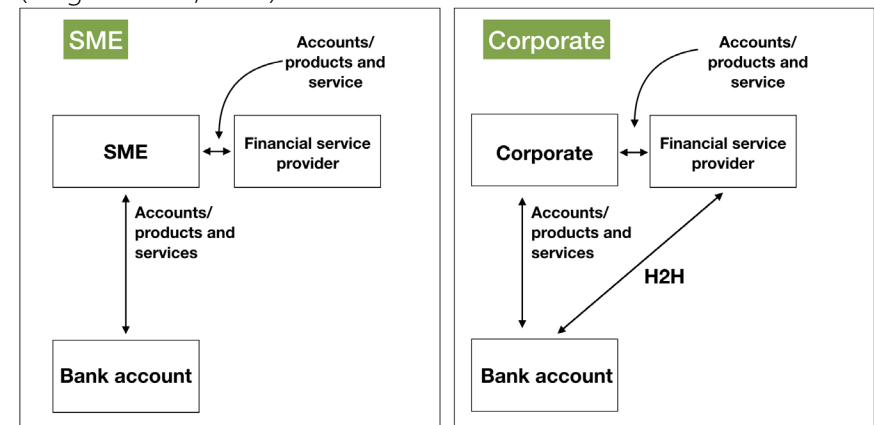


Figure 11: Bank connection with financial product or service provider

Conclusion

SMEs are unable to connect their bank directly and in real-time to their financial products and services. For large corporations, an H2H connection is sometimes possible but expensive and only lucrative for the largest corporations of the world. It would be ideal for all businesses to be able to have an inexpensive, direct connection between their bank and financial product or service provider. This ideal is becoming a reality by a shift in the financial product and service industry.

2.3 // The shift in the financial industry

The financial product and service industry is experiencing a transformation. This innovation is driven by technology, competition and consumer expectations, catalysed by regulation (Coldrey, 2018; Finastra, 2018; Kimber et al., 2018; Rana et al., 2019; F. Reynolds, 2017) (see figure 12). This chapter will explain the three different transformation elements. The chapter will conclude with an explanation of the regulatory changes.

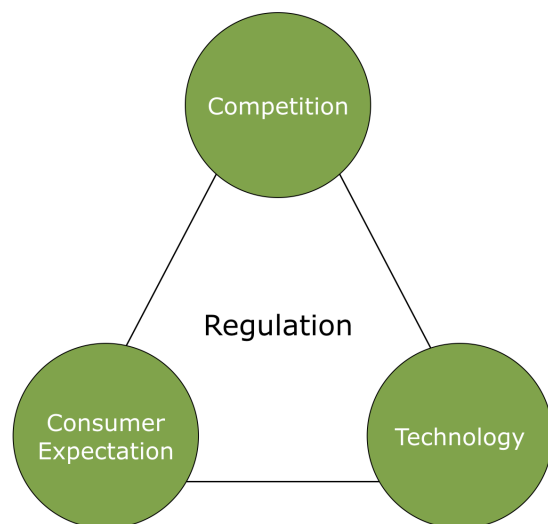


Figure 12: Financial innovation drivers

Consumer expectations

Consumers are surrounded every day by products and services tailored to their specific needs. Consumers expect user-friendly, fast and intuitive designs. This expectation is no different for business users. They want their financial product and services to be transparent, convenient, reliable, fast and secure.

“Despite the emergence of challenger banks and FinTechs, there is a gap between the increasing expectations of SMEs and what is being offered by incumbent players in the market” (Kimber et al., 2018).

“While those making and receiving payments generally have little understanding of how their digital payments happen, they do expect a convenient, reliable, fast

and secure payments experience” (n.a, 2018).

“As the future of European payments takes shape, insights are apparent: banks need to respond to customers’ rising expectations for transparency, convenience and speed.” (Agarwal, Eroglu, Kotthaus-Krahmer, Mallick, & Grünhage, 2019)

Competition

Competition is increasing as challenger banks, and Fintechs are joining the financial product and service industry with new and innovative user-friendly products and services. Incumbent banks need to keep adapting their innovation strategies to avoid losing market share to new entrants. For the consumers, this competition will lead to better products, more tailored to everyone’s financial product and service needs (Kimber et al., 2018).

“The traditional banks have also been facing increased competition from innovative financial technology firms (FinTechs) focusing on niches within the payments value chain.” (n.a, 2018)

“At the same time, they may also find themselves ceding control of large parts of the customer interface to competitors or even non-banks.” (Colin Heath et al., 2018)

“This powerful combination of technology advancement and regulatory change has the potential to create the perfect storm for competition in the B2B payments market.” (Stephenson, 2019)

“the UK driving Open Banking initiatives to increase competition, encourage new entrants and disrupt the status quo and create a new playground for new business models.” (Rana et al., 2019)

Technology

Technology has been at the forefront of disruptive innovation for multiple decades (Berman & Hagan, 2006; Habtay, 2012). The financial product and service industry is no exception. Technology is contributing to faster ways of gathering, analysing and securely transferring data anywhere on the planet. Bringing financial professionals together and growing businesses to never before seen sizes.

“The checklist of potentially game-changing technologies continues to grow and drive customer expectations.” (Rana et al., 2019)

“Open Finance, starting initially as legislation in the UK in 2017, has driven what is essentially a disruptive technology-based transition in the banking industry.” (Accenture, 2018)

“APIs not only represent a quicker and more cost-effective method of integration but also offer a transformation in the way we manage treasury information.” (Stark, 2018)

“Strong API Developer Portal capabilities are key to winning in Open Banking” (Cortet & Stevens, 2018)

For now, it is crucial to understand APIs. APIs are what enables openness. An API can be described as a messenger that takes requests from a user and tells a machine what to do and feeds information back. Think of a restaurant with a menu to choose from, and the kitchen as the place food is cooked. An API is a waiter; taking your order and bringing the food. In a food court, there could be multiple waiters all bringing something you ordered, back to one place. This is what happens for the more digital example of comparison websites. They aggregate information from multiple sources through the use of APIs to one single location. Figure 13 shows a simplification of an insurance comparison website with six API connections to different insurance companies. Data from an individual insurance company is requested (an API call) and send towards the comparison site.

The three different types of APIs are private, partner and public. Table 6 shows the characteristics of these APIs. PSD2 data and functionalities mandate Open APIs as API calls are not allowed to be monetised. Nothing is said about Open Banking so Open banking enabled data could also be offered through partner APIs.

Private API	Partner API	Open API
> Internal data sharing	> Exposed to authorised partners	> Available to the public with no restrained in access
> Effective data sharing	> Can be monetised	> Useable by everyone
> Secure	> Secure	> Innovation through engaging the developer community (Botta et al., 2018)
	Open Banking	PSD2/Open Banking

Table 6: Types of APIs

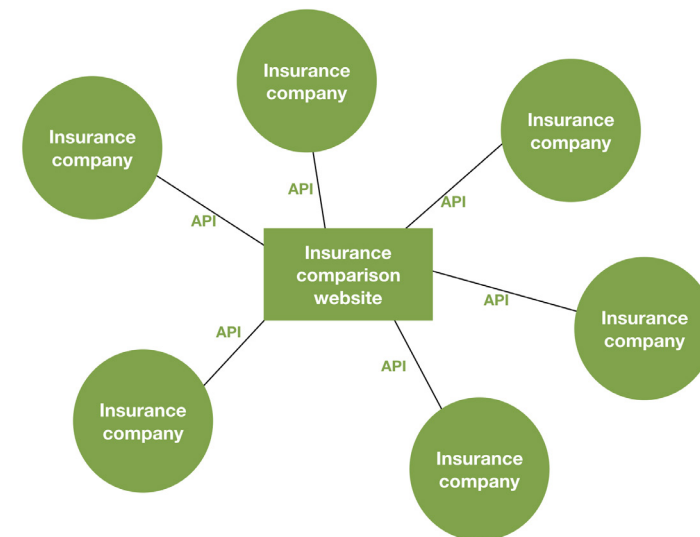


Figure 13: A comparison website collecting API calls

Regulation

PSD2 is the first regulation in the world to focus on opening up the banking system. Different regulations have followed all over the world, catalysing innovations in the financial product and service industry.

PSD2

Payment service directive 2 or PSD2 aims to stimulate more competition and innovation and remove the barriers for new entrants to the European payment market (Fritsch, Marechal, & Christov, 2018; Gałkowski, Podgajny, Jankowski, & Maruszczak, 2019). PSD2 mandates banks to open up data and functionality to licensed Third Party Providers (TPPs). A 'thirds party provider' is defined as a party collecting data and functionality from one or multiple banks to deliver value-adding products or services to the user.

PSD2 mandates banks to use APIs to allow third parties real-time access to AIS, CAF and PIS data/functionality. An explanation of AIS, CAF and PIS can be found in table 7.

“The objectives of PSD2 are to make payments safer, increase the consumers’ protection, foster innovation and competition while ensuring a level playing field for all players, including new ones”.(Stephenson, 2019)

“Its main objectives are to drive increased efficiency, competition and security while encouraging lower prices for payments.” (Rana et al., 2019)

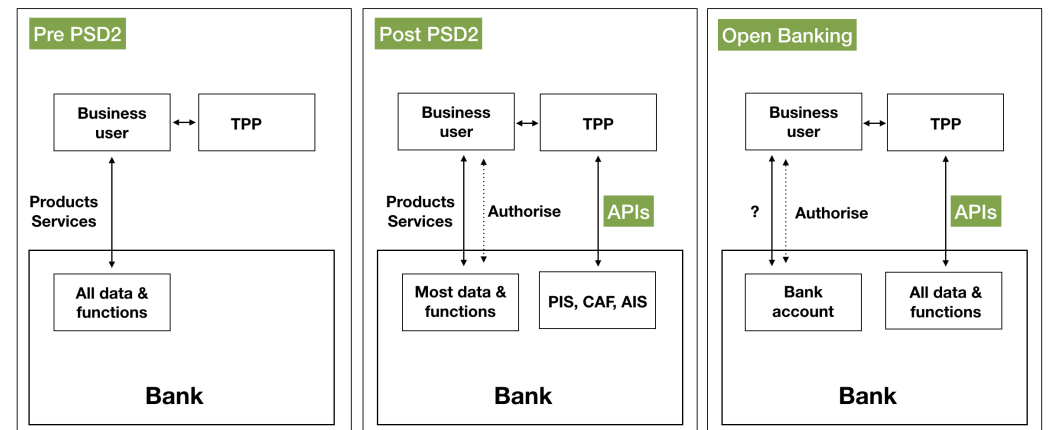


Figure 14: Open Banking and TPPs

PSD2 service

1 Payment initiation services (PIS)	Allowing a third party (TPP) to initiate payments from your account
2 Confirmation of availability of funds (CAF)	Reviews the current account to see if enough funds are available for the required transaction
3 Account information service (AIS)	Allowing a third party (TPP) to access your account(s) information

Table 7: PSD2 services

2.4 // Open Banking

PSD2 mandates three data/functionalities to be opened up through APIs. Open Banking refers to opening up all other bank resources. TPPs can use these bank APIs (1), together with external non-financial APIs (2), to create new products and service offerings (3) for the business customer (Figure 15).

The INNOPY definition is used to explain Open Banking: “Open Banking is defined as a business approach in which value creation results from sharing, providing and leveraging access to bank resources. Data, processes and other business capabilities of banks are made available to an ecosystem of Third Parties (e.g. Fintechs, technology vendors, corporate customers) through application programming interfaces (APIs)” (Cortet & Stevens, 2018)

Data, processes and other business capabilities of banks made available
Banks offers a large variety of products to businesses, both small and large (chapter 3). A bank has more resources than the products in its portfolio. These resources include different types of bank information, a variety of accounts, banking action other than payment initiation, and privacy or security standards (Colin Heath et al., 2018) figure 16.

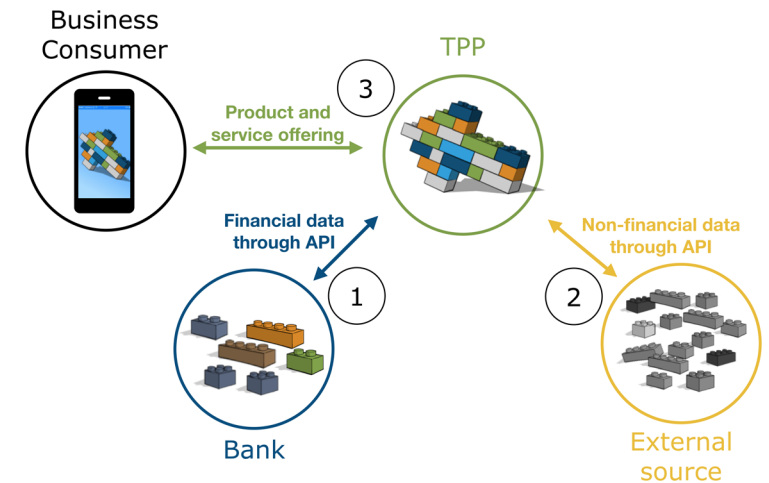


Figure 15: Creating value using Bank data and data from external sources

An ecosystem of Third Parties through application programming interfaces (APIs)

Major consultancies reached a consensus that additional value is created if banks businesses and TPPs work together in a data-sharing ecosystem. Allowing for a wide range of products and services, benefiting all stakeholders (Baumgärtner et al., 2018; Cortet & Stevens, 2018; de Groote, O. Bonte, R. Peters, & K. Simons, 2017; Eckermann, S. Heidegger, H. Röhrig, M. Santos, & S. Zahn, 2018; Kimber et al., 2018; Lal et al., 2019)

Using API technology allows banks to open up to third parties and allows third parties to open up to each other. This connected openness can create an ecosystem of financial product and service providers.

Account resources	Identity resources	Managed resources	Derived resources	Transaction Types	Bank capabilities	Bank resources
Current	Name	Mandates	Behavior	Credit Transfer	Business processes	ATM
Savings/Deposit	Address	Whitelist	Credit Score	Int'l Payment	Technology	Branches
Loan	Gender	Blacklist	Preferences	Domestic payment	Algorithms	Opening times
Credit card	Date of Birth	Consent		Direct Debit	Sanction screening	Exchange rates
Mortgage	Email			Payment mgt (return, recall)	Fraud checks	Prod. catalogue
Investment	Mobile number			Buy/sell shares	AML checks	
Pension	CoC number			Signing	Settlement hub	
Crypto currency				Amend managed/identity resources	Privacy standards	
					Security standards	
					Pseudonymisation	

Figure 16: Banking resources

Open Banking Threats for: Banks

1. Incumbent banks used to have a monopoly on all aspects of the value chain. All data generated by their clients was their property. They also offered banking products. If someone did not like that, the only thing someone could do is switch to another bank which had the same power. The reason for the worldwide wave of regulations is to increase the competition and strip banks of this monopolistic power. Returning the control of data to the consumer.
2. This competition can drive down their revenue due to competitive pricing. As a result of PSD2, banks will lose market share over PIS, CAF and AIS capabilities. Open Banking will only increase the competition for more capabilities by opening up more data and functionalities.
3. Losing touchpoints with their customers poses a significant threat to banks (Kimber et al., 2018; Skan, 2015). There will be less need to use banking products and services as more data and functionalities can be accessed through TPPs.

TPPs

1. Removing barriers for new market entrants is one of the reasons for opening up. As a consequence, the competition will increase for TPPs as well as banks. They will need to adapt to changing consumer expectations and compete on price, product and service while keeping a high-quality standard (McIntyre & McFarlane, 2018).

Consumers

1. For the consumer data, privacy and cybersecurity are ongoing topics of attention for any new digital innovation. For businesses data leaks or breaches could have catastrophic consequences. By law, financial product and service providers are obliged to take every available measure possible to counter potential threats. Many banking data breaches have proven the effectiveness of that law (Camillo, 2017).

Open banking opportunities for: Banks

1. The more a bank opens up its resources, the more possibilities can be constructed to create value. Like playing with building blocks. The more blocks someone has, the more creations can be conceived.
2. Another opportunity for banks is to join the TPP ecosystem. Creating their own (bank branded) TPPs will retain the connection with consumers and possibly even create new ones.
3. Banks stand to lose revenue due to competitive pricing; Open Banking allows them to monetise API calls that are not PSD2 services (need to be free of charge by law). This will generate additional income which can compensate or even contribute revenue.
4. Banks that open up the most capabilities the quickest create opportunity. Doing so could result in use cases regaining customers strictly on product capability (Gozman, Hedman, & Olsen, 2018).

TPPs

1. TPPs have the opportunity to compete for products and services previously offered by banks.
2. TPPs can gain user touchpoints previously owned by banks. These touchpoints can be used as leverage for future partnerships or collaborations. They could also be applied to enhance business models (e.g. marketing, advertising)
3. Open Banking opens up a vast amount of data. Leveraging this financial data potentially with non-financial data could result in products not yet experienced by financial professionals.

Consumers

1. Consumers and businesses are on the receiving end of this innovation. They will experience new product and service offers.

Further insights

Additional insights are accumulated while researching the context and establishing the threats and opportunities of Open Banking for financial function. These are the essential insights split up into pains and gains.

Gains

Instant payments

New instant payment schemes are emerging that could have serious implementations for the financial function. "Real-time payments and 24/7 settlement will change liquidity dynamics profoundly". (Fellowes & Kawaguchi, 2018)

Automation possibilities

Process automation for the financial, administrative tasks are created yet more potential for automation is possible. Combined with big data, opportunities for fraud prevention and analytic capabilities arise. When combining artificial intelligence (AI) and robotic process automation (RPA), possibilities are created (Nordea, 2019)

Pains

Unclear overview of service offerings

The amount of services surrounding the financial function is overwhelming, and the overview is sometimes murky. "75% of financial employees say they are willing to pay for advisory services that help them navigate complexity" (Barbey et al., 2018)

Lacking user experience

Due to current digital product and services in everyday life, the financial function expects the same ease from their products. "Today's corporate banking clients want the efficiency and convenience they experience every day on retail web-sites such as Amazon and eBay" (Strauß, Gotteberg, Kude, & O.B., 2018)

Underdeveloped analytic capabilities

Companies do not have the right tools in place to create the insights they wish. "75% of respondents are not actively monitoring key risks using "at-risk" measures. This inconsistency in tools creates a significant opportunity for the financial function to invest in technology to deliver more sophisticated real-time analytics." (Cameron & Cunico, 2017)

Undeveloped customer journey

The customer journey needs reshaping for the 21st century. "Services and experience often fail to meet the needs of SMEs, presenting a sizeable opportunity for institutions that can deliver an exceptional customer journey." (Kimber et al., 2018)

Cybersecurity

Cyber-attacks are occurring more frequently and more intensely and is consequently becoming an essential topic of discussion. 43% of all companies and even 19% of charities experience a cyber-attack of some sorts every year (Vaidya, 2018).

Need for a single interface

A large amount of fragmentation in the financial product and service industry makes it challenging to create a fully inoperable system for a company. "The ultimate goal is the provision of a single experience for customers through one interface – one seamless end-to-end journey to the desired customer outcome." (Rana et al., 2019)

Potential for shared finance

The 'shared business model' is creating value in different parts of the economy. Financial shared product/service business models have seen little investment even though their added value is proven. "Finance shared service centres drove significant gains in terms of process efficiency and economies of scale." (Wensveen, Iepeak, Cecil, Gupta, & tjandra, 2013).

Generative session

The insights from interviews on page 17-20 and the insights on the previous pages are combined and used for an internal generative session. The objective of the generative session is creating future visions for financial products or services is. The reason to have this session at this point in the process is to use INNOPAYs Open banking team's knowledge before any design direction was laid out. Meaning that the six Open Banking experts that participated during this session had all the creative freedom possible.

The participants were given a template on A3 with all the insights in one or two words to connect, draw and write on as they wished. They were also given A4s explaining all the insights and A4s with the financial function. The insights and the financial function structure were presented beforehand so that the A4s were used as a reference.

After the presentation, the participants were given 45 minutes, split up in different rounds, to create future visions and write/draw these visions down on templates. These templates, as well as the video recording from the session, is later analysed. The results are summarised below.

The future visions created during the generative session formed the base for the first ideation phase.

Its is highly recommended to look at the results in appendix 5 for generative session result summary as this is used for the first ideation.



Figure 17: Generative session

CHAPTER 3
First design

3.0

This chapter introduced the first ideation phase that resulted after the session. It will then continue to explain the survey that analysed three ideas from the ideation phase as well as create more context of the financial function and the state of play with regards to Open banking.

3.1 Ideation phase 1.0

3.2 Survey

3.1 // Ideation phase 1.0

The reason for starting this initial ideation phase at this time in the process is to get more feeling of what the gathered insights could be used for. The generative session was a great steppingstone as it created an overview of possible insights that could potentially be connected.

Ideation phase one is executed to steer the solutions from the session together with previous research into a more tangible and substantial design direction. This is done by using morphological analysis bases on the session results in appendix 5. Belaziz, Bouras, and Brun (2000) explain that using a morphological analysis is an effective way of combining different product attributes into one or multiple products. The generative session results overview is printed out, and ideas are linked together creating the foundation of the first set of ideas. Discussion within INNOPAY led to the enrichment of ideas. This ideation phase brought along six product/service concepts. As these ideas are build up out of different data and functionalities, these ideas will be displayed as schematic representation and not actual product sketches.

The business passport

Figure 18

Addressed insights

Fraud/financial criminality
Information partnerships
Trust
Connectivity Security

Function

This idea is meant to combat the threat of financial crime by creating a platform on which businesses would need to register with their bank ID. When registered, companies can safely transfer assets (financial or data) between actors. This platform uses transaction data to run fraud prevention analytics. This platform creates a trust enhancing secure ecosystem.

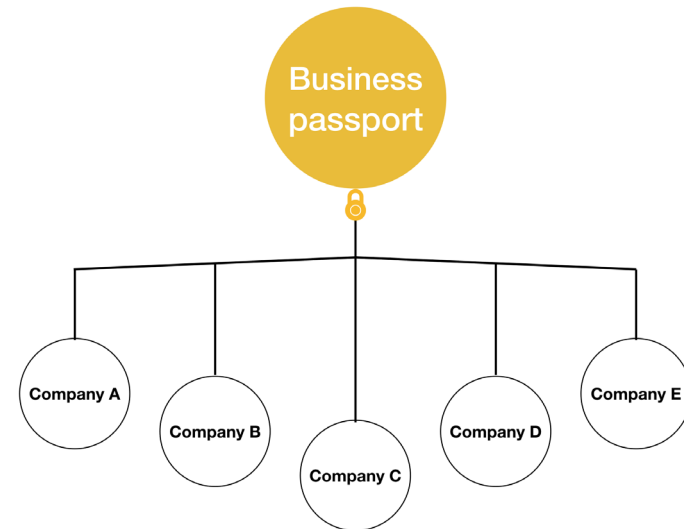


Figure 18: Business passport

Data quality tool

Figure 19

Addressed insights

Forecasting quality
Information needs
Too much software

Function

High-quality forecasting data is challenging to obtain. This concept enhances the amount of useful data by bundling historical forecasts and extracting useful forecasting metrics. This concept analyses history business data in combination with external data and recommends what extra data would be helpful to enhance forecasting quality.

Tooling recommendations

Figure 20

Addressed insights

No clear overview of service offerings
Interpretability of software
Administrative tasks are time-consuming

Function

This concept will help you navigate the world that is financial product and service providers. It is a repository where financial product and service providers can apply. Recommending products according to client's product feature needs as well as other manual input wishes (e.g. price, language, etc.). Businesses would have fitting products and services provided to them as well as service providers getting feedback on services clients indicated to need.

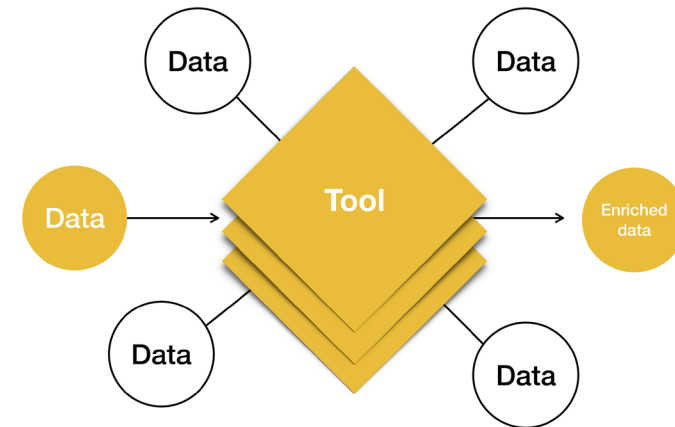


Figure 19: Quality of data tool

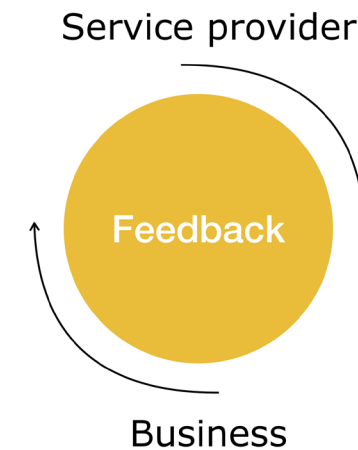


Figure 20: Tooling recommendation

Automation recommendations

Figure 21

Addressed insights

Job repetition

Administrative tasks are time-consuming

Foreign exchange

Cash flow

Function

Too many tasks on the administration side of the financial function still have to be done manually. This labour-intensive work is time-consuming and results in human errors. This concept focusses on relieving this pain by creating automation recommendation. It works by actively detecting errors so that users know which processes need extra attention or automation investments to reduce manual labour. This concept would collect error frequencies across their clients to be able to identify faster and proactively advise further steps.

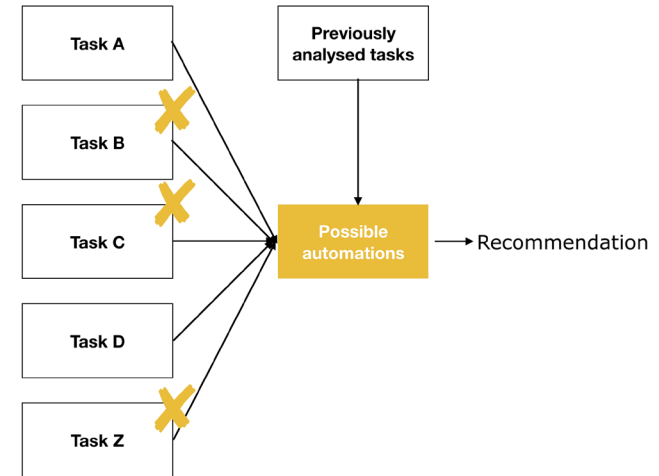


Figure 21: Automation recommendations

Tikkie© for credit scoring

Figure 22

Addressed insights

Fraud/financial criminality

Trust

Information partnerships

Function

If you are a supplier of good or services, how do you find out if a party is going to be able to pay you in time or at all? This concept allows businesses to send credit scoring request to clients. Someone sends a credit scoring invitation and when accepted this concept to analyses the receiving party's financial history without sharing any sensitive information. Feeding only a credit score back to the sender.

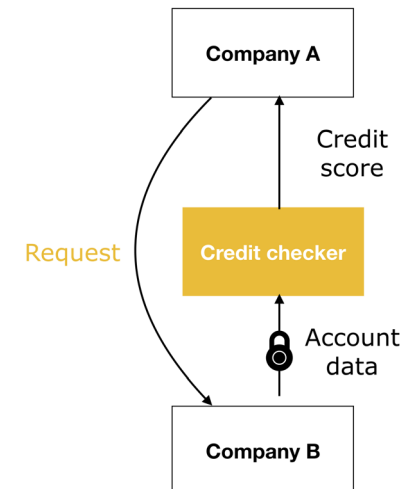


Figure 22: Tikkie for credit scoring

Benchmarking metrics

Figure 23

Addressed insights

- Quality control
- Benchmarking external
- Information needs
- information partnerships
- Forecasting
- Trust

Function

There is a real value from knowing your position in a market (Elmuti & Kathawala, 1997). It can help companies overcome or even navigate past hurdles that otherwise would have held them back. Understanding your strengths and weaknesses allows for effective future investments and forecasts. Companies are reluctant sharing information among each other and with good reason. Business data can be sensitive for the competitive and needs to be carefully handled. This concept helps with both these issues. It anonymises all company data, financial or non-financial, and calculated metric averages across specific business segments. Letting you know where you stand.

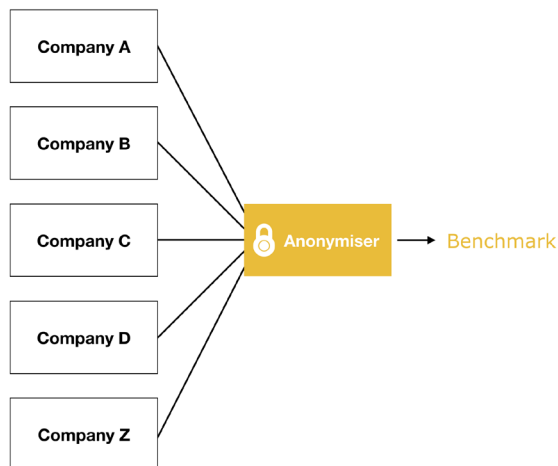


Figure 23: Benchmarking Metrics

Ideation ranking

A multiple attribute decision-making method is used to decide which idea will be used to further the design process. The multiple attribute decision making (MADM) model is a functional method of making a selection between actors with numerous attributes (Mahdavi et al., 2008). No weight has been supplemented to the attributes as all are difficult to measure and are estimated to be of even impact and importance. (table 8)

The decision-making method is made up of three attributes:

1. (Correlation) with the topic Open Banking.
2. (Alleviation) Is the idea useful for the financial function?
3. (Liberation) How much would this impact the business overall?

	Business passport	Data quality	Tooling	Automation	Credit scoring Tikkie	Benchmarking
Correlation	2	4	4	3	3	5
Alleviation	4	3	2	4	2	4
Liberation	2	2	3	4	2	3
	8	10	9	11	7	12

Table 8: MADM model ideation phase 1.0

Conclusion

Three Ideas from the ideation phase are rated the highest. First, the benchmarking tool. A tool truly enabled by Open Banking. Second is the recommendations for automation as this had a significant impact on both the financial function and for the business. It does slightly lack the Open Banking topic aspect and therefor Open Banking value demonstrated. Data quality tool placed third. It uses banking and possibly non-financial data and functionalities. There is not enough data gathered to specify this idea to make substantial assumptions on the impact on a business. Further research is needed to investigate what data needs to be enriched. The rest of the ideas are not discontinued. These ideas, or elements of, will be utilized during the second ideation phase.

3.2 // The survey

One hundred and fifty-two financial professionals participated in this online survey. The research company helped with the sampling of the participants sending out the survey and collecting the data. The design and analysis were done inhouse. Sherloq also consulted on the extent of the questions. Advising on attributes like the number of trends and ideas that were to be questioned. The survey has three purposes. To validate ideas, to generate new insights and to create an additional context for Open Banking and the financial function.

Appendix 6 shows the survey design.

Appendix 7 shows the extensive survey results.

Survey results

Table 9 and 10 shows background information on the respondents; the size of the business they work for what they believed their function to be. Multiple answers were possible if a respondent thought to have multiple functions. This information is meant to be used for further analysis.

Company size	Frequency	Percent
0 - 10 employees	31	20.4
11 - 50 employees	34	22.4
51 - 100 employees	36	23.7
101-250 employees	22	14.5
251+ employees	29	19.1
Total	152	100.0

Table 9: Company size

Total	275
CFO	42
Controller	46
Accounts payable	43
Accounts receivable	34
Treasurer	17
Financial planning and analysis	41
Tax	16
Auditor	14

Table 10: Indicated roles (multiple answers possible)

The Financial function

As explained in chapter 3 'the user', the tasks across all businesses were similar but, the specific job descriptions were different. This was reconfirmed by comparing the respondents indicated tasks with the indicated functions (comparing answers of table 10 and 11). The predetermined tasks-function combinations did not significantly match the outcome of the survey. For consistency reasons, further analysis is done using the tasks, not the function.

Tasks	Number of responses
Develop and track KPIs	13
Forecast borrowing/funding needs	13
Maintain insurance portfolio	13
Forecast investment opportunities	14
Produce models to project long term growth	15
Maintain accounts receivable files and records	16
FX management	16
Forecast future taxations	16
Issue financial statements	21
Create an audit plan and report	21
Create the annual budgets and forecasts	22
Increase profitability and cashflow	23
Improve the payment process	25
Maintain the billing system	27
Analyse financial and operational results	28
Ensure that taxes are paid	29
Detect financial crime or fraud	31
Manage liquidity	34
Budgeting and financial planning	34
Keep track of all payments and expenditures	35
Generate invoices and account statements	38
Produce monthly reports	41
Risk management/mitigation	47
Ensure that the company complies with all legal and regulation	47
Develop financial strategies	48
Pay employees and vendors	48
Total	715

Table 11: Indicated tasks

Open Banking's state-of-play

(Graph 1 and 2)

How much personal Open Banking knowledge does the financial function have? How important is Open Banking in their department? The state-of-play of Open Banking is questioned in the survey.

The unfamiliarity with Open banking is striking. 79% of respondents indicate to be unknowledgeable on the concept. For INNOPAY, this is essential information as these are all potential clients who need to be educated on the topic.

Employees focused on the strategy of a company know more about Open Banking. On a tasks level, strategic tasks scored higher (average of 53% are knowledgeable) compared to operational tasks (19% are knowledgeable). Indicating that financial function which is more focused on the future is more knowledgeable.

The respondents indicated to have not heard of open banking (n=41) are withdrawn from answering the next question on the organisational state of play of Open Banking.

The rest (n=111) indicated that Open Banking implementation progression within their company (1-5).

89% of respondents indicated that their finance department had not made any decisions. These departments could require consulting, which is intriguing for INNOPAY. This means that nearly 9/10 businesses are not planning to do anything with Open Banking. A reason for this could be the fact that businesses are unaware of potential benefits that stand to be gained from Open Banking.

(There are no mentionable correlations between the organisational state of play and 'tasks' or 'company size'.)

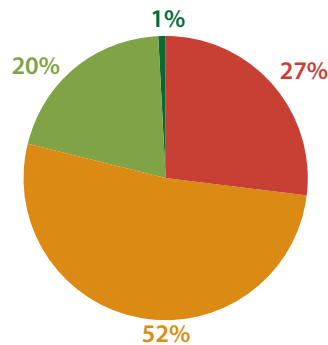
Open banking is in the 'early adoption phase'(Rogers, 2010) (2.5-13.5%= early adoption). 11% of departments either have a plan or are formulating a plan. Again, this could be the result of inadequate knowledge on the topic of Open Banking and the corresponding benefits.

Conclusion Open Banking state-of-play

Respondents, on average, indicated to have little knowledge on the subject. Which is striking as the opportunities surrounding the topic are so vibrant and untapped. It is essential to get people to get to know the product to increase the rate of adoption. To increase the rate of adoption, illustrating the potential of Open Banking (Chesbrough & Crowther, 2006; Tornatzky & Klein, 1982). Secondly, financial professionals should be educated and motivated to learn through the promotion of the topic (Frambach & Schillewaert, 2002; Wozniak, 1987).

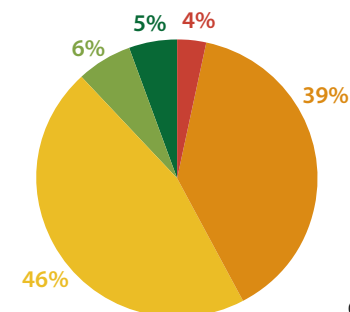
In short, to increase the adoption rate for Open Banking, two things need to happen:

1. The value of Open Banking needs to be demonstrated (educate)
2. Financial professionals need to get excited in order to learn about Open banking (engage)



1. No, I don't know the concept Open Banking
2. I have heard of the concept Open Banking
3. I am knowledgeable on the concept of Open Banking
4. I am an expert on Open Banking

Graph 1: Personal knowledge on Open Banking



1. We have not heard of this topic.
2. We have heard of the topic but have not yet discussed.
3. We have discussed this topic but have not yet made decisions.
4. We have discussed this topic and are formulating a plan.
5. Yes, we have a plan.

Graph 2: Operational state-of-play

Validation of product/service ideas

(graph 3,4,5,6)

The last chapter identified the three highest-rated ideas. After discussions with both the research company and INNOPAY, it was decided to validate two of the three ideas as actual product prototypes. The 'quality of data tool' will not be designed as a prototype but will be used as inspiration for questions about the demands for the quality of data.

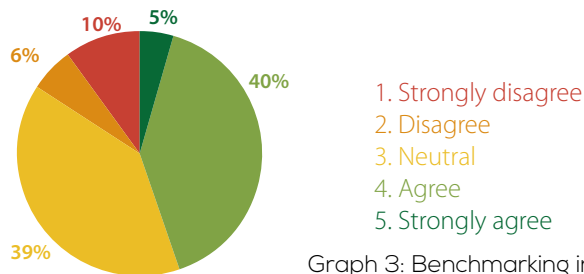
Products for survey

Mock-up screens, together with text, are used to help respondents understand the two product prototypes. A financial function within INNOPAY is used to analyse both screens and texts and affirmed them to be comprehensible. Benchmarking and automation are the two highest-rated ideas. Figure 24 and 25 show the benchmarking screen and automation screen, respectively.

For full results check Appendix 11

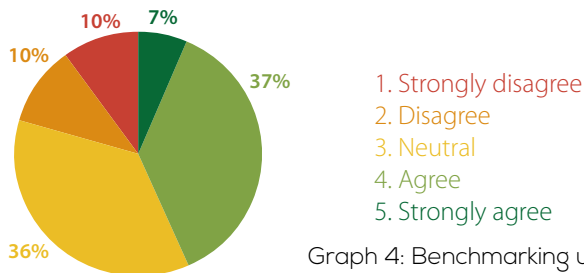
Benchmarking

Do you think this is an exciting product? (Innovation, Inspiration)



Graph 3: Benchmarking interesting

Would this product be helpful while doing your job? (Alleviation, Liberation)



Graph 4: Benchmarking useful

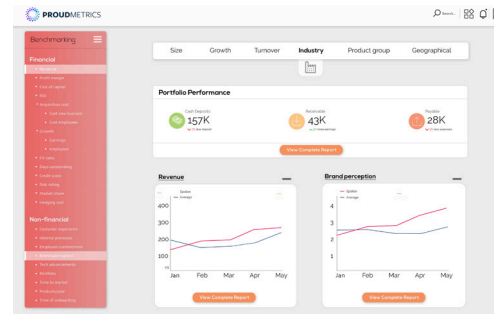


Figure 24: Benchmarking prototype for survey

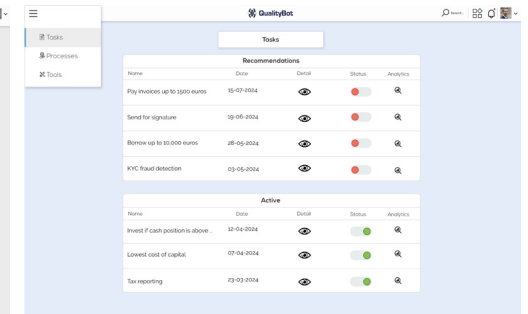
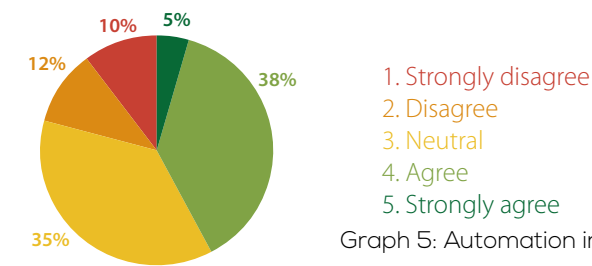


Figure 25: Automation prototype for survey

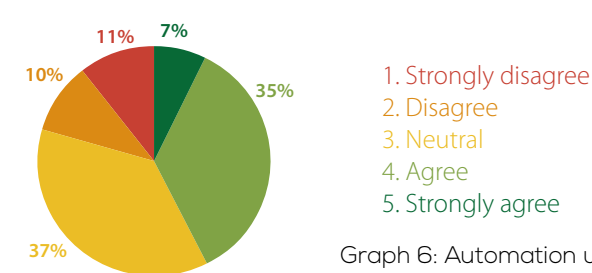
Automation

Do you think this is an exciting product? (Innovation, Inspiration)



Graph 5: Automation interesting

Would this product be helpful while doing your job? (Alleviation, Liberation)



Graph 6: Automation useful

Correlation between product perception

A significant correlation is found between benchmarking and automation with regards to product perception (exciting, useful). People tend to react positive or negative to both ideas. This correlation suggests that respondents are either progressive or conservative with regards to new (Open Banking enabled) financial products.

Interesting (Pearson $\chi^2 p >.001$) N =.609

Useful (Pearson $\chi^2 p >.001$) N =.665

Interesting (auto) *useful (bench) (Pearson $\chi^2 p >.001$) N =.571

Interesting (bench) *useful (auto) (Pearson $\chi^2 p >.001$) N =.557

Generation quality of data

Specific insights regarding the quality of data are collected. This collection focusses on the tasks of the financial function. Two statements are given about the completeness of data and the importance of real-time data:

1. I have all the data to complete this task. (table 12)
2. Having the data for these tasks, real-time would positively impact the task. (table 13)

Generation quality of data insights

Incompleteness of data

Interviewees indicate a dissatisfaction with the quality of their data. Strategic tasks show a clear majority lacking in data richness (7 Strategic against 3 Operational). For affirmation, see table 12. Confirming the indication from interviews about the incompleteness of data required for successful forecasting.

Importance of Real-time

The interview indicated that incremental batch data collection is an inconvenience for operational tasks. This phenomenon is confirmed by the responses of the survey. Real-time data has a more significant impact on operational tasks. For affirmation, see table 13.

Incompleteness of data	% Indicated	
Detect financial crime or fraud	6,5	SO
Produce models to project long term growth	6,7	S
Produce monthly reports	7,5	O
Develop and track KPIs that support the company's strategic direction	7,7	S
Forecast borrowing/funding needs	7,7	S
Risk management/mitigation	10,8	S
Ensure that the company complies with all legal and regulation	10,9	SO
Forecast investment opportunities	14,3	S

Table 12: Incompleteness of data

Importance of real-time	% indicated	
Produce models to project long term growth	60	O
Forecast borrowing/funding needs	61,6	S
Ensure that taxes are paid	62,1	O
Pay employees and vendors	62,5	O
Improve the payment process	68	O
Produce monthly reports	68,3	O
Maintain accounts receivable files and records	68,8	O
Increase profitability and cashflow	69,5	O
Keep track of all payments and expenditures	71,4	O
Manage liquidity	73,6	O
Forecast future taxations	75	S

Table 13: Importance of real-time data

List of reoccurrences

Analysing the results of the survey finds reoccurring tasks. Table 14 shows an overview of these tasks together with the subjects.

Sub-conclusion 1

- Automation of processes and having data real-time is more critical for operational tasks.
- Strategic tasks have the most substantial amount of missing data.
- Benchmarking and automation are both exciting and useful concepts (<42% (strongly) agree).
- Positive respondents significantly correlate to positive perceptions of concepts. Suggesting that creating a positive impression of Open Banking would assist with increasing adoption. As peoples purchase decision is affected by their emotional perception (Sheth, Mittal, & Newman, 1999; Soodan & Pandey, 2016)
- The list of reoccurrences displays important tasks with high impact value.

	Change in				
Operational	Real-time	Incomplete data	financial function	Benchmarking	Automation
Monthly reports	X	X	X		X
Financial statements	X	X	X		X
Risk management	X	X		X	X
Crime and fraud	X		X		X
Manage liquidity	X	X		X	X
Strategic					
Produce models to project long term growth	X		X	X	
Forecast borrowing/funding needs	X	X	X		X
Develop financial strategies		X	X	X	
Ensure that the company complies with all legal and regulation		X	X		X

Table 14: Reoccurring tasks during the survey

Financial product and service industry trends

See graph 7 and 8.

The following trends in the financial product and service industry are put forward by INNOPAY and others (Courbe, Garvey, Engel, Lyons, & O'Hara, 2016; Prabucki et al., 2018; Reynolds et al., 2019). For this thesis, all trends were analysed and discussed in an (Open) Banking expert group within INNOPAY to isolate ten trends to be questioned further in the survey. As the survey is long, the research company advised using a maximum of ten trends.

A weighted, normalised decision-making matrix is used to make this decision (Triantaphyllou, 2000). This method is chosen because it allows for a weight to be added to attributes that are deemed more important for decision making. This allows for fair judgement of each trend.

The explanation of trends in Appendix 10

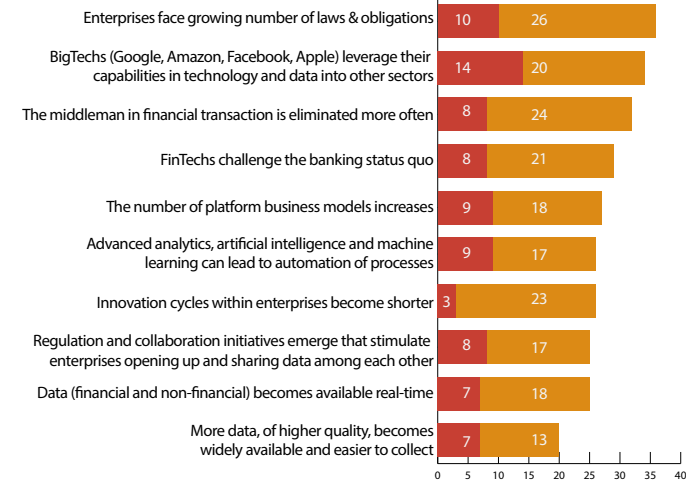
The results of the weighted in Appendix 11

Chosen for the survey:

1. Regulation and collaboration initiatives emerge that stimulate enterprises opening up and sharing data among each other
2. Advanced analytics, artificial intelligence and machine learning can lead to automation of processes
3. FinTechs challenge the banking status quo
4. The middleman in a financial transaction is eliminated more often
5. More data, of higher quality, becomes widely available and easier to collect
6. BigTechs (Google, Amazon, Facebook, Apple) leverage their capabilities in technology and data into other sectors
7. Data (financial and non-financial) becomes available real-time
8. The number of platform business models increases
9. Enterprises face a growing number of laws & obligations
10. Innovation cycles within enterprises become shorter

Threats

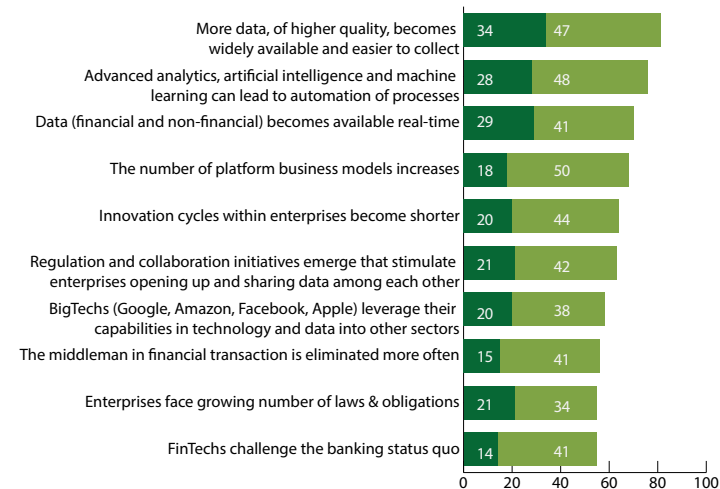
■ Major threat ■ Minor threat



Graph 7: Trends perceived as threats

Opportunities

■ Major opportunities ■ Minor opportunities



Graph 8: Trends perceived as opportunities

Sub-conclusion 2

Interesting is that the respondents indicated three 'major' opportunities (dark green) all having to do with data or the use of it. Perceived threats are 'laws and obligations' as well as 'Bigtech leveraging their technology in the financial market'.

What is alarming and unexpected, however, is that Fintechs are among the highest-ranking threats, so is the elimination of the middleman from transactions even though all evidence points towards both trends having a high positive impact (Szmukler, 2016). Do the respondents have enough understanding of the topic and are they threatened by Fintechs or are they unaware of the possibilities?

A correlation test for the two threats determined the latter. A significant correlation (Pearson χ^2 $p > .05$) $N = .401$ is discovered between the 'Fintechs' and 'elimination of the middleman' perception and the level of 'Open Banking knowledge'.

Meaning: When Open Banking knowledge is lower, these two trends are significantly more likely to be perceived as threats and vice versa.

Indicating that in order for people to start seeing Fintechs as the opportunities they are, they require an expansion of knowledge. Better education on Open Banking will increase the perception of trends. It is essential to educate and engage the customer (Pollari & Verbeek, 2019).

Total survey recap

1. Open Banking is still in the early adoption phase.
2. Education and engagement could help to boost the adoption rate within the financial function.
3. This can be achieved by creating innovative and inspiring use cases.
4. Increased Open Banking knowledge will enhance the perception of trends. Making for a more innovative mindset.
5. The benchmarking and automation idea are both described as interesting and useful.
6. Strategic tasks have the largest amount of missing data and would be most benefited by a benchmarking tool.
7. Operational tasks have the most use for real-time data as well as automatic processes.
8. More and faster data together with new analytical powers, are perceived to be the most significant future opportunity for the financial function.

CHAPTER 4
Final design

4.0

This chapter begins with a recapping summary of the information gathered up until this point called 'the groundwork'. From there it continues to explain the different concepts thought up thought up in during the second ideation phase. It will conclude with an analysis and decision of the concepts.

- 4.1 The groundwork
- 4.2 Concepts
- 4.3 Selection

4.1 // The groundwork

This chapter introduced the first ideation phase that resulted after the session. It will then continue to explain the survey that analysed three ideas from the ideation phase as well as create more context of the financial function and the state of play with regards to Open banking.

This chapter begins with a recapping summary of the information gathered up until this point called 'the groundwork'. From there it continues to explain the different concepts thought up thought up in during the second ideation phase. It will conclude with an analysis and decision of the concepts.

The groundwork

For the second ideation phase, a business banking, Open Banking and financial function framework are drawn up to function as a guide throughout the second ideation phase. This nine-point framework is referred to as 'the groundwork'. The groundwork reiterates what has been discussed up until now, and together with the previously gathered insights from the interviews, literature and survey will be used to construct ideas during the next phase. The groundwork:

Business banking

- The competition on the financial product and service landscape is picking up between Incumbent banks, challenger banks and fintech.
- Collaboration between financial product and service providers is believed to be the most constructive method of creating value-adding products and services.
- Banks will need to focus more on their customer as user expectations are shifting.

Open Banking

- For banks to gain a competitive advantage, it is essential to open up data and functionalities while creating innovative use cases.
- Leveraging Open Banking enabled data, potentially with non-financial data, could result in products unexperienced by financial professionals.
- An increase in Open banking adoption is required as it is currently low. This

increase can be achieved by creating inspiring use cases and promoting the concept of open banking.

The Financial function

- The tasks within the financial function are moving from operational to more strategic tasks as more time is freed up primarily due to technological advancements and data.
- Richness of data is important for strategic tasks to make strategic decisions. While the quickness of data has more influence on the operational tasks.
- The financial function is looking for safe and secure products and services that are easy to use, interoperable with high analytical capabilities that increase efficiency.

Open banking enabled services

For the Business users to get to know Open Banking enabled services, it is of interest looking at combinations of financial (Open Banking) data and non-financial data. Combining more 'building blocks' results in more opportunities to create something innovative and inspiring. It also increases the frame in which value can be added to outside just banking. Figure 26 recaps this structure.

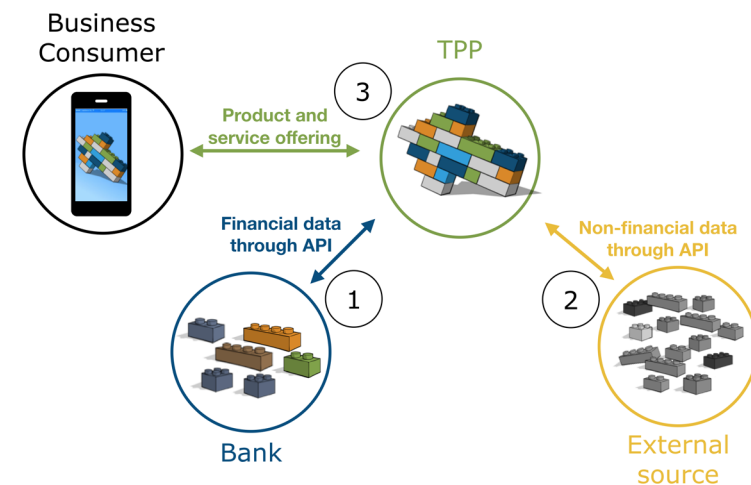


Figure 26: Creating value using Bank data and data from external sources

4.2 // The concepts

Benchmark

Figure 27

Insights:

- Quality control
- Benchmarking
- Information needs
- Information partnerships
- Strategic decision making
- Forecasting
- Trust
- Indicated by survey

Function

The value of benchmarking is proven as companies have been using specific benchmarks to gain insights for quite some time. These benchmarks, however, are mostly financial metrics and are usually from historic industry standards. This product offers a real-time insight into financial and non-financial metrics that help analyse your companies' position.

It offers a descriptive tool to show your financial or non-financial metrics position compared to a specific business segment. Other companies could also sell their anonymised data to this benchmarking tool which in turn could sell additional metrics and insights to their client.

Building blocks

Open Banking

- Anonymized company-data pool
- Account resources
- Derived resources
- Transaction types
- Bank capabilities

Non-financial data extracted from

- Insurance
- Customer relationship management tools (CRM tools)
- Search engine optimisation tools (SEO tools)
- Enterprise resource planning tools (ERPs)
- (business process management tools (BPM tools)
- Treasury management systems (TMS)
- Robotic process automation tools (RPA tools)
- Human resources tools (HR tools)
- social media business tools.

Benchmark

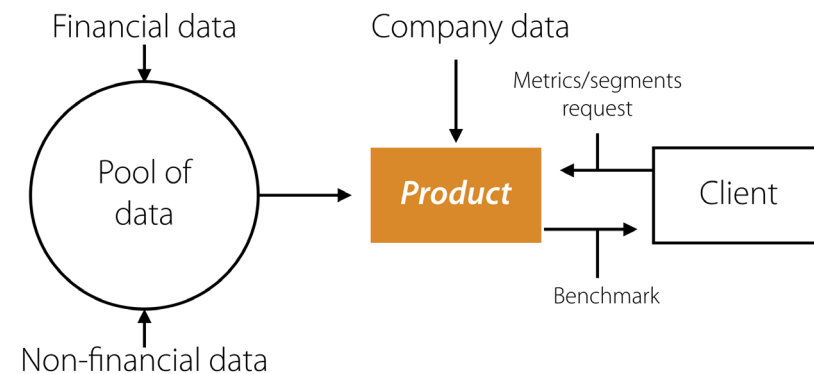


Figure 27: Benchmarking idea

Automatic operations

Figure 28

Insights

- Automation possibilities
- Job repetition
- Time-consuming administrative tasks
- Cash flow
- Internal quality control
- Indicated by survey

Function

Automation of real-time processes is more important for the operational side of the financial function. This concept automatically files and stores accounts payable and receivable data and creates financial statements and reports. It will be able to automatically send payments requests with predetermined settings and conduct fraud checks on every transaction coming in and out. Another feature of this product will include automatic electronic payment signatures, both internally and externally. Allowing financial professionals to sign off on any matter digitally.

Building blocks

Open banking

- Use bank ID as a signature verification
- (Open) banking blacklist
- Payment initiation
- Real-time analytics
- Account resources
- Identity resources
- Managed resources
- Derived resources
- Transaction types
- Bank capabilities

Automatic Operations

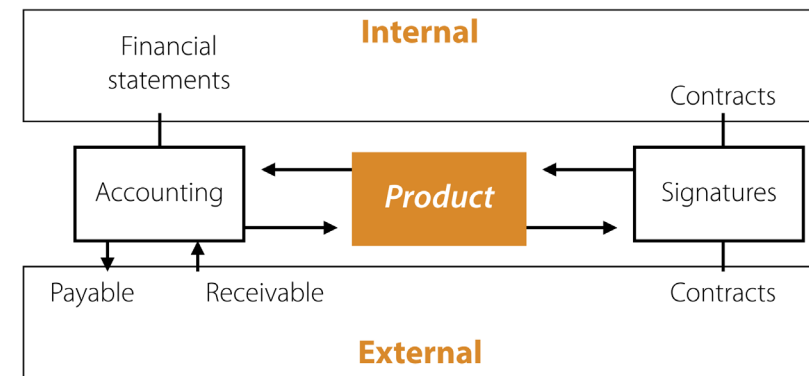


Figure 28: Automation Operations idea

OutOfOffice

Figure 29

Insights:

- Need for 24/7 financial function
- Instant payments
- Automation possibilities
- Cash flow
- Job repetition
- Time-consuming administrative tasks
- Indicated by survey

Function

Due to instant payments, cash can come in and go out of a business at any point during the day. This can result in a cash surplus or a cash deficit while the financial function is not at work. This concept relieves those people of the pain of always having to be on alert. It will send a notification when a change in cash flow is detected. It can also be programmed to make decisions if it is predetermined to do so automatically.

Open Banking:

- Use bank ID as a signature verification
- (Open) banking blacklist
- Account information
- Account resources
- Identity resources
- Managed resources
- Derived resources
- Transaction types
- Bank capabilities
- Investment opportunity portfolio

Cash flow surplus (abundance of capital)

Short term possibilities

Pay debt (early=reduce costs)

Invest

Build a cash buffer

Long term possibilities

Negotiate lower rates for upfront payments (subscriptions) or investments

Go on holiday

Cash flow deficit (caused by automatic payments)

Short term possibilities:

Collect outstanding dept (against lower rate)

Borrow

Overdraft arrangement

Factoring recommendation

Sell liquid asset

Long term possibilities:

Negotiate better term with customers/suppliers

Reduce overhead

Building blocks

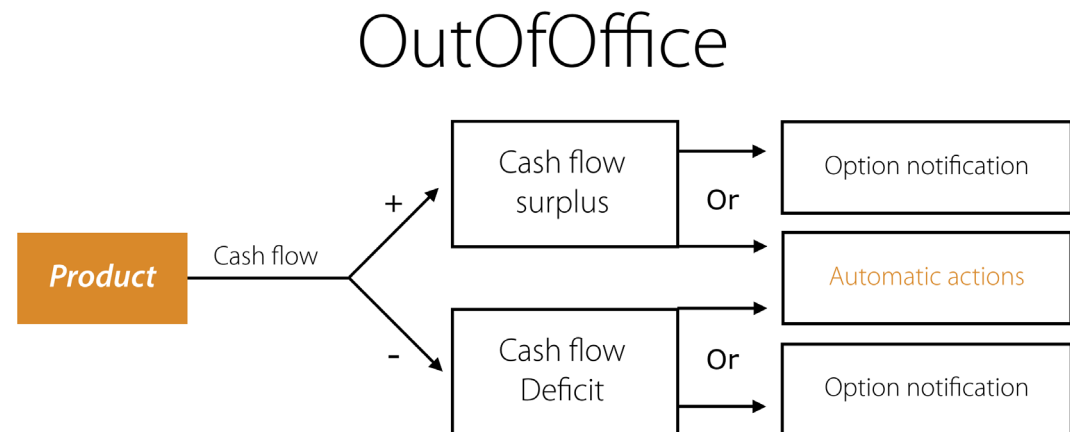


Figure 29: OutOfOffice idea

Predictive warnings

Figure 30

Insights:

- Quality control
- Information needs
- Information partnerships
- Forecasting
- Trust
- Underdeveloped analytical capabilities
- Strategic decision making
- Indicated by survey

Function

Open banking opens up historical data. Financial or non-financial data is analysed and grouped into patterns. These patterns are used to create predictive models. Using these models to predict a business's trajectory would be of immense value as it enhances the ability to future vision. This value is created by analysing your company's trajectory and warning when a pattern occurs. A step further would be to propose specific recommendations. Historical data of a company's actions can be used to create expectational forecasts and recommend actions. The recommendations could be tools sold through an Appstore like interface showing exactly how it would affect your business trajectory.

Model examples

- Bankruptcy models
- Investment/borrowing
- Industry change model
- Technology hype (Gartner hype curve)
- Customer (segmentation)
- Sales
- Marketing
- Optimisations

- Etc.

Building Blocks

Open banking data

- Historical patterns
- Account resources
- Identity resources
- Managed resources
- Derived resources
- Transaction types
- Bank capabilities

Non-financial data extracted from

- Other algorithms/models
- Socio-demographic factors (age, job, marital status, education...)
- Insurance
- Customer relationship management tools (CRM tools)
- Search engine optimisation tools (SEO tools)
- Enterprise resource planning tools (ERPs)
- (business process management tools (BPM tools)
- Treasury management systems (TMS)
- Robotic process automation tools (RPA tools)
- Human resources tools (HR tools)
- Social media business tools

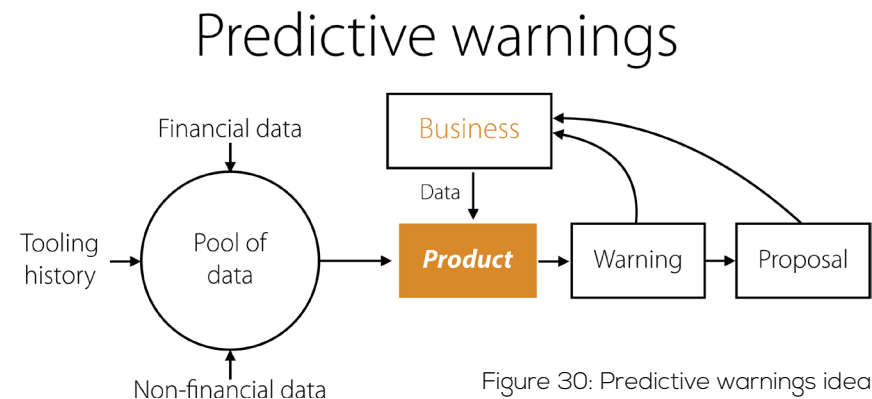


Figure 30: Predictive warnings idea

4.3 // The selection

As the survey concluded that the adoption rate of Open Banking is low, two extra attributes are added to the MADM model.

Enhancing the adoption of Open Banking, these two attributes are:

1. (Innovation) The value of Open Banking demonstrated.

2. (Inspiration) Financial functions need to get excited to learn about Open banking.

These ideas are subjected to a discussion process within INNOPAY and followed by a selection discussion. Functionality, Open Banking features and innovation is analysed during the discussion. This discussion led to a more detailed description of the products and services and their interactions. From the selection discussion, the following scores are gathered. See table 15.

Benchmark

The Benchmarking idea is genuinely enabled by Open Banking. Benchmarking already exists; that is why it scores lower on the innovation level. This product, however, does able new metrics and segments and offers real-time insights and analytics. Because these are never before obtainable insights, the inspiration level, as well as the personal and business impact, is scored high.

Automatic operations

Having operational tasks automated is a hot topic for most businesses. It will save time, money and increase efficiency. It is, however, not a real Open Banking enabled product as the PSD2 opened functionalities would suffice to create this product. It does not use data streams or functionalities opened up by Open Banking. Large amounts of automation tools are coming to the market focussed on operational tasks. Making this product less innovative and less inspiring.

OutOfOffice

This product is not only an Open Banking enabled product, but it also solves a problem caused by an Open Banking enabled trend. Instant payments will cause financial functions to be active round the clock. Having a tool like this is needed to relieve that burden. It solves a problem that does not yet exist,

therefore scoring high for innovation and inspiration. For the financial function controlling the cash flow, this would be a helping hand. On a company scale, this would have less impact.

Predictive warning

This product, even though being highly theoretical, is believed to be a potential end goal for Open Banking for businesses. A machine could warn companies who are on a wrong or right path, faster and more accurate than humans. It would allow recommendations for what tools, actions, and processes to invest in, increasing efficiency and productivity. For all these reasons, it scores high in all criteria.

Conclusion

A predictive warning system able to propose solutions for complex business solutions ranked the highest. A benchmarking product is a real Open Banking product designed for the not so distant future. A product that would allow financial functions to manage their cash flow 24/7 actively would solve a problem not even in existence. Creating a product that would fully automate the entire selection of operational tasks would increase efficiency and productivity. It does not, however, use Open banking enabled functionalities.

All these products are useful for the financial function. A large part of the thesis is to spark inspiration by showing true innovate Open Banking enabled products and services. The automation tool will not be used for further design.

	Benchmark	Automatic operations	OutOfOffice	Predictive warning
Correlation	5	2	5	5
Alleviation	4	4	3	4
Liberation	4	4	2	5
Innovation	3	3	4	4
Inspiration	4	4	4	4
	20	17	18	22

Table 15: MADM model Final design

CHAPTER 5
Implementation

5.0

This chapter will explain what is needed to create the 'Mynance world' as well as the implementation of the different use cases. Required data and functionalities will be listed together with specific data and functionalities applications required to make this use-cases reality.

The Mynance features explained together with the resulting benefits. After, some underlying data systems are explained the requirements of each individual use-case are given. This chapter will end with validating Mynance

5.1 Mynance

5.2 The Concepts

5.3 Education possibility INNOPAY

5.4 Validation

5.1 // Introduction to Mynance

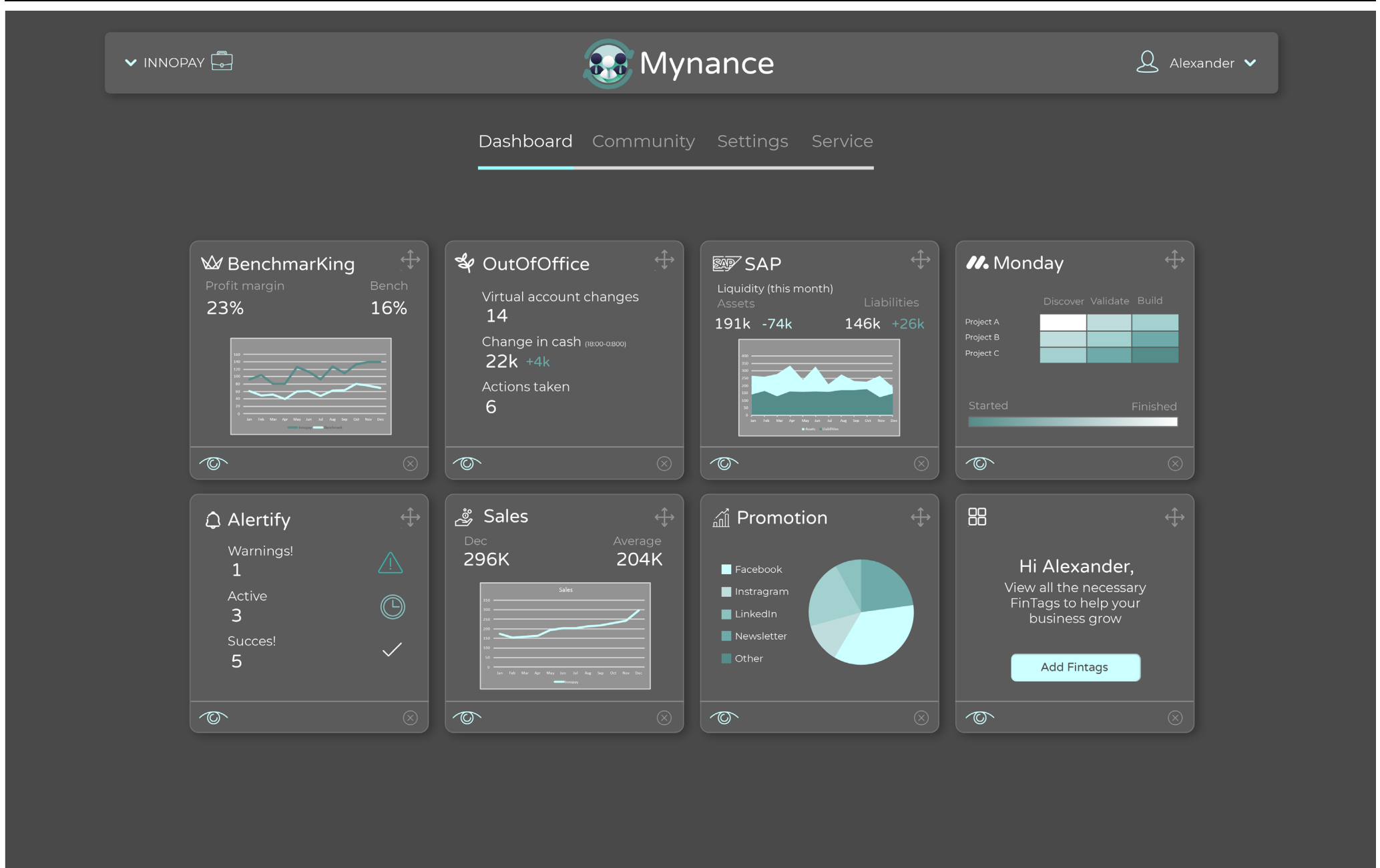


Figure 31: Mynance dashboard

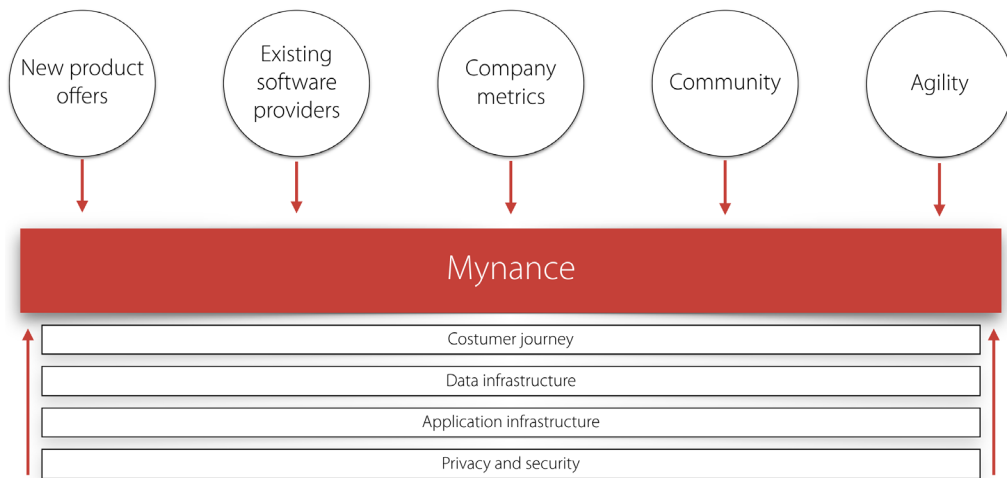


Figure 31: Mynance back-end and front-end

Benefits of working with an all in one solution (figure 32)

Customer journey

- Everything in one place
- Using one homogeneous data system removes operability issues between products
- A large number of stand-alone products and services are creating an unclear overview. Being able to go through products and services from one location, manually or automatically, filtering out unwanted attributes, helps businesses find the right products and services.
- This omnichannel platform can be used anywhere, anytime
- Easy data connections management

Data infrastructure

- All data required to run applications successfully can be plugged into the Mynance API connector portal (see figure 33)
- Save and secure internal and external communication possibilities

Application infrastructure

- A one-stop-shop for all your financial product and service applications
- App store like infrastructure
- Sandbox environment for new product or service creation

Privacy and security

- All compliance under one roof. No need to trust multiple parties.
- Strong customer authentication requirements to join the platform
- All-round API encryption
- Communication encryption
- Distributed ledger data transfer history (blockchain)
- Easy data connections management

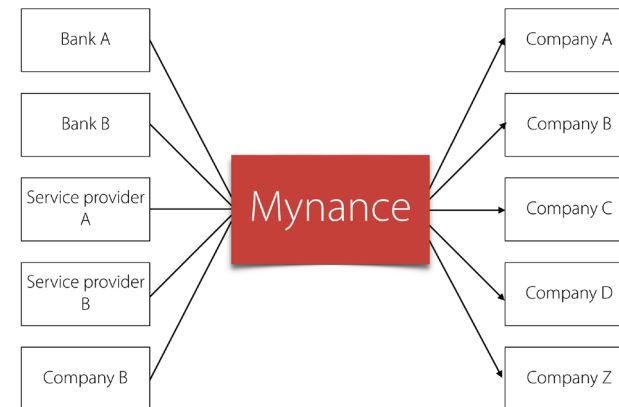


Figure 33: Every type of product and service providers can plug in their data

Anonymisation

Historical financial and non-financial data is required to build Mynance. For the 'own business' metric, financial data is taken from the business itself and their accompanying bank(s) and service providers. For the benchmarking tool, the industry-standard metric is derived from bank data of multiple businesses that are segmented and then anonymised. This anonymisation is done by removing all identity from all separate data and threading each segment and metric into different data pools (see figure 34). This segmentation is done to protect the privacy of businesses and combat identification through the use of Bigdata triangulation analyses; a form of using different data inputs to identify a person or entity (Narayanan & Shmatikov, 2008; Sedayao, Bhardwaj, & Gorade, 2014). A variety of financial and non-financial product and service providers can execute the same process creating benchmarking insights into different metrics or use pattern recognition on that anonymised data. Different pools of data determine respective averages.

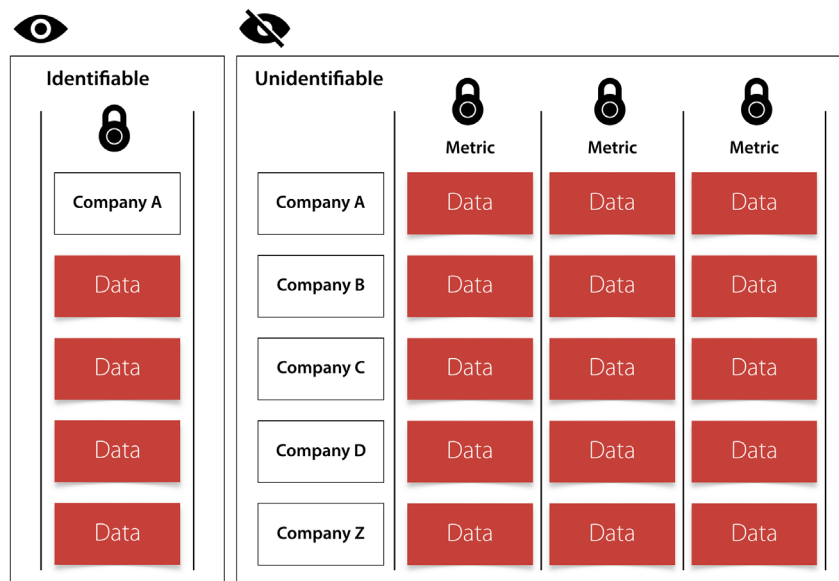


Figure 34: Data anonymisation through metric isolation

The complexity of financial analytics

Data analytics have four levels of complexity and added value (Bekker, 2019). Figure 35 shows descriptive, diagnostic, predictive and prescriptive analytics and their corresponding value. Descriptive analysis describes what has happened in the past. Diagnostic analysis describes why something happened. Predictive analysis predicts the future using descriptions and diagnostics. Prescriptive analysis helps with the question: what should we do? Aggregating predictive analyses, allowing for recommendation-based decision making. Prescriptive analytics is described as the next frontier for analytics, harnessing new ways to support decision making (Bertsimas & Kallus, 2019; Gröger, Schwarz, & Mitschang, 2014). Currently, in the healthcare industry, there is an analytical revolution moving towards prescriptive analytics (Adams & Garets, 2014). Alertify functions on this highest level of analytical complexity.

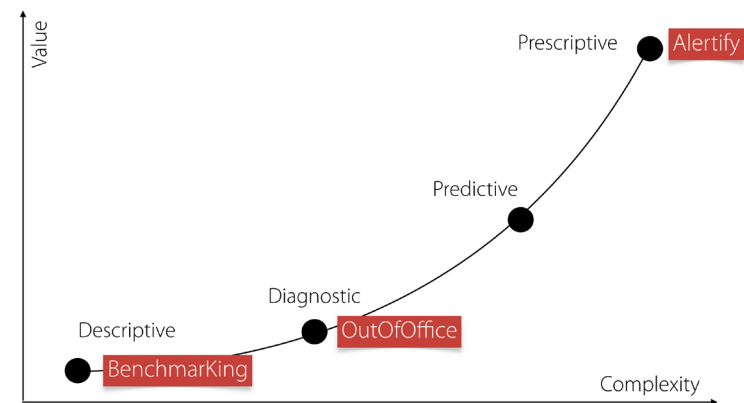
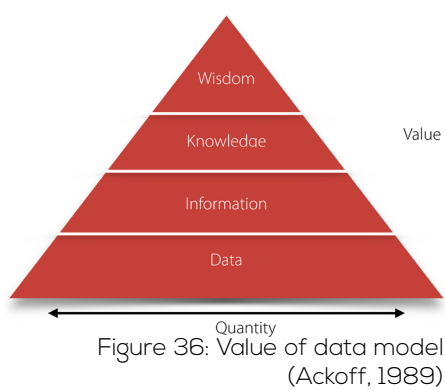


Figure 35: Concept with respective complexity of analytics

Prescriptive analytics possibilities



The amount of data generated all over the world has been growing significantly over the years (Reinsel, Gantz, & Rydning, 2017). Data on its own has little value; the value is in the application and analyses of that data. Thirty years ago, Russel Ackoff wrote about the different levels of data application nicely bound together with a quote: "An ounce of information is worth a pound of data. An ounce of knowledge is worth a pound of information. An ounce of understanding is worth a pound of knowledge" (Ackoff, 1989). He describes the increases of data value through the way it is processed and analysed. The DIKW pyramid framework (data, information, knowledge and wisdom framework). See figure 36.

The newer model

Liu (2014) explains, through a business lens, how value is created in the age of Big Data. He uses a graph to dissect the pyramid model and explain his view on the modern values of data (see black dots figure 38). Like Ackoff, he claims that data processing enables information and information creates knowledge with an end goal of achieving wisdom. Liu continues by analysing what value 'wisdom' has on business: to make decisions which translate into actions. This thesis argues that this model is not a pyramid nor a graph. It is a cycle. From action comes new data. Data creates further information leading to knowledge, enabling new decisions and implementing new actions. This cycle continues until enough data is collected to be able to make accurate and significantly proven predictive models. New processing capabilities like artificial intelligence and machine learning are catalysing analytics from predictive to prescriptive decision making.

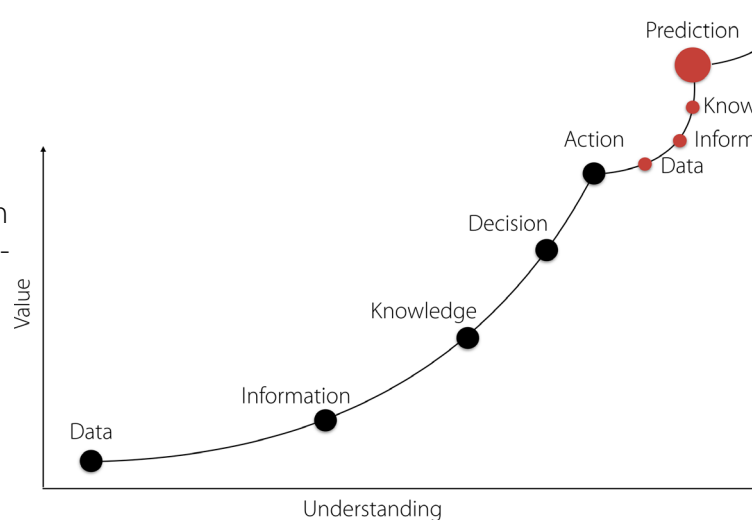


Figure 38: New model for the value of data

Artificial intelligence (AI), machine learning (ML)

Financial functions have long used statistics. Its primary purpose is to analyse results and find relations between different actors. These results are translated into mathematical equations that are used to forecast specific actions. Even if some equations are designed to incorporate a large variety of factors, they are static. Artificial intelligence and machine learning are used to combat this static by being able to compute complex ever-changing algorithms.

Artificial intelligence is a process where machines are programmed to learn and act as humans.

AI primarily enables robotic process automation (RPA). For example, software that automatically analyses financial statements and inputs it into accounting software.

Machine learning is a form of artificial intelligence that uses data science to create algorithms which 'learn' from data. An example is chatbots that increase their ability to reply to the more someone interacts with them. Machine learning can apply algorithmic data to existing forecasting models creating more accurate and real-time predictive models, also being able to learn from each outcome and tweak algorithms accordingly. Machine learning has a more significant potential for the financial function (Schindler & Braak, 2017)

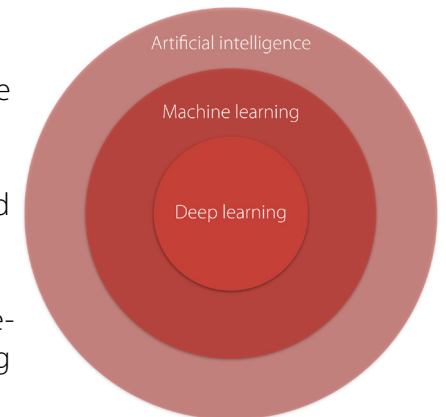


Figure 37: AI, machine learning and deep learning

5.2 // The concepts

The screenshot displays the 'OutOfOffice' dashboard within the Mynance application. The top navigation bar includes the 'INNOPY' logo, the Mynance logo, and a user profile for 'Alexander'. The main dashboard area is divided into three columns:

- Predetermine settings:** This section allows users to configure automatic actions based on cash flow changes. It includes sliders for:
 - Alert threshold: 'Alert me when change in cashflow exceeds €'
 - Excess: 'Auto invest if offer has a return of % or more %
 - Payment: 'Pay depts up to of the excess %
 - Buffer: 'Save up to for a cash buffer €
 - Deficite: 'Auto borrow if offer has a interest of % or less %
 - Assets: 'Sell upto of liquid assets %
 - Factoring: 'Recommend factoring when change exceeds %
- Offerings:** This section lists five companies with their current cash flow status and interest rates:
 - Company X: 'Has an abundance of cash. Available till 15-09-2019. Interest rate 0,1%'
 - Company Y: 'Has a short term cash shortage. Expected until 9-09-2019. Interest rate 0,7%'
 - Company Z: 'Has an abundance of cash. Available till 15-09-2019. Interest rate 0,1%'
 - Company P: 'Has a short term cash shortage. Expected until 9-09-2019. Interest rate 0,7%'
 - Company P: 'Has a short term cash shortage.'
- History:** This section shows a list of transactions with company names and dates:
 - Alpine Acoustics: 15-09-19
 - Signal Security: 14-09-19
 - Odin Lighting: 10-09-19
 - Omegacoustics: 09-09-19
 - Cliffoods: 06-09-19
 - Apextales: 28-08-19

Figure 39: OutOfOffice screen

OutOfOffice

Predetermined settings

The central part of this concept is the predetermined settings that will help the financial function not needing to be on alert 24/7.

Quite a simple mechanic does this. When a cashflow rises or drops beyond a certain level, the user gets a notification, or this product conducts one or more automatic actions. For this concept to know how much cash there is, it needs to aggregate account data and calculate total cash. From there, the user will need to authorise OutOfOffice to make borrowing, lending or other (predetermined) decisions.

Peer to peer (P2P) lending marketplace

One of the discovered trends it that the middleman in a financial transaction is eliminated more often. OutOfOffice gives users the ability to lend and borrow money P2P. Pre-set cashflow options can be configured to accept offers on this peer to peer marketplace automatically. Meaning if cashflow drops, the settings can determine to borrow from a bank or P2P.

Requirement building blocks for this concept (figure 40)

Open Banking building blocks

- A verified bank ID is used to get signatures for transactions.
- Access to account information is needed to assess a cash flow situation including transaction history
- The ability to initiate a payment is needed to conduct transactions.
- No fraudulent transactions can be made using banks blacklist a
- A real-time credit scoring analytics, precisely decide the cost of interest to combat cash deficit.
- Investment banking opportunities need to be opened up to recommend for an excess of cash.

Non-financial building blocks

- For inter-business lending, capabilities need to be in place.
- A messenger is needed for P2P communication

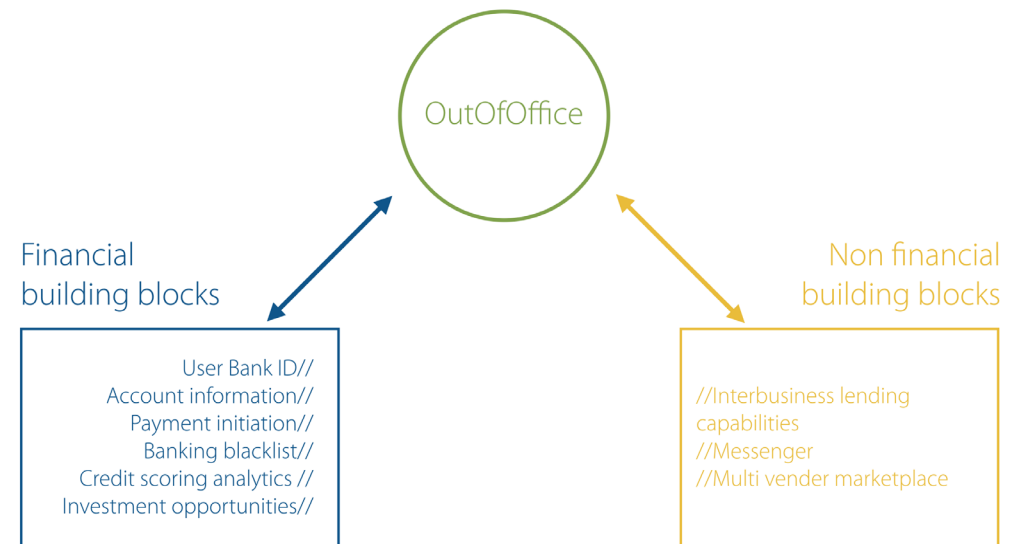


Figure 40: OutOfOffice building blocks

Benchmarking



Metrics

Segments

Size



Growth



Turnover



Industry



Product offering



Geographical



Add Other

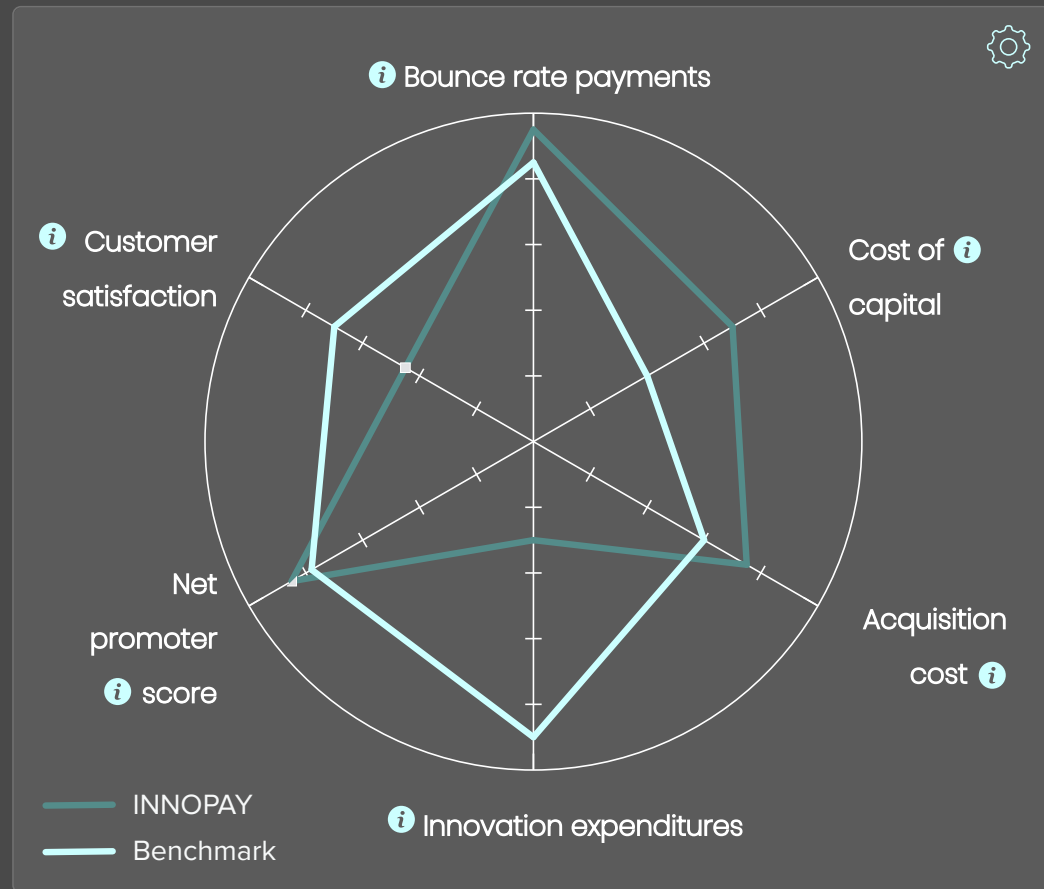


Figure 41: Benchmarking screen

Benchmarking

Benchmarks are averages of industry segments. Table XXX shows some of these segments. A benchmark can be as general and as specific as needed. To benchmark a specific segment, combinations of segments are possible. To decrease the ability to single out companies, a minimum amount of data is always required to benchmark. Otherwise, someone could specify segments until one or a few companies are left. Such specification could lead to revealing sensitive company-specific data.

Requirement building blocks for this concept (figure 42)

Open Banking building blocks

1. Account information to determine the user's metrics. Account information of multiple businesses is bundled into the benchmarking averages.
2. Segmentation information (e.g. Location, industry)
3. Pseudonymisation technology of banks can be used to help anonymise the data.
4. Credit scores to be used as a metric
5. Bank ID is used to give consent for sharing banking data

Non-financial building blocks

1. Location services to determine geographic segmentation
2. Product/service catalogue used for segmentation and benchmarking
3. Company metrics (e.g. Employee number, tenure) used for segmentation and benchmarking
4. For more segmentation and benchmarking data from external tools like:
 - Customer relationship management tools (CRM tools)
 - Search engine optimisation tools (SEO tools)
 - Enterprise resource planning tools (ERPs)
 - Business process management tools (BPM tools)
 - Treasury management systems (TMS)
 - Robotic process automation tools (RPA tools)
 - Human resources tools (HR tools)
 - Social media business tools

There is an extensive amount of benchmarking possibilities, both financial and non-financial. If interested, table 17 gives an overview of examples of these benchmarks.

Segments

- Geographical
- Market
- Size
- Growth
- Turnover
- Industry
- Product

Table 16: Segments

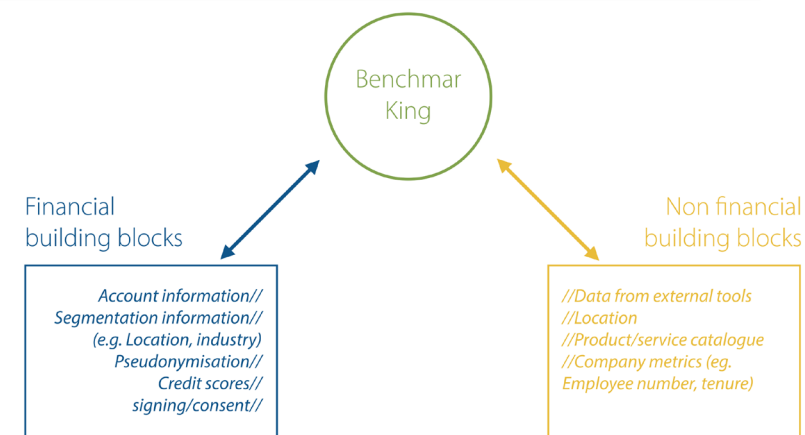


Figure 42: Benchmarking building blocks

Benchmark examples

Financial:

Revenue	Income
Revenue growth	Growth of income (per time unit)
Profit margin	Per cent profit per income
Profit margin growth	Increase in profit (per time unit)
ROI	% return on investment
Cost of capital	Price of borrowing
Marketing costs	Amount spend on marketing
Number of employees	Number of employees
Acquisition cost	Cost for a new employee
Bounce rate authorised payments	% of unpaid authorised payments


Non-financial:

Customer satisfaction	Score out of 10
Employee satisfaction	Score out of 10
Number of products in the portfolio	Number of products in the portfolio
Average time to market	The time needed from design to market a product
Products produced per year	Number of products produced
Time of onboarding for new customers	Onboard time per customer
Time of onboarding for new employees	Onboard time per employee
Net Promoter Score	Promoting costumers – Detracting customers*100
Tooling for all kinds of processes	Different tooling for different processes
Employee turnover	Employee time spend at a company

Table 17: Benchark examples

Alertify

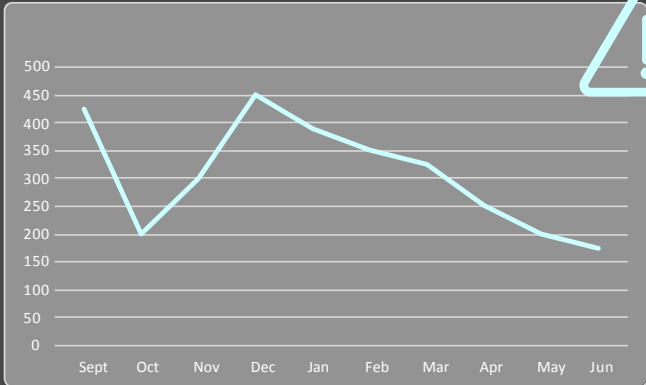
Options

- History
- Advice centre
- Tooling 
- Settings

Warning

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Do consequat massa quis enim. Aenean leo ligula, porttitor eu, consequat nisi vel augue.

Resolve Ignore



Active

Sales of Product X after implementation tool Y

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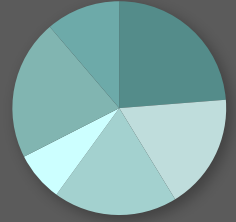
A line chart titled 'Sales' showing data from January to December. The y-axis ranges from 0 to 350. The data points are approximately: Jan (180), Feb (160), Mar (160), Apr (170), May (190), Jun (200), Jul (200), Aug (200), Sep (210), Oct (220), Nov (240), Dec (280). The legend indicates 'Innopay'.

Active

Accounts payable open invoice summery

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

- 0-10 days
- 10-30 days
- 30-60 days
- 60-90 days
- 90+ days



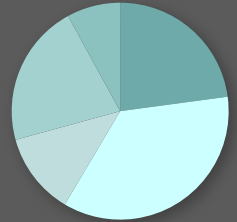
A pie chart showing the distribution of accounts payable open invoice summery across five categories: 0-10 days, 10-30 days, 30-60 days, 60-90 days, and 90+ days.

Active

Percentage of social media engagement

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

- Facebook
- Instagram
- LinkedIn
- Newsletter
- Other



A pie chart showing the distribution of social media engagement across five categories: Facebook, Instagram, LinkedIn, Newsletter, and Other.

Figure 43: Alertify screen

Alertify

Advice centre

When an alarming pattern is discovered, Alertify gives advice. This advice is a listing of multiple options and expected trajectories. These trajectories are based on patterns drawn from historical data. This option can also be consulted manually if no alarming pattern is detected.

Tooling

Instead of advising strategies, it is also possible to recommend tooling. These can be all sorts of tools having to do with all kinds of business processes. External tools can maintain their own data pool to create future projections. The amount of data a tool has gathered increases the accuracy of a prediction. If a tool has a positive predictive course, this can be used to advertise such a tool.

Requirement building blocks for this concept (figure 44)

Open Banking building blocks

1. Transaction information to determine and segment income and expenses
2. Account information to determine personal trajectories and bundle into pools to find patterns
3. Payment initiation to purchase recommended products or strategies
4. Existing banking algorithms that are already designed to help find patterns
5. Access to databases to create an extensive pool of historical
6. Signing/consent to authenticate to purchase recommended products or strategies

Non-financial building blocks

1. Non-financial algorithms/models that are already designed to help find patterns
2. Insurance company data and functionalities that already exist to help find patterns
3. Data from external tools like:

- Customer relationship management tools (CRM tools)
- Search engine optimisation tools (SEO tools)
- Enterprise resource planning tools (ERPs)
- (business process management tools (BPM tools)
- Treasury management systems (TMS)
- Robotic process automation tools (RPA tools)
- Human resources tools (HR tools)
- Social media business tools.

Requirements

Alertify is a robotic advisor for the financial function. Combining predictive models to create recommendations

Examples of current predictive models include:

- Bankruptcy prediction models (Shin & Lee, 2002)
- Fraud detection (Perols, 2011)
- Interest rate optimisation (Krollner, Vanstone, & Finnie, 2010)
- Foreign exchange forecasting (Krollner et al., 2010)
- Stock exchange forecasting (Patel, Shah, Thakkar, & Kotecha, 2015)

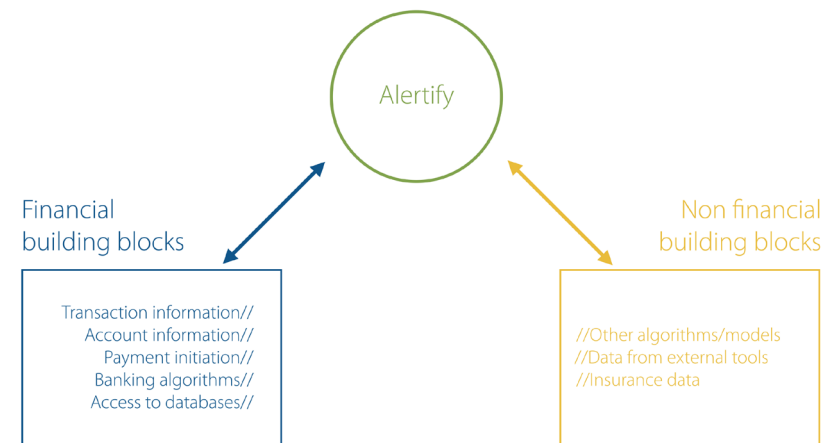


Figure 44: Alertify building blocks

5.3 // Education and inspiration possibility for INNOPAY

INNOPAY should get more involved in getting Open Banking to the (business) consumer. Currently, they focus a lot on descriptive Open Banking tools. The Open Banking Monitor and Third-party provider radar are all based on descriptive analysis. More value is added when using predictions.

Open Banking is still in the early adoption, and for it to reach its full potential, the adoption is necessary to be enhanced. Education and inspiration are required to boost this adoption.

What role could INNOPAY play in the adoption of Open Banking?

The INNOPAY Open Banking VISION

A survey can be a fantastic tool to get the Open Banking ideals and opportunities out into the open. A potential way to inspire and promote Open Banking could very well be through the use of a survey. Introducing the 'INNOPAY Open Banking VISION', keeping people up to date with new and improved Open Banking products, services and features.

The key feature of this VISION is a survey using well thought out innovative use cases to educate and inspire the reader/respondent on future Open Banking possibilities as well as generate new insights. These future Open Banking possibilities need to be more than just descriptions of current market insights like the tools they use now. They should focus on predictive visions. Doing so will not only get Open Banking adopted more, but it will also get the INNOPAY name and brand recognised more. INNOPAY will need to ensure that use cases are critically analysed as having faulty predictions can hurt the brand.

To enhance the value of the Open Banking VISION, more than the survey could be added. It could include a newsletter, explaining new Open Banking insights and exciting products that have come to the market. The VISION can include INNOPAY's tools and successful projects. Creating a combination of a survey, a newsletter and a blog post as shown by figure 49. Enhancing Open Banking adoption and name and brand recognition.

If this VISION successfully educates and inspires the reader/respondent, it could have a snowball effect on the reach. Generating more subscribers through the quality of the provided information.

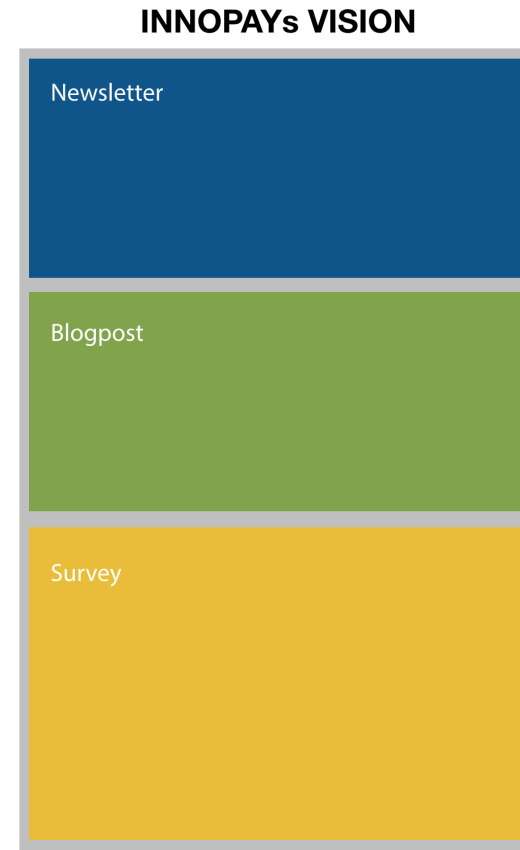


Figure 45: INNOPAY's VISION

5.4 // Validation

Validation with financial functions

This segment will explain the insights from four external interviews with financial functions and one internal validation session.

Method

A semi-structured interview is conducted to validate the different concepts by the users. This interviewing technique is used to be able to compare outcomes while allowing for considerable independence of answering. The questioning was kept equal for all concepts resulting in a practical yet straightforward interview guide (Appendix 12). Table 19 shows the questions. The concept is explained between question one and two. Two interviewees indicate to have a more strategic job description and two operational.

Question

1. What do you think this does?
2. Would you be interested in this product (helpful)?
3. Does it get you excited?
4. Would you like to add something? Either for the product or the design.

Reason

- Does it get the point across?
- Is the design instinctive?
- Is there use for the concept?
- Is it innovative?
- Are you inspired?

New insight/product features

Table 18: Validation question

Dashboard

1. The layout of this tool implies a dashboard. Every interviewee understood without an explanation of what the general application of this concept is.
2. One interviewee indicated not to see the use of this concept as they make financial dashboards themselves, signifying the added value of dashboards in general. The other three interviewees are very keen on the idea of a dashboard. They are naming interoperability and customisation as their primary motives.
3. Overall, interviewees indicated to be moderately excited as a dashboard is not a new product/feature. Their excitement came from the appearance: "I

have seen dashboards but not as polished as this one". Someone else said, "not having to convert balance sheet information to be able to use it in different places sounds amazing". One interviewee indicated to be used to what he uses now, not seeing the value of implementing something new.

4. Things that interviewees wanted to add:

- a. Different colour scheme. The dark layout was in line with the personal style
- b. It has to be smart. Fintags need to be able to change automatically
- c. Easy to edit in the backend. Ability to make software changes to be compatible with inhouse created software.

OutOfOffice

1. Interviewees were unclear what the function of this concept was. Initial guesses are a concept around automatic payments. Some other guesses were a transaction journal, a credit score rating generator and a liquidity forecaster. Most guesses are in the right direction. The distinctiveness of the design needs to be increased.
2. The explanation cleared things up about the need for this concept. This is a concept that is designed to help with liquidity management. Only a certain amount of financial functions is concerned with this task. Two interviewees were concerned with this task, and two were not. The interviewees that did not have this task as part of their job description was asked to envision this future liquidity problem — resulting in less reliable answers. All response was positive. One response from an operations manager of an online grocery company, in particular, stood out. "we have many transactions happening outside office hours. If there is a complaint, we would like to pay our customers immediately. This product would benefit our customer relationships."

3. The degree of inspiration depends on whether the interviewee is concerned with the management of liquidity. The interviewees with this task in their job description are keen on having this concept as soon as possible. Interviewees without liquidity management in their job description lacked a sense of urgency even though all replied positively to the product. This indicated a relation between job description and level of inspiration.

4. Things that interviewees wanted to be added:
- Quick indicator of product function
 - Money marketplace needs a more explicit indication
 - Switch the setting and history boxes needed to

Benchmarking

1. The name gives a clear indication of the function of the concept. Benchmarking is a familiar term.

2. Both operational and strategic interviewees see the benefit of using a benchmarking product. All indicated a different set of metrics that are of interest. This variety of responses is expected as this was also a result of the survey. A reoccurring benefit was the combination of financial and non-financial metrics. Some financial metrics exist but having, even more, would enhance the efficiency of decision making drastically. Non-financial metrics can incorporate external factors like customer satisfaction and net promoter score. These metrics are difficult to obtain at this moment in time, so having them all in one place would be truly incredible.

3. Benchmarking already has a name for the financial function. For this reason, the function of this concept was easy to understand. The innovativeness that sparked inspiration came from the added metrics and the precision of the benchmark. All interviewees were extremely positive and would like to use this concept as soon as available.

4. Things that interviewees wanted to be added:
- A better definition between metrics and segments
 - A time scale on the extra information graph
 - More specific segmentation

Alertify

1. Because of the name, interviewees believe Alertify to be a notification centre. The labels of the concept elements and the overall look confirms this belief.

2. This is a theoretical concept. This level of abstractness made it difficult for interviewees to grasp the potential of this concept fully. For them to understand this concept, an explanation together with examples of possible outcomes was required. The interviewees with a strategic and operational background believed this concept to be the future of finance. They explained that over the years, they had seen a constant increase in analytical power. This concept is a logical step. The operational interviewees added that they would incorporate more analytics into their daily tasks if an overview like Alertify were possible.

3. The two interviewees with a strategic background sounded genuinely happy hearing the explanation of the idea behind this concept. The interviewees with operational tasks needed slightly more convincing. They were more practical in their follow-up questions. Explaining that before such a product would come to market, continuous research would be required. They were even mentioning the chances of being sued if forecasts or predictions were inaccurate. Strategic interviewees were less thorough with their questioning. It could be that they were more excited to pitch in ideas for this concept instead of question it.

4. Things that interviewees wanted to be added:
- proven regression analysis
 - more instinctive design

Validation within INNOPAY

Method

For the internal validation, two interviewees are questioned at the same time. The reason for this is to enhance discussion between the two. The reason for an internal validation was checking if the outcome of the thesis was anything like they expected. Also, if any part should be added or done differently to be of more significant benefit to INNOPAY. There was no use using the same interview guide as for the external interviews as both interviewees already knew and discussed the concepts prior to the internal validation.

Dashboard

The dashboard was believed to be the right way to present the chosen concepts. It was clear what the dashboard was meant to do, and it presented a modern appearance.

OutOfOffice

This concept was thought to be an excellent tool to present Open Banking in a way that is comprehensible to a broad audience. It has an obvious problem with an easy-to-understand solution. A great way to explain a basic function of Open Banking.

Benchmarking

The benchmarking has been a favourite from INNOPAY perspective for a longer time. The variety of applications for this concept plays an essential role in this adoration. There is a creativity that is left untouched by a product like this. For INNOPAY, they can use it to present the whole concept. They can also use the Benchmarking to scope into the most specific metrics thinkable to inspire the most niche users.

Alertify

“This product shows the future of data usage”. Alertify looks further than Open Banking opportunities; it embodies the future use of data. Again, this is a product that allows for creativity in the presentation. Present the analytical possibilities with the use of examples that can be as general or as specific as required for a particular situation.

CHAPTER 6
Further words

6.0

This chapter will introduce the discussion where the limitations will be discussed as well as future implications and possible future steps for the concepts. After, a general conclusion is formulated This chapter will conclude this thesis with a personal reflection.

6.1 Discussion

6.2 Conclusion

6.3 Personal reflection

Everytime everywhere

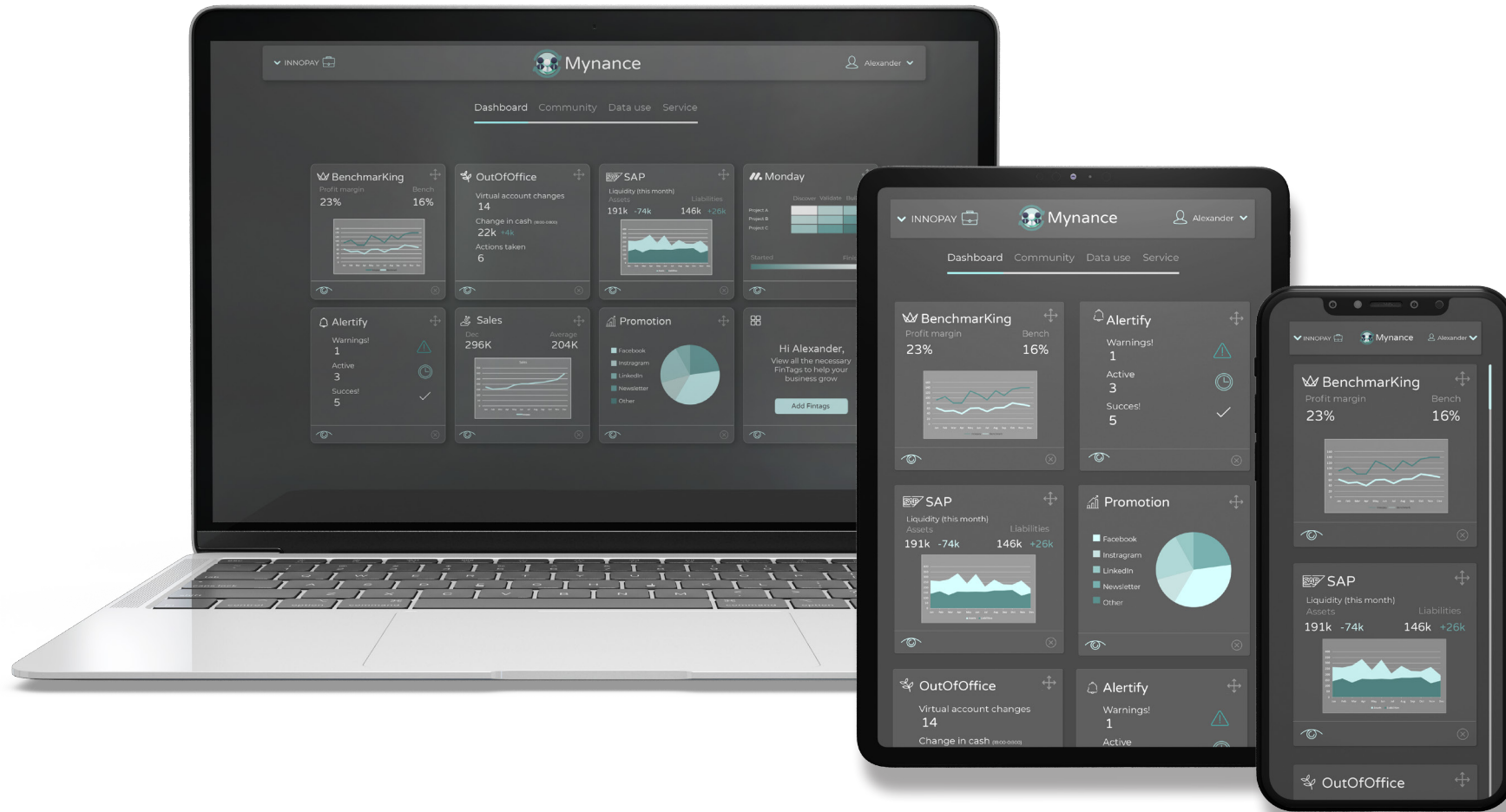


Figure 46: Mynance on all devices

6.1 // Discussion

14. Discussion

During this thesis, multiple methods are used, and conclusions are drawn. As with any thesis, these came with some limitation and also implications for further research. This chapter will shed light on these limitations and implications.

Limitation

1. Implementation of PSD2 during this thesis

Four months after the start of this thesis, PSD2 was implemented by the European Union. Banks, consultancies and other involved parties explored a significant amount of intelligence on the topic during this period. Because of the amount of emerging information during the project, some of the information might be outdated as for now. For example, new trends are analysed by INNOPAY and other organisations after the analysis of trends done during this survey.

2. Survey number of respondents

The number of survey respondents was calculated to be sufficient to be able to complete analysis with significant outcomes. The number of respondents was calculated to be used for an analysis of the functions (bundles of tasks) and not on the tasks itself. Because the number of tasks is higher than the number of functions, the significance of the analysis is lower as the number of respondents per analysis is lower.

3. Survey questions dodgy answers

The 'trends' portion of the survey was the only portion that used a different answering option. All other answers were scored on a scale of 1-5, low importance to high importance respectively. The 'trends' were scored on a 1-5 measurement where 3 was the medium (1= major threat 3= medium 5= major opportunity). The analysis of the answer to this question led to some strange insights. This peculiarity could indicate that some respondents incorrectly read the question and therefore answered the question in a way that resulted in strange outcomes.

4. MADM has difficult to measure attributes

The multi-attribute decision-making model included difficult to measure attributes. Attributes like innovation and inspiration are heavily dependent on the personal belief of the group scoring that attribute. Having the same experts in the field of Open Banking score attributes increased the validity of these scores, but still, they are complicated to accurately and consistently score.

5. Alertify is difficult to prove

OutOfOffice is a concept that uses existing data, functionalities and actions and is therefore close to reality. Benchmarking uses data and functionalities that could easily be opened up by banks and non-banks (in the same way PSD2 opens up data and functionalities). It also uses existing techniques (pseudonymisation done by banks today) to anonymise that data. This data is then displayed in a new manner. The essential elements of this concept are not far from reality. The essential mechanism of Alertify is pattern detecting algorithms. Such an algorithm somewhat exists currently (e.g. prescriptive healthcare analysis); however, such analytical capabilities are still very much in the early stages of progress. The fact that these capabilities are being created makes it a plausible concept. Not knowing precisely what is needed to make this concept a reality makes it difficult to prove.

Implication

1. INNOPAY should have a more prominent participation role
The role of INNOPAY as an Open Banking active promotor is slim at this moment. They participate by analysing the current state of affairs and create tools to educate on the Open Banking ability of others. What they should do is take a more active role in the promotion of Open Banking. They should invest in designers, continuously creating use cases or future visions that are easy to understand for every type of user. The interviews and the survey indicated that little to no people have an understanding of Open Banking even though it will

directly impact the way they do their job. Demonstrating what Open Banking can mean for its stakeholders is incredibly crucial for the adoption rate. Higher adoption rate translates to higher participation of Open Banking enabled products and services. In turn, this can mean more clients for INNOPAY. Especially when this promotion is created under the INNOPAY brand. This is why INNOPAY should implement a more futuristic approach to Open Banking promotion.

2. Advanced analytical capabilities within the shift of operational to strategic

Data and functionality opened up by Open Banking will be used for a variety of different means. Taking the shift of roles within a financial function into account from more operational tasks to more strategic tasks while looking at the business client of banks, the advice would be to focus on the future of analytical capabilities. Opportunities are being explored to combine different technologies with new analytical possibilities to create prescriptive tools. Not only in the banking and financial service industry does this have future implications, but for more and more industries will this start to play an essential role. It is even believed to have implications across industries. These analytical capabilities are the future of data usage and should, therefore, be the focus moving forward.

Future steps for concepts

1. Validation with too few people

There was only enough time to validate the concepts with four financial functions. This number of respondents is too low to say anything significant about any concept. To accurately validate these concepts, more people would need to be interviewed or surveyed. The exact amount that is needed is challenging to determine because both the Benchmarking and Alertify are theoretical concepts. For OutOfOffice, someone would have to look at the amount of 'operational' jobs that would be affected by Instant payments. From there, someone could determine the number of respondents needed the same way that was used for the survey during this thesis.

2. Tangibility of concepts

All products are designed to showcase a potential of Open Banking. None of the products is designed to a degree to which production could start tomorrow. Should that need to be the case, there would still be plenty to figure out. Data privacy and security are significant aspects that would need to be addressed. Also, business models can be created to find out where someone stands to make a profit. Roadmaps should be drawn up to guide implementation in a well thought out fashion. Especially for Alertify, finding out what it takes to create prescriptive financial analysis is years away from reality and not something for one single person to figure out. Luckily thousands of people are utilised, and billions of euros are spent every year to find financial solutions.

3. User interface and experience

No expert on UI or UX was used during the design process. There is still room for improvement for both the appearance and the experience as both are not thoroughly tested. The design captures the essence of the concepts. Would these ever become real products then it would be highly recommended to use UX and UI experts as well as conducting rigorous usability testing.

6.2 // Conclusion

This thesis aimed to create Open Banking enabled use cases for business clients of banks. The initial groundwork had to be done analysing the financial function and the corresponding Open Banking possibilities to create these use cases. This groundwork consisted of 4 steps

1. The first step was to get a clear depiction of the financial function.
2. Secondly, analysing the user's relationship with their bank.
3. The third step was to see what difference Open Banking would make
4. Finally creating a use case designed for the financial function enabled by potential data Opened up by their bank.

The first three steps are based on literature, quantitative and qualitative research. The fourth step is created by collaboration and design. This nine-point groundwork formed the base for the design of the use cases, which consisted of insights from the survey, literature and the interviews.

A multi-attribute decision-making model is used for the framework of the discussions throughout the ideation phases. As there were multiple ideation phases, having discussions led to more collaboration during the design process. This model can be re-used for other design processes regarding innovations. All attributes need to be thoroughly discussed beforehand in order to enhance the strength of this decision-making model. The attributes are as follows:

1. Correlation
2. Alleviation
3. Liberation
4. Innovation
5. Inspiration

INNOPAY will be able to use the presented use cases to promote Open Banking to banks, Fintechs, businesses and non-profit organisations. As the Benchmarking and Alertify have extensive possibilities for external data usage, these products can additionally be used to present to cross border industries. In turn, allowing Open Banking to be the front runner in promoting the Open Data Economy. As predicted will happen by INNOPAY (Jansen & Cortet, 2019).

6.3 // Personal reflection

Process

Subject complexity

The subject of this thesis was more complicated than was the notion from the beginning. I understated it to be a research on Open Banking, exploring possibilities, and putting these possibilities to use on the financial department of a company. It ended up being a study on 'business banking'. Exploring a large variety of products, services and users. With that came a study on Open Banking, finding implications and opportunities. Lastly, a study on the financial department of businesses. A complex world of different tasks, roles and dynamics together with a wide variety of products and services for processes I had never heard before. To make life a little more complicated, I was not designing for a particular company. I was designing theoretical future visions for 'Open Banking'. Combining these topics and direction into one or multiple use cases proofed to be more complicated than I had anticipated.

The generative session with Open Banking team

The generative session before the first ideation phase was done in collaboration with the INNOPAY Open Banking team. This session helped me to understand different trains of thought concerning Open Banking as well as thoughts of the overall direction of the project.

I would have liked to also conduct a generative session with the financial function. A well-constructed generative session with the financial function could spark creativity from the user's point of view. I believed this could have helped bring Open Banking as a topic and the financial function as topics together quicker. I have tried multiple times with multiple companies to arrange said session, but I was not successful.

The survey was very long

One remorse was that the survey, which was the element that brought the research together, was exceptionally long. Many different people participated with the creation of this survey leading to a fragmented set of questions and topics survey styles. I understand that for the respondents, it could have been

difficult to hold focus throughout the long survey as they were led through different topics.

Statistical analysis

When the survey came back from Sherlog, it was time to get busy with the analyses of the results. After a long period chasing people down for the design of the survey, which was very educational, it was time to get stuck into the data. It might have been the talking to all these people thinking about numbers all day but finding out how to analyse this data and discovering insights is something I really enjoyed.

Believe in quantitative and qualitative

I see the strength of combining quantitative and qualitative research. During this thesis, they have complemented each other in ways of which I did not expect. It helped me to get behind specific ideas and completely discard others. Having useful data to hold on to is genuinely essential in times of disorder and confusion in a design process. I could not have gotten to where I was if I only used one or the other.

Theoretical design (mostly use of data)

Finding use cases enabled by Open Banking meant finding ways to use banking 'data' with other forms of data. As a designer, this felt very theoretical. This abstractness was something that took some time getting used to. After the generative session and the first ideation phase, the ideas became more tangible. Resulting in a more distinct design direction.

Degree of detailing of concepts

The last struggle of this thesis was the degree of detail required for the concepts as they were primarily based on the use of different types of data. Were the screens together with the data use enough to get the story across or did it need more of a backup story to validate a possible implementation? What could accurately be said of the future that would make these concepts reality?

The journey

After two years of doing the SPD Master, I was most used to was working in a team. When I started this project, I was looking forward to working on something by myself but just like working in teams, working alone has negatives and positives. As the project progressed, I found myself craving that collaborative mindset I was so used to. I believe that great teams can achieve great things, and this project has only confirmed this belief. I was given a chance to work with some very talented and hard-working people of which I am utterly grateful.

I have learned a lot from working by myself, working with INNOPAY and working with the TU Delft, combining insights, wishes, criticism and ideas of all who participated with me on this journey. Creating this what you have just read.



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