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Analysis and Design of a Legal Entity Verification System

Master's thesis

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Juriidilise isiku tuvastamise süsteemi analüüs ja kavandamine

Magistritöö

Juhendaja: Nadežda Furs

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Author's declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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Abstract

The Master's thesis describes the problem of slow manual process of verification of legal entities and the lack of solutions for small businesses. The goal of the thesis was to propose a new automated all–in–one solution for easy verification of legal entities that will be used by small and medium–sized businesses.

The primary objectives of the thesis were to collect requirements, create a prototype and validate it for the minimum viable product (MVP) of KYB Platform dashboard. The scope of the thesis includes business environment analysis, customer analysis, competition analysis, system analysis, vision of the architecture, high–fidelity prototype, prototype validation with customers and roadmaps for future product releases.

Design thinking framework was used as the project methodology. Requirements were collected from analysis of anti–money laundering legislation of Estonia, brainstorming sessions with KYB Platform team and customer interviews.

This thesis is written in English and is 95 pages long, including 14 chapters, 30 figures and 11 tables.

Annotatsioon

Juriidilise isiku tuvastamise süsteemi analüüs ja kavandamine

Magistritöö keskendub juriidilise isiku tuvastamise süsteemi analüüsile ja kavandamisele. Töös kirjeldati aeglase ja manuaalse tuvastamise probleemi, kus andmeid juriidilise isiku kohta otsitakse mitmest allikast. Turul olemasolevad lahendused lahendavad probleemi osaliselt. Samuti on olemasolevad lahendused rohkem suunatud suurettevõtetele ning turul puudub lahendus väikeettevõtetele.

Autor kirjeldab oma töös, kuidas idufirma KYB Platform OÜ, kus autor on tegevjuht, arendab uut juriidilise isiku tuvastamise süsteemi. Lahenduse eesmärk on lihtsustada ja automatiseerida juriidilise isiku tuvastamise protsessi. Idufirma soovib ühendada mitu lahendust ühte keskkonda ja muuta lahendus kättesaadavaks väikeettevõtetele. Seetõttu oli lõputöö suur eesmärk pakkuda välja uus automatiseeritud kõik–ühes lahendus juriidiliste isikute mugavaks tuvastamiseks.

Lõputöö autori praktilisteks eesmärkideks olid KYB Platform'i iseteeninduskeskkonna MVP (minimaalne väärtustpakkuv toode) jaoks nõuete kogumine, prototüübi loomine ja prototüübi testimine tegelike kasutajatega. Ülesannete täitmisel kasutati kasutajakeskset disainimõtlemise raamistikku. Nõuded koguti Eesti rahapesu tõkestamise seadusandlusest, ajurünnakutest KYB Platform'i meeskonnaga ja intervjuudest potentsiaalsete klientidega.

Projekti skoobi sisse kuulusid ärikeskkonna ja turu analüüs, kliendianalüüs, konkurentsianalüüs, ärianalüüs, süsteemianalüüs, visioon lahenduse arhitektuurist, kõrge täpsusega prototüüp, prototüübi testimine, tulemuste põhjal tegevuskava loomine.

Lõputöö kirjutamise ajal, 2021. aasta kevade seisuga, sai MVP loomise projekt KYB Platform OÜ poolt käivitatud.

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 95 leheküljel, 14 peatükki, 30 joonist ja 11 tabelit.

List of abbreviations and terms

Adverse media	Negative news from verified news outlets about the legal entity or private person, usually connected to AML keywords, scandals.
AI	Artificial Intelligence.
AML	Anti–Money Laundering regulations set in the directives and laws of jurisdictions by official regulators to prevent money laundering and terrorist financing activity
AML screening	Anti–Money Laundering screening, refers to the process of checking if the entity is on any PEP, sanctions lists or in adverse media.
API	Application Programming interface, which allows applications to communicate to each other.
API integration	A connection between applications. In the context of the thesis means the possibility to connect different applications between each other.
AWS	Amazon Web Services, cloud services platform.
BABOK	A Guide to the Business Analysis Body of Knowledge.
Backend	The data access layer of a system that the end-users don't see.
BPMN	Business Process Model and Notation, business process modelling standard.
Crypto	Virtual currency.
Dashboard	An environment where a customer can log in and perform their verifications. Also called a self–service environment.
ERD	Entity Relationship Diagram, describes the databases of the solution.
EU	European Union.
FATF	Financial Action Task Force, an international regulator for tackling money laundering.
FinTech	Financial Technology industry. Businesses that provide financial services in an innovative way.

Frontend	The visual layer of a system that the users see and interact with.
Gartner's Magic Quadrant	A tool for analysing competition and positioning amongst them.
Harvey Balls	A tool for analysing competition using pie-charts.
High–fidelity prototype	An interactive highly functioning prototype that represents what the product will really look like, e.g., a wireframe.
Identity verification	The process of verifying a private person's identity.
KPI	Key Performance Indicator, used for measurement of performance of a solution.
KYB	Know Your Business sector, where solutions focus on verifying legal entities.
KYC	Know Your Customer guidelines and best practices for customer verification. Also is used when referring to identity verification.
Legal entity	An entity that is registered as a company and not as a physical person.
Low–fidelity prototype	A simple prototype that doesn't perform any tasks, such as a paper sketch, mock–up.
ML	Machine Learning.
MVP	Minimum viable product.
Onboarding	The process of making sure the customer can use the solution independently. Includes account generation, granting permissions, customer training, integration.
PEP	Politically Exposed Person, a person who has been politically involved on a higher level.
PESTLE	Analysis of political, economic, social, technological, legal, environmental factors.
Porter's Five Forces	A method for analysing an industry.
Postback	The process of submitting information and sending it to the server.
Private person	An entity that is registered as a physical person and not as a company.
Q1–Q4	First quarter, second quarter, third quarter, fourth quarter of the year.

RahaPTS	*Rahapesu ja terrorismi rahastamise tõkestamise seadus.* Money Laundering and Terrorist Financing Prevention Act of Estonia.
RCA	Relatives and Close Associates of PEPs, family members, colleagues, and other associates of politically exposed persons.
RegTech	Regulatory Technology industry, solutions that manage regulatory requirements and compliance.
REST API	Representation State Transfer, software architectural style.
Sanctions	A watchlist of sanctioned countries, legal entities, or private persons.
Self–service environment	An environment where a customer can log in and perform their verifications. Also called a dashboard.
SMB	Small and medium–sized business.
SWOT	A tool/ method for analysing risks.
TO–BE	A visualisation of how the future process is going to look like.
TOWS	A tool/ method for analysing SWOT.
Transactions monitoring	A system that monitors the financial transactions to detect any abnormalities.
UBO	Ultimate Beneficial Owner, a private person that has a considerable ownership of the legal entity and can influence the legal entity.
UML	Unified Modelling Language, a modelling language used to visualise the system.

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Introduction

Any business that is directly or indirectly part of the financial sector or has large financial transactions, is obligated to check the background of their business customers according to the Anti–Money Laundering (AML) regulations. It is widely known that due to the digitisation trends and the Covid–19 restrictions since spring 2020 there has been an increase in the demand for digital verification solutions, because businesses need to continue digitally.

As described further in the thesis, a considerable amount of small and medium–sized businesses opt for the manual process of business verification. Manual approaches on average take months to verify a company, involve a lot of communication and waiting, as well as not being very user friendly. The existing semi–automated solutions on the market are solving the problem only partially and target mostly larger financial enterprises, making it difficult for smaller businesses to find a solution that would cater to their needs.

The goal of the thesis is to propose a new automated all–in–one solution for easy verification of legal entities. The solution will primarily be used by small and medium–sized businesses. The thesis will describe the development of a prototype of a legal entity verification solution for the company KYB Platform OÜ. The prototype, together with the preliminary research and the prototype validation results, will be used for the development of KYB Platform minimum viable product (MPV). The objectives of the thesis include the following:

- combine multiple legal entity verification solutions into one single solution;

- make sure the MVP is fully compliant with the AML regulations of Estonia [1];

- collect requirements for the prototype and MVP;

- use a user–centric approach to the prototype development and test the prototype with real users.

In the first chapter the author will describe the background of the topic and the problem of manual legal entity verification. The author will specify the goals, the scope and the author's input into the project. In the second chapter the author will write about the legal entity verification process according to the AML regulations.

The third chapter will provide an overview and advantages of design thinking, which is the chosen methodology for the project. The fourth chapter will show in detail the full project plan together with the chosen steps and tools.

In the fifth chapter the author will present the results from the analysis of the business environment, the industry and KYB Platform's risks. The sixth chapter will include the analysis of competitors of KYB Platform. The seventh chapter will describe the ideal customers of KYB Platform solution.

The eighth chapter will show the results of the business analysis. This includes interviews with the potential customers, the brainstorming sessions with KYB Platform team and the analysis of the AML legislation of Estonia. This chapter will also describe the business requirements and future processes of how the solution will work.

The ninth chapter will show the results of the system analysis, which will include the functional and non–functional requirements. The tenth chapter will have an overview of the architecture vision for the solution.

The eleventh chapter will show the prototype that will be made according to the requirements. The twelfth chapter will include the prototype testing results. The thirteenth chapter will describe the plans for after the launch of the MVP. The fourteenth chapter will have the conclusions and how the results can be used in future projects.

1 Problem Description

In this chapter the author will describe the background of why legal entity verification is needed and what are the main challenges connected to the current process, as well as what value can be generated from the author's research of this problem.

1.1 Background

There are many businesses that need to comply with Anti–Money Laundering (AML) and Know Your Customer (KYC) regulations both in Estonia, as well as globally. Even though money laundering preventing laws have been around at least since the 1980s, after the financial crisis of 2007 such regulatory organizations as FATF (Financial Action Task Force), Moneyval, United Nations (UN), European Commission and local financial inspections have started to direct more resources towards development of a modern legal framework for combating money laundering [2], [3]. This became a favourable environment for companies in the RegTech (Regulatory Technology). [3] RegTech is the term that describes solutions that manage regulatory requirements and compliance.

In 2018 the 5th anti–money laundering directive came into force and had to be adopted by the EU member states by January of 2020. Every new AML directive reflects the changes happening in the world by adding new obligated industries and describing the processes more thoroughly [2].

According to the Money Laundering and Terrorist Financing Prevention Act of Estonia (RahaPTS) the regulations apply to fifteen different business activities [1]. Next to classical financial institutions, Estonia, just like the rest of the world, is seeing new business categories such as virtual currency exchanges and FinTech (Financial Technology). FinTech is a business that provides financial, credit or payment services, but also puts a big emphasis on the innovative technology. FinTech companies are also obligated to follow the AML regulations [4].

Non–financial activities such as manufacturing, logistics and (e)commerce are currently not obligated to follow the AML regulations. However, due to more businesses moving online and the rise of online fraud, a change has been proposed to the eCommerce Directive of European Union (Digital Services Act), stating that any online business

should start verifying their customers [5]. We can see similarity in the case of virtual currency platforms, where with the 5th AML directive this business activity became more regulated [1], [2]. This shows that it is possible for many different business types to become AML obligated with the updates of the directives.

Know Your Customer (KYC) principles were established by the Bank for International Settlements (BIS) in the beginning of 2000s in order to specify the guidelines and best practices for customer verification [6]. KYC is often used as an umbrella term for describing the overall customer verification process, either for private person or legal entity. Also, KYC is used when referring to specifically private person identity verification. Trulioo [7] was one of the first companies to talk about Know Your Business (KYB), describing the process of business customer verification and onboarding. Some sources also call the legal entity verification Know Your Business Customer (KYBC) [5].

When referring to the term legal entity, the author means a business customer, partner, investor, supplier, and other type of company that is not a private person. When talking about a private person the author means a physical individual that is not a company. The author refers to legal entity verification process as KYB. When talking about customer onboarding the author refers to the point where the customer of an IT solution can use the solution independently, after getting all the necessary accesses and training. Customer onboarding and verification are often used together because in order for the onboarding to succeed the customer needs to be verified.

According to research done in 2018, the global KYB market is expected to reach at least $12 billion in 2022 [7]. However, this prognosis was done before Covid–19 in 2020, therefore based on the trends of businesses becoming more digital due to the restrictions of movement and less face–to–face customer verification, the author suggests that the KYB market size will be even bigger than the initial prognosis.

1.2 Problem Description

By the end of year 2019 only in Estonia there were registered 372 banking service providers and 33 credit institutions , over 80 FinTech companies and 2013 investment firms [8], [9]. The Bar Association of Estonia included 1056 law offices and attorneys in

November of 2020 [10]. These are some examples of the AML obligated businesses in Estonia, however, the RegTech industry is a global phenomenon.

According to global research done by Thomson Reuters in 2017, the business customer verification time in the financial sector is up to 32 days on average. This time of verification is also rising on average of up to 24% per year, despite the global digitisation trends and new innovative technologies. The reason behind the long verification time is the amount of information that needs to be collected and checked manually, as well as the human resource required [11]. Deloitte research also showed that onboarding one business customer can take up to 16 weeks and costs on average up to $30 000 [12]. With more than 200 jurisdictions in the world and thousands of databases that should be used to check the background of the customer, information is quite scattered and restricted.

During the customer verification process the parties need to communicate to each other in order to receive and process the data. On average the financial institution is forced to contact their customer who is being verified up to 8 times. This is partially the reason why Thomson Reuters' 2016 survey showed that 89% of customers are unsatisfied with the KYC or KYB procedure and even 13% of customers had left the financial service provider due to a bad experience with KYC or KYB [11], [13].

There are service providers that offer KYB services, biggest names include Thomson Reuters, Dow Jones, Bloomberg [14]–[16]. These existing solutions due try to automate, but have many manual processes in place, therefore making the verification process time consuming and expensive. The existing solutions on the market often have linear processes that don't allow much customisation. If we also look the service descriptions of the mentioned providers, we can see that many of them concentrate on one part of the KYB process and don't provide an all–in–one solution. Also, these solutions target the large financial institutions with high volumes and enough recourses [14]–[16]. It is known that small and medium–sized businesses (SMBs) often prefer the manual approach because they want to be compliant with the regulations but lack the resources and the need for a big brand complicated solution. By manual approach the author refers to the process of using online research and analysis of original incorporation documents of the legal entity.

All in all, in this thesis the author wanted to explore the problem of long manual or semi–automatic legal entity verification process and how many tools are needed to achieve the correct level of KYB. Also, the author wished to understand the important aspects of a KYB tool for an SMB.

1.3 Research Objectives and Goals

The goal of the thesis was to propose an all–in–one legal entity verification solution that would be user–friendly for an SMB and would cover the needs of the potential customers of KYB Platform OÜ. By all–in–one the author refers to a product that incorporates all the necessary KYB tools into one single space.

During the writing of this thesis, as of spring 2021, the company already scheduled KYB Platform MVP to be launched in Q2–Q3 (2nd to 3rd quarter) of 2021. The practical goal of the thesis is to collect requirements and provide input to the KYB Platform MVP development. The objectives of the overall project included the following: combine multiple KYB solutions into one single solution; make sure the MVP is fully compliant with the AML regulations of Estonia [1]; collect requirements for the prototype and MVP; use a user–centric approach to the prototype development and test the prototype with real users.

In order to achieve the goal, the author performed the following tasks:

- map the macroenvironment, industry and risks connected to KYB Platform;

- describe the competitors and customers of KYB Platform;

- analyse the AML requirements of Estonia;

- perform brainstorming sessions with KYB Platform team;

- conduct interviews with customers to understand their current business verification problems and processes;

- provide input into the KYB Platform MVP development through conducting business analysis and system analysis;

- describe the general architecture of the KYB Platform MVP;

- apply design thinking principles to the idea generation and prototyping process;

- design a high–fidelity prototype;

- test the prototype together with potential customers;

- propose further actions for development of KYB Platform MVP.

The tasks were performed by the author, involving team members of KYB Platform OÜ for the brainstorming sessions, when creating the architecture and when creating the high–fidelity prototype of KYB Platform solution.

1.4 Research Scope and Limitations

The research scope consists of the business environment and industry analysis, risk analysis, customer and competitors' descriptions, business analysis, system analysis, basic architecture description, high–fidelity prototype based on low–fidelity mock–ups, prototype testing and future development roadmap.

During the writing of the thesis the author concluded that the solution MVP needs to be a self–service environment (also called a dashboard), where a user can log in and perform verifications. The high–fidelity prototype is a visual representation of the MVP and didn't include any automated processes nor connected databases. The scope of the research doesn't involve thorough descriptions of databases that will be integrated into the solution. The business analysis, system analysis and architecture descriptions were done as deep as required by the start–up to quickly create and test the prototype as per design thinking principles. The author purposefully didn't include any AS–IS process descriptions, as all the interviewed customers had different manual processes of customer verification.

The thesis was written primarily in 2020 and therefore is based on the 5th AML directive and may not include the updates that have come to effect by any updated directives, such as the 6th AML directive. Also, the thesis is based on Money Laundering and Terrorist Financing Prevention Act of Estonia (RahaPTS) that was in force until 30.04.2021.

KYB Platform OÜ works in the business of trust and certain legal requirements, therefore the author had to assure the anonymity of certain customers and had to provide the

information regarding their current processes in a general form. Another limitation is the fact that KYB Platform is an actual product being developed, as well as operating in a highly competitive market. Therefore, the author didn't disclose any internal secret information. Since the author is the founder of KYB Platform OÜ, some results in the thesis may be considered subjective. Also, by the time of the publication of the thesis the solution described in the research may have already changed.

1.5 Author's Role and Input

The author of the thesis is the CEO and founder of a RegTech start–up called KYB Platform OÜ. The author's main job is to manage the business side, gather requirements from customers and help deliver the product that satisfies the needs of all parties. KYB Platform was launched in September of 2020. KYB Platform has 2 co–founders and 5 outsourced developers.

Since Covid–19 pandemic in spring of 2020, the author has been receiving requests from potential customers to build an automatic solution that would make the legal entity verification process faster and more convenient. KYB Platform has finished in the top–30 of the Estonian prototyping accelerator Prototron in January 2021. While writing the thesis, the author planned to launch the MVP of KYB Platform in Q2–Q3 of 2021 for the first customers.

In this project the author used the help of two team members: one technical founder and one product owner. The technical founder's expertise in development was mostly utilised when describing the architecture and building the high–fidelity prototype of KYB Platform. The brainstorming sessions were done with the technical founder and the product owner of KYB Platform.

2 Legal Entity Verification

In this chapter the author is going to describe the reasons why legal entities need to be checked and who are the obligated persons that need to verify their customers. Also, the author will define the meaning and explain how terms RegTech, KYC and KYB are connected to each other. Then the author will describe what a general process of customer verification looks like.

It is known that KYB tools are often compared to or mistaken for KYC, AML screening and transactions monitoring solutions, therefore the author will compare these concepts and bring out the main differences in the last part of the chapter.

2.1 AML Regulations

Anti–money laundering laws have been around at least since the 1980s. In 1989 a global regulator called FATF (Financial Action Task Force) was created in order to guide the international anti–money laundering politics [17]. Due to digital transformations, new types of emerging business activities and the financial crisis of 2007, such regulatory organizations as FATF, Moneyval, United Nations, European Commission and local financial inspections have started to direct more resources towards development of a modern legal framework for combating money laundering. The first Anti–Money Laundering (AML) directive was adopted in 1990 [2], [3].

In 2015 European Union (EU) adopted the 4th AML directive. By January of 2020 all the EU member states had to adopt the 5th anti–money laundering directive, which amended the 4th directive. Every new AML directive reflects the changes happening in the world, for example the 5th directive limited the anonymity of cryptocurrency businesses. The AML directive is the base for the money laundering legislation of the EU member states, such as in Estonia it is set in Money Laundering and Terrorist Financing Prevention Act (RahaPTS) [2].

According to the AML legislation the obligated persons are required to adopt Know Your Customer (KYC) principles when handling relationships with their new or old customers. This means that an obligated person, such as a financial institution, needs to perform a thorough background check of any customer's business activity, their transactions and

their location in order to make sure that that customer is not involved in any money laundering or terrorist financing activity [6].

2.1.1 Definition of an Obligated Person

As established in the previous chapter, there are certain businesses that are considered obligated to perform background checks on their customers. According to the Money Laundering and Terrorist Financing Prevention Act of Estonia (RahaPTS) the obligation to follow the AML regulations applies to the following business activities [1]:

- credit and financial institutions;

- gambling;

- purchase and sale of property;

- intermediary of property transactions, where total amount per month is at least 10 000 euros;

- traders defined by the Trading Act, with cash payments of at least 10 000 euros;

- buyers or whole sellers of precious metals and stones;

- auditors, providers of accounting and tax consultations;

- trust management and business service providers;

- virtual currency platforms;

- pawnbrokers;

- cross–border cash transportation services;

- art dealers.

In a summary provided by Veriff the industries affected by the 5th AML directive are financial and credit institutions, auditors, outsourced financial consultants, trusts, business service providers, legal sector that also includes notaries, estate agents, crypto business, art dealers, traders of goods [18].

2.2 RegTech and KYB

KYC (Know Your Customer) as an umbrella term is the obligatory process of verifying the customer when starting or continuing a business relationship. It involves checking the identity of the customer when they open an account or perform a certain transaction. [19] When referred to private person verification the process can also be called identity verification. Identity verification checks the person's identification document, its validity and legitimacy, as well as verifying that the document belongs to the person [20].

KYB (Know Your Business) is the term used when describing the obligatory business customer verification. The difference to KYC is that this process involves checking the background of a legal entity, its structure, and people behind the entity. A big part of KYB is finding the beneficial owners and their ownership structure [21].

KYC, KYB and other AML solutions can be categorised under RegTech (Regulatory Technology) that describes any solution that concentrates on regulatory requirements and compliance. RegTech solutions are known to be flexible, fast, easy to integrate and involve some sort of machine learning, artificial intelligence or data analytics [22]. RegTech solutions are known to be flexible, fast, easy to integrate and involve machine learning (ML), artificial intelligence (AI), or big data analytics. Since the RegTech solutions tend to be cloud based, the advantages of such solutions include low costs, flexibility in data protection, scalability in terms of adding and removing features, secure data storing [22].

Burnmark *et al*. [23] have classified RegTech companies as shown in Figure 1. Companies in the regulatory compliance space help financial institutions to gather regulatory data, set policies and automate data sharing with regulatory inspections, as well as involve the government into the process. Risk management start–ups analyse market risks, deal with data protection and prevention of cyber–attacks. Financial crime sector involves transactions monitoring, market abuse monitoring and AML screening. Identity management manages KYC procedures.

Regulatory Compliance	Risk Management	Financial Crime	Identity Management
Regulatory intelligence	Market risk	Financial fraud	KYC for identity verification
Compliance & governance	Conduct risk	Money laundering & terrorist financing	KYC for onboarding
Regulatory reporting	Cyber risk	Market abuse	KYC for AML checks
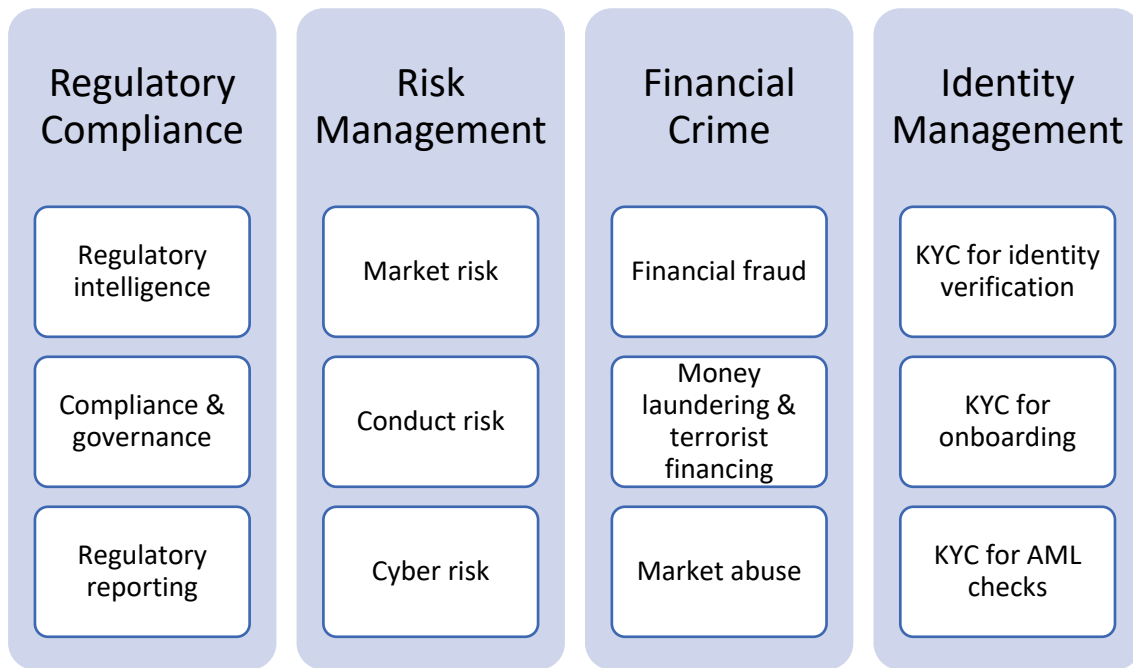
Figure 1. RegTech classification (by author based on Burnmark et al. [22]).

Burnmark *et al.* [23] also says that RegTech has an overlap with compliance support, and identity sectors. Compliance support involves trainings, tax, and legal tech start–ups. Identity sector means start–ups doing digital identity, offer new approaches to identity verification and checking biometrics. Burnmark also states that often these three groups overlap.

2.3 Customer Verification Components and Processes

According to Moyano and Ross, the classical KYC process begins when a customer wishes to start using the services of a financial business or institution. After agreeing on the terms and conditions, the business sends the customer the necessary forms needed for the KYC [3].

After the customer has filled in and provided all the necessary KYC documentation, the business needs to generate an internal report with an overview of their risk assessment of the customer that would explain based on what the business has made the decision of approving or declining the customer. Upon request this report should be provided to any regulatory institution that looks over the AML [3].

When onboarding a new customer, the obligated person needs to identify the legal entity or the private person based on the information that has been collected from official sources, such as national business registers or other validated data sources. Digital data collection methods are allowed. It is possible to collect the data straight from the customer who is being verified, however, these original incorporation documents need to be confirmed by a notary. The obligated person needs to verify the identity of the legal entity's representative or a private person and their right to represent [1]. In Estonia the legal entity is verified based on the registry card and registration certificate from the national business register or a documentation that equals to the mentioned certification. If it is possible to obtain the data from a business register or any relevant official database, then it is not necessary to ask for certification from the legal entity [1].

In Estonia's RahaPTS it is stated that when identifying a legal entity, it is required to check legal entity name, registry code or registration number and the date when company was registered. The names of the directors and board members or their substitutes need to be verified, as well as their rights to represent the company. Another important part is checking the contact details of the legal entity [1].

The obligated person needs to identify the beneficial owner of the transaction, verify the identity of the beneficial owner, understand who the beneficial owner is and what the control structure of the legal entity is. Beneficial owner, otherwise known as Ultimate Beneficial Owner (UBO), is the final person standing behind the legal entity or private person and therefore has influence and control over them. UBO is traditionally a private person but may have control through a legal entity as a shareholder, which is called indirect shareholding. It is in the beneficial owner's interest and for their benefit a transaction or operational decision is made. In different jurisdictions the percentage can vary, but usually 25 percent ownership is considered to be a majority shareholder, therefore a beneficial owner [1].

The obligated person is also required to collect information on whether the involved parties are politically exposed persons (PEP) or any of their family members or close associates are politically exposed (RCA). A politically exposed person (PEP) is a private person who has been politically involved on a higher level or has performed any public sector functions. Such people include heads of states, members of operating political parties, officers of armed forces, directors of government–owned enterprises, board

members of a central bank, ministers and many more [1]. Relatives and close associates (RCA) are the family members, colleagues, and other associates of PEPs. Both categories are considered to be higher risk and therefore require a background check when doing business with [24]. PEP or RCA screening means the process of checking whether the person is on any of the PEP or RCA lists. When the author used the term PEP screening or PEP check, then both PEP and RCA are meant.

Sanctions screening is another important part of the customer verification process. Sanctions are restrictions against countries, individuals or companies that are involved or are suspected to be involved in illegal activity. Sanctions lists are created by such institutions as UN, EU or OFAC (Office of Foreign Assets Control of the US), but there are also lists created by different jurisdictions and smaller organizations, all in all there are thousands of lists. Sanctions screening refers to the process of checking a legal entity or an individual whether they are listed on any of the sanctions lists [25].

Adverse media is also an important part of regulatory compliance. Adverse media means any negative news from reputable sources and publications that link a private person or a company to money–laundering, terrorism, corruption and any allegations about breaking the law [26].

Often times PEP, RCA, sanctions lists, and adverse media data is checked together and offered as one product by most of the service providers. Another way is to offer adverse media separately, as it requires a slightly different approach. The combination of all these checks is often referred to as AML screening or AML check [27].

Some examples of legal entity verification can be seen in Trulioo [28] and ShuftiPro [29]. Firstly, legal entity's basic information such as address, board members and date of incorporation are checked. Then beneficial owners are identified, as well as screened t against sanctions lists. As the last step Trulioo recommends to collect all the data into one report and download the report [28]. ShuftiPro also includes business statements and filings, industry codes and previous names of the company in the report [29].

2.4 KYB Comparison to Other RegTech Sectors

When referring to KYB it is often confused with some other RegTech sectors, such as identity verification, transactions monitoring and AML screening. Even though all the

mentioned sectors are meant for combating money laundering and performing background checks on customers, their processes and components are different. In this chapter the author is going to explain the main differences between these four sectors of customer verification.

2.4.1 KYB and Identity Verification

It is widely known that the verification of a legal entity starts with the business representative, which is a private person. Identity verification, often referred to as KYC, is used to verify the private persons, but also representatives of the company and the beneficial owners.

A basic process of identity verification is showing an identification document, such as a passport, ID–card or driving license, to confirm one's age and proving that the person is who they claim to be. Digitisation trends and rise of online fraud have sparked the need for digital identity solutions that would make confirming someone's identity faster and more efficient. For example, Veriff [30] offers a solution where a person requires to take of photo of their document with a webcam or a smartphone, then take a portrait photo and submit both pictures. The whole flow is done in one secure environment in real time.

Table 1 shows the main differences between KYB and identity verification (KYC). KYB process focuses on verifying legal entities when identity verification is meant to verify natural persons to confirm their identity. Both product types are sold to businesses and are meant to fight online fraud and money laundering crime [31].

Table 1. KYB and KYC comparison (by author).

	KYB	Identity verification (KYC)
Business model	B2B	B2B
Verification of	Legal entity	Private person
Types of checks	Company information (address, status)	Document validity and expiration
	Board members	Document legitimacy
	Shareholders and UBOs	Facial comparison
	Representative of the company	Video recording of the process
	Identity verification	Video call
	PEP, Sanctions, Adverse Media	PEP, Sanctions, Adverse Media
	KYB forms/ questionnaires	

Documents being checked	Articles of association, business register extract, power of attorney, certificate of good standing	Passport, ID–card, residence permit, driving license and other
Databases	Business registers, UBO & Shareholder databases	Population register, document datasets
Cost	Depending on jurisdiction, can reach thousands of euros.	Prices vary from under 1 EUR to 15 EUR per check, depending on whether video call is involved.
Time (manual)	32 days	24 h
Time (automatic)	Minutes/ Hours	60 sec

As noted before, KYB process usually consists of company basic information check, board members, shareholders and beneficial owners, representatives of the company, identity verification of representatives and beneficiaries and PEP, sanctions and adverse media screening [28]. KYC process checks the person's identification document, its validity, expiration date, legitimacy, the portrait photo is compared to the document photo. Usually, some form of video recording of the process needs to be saved, to make sure that the person is real and willingly going through the verification process. PEP, sanctions and adverse media screening can also be added to identity verification [32]. Some solutions also provide a video chat option, where the user goes through the verification process together with the guidance of a verification specialist [33].

For identity verification it is necessary to provide a form of identification, such as passport, ID–card, residence permit or driving license. KYB documents include articles of association, business register extracts, shareholders documents, certificate of good standing, power of attorney and any other document that serves as proof of business [34].

It is known that information about natural persons is stored in population registers. Identity verification companies also use document templates in their automated verification process. A business verification product needs to have connections to business registers and other business databases [35]–[37].

Cost of KYB can reach thousands of euros if done manually. Price per identity verification is much cheaper due to its automatic nature and can be under €1 per check

[38], [39]. In terms of speed, as mentioned previously manual KYB can take up to a few months. Automatic KYB is known to take minutes or hours, depending on the jurisdiction and the provider [11]. In identity verification, most of the providers perform the verification automatically in a matter of seconds and complicated cases get solved in a matter of hours.

2.4.2 KYB and Transactions Monitoring

Transactions monitoring is a term in AML that refers to monitoring of customer transactions in real time to determine if any high risk or out of the ordinary transactions are being made. Such monitoring is done using special software that combines the knowledge of the customer's history, previous transactions, and customer's risk level in order to predict the future and alert the financial institution if any suspicious transaction is made. A transaction is any sort of transfer of money or cash withdrawal. Suspicious activity can mean a transaction being made to a jurisdiction that the customer normally doesn't make transactions to, or if the amount of the transaction is higher than usual. Transaction monitoring is often times combined with AML screening, where all involved parties of the transaction are being checked [40].

One example of a transactions monitoring system is an Estonian start–up called Salv. Salv uses a rule–based approach, meaning it is possible to easily add your own rules to the transactions that need to be monitored. Also, one of Salv's goals is to reduce the amount of manual work of responding to countless alerts being triggered by the transactions monitoring systems. Salv wants to automate the monitoring process and make it more accurate, decreasing the number of false positive alerts [41].

The difference between KYB and transactions monitoring is that KYB is applied to verify and determine the risk of a whole legal entity, where is transactions monitoring software monitors money transactions and alerts of any risks in them. Legal entity verification is mostly used when onboarding a new business customer. Transactions monitoring is used to monitor the transactions of existing customers. Even though additional features can be applied to transactions monitoring, the traditional software doesn't go as in depth with the check as KYB, because it is applied to customers that have already been onboarded.

2.4.3 KYB and AML Screening

The combination of PEP, RCA, sanctions lists, and adverse media is often offered together and is called AML screening or AML check. The process is similar to transactions monitoring and can be automated using rules and match rate percentages. Match rate percentage is the accuracy percentage determining how exact the response should be. In AML screening both legal entities and private persons can be checked. The responses can be monitored and alerts can be triggered in case something has changed in the screening's initial result [27].

As mentioned in the examples of KYB companies such as Trulioo [28] and ShuftiPro [29], KYB process usually includes AML screening that is done on the legal entity, board members, shareholders and beneficial owners. The main difference is that AML screening includes only PEP, RCA, sanctions, and adverse media checks, but KYB refers to a much wider data analysis.

3 Design Thinking

In this chapter the author is going to go over the general concept of design thinking, the usual steps of design thinking described by several scholars, as well as the suggested tools and activities used in design thinking. Also, the author is going to compare design thinking to other software development frameworks.

Design thinking is an innovative method of development of prototypes, user interfaces, hardware, web, and mobile applications. The main aspect of design thinking is the human–centred approach to product development [42]. Some scholars add that design thinking also supports the analysis of whether it is possible and reasonable to use the technological resources of the team, as well as how much value the solution would bring [43]. Therefore, while being one of the possible product development frameworks, design thinking can also be a project and business management tool.

As the name suggests, design thinking first stemmed from observing the work of designers and how they solve problems and manage projects [42]. It is widely considered that Peter Rowe was one of the first, who used the term "design thinking" in the context of architectural projects, in his 1987 work "Design Thinking" [42], [44]. Some scholars add that the concept was popularized by David Kelley and Tim Brown in the 1990s when they started their design company IDEO. Through them design thinking began appearing more in the context of business management and software development [45].

Tim Brown [46] describes design thinking as an iterative journey that is meant for exploration rather than just reaching targets. Roger Martin is another known design thinker and similarly to Tim Brown has applied design thinking to business management. Martin [47] describes a design thinker as a person, who needs to balance stability and validity, creativity and facts, gut feeling and numbers.

In his academic research Nigel Cross [48] suggests that the key feature of design thinking is finding innovative answers and approaches to questions that are not fully defined. He adds that the point of this framework is to make assumptions, validate them by building prototypes and test them fast.

Many scholars have noted that the main purpose of design thinking is solving the wicked problems. Wicked problems were first described in 1960s–1970s as ill–defined problems

that involve a lot of mystery, their cause and effect is unknown. It is also difficult to apply analytical thinking to the wicked problems because it is difficult to categorise it and measure the result. This is exactly why design thinking concentrates a lot on the problem definition [47], [45].

When developing a product or starting a new project, Tim Brown [46] suggests thinking about the constraints of the project. The constraints are feasibility, viability, and desirability. Feasibility refers to what is possible to accomplish, what resources the company has, what are the external factors may affect the project. Viability can refer to scalability of the business model. Desirability, as the name suggests, identifies the needs of the customers, users and stakeholders [46].

3.1 Design Thinking Steps

The general strategy of design thinking is quite known; however, scholars offer different approaches and order of the activities. Some examples are shown in Table 2. A widely used process is the one showed by Crady [49], where the flow is as follows: empathise, define, ideate, prototype, test.

Table 2. Comparison of design thinking steps according to different authors (by author based on Lewrick, Link & Leifer [52], Crady [49], Sandino *et al.* [52], IDEO [53], Naiman [54]).

Lewrick, Link & Leifer	Crady	Sandino *et al.*	IDEO	Naiman
Understand	–	Define	Frame a question	Discover
Observe	Empathise	Explore	Gather inspiration	Frame opportunity
Define point of view	Define	–	–	Incubate
Ideate	Ideate	Ideate	Generate ideas	Ideate Evaluate & Refine ideas
Prototype	Prototype	Prototype	Make ideas tangible	Prototype & test Deliver
Test	Test	Select Implement	Test to learn	
Reflect	–	Review	Share the story	Iterate & Scale

Lewrick *et al*. [51] refer to the preparation step of the framework as the "understand" phase. In it the team needs to form a problem statement and makes initial assumptions. An ideal customer persona can already be described in this stage and initial interviews can already be done. A similar approach is supported by IDEO [53] that in the first step a problem question needs to be understood by thinking about the customer's needs. Naiman [54] refers to the first step as the "discovery" stage, where a topic of problem needs to be chosen and customers need to be questioned. Sandino *et al.* [52] name it as the "define" stage, where the scope and resources of the project need to be defined.

Classically known as the "empathise" stage, also called "exploration", this step refers to gathering information to confirm the team's assumptions [49]. Other authors refer to this as observing the environment, conducting interviews with potential customers or other form of research [51]–[54]. Ideation stage is when the team comes back together and makes a development plan, based on the findings from the previous stage. Prototyping and testing stage is the core part of the design thinking framework, and these steps are included in any scholar's work since the whole idea of design thinking is to deliver and test fast prototypes. The team chooses what type of fidelity they wish to achieve with the prototype and what method of testing they wish to use [51]–[54].

Not every author includes the reflecting stage into the design thinking framework. After the product has been tested, it is still suggested to analyse the feedback and come to certain conclusions about the future of the product. IDEO [53] also brings out the aspect of sharing the future roadmap with the customers and end–users to get them excited. Naiman [54] also brings out the aspect of scalability, in the feedback analysis stage it is suggested to think about how the product is going to grow in time.

3.2 Design Thinking Methods and Activities

Roger Martin suggests that observing the user's everyday tasks helps with understanding the context of the problem. Here Martin also highlights the importance of ethnography, the science of peoples cultures and habits [47]. Allison Crady [49] offers some suggested methods, activities and tools for every step of design thinking. In the "empathise" step Crady also supports the use of ethnography, but also qualitative and quantitative surveys, interviews with customers, users and stakeholders, document analysis. Sandino *et al.* [52] also support conducting surveys and interviews in that stage, also they suggest analysing

how the users act and think, how they solve the problem now, and whether they even see it as a problem.

In the second step Crady [49] proposes conducting a competitive and comparative analysis, map the user's journey, create empathy maps of the user's needs, configure user and business needs. Amongst other scholars, Lewrick *et al*. [51] are supporters of creating customer personas, using canvases and empathy maps in order to describe the customer's needs. Also brainstorming is a widely used method of generating ideas inside the team and it can be applied at any step of design thinking.

In the "ideate" step Crady [49] advises to conduct design sprints and create user stories. Sandino *et al.* [52] add that in the ideation stage the design team could also test the existing methods that their users are using. It is important for the design team to understand in what order the users perform the tasks.

During the prototyping stage Crady [49] offers to design the prototype of the required fidelity, such as a drawing mock–up, wireframe, low–fidelity or high–fidelity prototype, minimum viable product (MVP). Sandino *et al.* [52] also suggest test different scenarios of how the product will be used, in order to prevent any possible errors.

In the testing phase any required method of testing can be applied, such as usability testing, A/B testing, click tests and more. No matter the method, it is important to create a testing plan, define the metrics of success and monitor the progress [49].

3.3 Design Thinking Compared to Other Frameworks

Design thinking may seem like the waterfall methodology, as they both follow similar steps. However, waterfall is not as flexible, as it doesn't include possibility of iteration in the building stage. This means that once the requirements have been decided on in the design phase, no new requirements are allowed into the building phase [55]. A comparison of widely used design thinking and waterfall processes are provided in Figure 2.
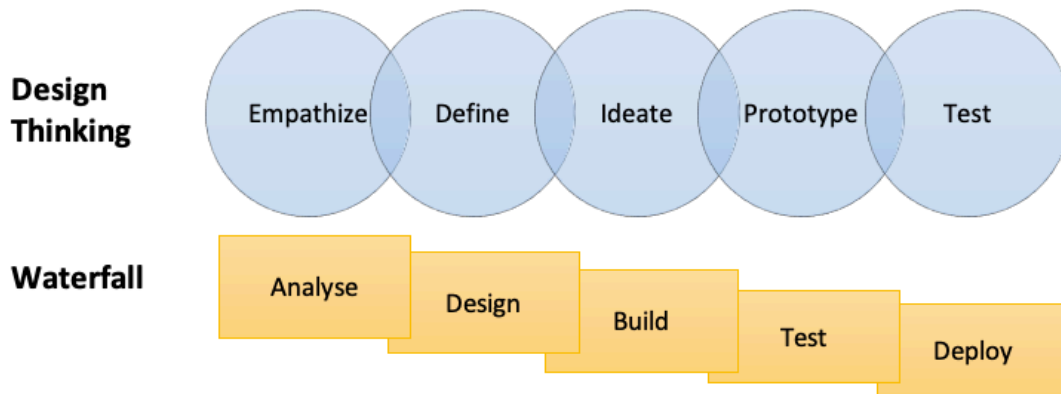
Figure 2. Design thinking compared to waterfall process (by author based on Steinke et al. [55]).

In the waterfall framework the development team is often too focused on the task deadlines, not thinking about the user and how they are going to use the product. Instead, design thinking's primary focus is on the user, which is why the empathise stage is very important. Also design thinking supports constant brainstorming, product testing and re–thinking of ideas [55].

Some scholars have advised to implement design thinking into waterfall's analysis and design stages to help the team start a dialogue about the problem statement and brainstorm ideas. This may especially improve the team's motivation with projects that include a lot of unknown [55].

Design thinking is more similar to agile development methods, as it also supports communication, user–centric approach to development and working products over processes. Also design thinking is flexible in response to changes in the requirements. It is advised to implement design thinking into the first part of agile development in order to define the customer requirements better [55].

4 Methodology

In the thesis the author has used the design thinking framework and applied it to the whole project. The main goal of the project was to collect requirements for the MVP, create the prototype, validate it with potential users and create a roadmap for the development of MVP, as well as future releases. The author used a combination of different suggested steps of design thinking that are shown in Appendix 2. The author decided to frame the project with the following design thinking steps: Explore, Define, Ideate, Prototype, Test, Reflect. The project plan is shown in Appendix 3.

Design thinking methodology was chosen due to its human–centric approach and the prototype was created with a big emphasis on usability. Also, in the project there were a lot of unknown factors, due to this being a brand–new product concept. Design thinking was also chosen because of KYB Platform being a start–up, which values quick paced prototyping and testing to launch the MVP as fast as possible.

4.1 Explore

The purpose of the exploration step was to understand the macro environment of RegTech and the industry of legal entity verification (KYB). Here the author will describe the tools used in this stage of the project. The author called this the exploration stage because the customers were not involved in the process, therefore wouldn't have been appropriate to call it the "empathise" stage.

4.1.1 Brainstorming

Traditionally, brainstorming sessions are used during later stages of design thinking, such as the ideation stage [49]. However, as the KYB Platform team has expertise in the KYB market, then the author decided to start conducting brainstorming sessions from the very first stage to gather input into the business environment and industry analysis.

A brainstorming session means that a group of people offer, write down and discuss potential ideas for the topic in question. Lewrick *et al*. [51] suggest using 20 minute brainstorming sessions, where every member shares their ideas orally or in writing. The key is to generate spontaneous ideas. It is important for all the team members to have the same understanding of the problem in order for the session to succeed [51]. It is not

allowed to criticise the ideas of team members. The point of the brainstorming session is to produce as many creative solutions as possible. Afterwards the ideas are discussed, the best ideas are chosen and are worked on in the next stages of the project [51].

4.1.2 PESTLE

The author has decided to use the PESTLE analysis for describing the macroeconomic factors that might affect the solution and the market that the solution is going to operate in. This method is widely used in business plans and is suited for companies that have yet to launch, which is the case of the author's solution. Also the results of such analysis can later be used when attracting investors to the start–up [56].

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PESTLE analysis usually consists of analysis of the following factors [56]:

- Political: political trends, international conflicts, governmental policies, governmental support towards new businesses and innovation.

- Economic: tax rates, costs of starting a business, purchasing power of people, region popularity, trends amongst users.

- Socio–cultural: history and traditions of the region, demographics, influences.

- Technological: number of start–ups in the region, grants and governmental support, resources for innovation, education, academic work.

- Legal: laws for employees, tax laws, data protection laws, anti–money laundering laws.

- Environmental: sustainability practices, conscious consumption and production, position on climate change.

Some scholars advise to include the probability of occurrence to every variable (e.g., High, Medium, Low). Since PESTLE analysis gives only the view of the external

macroeconomic factors, it is advised to use it together with such tools as Porter's Five forces and SWOT analysis [56]. PESTLE analysis results can also be categorized into SWOT as opportunities and threats [57].

4.1.3 Porter's Five Forces

Porter's Five Forces model was developed by Michael E. Porter back in 1985 and deals with the forces that influence the market and competition. This method is used to determine the company's or the product's positioning amongst the competition and also the overall profitability and attractiveness of the market. [58] Porter's Five Forces analysis helps identify the impact that other industry players, such as customers, suppliers, alternative providers, potential and existing competitors, have on the business or product in question [59]. An example of the Porter's Five Forces diagram is shown in Appendix 4.

Bargaining power of partners is traditionally called power of suppliers. This refers to number of suppliers, how easy it is to switch suppliers, size and influence of suppliers, and switching costs [57]. The author uses the term power of partners, as this fits the use case better. Power of customers, otherwise known as bargaining power of buyers, assesses how easily the customers can dictate the prices of the solution, specifically, how easily can they set the price to be lower. This parameter shows the number of customers in different segments, value of the customer to the company, the switching costs for the customer [57].

Threat of alternative solutions describes any alternative solutions or possible approaches to the problem that the solution is trying to solve. If there are any powerful easy alternatives, that means that the customers will switch to them in case the business raises its prices. [57]. Threat of new solutions defines how profitable and attractive the market is and whether there are any barriers to enter the market, such as legal requirements, patents, or governmental policies. Competition amongst existing solutions is the number of competitors on the market, their size, market growth rate, barriers to exit the market [57].

Porter's Five Forces is a classical business environment analysis tool, but compared to PESTLE, it concentrates on threats, rather than opportunities. Porter's Five Forces

diagram is a widely used tool in strategic planning and this is the reason why it was chosen by the author.

4.1.4 SWOT

Another known tool used in business strategy development and product risk analysis is SWOT. SWOT is an abbreviation for a 2x2 matrix consisting of Strengths, Weaknesses, Opportunities and Threats, the diagram is shown in Appendix 5 with examples of what should be added to every category [57].

Strengths and weaknesses are internal factors that the business can change. Threats and opportunities are external factors that the business has no control over, however can prevent [60]. Strengths describe what the business is the strongest in or the team has expertise in. Weaknesses describe what is lacking in the company or what expertise is missing.

Opportunities are the external factors that the company can utilise to achieve its goals, such as government policies. Threats are the factors that can damage the business, product demand or the market in general [60]. As mentioned previously, Porter's Five Forces analysis can provide input into the threats of a business and PESTLE analysis results can be categorised under opportunities and threats.

One of the methods to analyse SWOT is to use the TOWS method, such as shown in Appendix 6. A TOWS is a 3x3 matrix that helps the team to identify the following [61]: using strengths to recognise and take opportunities (SO); using strengths to recognise and avoid potential threats (ST); taking opportunities in order to improve weaknesses (WO); working on weaknesses and avoiding threats (WT).

These parameters can help the business to develop a strategy, depending on how many factors there are in every quadrant and what their weight is. Mini–mini strategies involve a more defensive approach, as it means that there are a lot of weaknesses and threats. Maxi–maxi strategies refer to a more aggressive approach, as it means that the company has a lot of strengths and opportunities. Mini–maxi strategy means that the company needs to take advantage of the opportunities. Maxi–mini strategy means that the company is stable but should work on the unique value proposition [62].

4.2 Define

The goal of the defining stage was to understand the competitors of KYB Platform, the customer segments, and the business requirements. Here the author is going to describe the methods used in this phase.

4.2.1 Competition Analysis

The first step of understanding the competition was to do a web–based market research and list all the competitors of KYB Platform. Second stage was to compare KYB Platform to the competitors using Gartner Magic Quadrant and Harvey Balls methods. The tools were chosen in accordance with the start–up's need to be able to show the results of the competition analysis in presentations to potential investors.

Gartner Magic Quadrant is a widely used method amongst start–ups when pitching their businesses. This quadrant was created by a research and advisory company Gartner Inc. The quadrant usually consists of two axes that represent two parameters and four quadrants. Inside the quadrant the business that is being pitched, as well as its competitors are placed into the quadrants depending on how they fit the set parameters [63]. An example of Gartner quadrant is shown in Figure 3.

Figure 3. Gartner Magic Quadrant example (by author).

The result of the Gartner's Quadrant analysis shows how the business can compete in the set industry. The first square in the quadrant represents the challengers of the market, the

second square on the right is the market leaders, the square under the first one is niche players, and the bottom right square represents the visionaries. [63]

Harvey Balls method is another typical tool for start–ups to show competitors and to pitch the business idea to the investors. In this case usually a table is made where the business or the product is being compared to its competitors using a few parameters. The value of every parameter is displayed as a pie chart [64]. An example of a competition analysis with Harvey Balls is shown in Table 3.

Table 3. Harvey Balls method example (by author).

	Business 1	Business 2	Business 3
Parameter 1	◑	◕	◔
Parameter 2	◔	◑	◕
Parameter 3	◑	◔	◕

Using pie charts makes it easier for the viewer to grasp the quantitative information, instead of text or numbers that require a more in–depth analysis. Harvey Balls method can be used in a number of diagrams, such as in project management and consumer satisfaction reports. In terms of using this method for competition analysis, businesses are advised to be objective in their judgment and fill in the pie charts truthfully [64].

4.2.2 Customer Analysis

Based on Dumas *et al*. [65] the author chose the interview–based discovery method. The interviews were conducted in a semi–structured way, meaning that the author had pre–defined questions, but also added questions during the conversation to specify some aspects. The goal of the interviews was to understand how the customers of KYB Platform define the problem, what are their challenges with the current process, what the current process looks like, how they envision the ideal solution and what are the main requirements for this new solution. For customer segmentation the author used customer personas method and Lean canvas method.

A persona is a made–up character that includes the main characteristics of a certain group of customers. A persona profile describes the basic demographic data, its pains, goals,

jobs and desires. The persona needs to be accurately described and it will provide the team some insight into the customer's buying habits and actual pain points. An example of a persona template based on Lewrick *et al*. [50] is shown in Figure 4, where the numbers indicate the order in which the persona profile needs to be filled in.

Name		
Description (1)	Illustrations, sketch, picture (6)	Tasks or jobs that they do (2)
Influencers (7)		Problems, pains (4)
Trends (8)	Use cases (3)	Gains (5)

Figure 4. Customer persona template (by author based on Lewrick *et al*. [50]).

Firstly, the persona's name, age, gender, family, and hobbies need to be described. Then the persona's tasks are described, but in the context of the problem that needs to be solved. Then more specific use cases need to be added. The next steps are to determine the problems and the opportunities of that customer. It is optional to add a customer picture or sketch, but also a mood board can be created instead, which would include illustrative pictures of the overall mood of the customer. The last steps are for determining who has power or influence over the persona and what trends the persona is following [50].

Lean Canvas is a short version of a business plan that describes the problem, customer segments and how to deliver the solution to that segment. The method was created by Ash Maurya based on the Osterwalder's Business Model Canvas. An example of the Lean Canvas can be found in Appendix 7 [66].

To achieve the most out of the canvas, it is advised to fill it in a suggested order. Firstly, it is required to describe the segment and the first users in a few words (1) and then note down 3 main problems that this segment is struggling with (2). After, the team should

write down a one–liner (3) that would spark interest in a customer. Then, 3 solutions to the listed problems need to be written down (4) and the channels of how the solution will be delivered to the customer (5). Afterwards, the business side should describe the business model (6), the cost structure (7) and what will the key metrics of the business will be (8). The last step is listing some unique things about the product or business that can't be easily copied (9) [67].

4.2.3 Business Analysis

The main purpose of business analysis is to determine the scope, capabilities, and functionalities of the intended solution, considering both the stakeholders' and the business's needs. Business analysis is provides input for developers and architects to understand what the solution should look like and how it should work [68].

In the business analysis part, the author collected the requirements through documents analysis of RahaPTS, semi–structured interviews with customers and a brainstorming session with KYB Platform OÜ team. Based on them the author has written down the business requirements and business glossary. Then the author mapped out the TO–BE processes using Business Process Model and Notation (BPMN), as it is considered to be the industry standard. TO–BE processes show how the solution is going to work, what tasks are performed in what order.

Then the author wrote down the business rules and created a business domain model to have an overview of what the solution needs to include. Business domain model was created using specific UML software with the Unified Modelling Language (UML). Business analysis was performed according to the practices of BABOK v3 [69].

4.3 Ideate

The goal of the ideation stage was to generate ideas for building the prototype and the MVP and arrange the ideas from the interviews into the form of functional and non–functional requirements. Also, in this stage the architecture of KYB Platform was described.

4.3.1 System Analysis

In this stage the author described functional requirements in the use case diagram, using Unified Modelling Language (UML). The purpose of the diagram was to show the actors and their relationship with different features of the solution. Afterwards the use cases were described in higher detail and non–functional requirements were written down. System analysis was performed according to the practices of BABOK v3 [69].

4.3.2 Architecture

The architecture part of the project consisted of creating a visual representation of the architecture for KYB Platform MVP. In this part the author also created an entity–relationship diagram (ERD) to visualise the database of KYB Platform system. The ERD was drawn using a database modeler [70].

4.4 Prototype

A low–fidelity prototype can be paper–based, the main point of it is to show the general idea of the solution in a visual format. A high–fidelity prototype is a prototype that includes some form of user interaction and can be shown to potential customers [71].

The purpose of the prototyping stage was to build a high–fidelity prototype. Firstly, the author put together low–fidelity mock–ups using a mock–up tool and then the KYB Platform team created a high–fidelity prototype.

4.5 Test

As described by Maropoulus and Ceglarek [72], validation of a digital product means that the product is being validated whether it satisfies the requirements that were agreed on in the beginning of the project. In the thesis the author validated if the prototype and future MVP is compliant with the RahaPTS. The product was validated through product demos to the same potential customers that were interviewed before. During the product demos the author showed the prototype to the customers and asked the customers about whether the initial needs are satisfied and what other features need to be added.

The method of product demoes together with customer interviews was chosen, as the prototype was not ready for other types of testing such as usability testing or A/B testing.

The method was chosen in accordance with limited resources and time constraints. Other forms of testing are scheduled to begin in Q2–Q3 of 2021 when the MVP will be launched.

4.6 Reflect

After the testing feedback the author created a product roadmap for the development of KYB Platform MVP. The product roadmap types vary based on the audience, there are internal and external product roadmaps. Internal roadmap is for the company and not shared with the public. Internal roadmaps are used as a vision and motivation for all the stakeholders. External roadmaps are used as marketing materials on the company website or presentations, in order to get the customers excited about the future releases [73].

Feature–based roadmaps refer to a plan based on feature releases. Features are put on a timeline indicating at what time the feature is going to be released. Features can be different types of searches, report generation and other modules [73]. Goal–oriented roadmap consists of goals, achievements, or objectives on a timeline. A goal can be generating more signups, more customers, improving engagement. Features are still used, but they are planned under every goal [73]. In the thesis the author used the goal–oriented roadmap, as this can be used as an external roadmap to show to potential investors.

While writing the thesis the KYB Platform MVP development already started. The team developed in iterations, which means that the whole development process was divided into small tasks and sprints. The author described all the tasks with their development time in an implementation roadmap. Also, once the MVP is launched and there will be actual traction, there needs to be a way to measure the results. For that the author described the Key Performance Indicators (KPI) for the MVP:

5 Business Environment Analysis

As per the project plan set in Appendix 3 the business environment analysis started with a brainstorming session with KYB Platform team, as described in Appendix 8 and shown in Appendix 9. The goal of the analysis was to understand the RegTech market and risks associated with the business. The brainstorming session was a semi–structured video chat, where the author and the team answered the following questions: What is influencing our business? What can make or break our business? What do we know about the industry and competition? What are our strengths and weaknesses? As well as using their own previous knowledge about the topic, the team also researched the information on the internet to provide proof to their arguments and ideas.

After getting the input, the author conducted a PESTLE analysis to determine the external opportunities and threats of the market, Porter's Five Forces analysis to understand the KYB industry and a SWOT/ TOWS analysis to determine the risks.

5.1 PESTLE Analysis Results

PESTLE analysis is shown in Appendix 10. The team of KYB Platform mapped the political, economic, social, technological, legal, and environmental external factors that may influence their business and product, also the team wrote down the factors that are more RegTech specific, and finally the importance (High, Medium, Low) of every RegTech factor.

The high importance factors were the ones that the team can use to their advantage, should emphasise more, be aware of the most. Mostly these factors are connected to the features that need to be launched in the MVP and the sales strategy of the business. The high importance factors were discovered to be as follows:

- Covid–19 related restrictions;

- higher fines for lack of AML compliance;

- digitisation trends, customers are used to getting their business solutions conveniently, fast, with as little effort as possible;

- higher risk of fraud online, a need for quality verification;

- trend for flexible, scalable solutions;

- obligated persons, such as the financial sector, legally obligated to verify customers;

- non–obligated persons have an interest in the verification tools.

One of the high importance political factors are the Covid–19 restrictions in 2020 and 2021 that make face–to–face verification complicated, therefore is adding to the need for a digital customer verification solution that would require a minimum amount of physical contact. Also, statistics show that the fines for not complying with AML regulations are growing, so businesses are seeking for accessible solutions to be AML compliant. Another Covid–19 high importance factor is the fact that due to the restrictions more businesses are going digital, however, the risk of fraud online is higher. Social trends of high importance include customers' needs for a flexible, scalable, convenient verification solution, possibly from just one place. The legal definition of an "obligated person" has expanded, making such businesses like crypto exchanges and FinTech also part of the sectors that require business verification. Similarly, as mentioned in previous chapters, non–obligated businesses also want to know who their customers and partners really are.

The medium importance factors shouldn't be considered less important than high importance factors, but these factors should be taken into consideration after the initial launch of the MVP. These factors affect the specific features of the solution and are connected to the future roadmap of the business. The medium importance factors of for KYB Platform were the following:

- crypto businesses part of the obligated persons;

- AML regulations being changed and updated, product needs to keep up;

- economic growth allows customers to afford better RegTech solutions;

- customers want to pay for convenience;

- importance of data storing, data security and sensitive data;

- speed of verification, AI (Artificial Intelligence)/ ML (Machine Learning) solutions;

- sustainability trend, conscious partnerships with businesses that customers can trust.

Digital currency business has been growing rapidly and is now considered to be obligated to perform background checks on their customers. Therefore, this brings more business to KYB Platform. Another medium importance aspect is the fact that AML regulations are being updated, expanded, and changed every couple of years. This means that KYB Platform solution needs to be flexible to accommodate change in the product. Trends of medium importance include the customers concentrating more of the quality and the convenience of the product, rather than the price. Importance of speed of the verification solution has also been noted down, as well as customers wanting more AI/ML solutions. Importance of data storing has also been noted during the discussion. Knowing your business partners and customers is also important from a sustainability aspect.

The least important external factors for KYB Platform were the following:

- start–up grants and governmental support;

- low costs of starting a business in Estonia;

- data analysis trends;

- environmental factors being part of risk assessment of business customers.

The team thought that lack of funding from the government and higher starting costs wouldn't have stopped them from starting a company. Data analysis is part of the KYB Platform solution. However, this is not the focus of the product, therefore the trend for big data analytics is not part of the context. Sustainability attributes, such as environmental factors or gender equality in a business, may be included into KYB Platform in the future, but at the time of discussion the team thought it should stay low priority due to other focus.

5.2 Porter's Five Forces Analysis Results

The Porter's Five Forces Analysis was conducted based on ideas that the team came up with during the brainstorming session. Appendix 4 shows an example of a Porter's Five Forces diagram and questions that need to be answered for every sector of the diagram. While the PESTLE analysis looked more on the overall RegTech market, the Porter's analysis concentrated on the KYB industry specifically. The results of the Porter's Five Forces analysis are presented in Figure 5.

Threat of alternative solutions		
▪ Manual work, departments of people collecting and analysing data. Cost is thousands of euros (salaries). ▪ Combining at least 5 different solutions to achieve the goal. Requires prepayment, thousands of euros. ▪ Not doing the verification results in thousands (or even millions) of euros in fines.		
Bargaining power of partners	**Competition amongst existing providers**	**Bargaining power of customers**
Business registers have fixed governmental fees. Other databases work on cost–volume, the larger the volume, lower the cost per data attribute. Switching costs are high (because integrating the partner requires resource). Self–cost is already high; margin can't be too high. Many alternatives to databases, but no alternative to business register (legal requirement).	▪ A few players doing something similar. 2–3 players historically known, 1–2 new players. ▪ Many players that doing KYB partially. ▪ KYB market is still developing, therefore no standard has been developed. ▪ Industry growth 16% per year. ▪ Product development requires a lot of resources.	▪ KYB market size 25 billion Euros. ▪ Switching costs are high because a lot of integration time and money has been spent. ▪ Customers more price–sensitive, since in the business of volumes. ▪ Around 500 FinTechs in the Baltic States, at least 5000 FinTechs in Europe. ▪ 1000+ crypto businesses in Europe, 3000+ banks in Europe.
Threat of new solutions		
▪ Digitisation trends, Covid–19, more businesses going online. A need for more solutions. ▪ Entering the market is difficult, requires a lot of resources. ▪ Products need to follow legal requirements. Certification adds value.		

Figure 5. KYB industry analysis using Porter's Five Forces method (by author).

Competition amongst existing KYB providers shows that there are only a handful of direct competitors of KYB Platform, a couple of whom have established brands. However, there are many players on the market that concentrate on one part of the KYB. KYB market is still in the development stage, therefore most of the players offer different approaches to KYB and there is no universal standard yet. Industry is growing rapidly with 16% growth rate per year. Entering barriers are high, as KYB product development requires a lot of resources. Overall competition is low to medium.

Customers' bargaining power can be described as medium. Switching costs are high, because most of the KYB solutions are expensive and require a longer integration period. Customers are somewhat price sensitive and do have an understanding what type of solutions are offered. Customers are used to paying less with larger volumes. There are thousands of FinTech and crypto businesses in Europe, more than 3000 banks.

When it comes to bargaining power of partners or suppliers, then it can be considered medium. Most of the data providers have fixed fees, especially the governmental databases. Some databases work based on cost–volume. Switching costs are high for the KYB providers, because integrating databases into a system is expensive. Even though there are alternatives to data aggregators, there is no alternative to national business registers.

There are three threats of alternative solutions. Manual approach means that a company needs to hire people that will collect and analyse the data. This approach is expensive since the company needs to pay salaries and database access fees. Semi–automatic approach means that the company combines a few different solutions that do partial KYB. However, this approach may be inconvenient, since a full KYB check would require at least five different solutions. The third alternative to KYB is not doing KYB. This approach means that the company may end up paying thousands, if not millions, of euros in fines for not being compliant with AML regulations. The author suggests that the threat can be considered low.

Threat of new solutions can be considered low to medium. The market entering barriers are high, product development requires resource as well as certification. Still, due to the digitisation trends and Covid–19 in 2020 and onward, there has been a spike in the need for convenient business verification tools.

5.3 SWOT Analysis Results

For the SWOT analysis the team of KYB Platform thought of their strengths, weaknesses, opportunities, and threats both in the context of the product that is being developed, as well as the business itself. The results are presented in Figure 6.

STRENGTHS	WEAKNESSES
S1: Experienced team, KYB and RegTech experience. S2: All–in–one solution, 5 solutions in one platform. S3: User–centric approach, UX is a priority. S4: Quality data. S5: Fast business verification. S6: Flexibility in the product.	W1: Expensive product development. W2: AI/ ML development requires time. W3: Need to add more UBO databases. W4: Sales and development need to be hired. W5: Dependence on partner databases.
OPPORTUNITIES	**THREATS**
O1: Become a KYB standard. O2: Participate in the establishment of the KYB market. O3: Digitisation trends. O4: Covid–19, businesses moving online. O5: Become a business register, have our own databases. O6: Adding more interesting attributes and angles to business verification.	T1: Regulations changing, product needs to change. T2: Building a non–scalable business. T3: Too fast growth, too slow growth. T4: Other RegTech players becoming competitors.

Figure 6. KYB Platform SWOT analysis results (by author).

As seen in the results, KYB Platform's strengths are the experienced team and a strong product that incorporated user–experience, quality data, speed, and flexibility. The main weaknesses are limited development resources, which is a barrier for new features, new database implementation and AI/ ML development. Also, during the initial stage the product will be dependent on databases, such as business registers.

The team feels strongly about becoming a standard in KYB, as well as helping in the development of the KYB market. As mentioned previously, digitisation trends and Covid–19 in 2020 have pushed businesses to go online and demand for digital verification

products has risen. KYB Platform could even replace the business registers at some point, as well as develop new approaches to business verification in general. However, threats to the product include changes in regulation, competition and the business not being able to scale or scaling too fast.

After the SWOT matrix, the author conducted a TOWS analysis, the results of which are shown in Figure 7. Using the team's experience KYB Platform will be able to take opportunities, such as building a quality product that will become a KYB standard. Also, the product will evolve, potentially becoming a new business register. Strengths of the flexible product will allow KYB Platform to adapt to changes in the AML regulations. The team's experience in the KYB market will allow to build a scalable product.

	OPPORTUNITIES (O)	THREATS (T)
STRENGTHS (S)	SO Using our team's experience in RegTech to build a product that will become a KYB standard. Fast, quality, user–friendly, convenient product that the customer will not be able to live without. Quality product will be able to act as a business register. Experienced team able to add new approaches to KYB.	ST Flexible, modular product can adapt to change in the regulations. Experienced team combined with quality data will make the product scalable.
WEAKNESSES (W)	WO If the product will become a standard, then the resources spent will be worth it. Digitisation trends and Covid–19 makes businesses move online, meaning there is a need for such a product. More business means higher revenue and more possibilities for hiring and development. Becoming a business register and having your own approach to KYB will make it not dependent on partners.	WT Building the product based on high priority requirements, to avoid overspending. Hiring plan and product roadmap will help tacking these weaknesses.

Figure 7. KYB Platform TOWS analysis results (by author).

Weaknesses included limited resources, however, if the product will be part of the standard KYB ecosystem, then more resources spent at the beginning will be worth it. Due to the digitisation trends more businesses are moving online and there is more demand for KYB Platform. More demand means more opportunities for hiring development. When KYB Platform will become a register or a database on its own, it will stop depending on third–party providers. To avoid building a non–scalable product, the team needs to concentrate on the requirements that will bring the most value to the business. Also, a hiring plan and product roadmap will help with tackling any future problems connected with growth.

As seen in both in Figure 6 and Figure 7, KYB Platform has a lot of strengths and opportunities, therefore maxi–maxi strategy is appropriate to use. KYB Platform can be more aggressive with their sales strategy and thanks to the opportunities – spend a bit more on product development, as the demand for the product is high. Mini–maxi strategy can also be applied, and even combined with maxi–maxi strategy. This means that to speed up the development process the team can outsource development. Also, as it seems that there are some threats of competition and alternative solution, KYB Platform should this of their competitive advantage.

6 Competition Analysis

The competition analysis was conducted based on the input from the brainstorming session. The team wrote down the competitors they already knew, as well as used a Google search with keywords such as "business verification", "KYB", "legal entity verification". Afterwards the author performed a comparative analysis of all the competitors using Harvey Balls and the Gartner's Magic Quadrant. The competitors were divided into direct and indirect competitors.

The author used KYB features to compare the competitors. Those features are connections to business registers, UBO data, PEP, Sanctions and Adverse media screening (AML screening), identity verification, AML/ KYB questionnaire. Also, the author checked if the solution is only available as a dashboard (to sign in and conduct the verification) or whether there is also possible to integrate the solution into the customer's existing process (API). The analysis didn't have any limitations in terms of the competitor's location or size. The author included only active companies.

The author only compared the main features, as this is part of the scope of the research. Speed, usability, and other aspects of the solutions were not tested. The goal of the analysis was to understand what set of features, typical for a KYB product, are provide by competitors.

6.1 Direct Competitors

A direct competitor of KYB Platform is a business that performs business verification either manually or automatically and includes one or multiple features of KYB. The analysis showed that the main direct competitors are Trulioo [28], Refinitiv [74], SumSub [75]. The author used Harvey Balls to compare the features of the competitors, which is shown in Table 4.

Trulioo [28] has been operating since 2009 in Canada, mostly concentrating on the North American market. The business started off as an identity verification start–up and around 2017 business verification was added. Trulioo has both API (Application Programming Interface) integration possibility, as well as a portal. By API integration the author means the possibility to connect the solution to an existing application without developing your

own solution. The company utilises partners and business registers, however it is not fully known from their website if the data is straight from the original source or is cache from their database. Identity verification basic needs are covered, but there are no questionnaires that is possible to send to a customer to ask them about certain details. Identity verification mostly needs to be purchased and integrated separately.

Table 4. KYB Platform direct competitors using Harvey Balls method (by author).

	Trulioo	Refinitiv	SumSub
Dashboard	◕	◑	◕
API integration	●	●	◑
Business registers	◑	◑	◑
UBO data	◑	◑	◑
AML screening	◑	●	◕
Identity verification	●	◑	●
KYB questionnaire	○	○	◑
Other	Not flexible, identity verification is separate	Many products that the customer needs to understand and combine	Mostly concentrated on dashboard, no API integration

Refinitiv [74] is a company that is connected to Thomson–Reuters business. There is a wide variety of products, meant more for a corporate client that has large volumes. There is a dashboard possibility, but the author assumes they mostly work with API integrations. As with Trulioo, it is not fully known if Refinitiv takes the data straight from the business register or sells cached data. But as the company has established great partnerships, it is sure that they have access to both business registers and some UBO registers. The company has its own PEP, Sanctions and Adverse media database. There are no KYC/ AML questionnaires being advertised. The negative side is that there is a wide variety of products that the customer needs to combine and understand.

SumSub [75] also started as an identity verification company. In their KYB product, there is a big emphasis on the dashboard solution, however no mention of an API integration

possibility. SumSub promises to check both the basic company data, as well as UBOs, according to the regulations. However, the author is not sure if the data comes straight from the sources or is also combined with some proprietary databases of SumSub. AML screening services are provided. SumSub is one of the few companies that also provides KYB questionnaires.

6.2 Indirect Competitors

Indirect competitors of KYB Platform are businesses operating in the RegTech sector, but either are not marketing themselves as KYB companies or don't have the full set of features to call themself a KYB company. The author divided the indirect competitors into groups: business registers, UBO databases, AML screening providers, identity verification companies. The comparison is provided in Table 5.

Table 5. KYB Platform indirect competitors using Harvey Balls method (by author).

	Business registers	UBO databases	AML screening	Identity verification
Examples	e–Business Register of Estonia, agents	Dun & Bradstreet, Orbis	Dow Jones, Thomson Reuters, ComplyAdvantage, LexisNexis	Veriff, Onfido, Jumio, IdNow
Dashboard	◐	◕	◕	●
API integration	◐	◕	●	●
Business registers	●	◐	○	○
UBO data	◐	●	○	○
AML screening	○	◐	●	◕
Identity verification	○	○	○	●
KYB questionnaire	○	○	○	○

Business registers can be divided into official registers, such as the e–Business Register of Estonia [76], and official agents, who help register companies and hold the data of those companies, which is a common practice in jurisdictions such as St. Kitts and Nevis [77] and such. The author estimates that there can be more than 200 different official commercial registers in the world. Usually, business registers have an environment to log into and conduct a search or request articles of association of the company. At least ¼ of the registers have some possibility to connect to them via API. However, it is widely known that not all commercial registers allow access to entities that don't have a legal reason to conduct a search. UBO data is available if it has been reported by the legal entity, not all jurisdictions have mandatory UBO reporting. Classical identity verification solutions and KYB questionnaires are not available in business registers.

UBO databases hold the information of UBOs and shareholders of the company. Some countries have the UBO registers as part of the commercial registers. There are also such solutions available as Dun & Bradstreet [78] and Orbis [79]. Both solutions are meant for corporate clients with large volumes and enough resources. UBO registers usually do have a search environment and an integration possibility. UBO solutions tend to get their information from multiple sources and manual research (including company audits), including business registers. Some form of PEP and Sanctions checks is usually included in these solutions. However, there is no identity verification and no KYB questionnaires available.

AML screening solutions such as Dow Jones [15], LexisNexis [80], Thomson Reuters [81] and ComplyAdvantage [82] focus on PEP, sanctions and adverse media checks. They tend to provide both a dashboard option, as well as API integrations. Business register and UBO data is usually not included. Identity verification and questionnaires are also not included.

KYC solutions such as Veriff [83], Onfido [84], Jumio [85] and IdNow [33] usually have some of the best dashboard solutions and provide quality API integration possibility. AML screening tends to be included with identity verification. While concentrating on verifying private persons, these solutions don't have access to business registers and UBO data. KYC solutions also don't usually provide the full long AML forms.

6.3 Gartner's Magic Quadrant Results

Inside the Gartner's Magic Quadrant, the author wanted to compare all the competitors described above with two axes: number of features and customer size. The quadrant is shown in Figure 8.
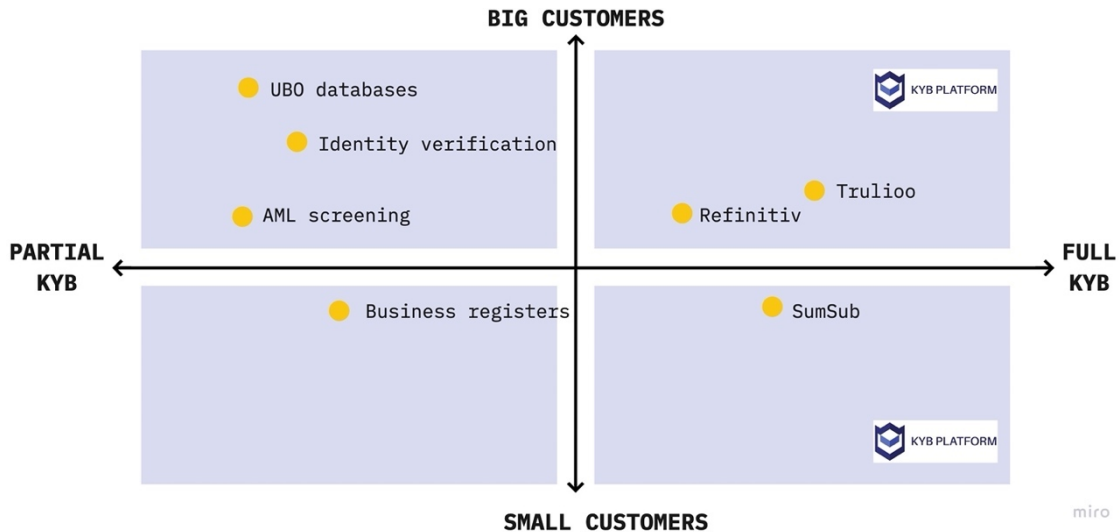
Figure 8. KYB Platform competitors using Gartner's Magic Quadrant method (by author).

KYB Platform wants to be in the top right corner of the quadrant, which means one of the competitive advantages to become the market leader should be having more features and target bigger customers. Trulioo and Refinitiv are also in the top right sector of the quadrant, as they are the direct competitors of KYB Platform. However, at first KYB Platform wishes to target the SMBs, therefore petting them in the visionaries' quadrant. As SumSub also targets smaller customers, they are close to KYB Platform. Business registers perform only partial KYB but can be accessed by customer of any size. Business registers are niches players, because not every customer knows how to access the register and has the permissions to do so. Identity verification, UBO data providers and AML screening providers are considered challengers of the industry, being in the first square.

7 Customer Analysis

The author conducted five interviews with potential customers and industry experts. The author purposefully chose to interview only five customers, and later in the project also test with the same five customers, because some scholars claim this to be the ideal number for validating a new solution. Nielsen supports the idea that after the fifth interview it is unlikely that any new insight will be gained [86]. The interview was in a semi–structured form and the interview questions are provided in Appendix 11. The summaries of the interviews are provided in Appendix 12.

The sample size included potential customers from AML obligated industries, such as FinTech, RegTech, legal, investment and banking. The participants of the interviews were all from the Baltic States, as this is the initial market where KYB Platform will launch. Three participants agreed to disclose their name and role, two participants wanted to stay anonymous.

7.1 Lean Canvas Results

After the interviews and the brainstorming sessions with the KYB Platform team, the author created customer personas and a Lean canvas. Lean Canvas is provided in Appendix 13. Totally 8 main customer segments were discovered during the customer interviews and brainstorming sessions, which were the following: law firms, investment, FinTech, crypto business, art dealers, logistics, manufacturing, e–commerce.

The main problems that were added to the canvas were the obligation to comply with AML regulations and checking the background of businesses. However, the current tools on the market are slow, expensive and most of the users opt for the manual approach. Also, the current solutions are meant for a corporate high–volume customer, and don't have an option for a smaller business. Therefore, the solution that KYB Platform offers is all–in–one, which means that all the necessary features are in one place. The solution will cover data of 200+ jurisdictions and will gather the data in a matter of seconds. The main value propositions of the solution include accessibility, ease of use, straightforward business model, speed, automation, and AI. A great advantage of the company is the experienced team.

The solution will be delivered to the customers through direct sales using LinkedIn and the website. The business model includes monthly subscriptions, pay–as–you–go options, additional fees for integration and customisation. The main costs include development and integrations with databases. The key metric is the number of purchased subscriptions and pay–as–you–go verifications.

7.2 Persona Creation Results

While creating the personas the author decided to add modifications to the template provided in Figure 4. The author removed the illustration, as the author saw no value in it. Secondly, the author opted for user stories, instead of use cases. User stories provide a more general overview of the goals of the persona, making the process of persona creation faster. The user stories were described in the format "as a *user*, I want *this* in order to achieve *that*". The persona of Investor is provided in Figure 9.

Name: Miss Investor		
Description (1) Investor, venture capitalist, board member, partner, angel investor, accelerator Estonia, Latvia, Lithuania	**User stories (3)** As an investor I want to save my time on business verification to concentrate on my main job. As an investor I want to use a pay–as–you–go verification method to not be connected with a subscription. As an investor I want to verify start–ups and my partners faster to invest faster.	**Tasks or jobs that they do (2)** Investing in start–ups. Partnerships with co–investors.
Influencers (6) Co–investors, start–ups, colleagues, industry experts, governmental policies.		**Problems, pains (4)** No tools to verify a few businesses. Tools meant to be integrated. Verification of businesses slow, manual, expensive. Difficult to understand the verification data.
Trends (7) Popularity of certain industries (e.g., as of 2021 healthcare, sustainability), AI/ ML, risks.		**Gains (5)** Using KYB Platform as an easy automatic tool to verify start–ups and partners.

Figure 9. Investor persona for KYB Platform (by author).

Investors invest in perspective start–ups, either by themselves or together with other investors. Investors wish to not spend too much time on legal entity verification and having a convenient business model, opting to pay per verification and not being tied to a monthly or yearly payment. The verification needs to be fast, as the investor wants to invest as soon as possible.

Figure 10 describes the FinTech persona. The main job of the persona is to provide FinTech services, such as digital payments, lending, banking. The verification part is required to onboard customers and start a business relationship with them. The main goal of the FinTech is to be fully AML compliant to avoid paying fines. Therefore, the persona is dependent on regulations, but also is influenced by digitisation trends.

Name: Mr FinTech		
Description (1) Compliance officer, CEO, CPO, CTO, CFO Estonia, Latvia, Lithuania	**User stories (3)** As a C–level person I want to have an automatic fast verification tool to concentrate on my main job. As a compliance officer I want to have an all–in–one verification tool that will get me data fast to onboard customers fast. As a FinTech persona I want to be fully AML compliant in order to not pay fines.	**Tasks or jobs that they do (2)** Onboarding customers. Providing FinTech services (payment, lending etc). Transactions, transferring funds.
Influencers (6) Regulations, customers, investors, partners.		**Problems, pains (4)** Customer onboarding is slow, manual. Not having access to official data, too many sources.
Trends (7) Digitisation trends, Covid–19, popularity of certain industries (e.g., as of 2021 healthcare, sustainability), AI/ ML,		**Gains (5)** Using KYB Platform as an easy automatic tool to verify and onboard customers.

Figure 10. FinTech persona for KYB Platform (by author).

A smaller business where the C–level team member conducts the verifications – it is a matter of getting a fast easy solution, possibly outsourcing, to concentrate on other tasks. For a bigger team with a compliance officer – a helpful tool is required that will gather the data from trusty sources as fast as possible.

8 Business Analysis

In the following chapter the author has listed the stakeholders of the project, mapped the business requirements, described the TO–BE process, business rules and a business domain model. The business requirements were based on three sources: customer interviews, brainstorming session with KYB Platform team and AML requirements set in RahaPTS.

8.1 Stakeholders

In order to understand where the requirements will come from and what their priority will be, the author identified the stakeholders of the project. The stakeholders of the project are as follows:

- customer – a person who wants to start using KYB Platform and need to verify and onboard legal entity customers, participants of the processes that have been analysed and modelled in this thesis. Customers have been divided into three categories:

  o decision maker – the person that decides whether the company will start using KYB Platform, usually the director or a higher manager in the company;

  o user – the person who checks the background of the legal entities, verifies and onboards them, will be using the KYB Platform, usually a compliance officer, AML specialist, KYC specialist, legal assistant or secretary;

  o investor – customer that is also interested in investing funds into the KYB platform company;

- end–customer/ end–user – the customer of KYB Platform customer, a legal entity that is being verified and onboarded by the KYB Platform, participates in the KYB process by providing necessary information to get verified;

- KYB Platform team – team who is developing the platform and managing the business of KYB Platform company, can be divided into two categories:

  o IT – the people who are developing the KYB platform based on the provided requirements and processes;

o business – the person who represents the company in business related activities, gathers requirements and provides the input to developers, the author of the thesis;

- databases – solution or provider that is currently being used by the user to gather business data, as a partner the database is integrated into the KYB Platform and participates in the TO–BE process: shareholder and beneficial owner databases, commercial registers, PEP and Sanctions data providers, identity verification companies, other databases;

- law and regulators – new AML directives that bring changes in the regulations, therefore changes in the KYB Platform and process, also regulators that need to have an overview of the how the obligated persons verify and onboard their customers.

The stakeholders participating in the processes are users, end–customers, and databases. Since the list of stakeholders was not long, the author didn't see a need for any stakeholder influence analysis. The most influential stakeholders in the project were the customers, both decision makers and users, the KYB Platform team and the law. The author conducted interviews with the customers and brainstorming sessions with the KYB Platform team, as well as analysed the AML regulations of Estonia.

8.2 Customer Interview Results

The author conducted five semi–structured interviews with potential customers of KYB Platform that were also experts in RegTech, FinTech, legal industry, financial and investment industry. The customer interview brief summaries are provided in Appendix 12. Based on the interviews the author listed the requirements in Appendix 14, giving every requirement an ID and showing how many respondents requested the feature.

As shown in Appendix 14 the top requirements from customer interviews were that the information about the company needs to be collected from the business register. Information about the UBOs, directors and board members need to be checked. PEP and Sanctions lists need to be implemented in order to screen the people in the company. An important aspect is also the trustworthiness of the sources, showing the sources in the report and having proof that the data was not changed. Another important request was to check the representative's rights to represent the company.

A few customers also mentioned that even after using some sources they still need to ask the customer to provide additional documents or answer additional questions. This also confirms the problem description noted in chapter 1 and chapter 2, that one of the reasons of the process being so slow is the communication aspect. Therefore, the customers asked for a possibility to ask their end–customer to provide documents or fill in the form with questions through the KYB Platform system directly. Another request was to get the documents confirmed by an e–notary.

The least requested features included being able to download the reports in PDF, highlighting the risks in the company, information being provided in English, API integration, verification being provided in levels/ modules, being able to search multiple companies at the same time, implementing digital signatures, having more sources and being able to search the company using different parameters.

8.3 Brainstorming Session Results

The requirements from the brainstorming session are provided in Appendix 15. The team decided to divide the KYB process into three main stages:

1. collecting data from the business registers;

2. checking all involved entities against PEP and Sanctions lists;

3. checking the identity of the representative of the company.

Only fresh data needs to be collected; therefore, the requests need to be done in real time straight from the source. The verification needs to be divided into levels or modules, where the customer can start with a more basic check and continue with a more in–depth company analysis. The information needs to be provided as a report, but since the report may be very long, the report needs to be divided into parts or tabs.

The team also confirmed that there needs to be a way to ask the end–customer to provide additional company incorporation documents and answer questions through filling in a KYB questionnaire. Instead of an API integration option the team decided to start with a dashboard solution, where the customer can log in to perform the verifications. This type of a visual solution will be easier to sell to potential customers. The business model needs to be implemented as a monthly subscription and a pay–as–you–go option.

8.4 AML Regulation Analysis Results

Based on the AML regulation of Estonia RahaPTS the author has collected the main requirements that need to be covered by the KYB Platform solution. The results are provided in Table 6.

Table 6. Requirements from RahaPTS (by author).

ID	RahaPTS requirement
LR1	Legal entity name, registration code and date of registration need to be provided.
LR2	Board members and directors need checked.
LR3	UBO information, control structure, structure of the company checked.
LR4	Check whether involved parties are politically exposed (PEP).
LR5	Check whether relatives or close associates of involved parties are politically exposed (RCA).
LR6	Identity verification of the representative of the legal entity.
LR7	Identity verification of the UBO.
LR8	Sanctions lists check for all involved entities.
LR9	Checking whether the representative has the right to represent the company.
LR10	Company contacts information.
LR11	Information is collected from a business register or a national database of companies, information source needs to be trustworthy. Registration card, extract from business register, company registration documents.
LR12	Information can be asked from the end–customer, but then the documents need to be digitally confirmed (notary). If information is gathered from the business register, then it is not required to ask from end–customer.

As shown in the table it is required to check the legal entity name, registration code, date of registration and contact information. Connected entities, such as board members and directors, UBOS and representatives need to be verified. It is necessary to understand what the control structure of the company looks like. All connected entities need to be screened against PEP, RCA and Sanctions lists. Identity verification needs to be done for the representative of the company and UBOs of the company. Representation rights of the representative need to be verified.

Data can be collected from the end–customer directly, but in that case the documents need to be digitally confirmed by a notary or other form of digital confirmation. However, if

the data is collected from the business registers and national databases, such as a registration card, digital extract directly from the national database and incorporation documents straight from the business register – in this case the documents don't need to be asked from the end–user.

8.5 TO–BE Processes

Based on the provided requirements the author described the potential future flow of the process. The main functionalities that the processes needed to include were:

- logging into KYB Platform dashboard;

- search functionality;

- report purchasing;

- requests into business register, AML screening;

- identity verification, KYB questionnaire.

Figure 11 describes the new general process of verifying a legal entity. Firstly, the customer of KYB Platform that needs to verify a legal entity logs into the dashboard. Then they use the search, purchase the report, report is being generated by the KYB Platform system and then the customer is able to perform a more in–depth checks by adding to the report.
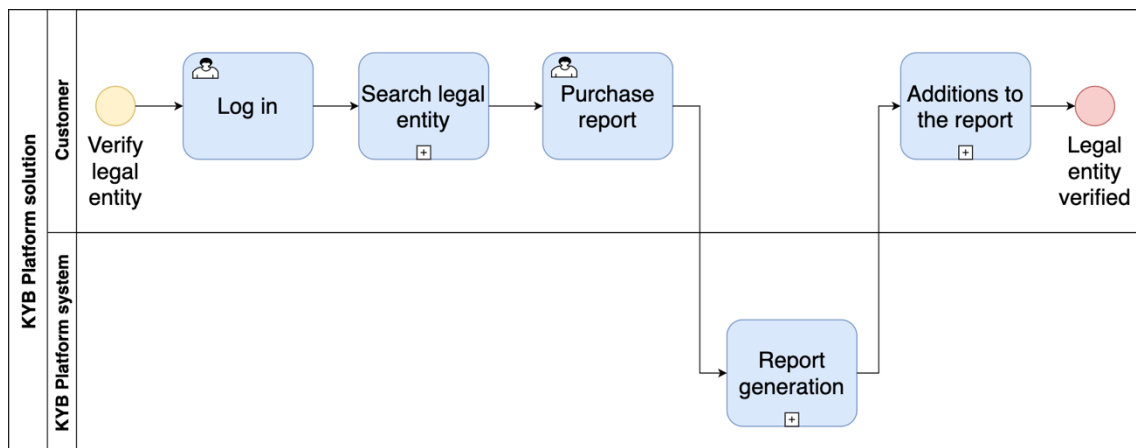

Figure 11. KYB Platform legal entity verification general TO–BE process (by author).

Figure 12 shows the sub–process of searching the legal entity. The customer of KYB Platform needs to be logged in and press "Start new verification" button. The user is then prompted to use the search feature and enter the legal entity name into the search bar. While the user is entering the name, KYB Platform system is already requesting information from the business register in order to provide the customer with possible matches. If there are no matches found based on the name, the customer is displayed the required message. They will have the option to then check the spelling of the name and try again. If they are sure the name spelling is correct, the customer is prompted to enter the registration code and the country of registration of the company in question.

However, if the customer sees on the list of possible matches the correct legal entity, they can click on that name. In both cases, whether the company was found only based on name or name and registration code and country, the customer is prompted to choose the modules that they want the report to have and finish the purchase process.
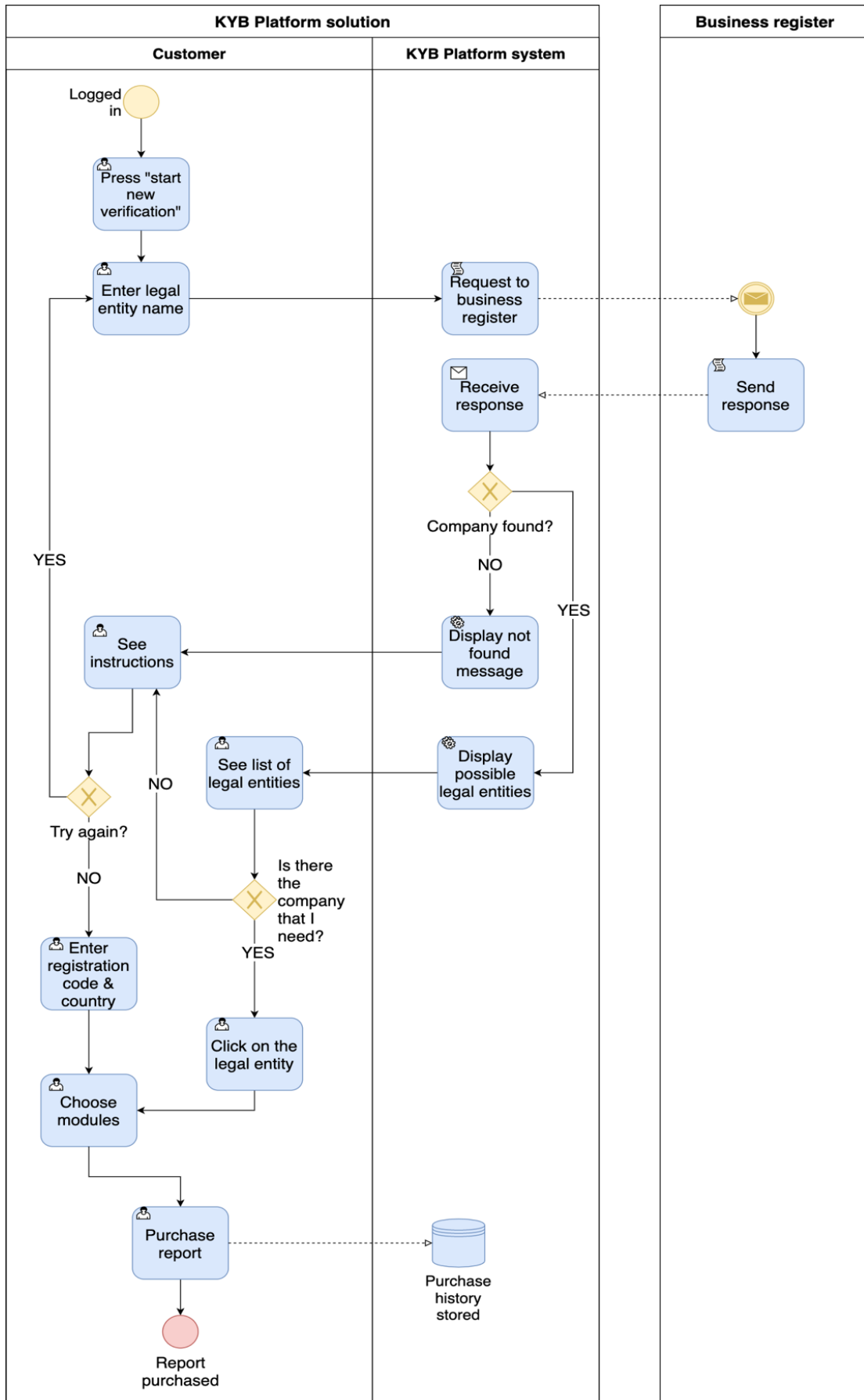
Figure 12. KYB Platform legal entity search detailed TO–BE process (by author).

Figure 13 shows the new report generation process. The report is being generated by the KYB Platform system after being purchased by the customer. While it is being generated the customer is able to see all their verifications in a list and click on the purchased report to see it being updated in real time.
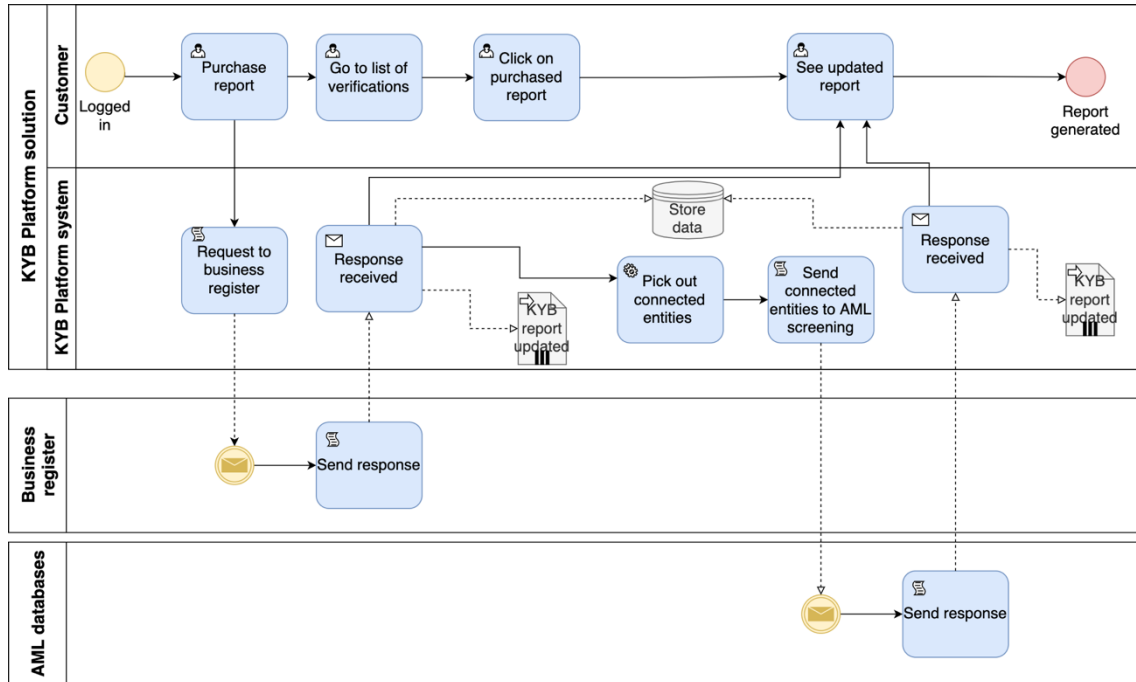
Figure 13. KYB Platform report generation detailed TO–BE process (by author).

KYB Platform system requests information from the business register, updates the report with the information from the business register, recognises the connected entities from the unstructured data of the business register response. These entities are then sent into AML screening where entities are screened against AML databases. All responses, either positive or negative (match found or not) are sent back to KYB Platform system and the report is updated again. Even if no information is found or there is no match – the report the still updated accordingly.

Figure 14 shows the new process of adding checks to the report using identity verification use case as an example. The customer of KYB Platform goes to the report that was already generated, chooses the identity verification tab, and sends a verification link to the end–customer's email address.

71
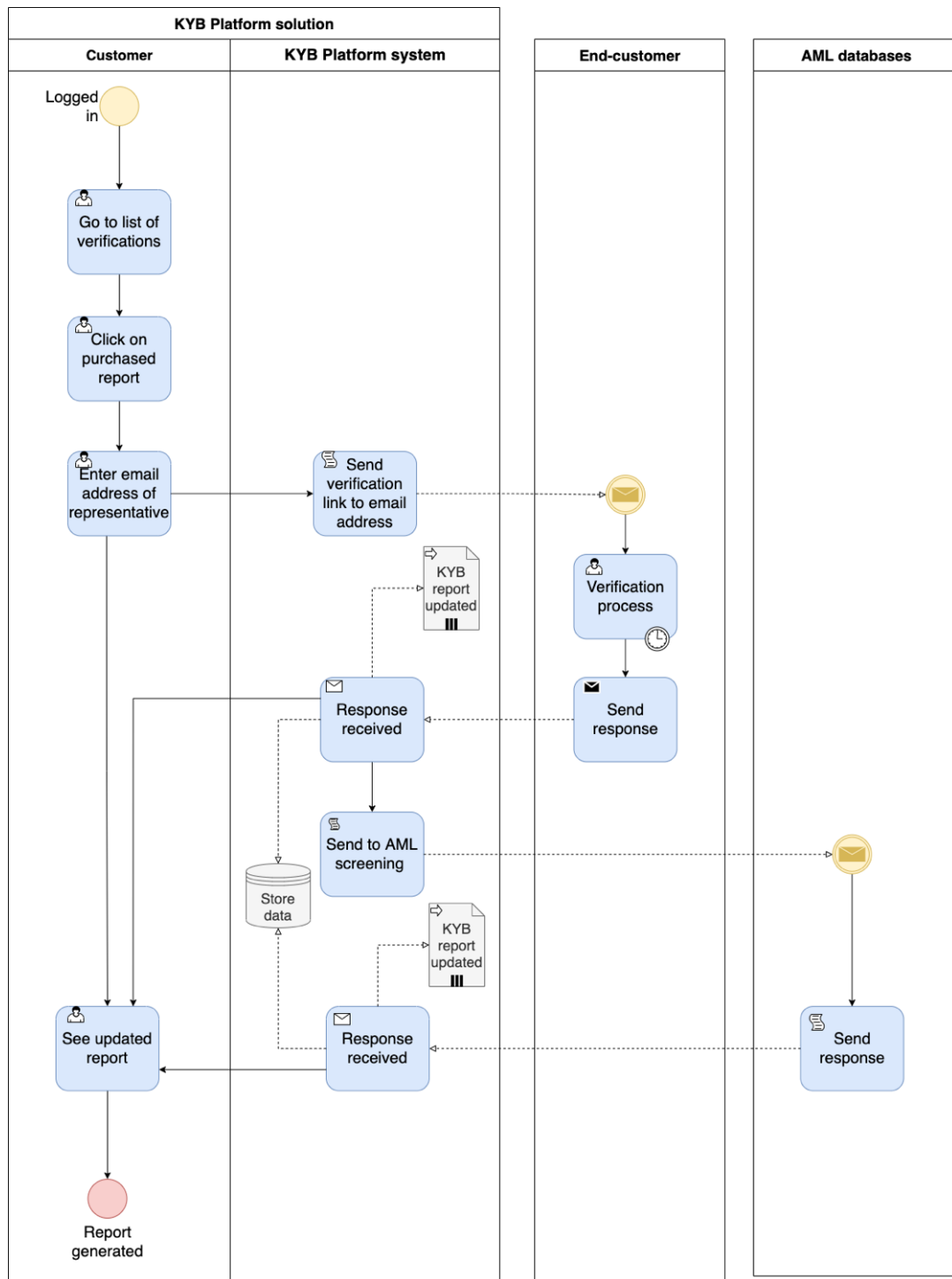
Figure 14. KYB Platform identity verification in the KYB report detailed TO–BE process (by author).

The identity verification link can be opened by the end–customer during a few days (link expiration scenarios are out of scope). After the identity verification process is finished by the end–customer and this triggers an update in the report. Once identity verification data is received by KYB Platform system the end–customer's details are sent into AML screening. Once AML screening is performed, the report is updated again.

The process described in Figure 14 can be applied to the KYB questionnaire or when asking for additional documents from the end–customer. In this case the customer also sends a link to the end–customer from the KYB Platform dashboard and the end–customer fills in the form or uploads their own original company incorporation documents. The results and documents are then displayed in the dashboard under a separate tab in the report of that legal entity.

8.6 Business Requirements and Business Glossary

The author analysed the requirements that were gathered from the customer interviews, brainstorming session and AML requirements analysis shown in Appendix 16 and has combined them into business requirements that are shown in Table 7. The requirements are meant for building the prototype and the MVP. During this phase the author concluded that a dashboard solution would be appropriate for this solution. A dashboard is a self–service environment where the customer can log in and perform verifications.

The author combined all the requirements into one table in Appendix 16 and merged (colour blocked) the requirements that request the same feature or can be solved by the same feature. In the requirements analysis the author added priorities as per MoSCoW. The MoSCoW method is an acronym for the following criteria of prioritisation [87]:

- Must have – critically needed features for the stakeholders, the product can't be launched without these features.

- Should have – requirements that have medium importance, nice to have, but can wait.

- Could have – desirable requirements, but not critical for the initial launch of the product, can wait.

- Won't have – least needed features, can be either changed or deleted from the product strategy.

The most important part was for the legal requirements to be covered, since these are compliance related requirements, and the MVP can't be launched without them. The business requirements are shown in Table 7.

Table 7. Business requirements for KYB Platform solution prototype and MVP (by author).

ID	Business requirement
BR1	It is possible to log into the dashboard.
BR2	It is possible to see all the verifications that were created in a list.
BR3	The verifications list has the company name, registration code, country of registration, timestamp of when the verification was updated, status of the verification.
BR4	When a user clicks on the verification, they see a report about the company.
BR5	Report is divided into tabs: company information, UBOs, AML screening, identity verification, KYB questionnaire, documents, full report.
BR6	Information in the reports is timestamped (request sent, request received) and has the source.
BR7	It is possible to send an identity verification link to the end–customer's email.
BR8	It is possible to send a KYB questionnaire link to the end–customer's email.
BR9	Possible to search the company by entering the name, registration code and country of the company.
BR10	While entering the legal entity credentials, the system already requests possible matches from the business register and offers possible company matches to the customer.
BR11	The customer can purchase the report.
BR12	The customer can choose the modules that they need in the report.
BR13	Before purchasing the report, the customer can review the order and can cancel the order.
BR14	The report is updated every time a new module is purchased by the customer inside the report and a verification link is sent to the end–customer.
BR15	Information in the report is requested directly from the source in real time. Legal entity information is requested from the business register. AML screening is done using AML databases.
BR16	The customer can request original documents from the end–customer.

A user should be able to log in (BR1), see all their purchased verifications (BR2, BR3), click on any of the existing verifications and see the legal entity report (BR4, BR5). The reports will be divided into tabs (BR5) and all the information collected from the databases is timestamped and has the original source shown (BR6). The customer can additionally send an identity verification link to the representative of the company (BR7) and a KYB questionnaire to be filled in (BR8).

The search functionality is solved as a search bar where the customer can type in the company's credentials that they need to verify (BR9). Due to multiple customers mentioning that company names and registration codes are often misspelled or known partially, then the author decided to add a feature where while entering the name of the company the KYB Platform system already requests possible matches from the business registers and shows those possible matches to the customer (BR10).

The customer then can purchase the report about the selected company (BR11). While purchasing the report, the customer can choose the modules they need to be included in the report (BR12). Before purchasing the customer is shown the estimated time and price of the report and the customer has the right to cancel the order (BR13).

Inside the existing report the customer can purchase additional modules that were not purchased originally and then the report is updated accordingly (BR14). Information in the report is collected only from direct sources in real time, no cached data is used (BR15). Customer can request original incorporation documents from the end–customer, if there are any gaps in the data (BR16).

BR14 and BR15 are not part of the prototype but is part of the first version of the product MVP launching in Q2–Q3 of 2021. BR16 was still under question during the writing of the thesis, if the feature would be combined with BR8 or be a separate feature.

The author has created a business glossary shown in Appendix 17. The purpose of the glossary is for all the KYB Platform team members and stakeholders to have the same understanding of the vocabulary used in KYB Platform solution.

8.7 Business Rules and Business Domain Model

In the following chapter the author has described the business rules of the solution and according to them created a business domain model. The business rules are shown in Table 8 and business domain model shown in Figure 15. The terms used in the rules are defined in the business glossary in Appendix 17.

Table 8. Business rules of KYB Platform solution (by author).

ID	Business rule
BRU1	One customer can check 0, 1 or many legal entities. One legal entity can be checked by 0, 1 or many customers.
BRU2	A legal entity can have 0, 1 or many end–customers. One end–customer can be connected to 1 or many legal entities.
BRU3	The customer can generate 0, 1 or many verification links. One verification link can be generated by 1 customer.
BRU4	A verification link can be sent to 1 or many end–customers. One end–customer can receive and open 1 or many verification links.
BRU5	A customer can purchase 0, 1 or many reports. A report with a unique ID is connected to 1 customer.
BRU6	A report includes information about 1 legal entity. 1 or many reports can be generated about one legal entity. If there is no legal entity, there can't be a report.
BRU7	A report can include 1 or many modules. One module can be included into 0, 1 or many reports.
BRU8	A report can be updated 0, 1 or many times. One update is specific to 1 report.
BRU9	One customer can have 1 role. One role can be used by 0, 1 or many customers.
BRU10	A legal entity that is searched can also be a customer of KYB Platform.

A customer is a representative of a business customer (legal entity) of KYB Platform. BRU9 describes that a customer can be either in admin or regular user role, a customer can't be without a role. There can be many admins and many users, but there also can be 0 users. Certain rights are associated with different roles. BRU1 describes that a customer can search many legal entities but can also choose not to choose any legal entities to search. The same legal entity can be searched by any customer.

End–customer is the representative of a legal entity that is being verified. BRU2 says that a legal entity can be searched without a representative (end–customer). Also, many legal entities can have the same representative. BRU3 shows that the customer can choose to generate verification links, but also can choose not to request additional information via the verification link. Only 1 unique verification link can be generated. BRU4 describes that the same verification link can be sent to many emails and until the completion of the verification the link is valid and can be used. The same end–customer can receive multiple links and use them.

BRU5 shows that a customer can purchase many reports, but also can choose to just log into the dashboard and not purchase anything. A report has a unique ID that is associated with one specific customer. If there is no legal entity, there can't be a report, therefore one report has information about 1 legal entity (BRU6). However, the same legal entity can be included into many reports. A report can have at least 1 module. Modules don't have IDs, therefore can be included into any report, but also can stay untouched (BRU7). BRU8 shows that a report can stay without any updates, but also can be updated many times. Updates are connected to specific reports. BRU10 shows that a legal entity that is being verified can also be a customer of KYB Platform. Figure 15 shows the business domain model of the business rules.
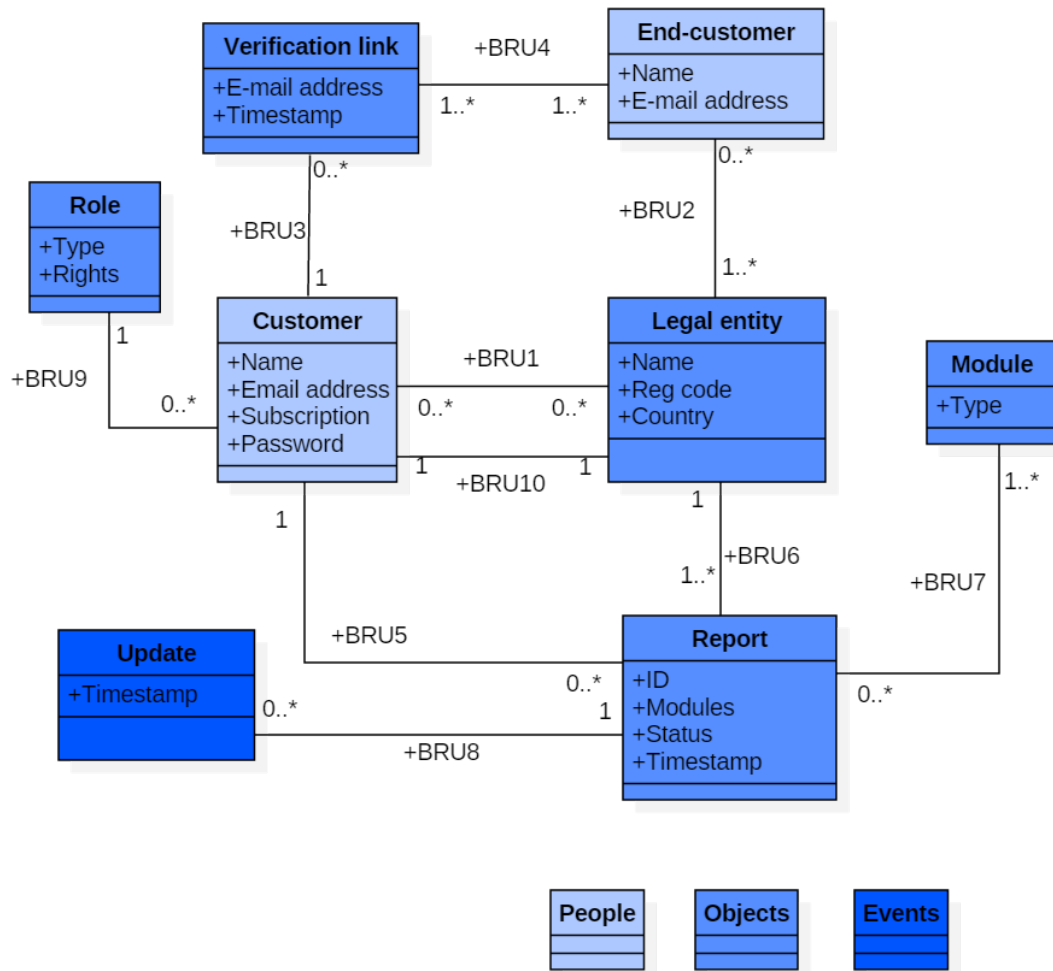

Figure 15. Business domain model for KYB Platform solution (by author).

The author also wanted to explain some aspects of the business rules and business domain model, according to some terms mentioned in the glossary found in Appendix 17. A module can be UBO, KYB questionnaire, Identity verification, AML screening, Business register check. Information for AML screening is requested from AML databases, and Business register check is conducted using Business register. The sources were not added to the domain, as they are located outside of the processes inside the Dashboard, where the Customer logs in. Identity verification, KYB questionnaire and original documents are requested through the Verification link. Verification is the whole process described in the business domain model.

9 System Analysis

During the system analysis phase, the author described the functional and non–functional requirements based on the business requirements listed in chapter 9. In the functional requirements the author created a use case diagram to visualise how actors will interact with the KYB Platform dashboard. Then the author described the use cases in more detail and added user stories. Finally, the author listed the non–functional requirements.

9.1 Functional Requirements

In this chapter the author described the functional requirements in the form of a use case diagram shown in Figure 16. The primary actor is the customer, who is using KYB Platform to verify legal entities. The secondary actor is the end–customer, who is the representative of the legal entity that is being verified.
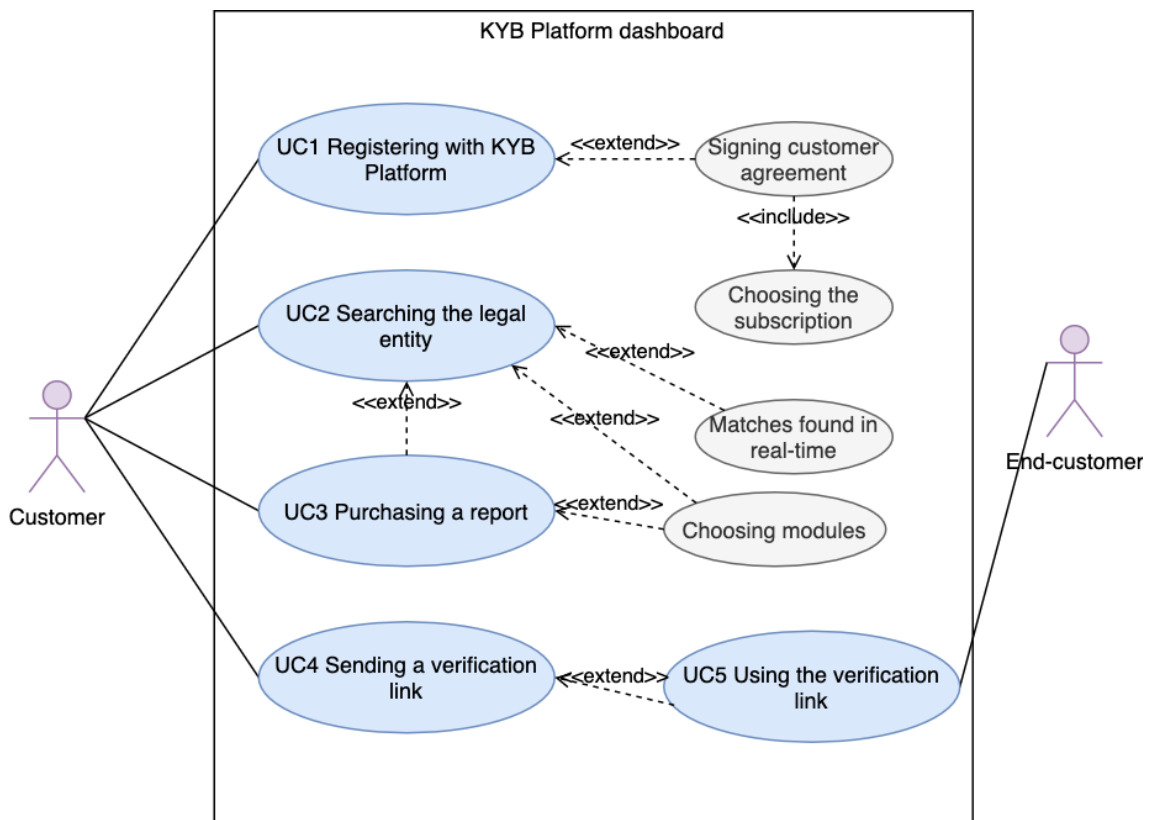

Figure 16. Use case diagram for KYB Platform dashboard MVP (by author).

In Tables 9 the author described use case UC2 and in Table 10 use case UC3, as they are the main use cases. UC1, UC4 and UC5 are added to Appendix 18 shown in the diagram in more detail. In every table there is also a user story and the business requirements that are connected to the use case.

UC2 in Table 9 shows how the customer will search for the legal entity they want to verify in the KYB Platform dashboard. The customer can choose amongst the modules how deep they want the search to be. They are prompted to type in the credentials of the legal entity, such as the name, registration code and country of registration.

Table 9. Use case UC2 Searching the legal entity (by author).

ID and name	UC2 Searching the legal entity
Primary actor	Customer
Secondary actor	–
Description	A Customer searches the legal entity that they want to verify (purchase a report).
Frequency of Use	Every time Customer needs to verify a legal entity.
Preconditions	Customer is logged into the KYB Platform dashboard
Postconditions	Customer has been directed onto the report purchasing page.
Main Flow	1. Customer clicks the button "Start New". 2. Customer sees the default modules. 3. Customer chooses additional modules they need to be included in the report. 4. Customer enters only the legal entity name. 5. Customer sees possible matches for the legal entity name. 6. Customer clicks on the legal entity that they need. 7. Customer is directed into the report purchasing flow.
Alternative Flow	Alternative 1: 3a. Customer doesn't choose any additional modules and sticks with the default modules. Alternative 2: 5b. No match was found for the legal entity, customer sees the message. 6b. Customer enters the legal entity name, registration code and country of registration. 7b. Customer confirms that the information is correct. 8b. Customer is directed into the report purchasing flow.

User story	As a customer I would like to search the legal entities in order to purchase reports about them.
Business requirements	BR9 – Possible to search the company by entering the name, registration code and country of the company.
	BR10 – While entering the legal entity credentials, the system already requests possible matches from the business register and offers possible company matches to the customer.

UC3 in Table 10 describes the use case of purchasing the report. As shown, there are multiple billing options, such as a credit card or a monthly invoicing system. After the customer has made sure the legal entity credentials are correct and they want to verify the chosen legal entity, they are prompted to confirm their purchase.

Table 10. Use case UC3 Purchasing the report (by author).

ID and name	UC3 Purchasing the report
Primary actor	Customer
Secondary actor	–
Description	Customer purchases the report about the legal entity.
Frequency of Use	According to the Customer needs.
Preconditions	Customer has conducted the legal entity search.
Postconditions	Report is purchased.
	Verification is added to the list of verifications.
Main Flow	1. Customer reviews the order.
	2. Customer sees the estimated time of completion and price for the report.
	3. Customer confirms the purchase of the report.
	4. Customer is directed into entering their credit card details.
	5. Customer finalises the purchase.
Alternative Flow	Alternative 1:
	1a. Customer changes the modules that they wish to purchase.
	Alternative 2:
	4b. Customer already has a credit card added to their KYB Platform account and money is taken from the account automatically.
	Alternative 3:
	4c. Customer has a monthly invoice agreement and doesn't need to enter the credit card.

User story	As a customer I would like to purchase the report in order to get an overview about the legal entity.
Business requirements	BR11 – The customer can purchase the report. BR12 – The customer can choose the modules that they need in the report. BR13 – Before purchasing the report, the customer can review the order and can cancel the order.

A few business requirements were not added to functional requirements, as they don't describe a process and no action is triggered inside them. BR3, BR4, BR5, BR6 and BR15 were added to the non–functional requirements.

9.2 Non–Functional Requirements

Non–functional requirements are connected to the quality of the solution and define how the functional requirements must operate. Such requirements can be availability, compatibility, functionality, maintainability, performance efficiency, reliability, scalability, security, usability, compliance and more [69]. The non–functional requirements are shown in Table 11.

Table 11. Non–functional requirements for KYB Platform solution (by author).

ID	BR ID	Requirement
Usability		
NF1	BR1	Possible to log into the dashboard and perform verifications.
NF2	BR2	After a customer is logged into the dashboard, they can see all their verifications in a list.
NF3	BR3	The verifications list has the company name, registration code, country of registration, timestamp of when the verification was updated, status of the verification.
NF4	BR5	Report is divided into tabs: company information, UBOs, AML screening, identity verification, KYB questionnaire, documents, full report.
NF5	BR9	Possible to search the company by entering the name, registration code and country of the company.
NF6	BR11	Pay–as–you–go purchasing option.
NF7	BR11	Monthly subscription purchasing possibility.

Functionality		
NF8	BR4	When a user clicks on the verification, they see a report about the company.
Compliance		
NF9	BR6	Information in the reports is timestamped (request sent, request received) and has the source.
NF10	BR15	Information in the report is requested directly from the source in real time.

As shown in the table, the author specified that the solution is a dashboard where the customer logs in to perform verifications (NF1). The customer is able to see all their verifications in a list (NF2). The list of verifications consists of columns that have legal entity name, registration code, country of registration, timestamp of the last update and status (NF3). The customer can click on any of the verifications and see a report (NF8). The report consists of tabs, every tab has information about the legal entity (NF4). It is possible to search the company using different parameters such as name, registration code and country (NF5).

The author specified BR11 that the report can be purchased using pay–as–you–go model (NF6) or a subscription model (NF7). Every piece of information in the report is timestamped and has the original source noted (NF9). The information should be fresh and is requested from the source in real time (NF10).

10 Architecture

In the following chapter the author described the vision of the architecture of the MVP and the entity relationship diagram. The KYB Platform system architecture is planned to be modular, meaning modules can be added and removed when needed. Since the features of the MVP will be tested and the requirements may change, the architecture needs to be flexible.

The system consists of frontend and backend. The frontend system includes the KYB Platform dashboard and a Backoffice. The dashboard is the self–service environment where the customers log in and perform the verifications. The Backoffice is an administrative tool for KYB Platform team to onboard and manage accounts and users.

The frontend is developed using React JavaScript framework. In the backend, the database used is MongoDB. Container deployment is used and for that the team opted for Kubernetes. Amazon Web Services hosting is used. RabbitMQ is used for the modules to communicate between each other. The language for backend is node.js, framework used is NestJs.

10.1 Architecture Vision

Together with the development team of KYB Platform the author created a visual description of the possible architecture of the MVP, which is shown in Figure 17. Explanations of the figure are noted below.

When entering the solution, the customer interacts with and triggers the following:

- Web client – web browser. Mobile client may be added in the future. All widely used browsers supported. React JavaScript library, CDN (content delivery network, network of proxy servers) or NGINX (application delivery software) will be used.

- Authentication server – for user authentication, authentication of email and password when logging into the dashboard. JSON Web Token (JWT) is an open standard for transmitting data between applications. Allows user to access certain applications based on the permission that the user has.
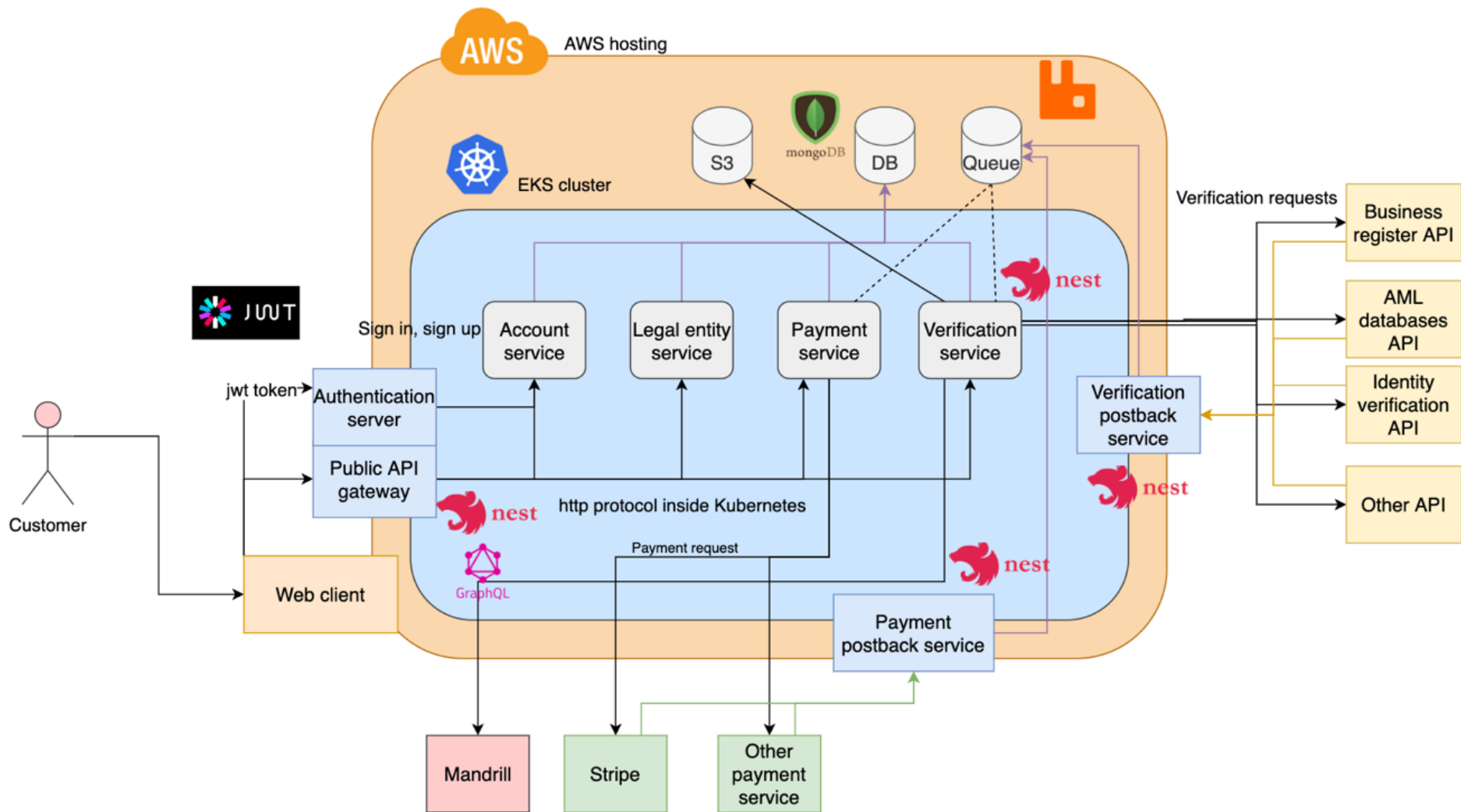
Figure 17. KYB Platform solution architecture (by author and KYB Platform OÜ).

Public API (Application Programming Interface) gateway is the access to backend services through REST API (Representation State Transfer). API based on NestJS framework for building Node.js applications and GraphQL data query language.

The solution consists of two main scopes that are the following:

- AWS hosting – Amazon Web Services is a cloud web hosting. Chosen due to its scalability and worldwide datacentres.

- EKS cluster – Amazon Elastic Kubernetes Service cluster for running Kubernetes. Kubernetes for easy deployment and scaling of containerised applications. Protected cluster blue services are available outside private network.

The databases and the message queueing functions are fulfilled by:

- Database – database where account data, legal entity data, payment data and verification data are stored. MongoDB is used, which is a NoSQL database program. Instead of MongoDB can use Postgres.

- Queueing – for queueing services, messages between services. RabbitMQ is used, which is a message–broker software.

- S3 – Amazon Simple Storage provides object storage. Will be used for storing PDF and XML responses from verification services.

For the public API gateway to connect to the services, a http protocol is used inside Kubernetes. Also, NestJS framework is used for all the services. The services are the following:

- Account service – customer accounts and their management.

- Legal entity service – legal entity data and management, such as status, dates, request history.

- Payment service – report purchases and their management.

- Verification service – verification requests and responses, their management.

Verification databases are outside databases, where the verification service sends the verification requests to, and the responses go to verification postback service are the following:

- Business register API – business register, where legal entity information is requested from.

- AML databases API – PEP, sanctions and adverse media screenings are conducted through this API. Names of entities are sent and responses whether any matches are found is received back.

- Identity verification API – checks the identification document and the selfie photo.

- Other API – any other additional database that can be integrated into the solution.

Payment services are outside services, that handle the payment process. These services will be:

- Stripe – a universal payment tool that can be used globally, requests credit card information.

- Other payment service – any other payment service can be added.

Postback services, where NestJs framework is also used:

- Verification postback service – for receiving responses from the verification databases.

- Payment postback service – for receiving responses from the payment services.

For sending verification links and other types of emails the team is going to use Mandrill, which is an outside service used for transactional automated emails.

10.2 Physical Data Model

In this chapter the author describes the physical data model in the form of entity–relationship diagram (ERD), which essentially shows how the data will be stored in the KYB Platform database. The diagram is visualised in Figure 18.
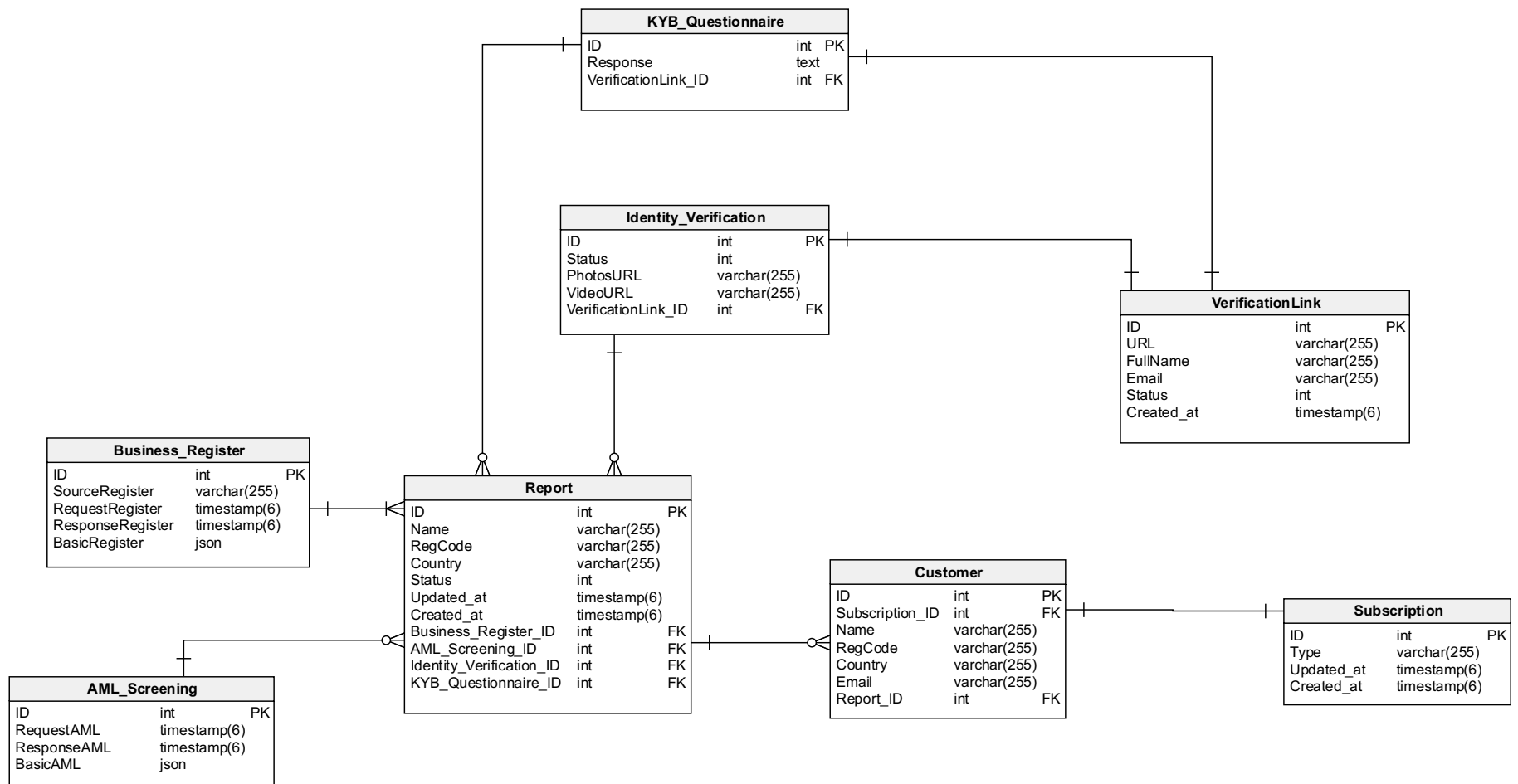
Figure 18. Entity–relationship diagram for KYB Platform database (by author and KYB Platform OÜ).

The author used the standard Crow's Foot Notation as per BABOK v3 [69]. The following cardinalities were used: zero to many; zero to one; only one; any number from one to many. The entities are all shown as rectangles, where at the top is the entity name. Inside the rectangle a unique identifier, also named a primary key (PK) is shown, and lower are all the attributes that are stored in the database. A foreign key (FK) refers to the primary key in another table. The author also presented the entities, attributes, and their definitions in Appendix 19.

As displayed in Figure 18, the actual physical data model turned out to be different than the business domain model in Figure 15. In the business domain model, the entity called Module was divided in the ERD into Business_Register, AML_Screening, Identity_Verification and KYB_Questionnaire entities. A Report can't be generated without a Business_Register request, since this entity is the base of the whole verification. However, a Report entity can include either no or multiple AML screening, identity verification and KYB questionnaire requests. In the business domain model, the report Update was presented as a separate entity, but in the ERD the team decided to simplify this and store the update information inside the Report entity.

Legal entity, an entity presented in the business domain model, was added into the Report entity in the ERD. End–customer information presented in the business domain model is stored inside the VerificationLink entity in the ERD, because it already contains the email address and name of the end–customer who is going to use the link. The verification link can contain either Identity_Verification or KYB_Questionnaire, every link is unique and once used, can't be re–used.

The Customer entity stores the information about the business customer of KYB Platform. Since the customer purchases reports, then the team decided to connect the Report entity to the Customer entity. Through the Report entity all the information from other modules can be found.

In the business domain model, the author added a Role entity that defines the user rights of the Customer. However, for the MVP the team decided to make one role with one set of standard permissions for all KYB Platform customers. An addition was made to the physical model, which is the Subscription entity. A customer can have only one

subscription that defines their payment plan and the discounts that the customer has on their account.

An additional entity may be added in a future version, which will be called Original_Documents. This feature will allow the customer to send a verification link to the end–customer for the end–customer to upload any original company incorporation documents they have. As the team is still deciding whether to make it part of the KYB_questionnaire entity or as a separate entity, then the author decided to leave this feature out of the MVP descriptions.

11 Prototype

Based on the input the author created a low–fidelity prototype shown in Appendix 20. KYB Platform team created a high–fidelity prototype based on the low–fidelity mock–ups. Figures 19–27 show the high–fidelity prototype of the KYB Platform dashboard.

There was no low–fidelity mock–up made for the logging in part of the process, it was orally discussed with the team. The high–fidelity screenshot is shown in Figure 19. The figure shows a prototype website of KYB Platform, where a log in button is added to the top right corner of the page. A customer can click on the button, enter their log in details and log into the dashboard.
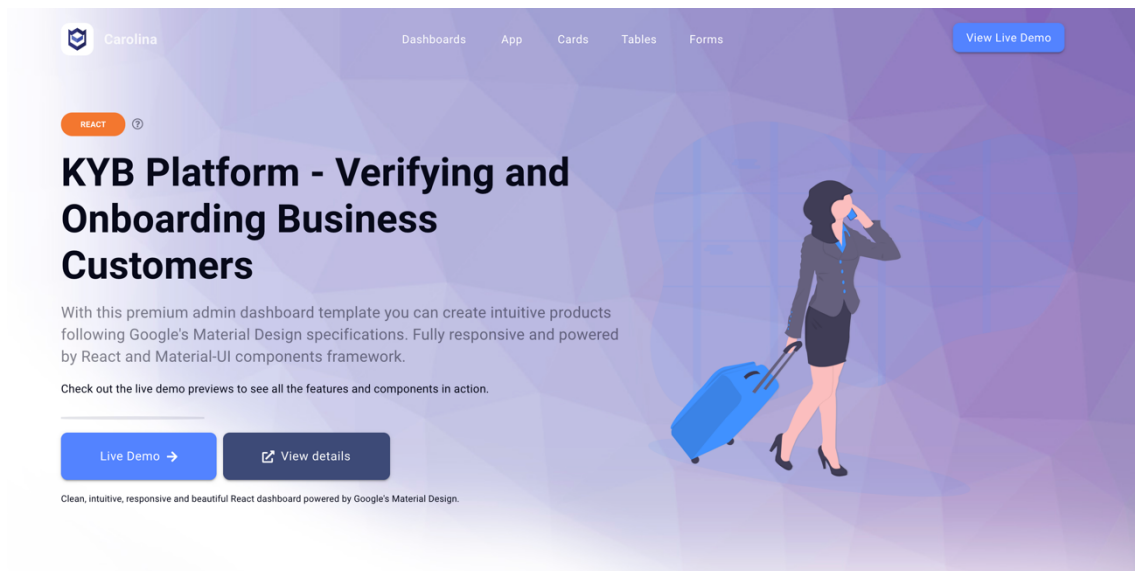

Figure 19. KYB Platform log in functionality (by author and KYB Platform OÜ).

The customer logs in and is able to see the list of all of the verifications that were created by them, the example is shown in Figure 20. On the verifications page the verifications are shown in columns: business name, registration code, country, timestamp of last update, status. Verifications can be searched by name. On the left of the page the customer sees a Start new verification button and the menu.

Figure 20. KYB Platform verifications list (by author and KYB Platform OÜ).

Figure 21 shows the legal entity report. There is a full report where all the modules are combined into one report. To make the report more user–friendly, the modules were also divided into tabs.

Figure 21. Legal entity verification report (by author and KYB Platform OÜ).

To add the elements of trust and transparency to the solution, every tab also shows the source of where the data was gathered from and the timestamps of when the request was made and when the response was received. This is shown in Figure 22. As per requirements set in the AML legislation, the data about the company needs to be fresh and gathered either straight from the business register or from the end–customer.

Source: e-Business Register of Estonia (Eesti Äriregister) https://www.rik.ee

Request made: 11.03.2021 15:52:00

Response received: 11.03.2021 15:55:00

Figure 22. Source of the data and timestamps in KYB Platform dashboard (by author and KYB Platform OÜ).

Figure 23 shows how the customer wants to send a verification link to the end–customer. They went to the identity verification tab, pressed the identity verification tab, and then pressed "Add identity" button. A pop–up prompted the customer to enter the e–mail address and the name of the end–customer.
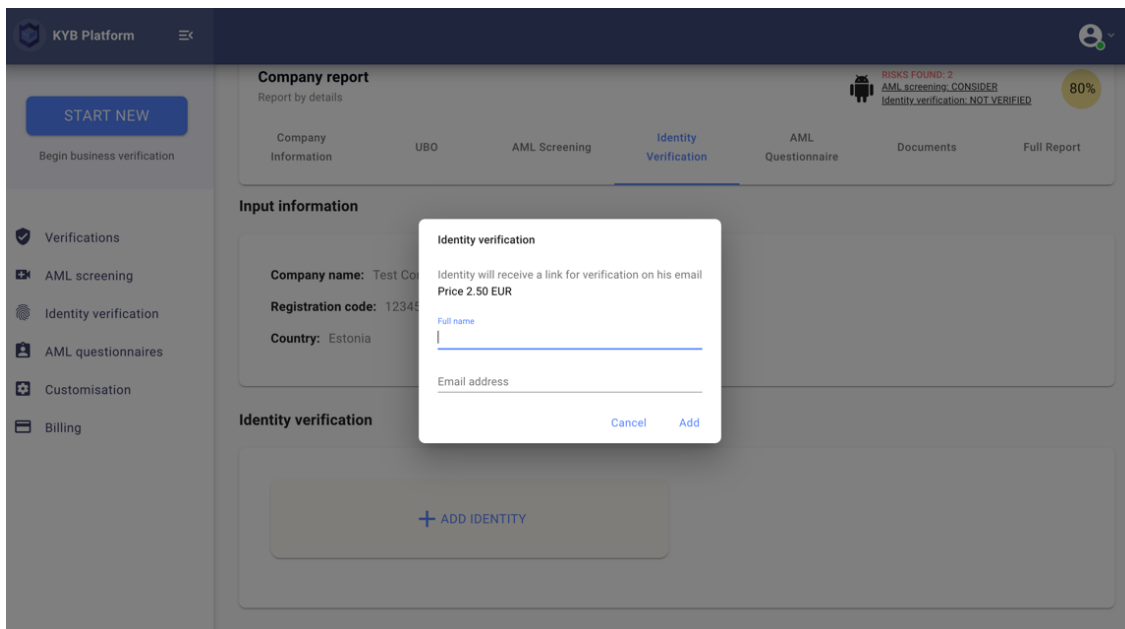

Figure 23. Sending a verification link to the end–customer's e–mail (by author and KYB Platform OÜ).

Figure 24 shows the customer pressed "Start New" button is directed onto the legal entity search page, where they are prompted to enter the company name and choose the country of registration. The user can already choose the modules during the search.
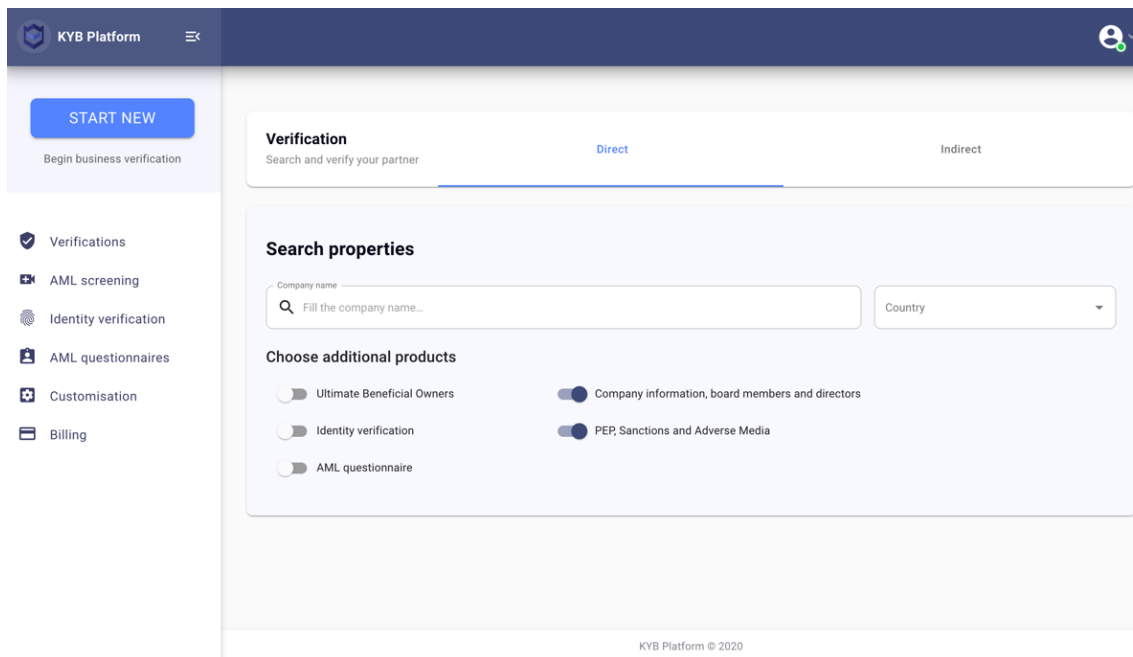
Figure 24. Legal entity search and choosing the modules (by author and KYB Platform OÜ).

The modules are as follows:

- Business register module (company information, board members, shareholders).

- AML screening module (PEP, sanctions, adverse media).

- UBO module (part of business register module).

- Identity verification (representative or UBO).

- KYB questionnaire (in the prototype referred to as AML questionnaire).

- Documents (original documents requesting).

While entering the company name the customer is shown possible matches for the company, as described in Figure 25. In case no match is found, the customer is prompted to type in the company registration code and country of registration.

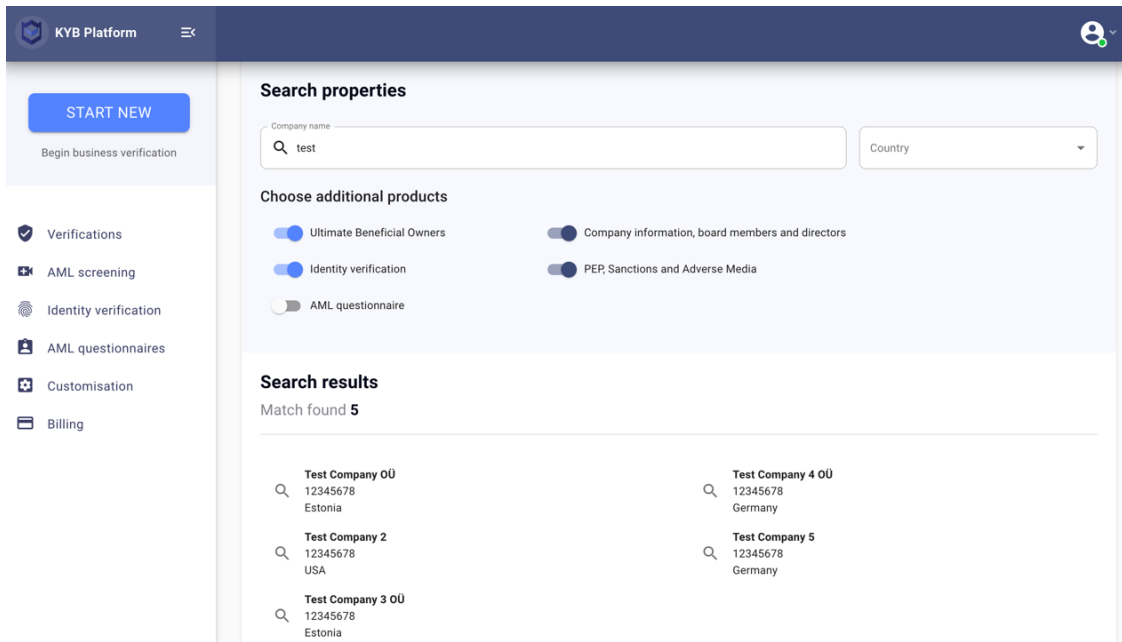Figure 25. Searching and seeing matches in real time (by author and KYB Platform OÜ).

Figure 26 shows the report purchasing page, where the customer sees the estimated time and price of the report. The customer can change modules and the price will adjust accordingly.
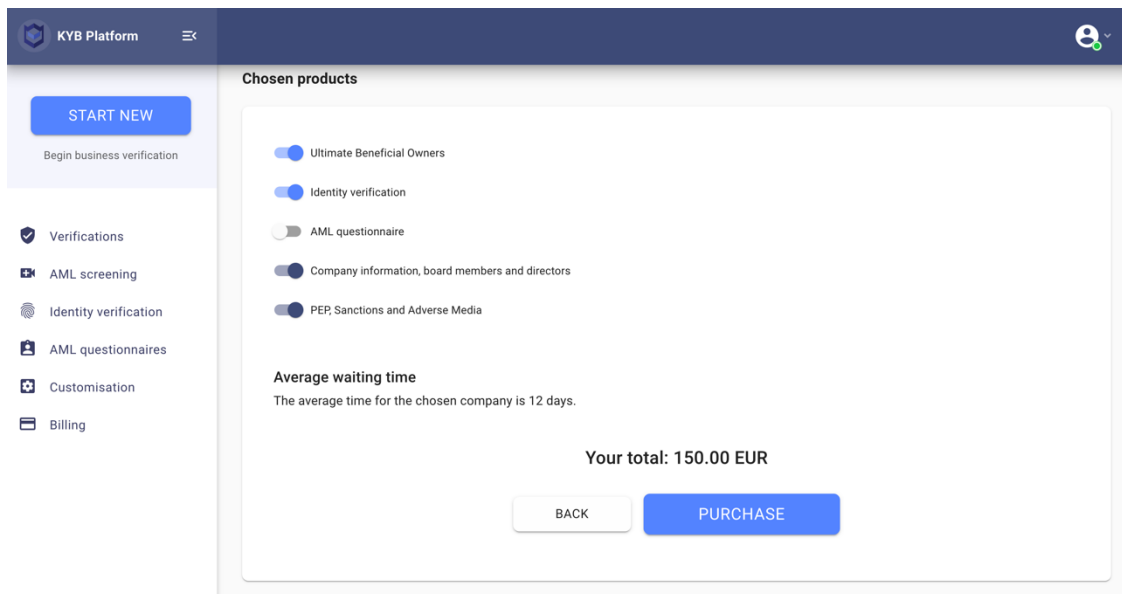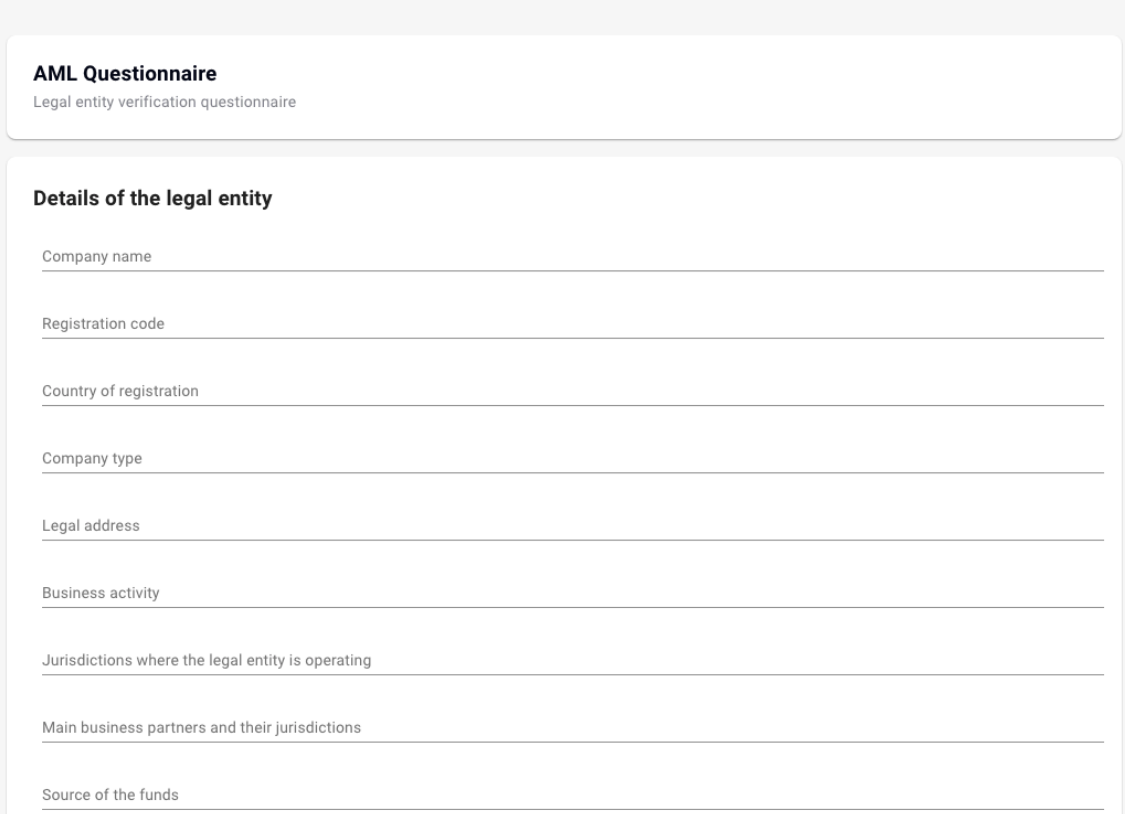
Figure 26. Report purchasing page (by author and KYB Platform OÜ).

After the report is purchased, the verification is shown on the verifications page (Figure 20) and the customer can see the status of the verification.

Figure 27 shows the KYB questionnaire module of the solution. The customer of KYB Platform can customise the questionnaire and send it to the end–customer to fill in in case of any gaps in the data.

Figure 27. KYB questionnaire in KYB Platform dashboard (by author and KYB Platform OÜ).

The prototype is a visual representation of what the MVP will look like during the Q2–Q3 2021 launch. The prototype doesn't have any real databases and business registers connected to it. The prototype has hardcoded responses and reports.

12 Solution Validation Testing

In this chapter the author describes the process of validating the solution. The prototype was validated against the requirements set in RahaPTS, as this the MVP can't be launched without being compliant with the legislation of Estonia. Then the author validated the prototype with the customers whose requirements were collected in the first phase. The requirements collected from the KYB Platform team during the brainstorming session were not validated separately, as most of them were either non–functional requirements, or were overlapping with the legal requirements and customer interview requirements.

12.1 AML Requirements Validation

Firstly, the author validated if the requirements set in the RahaPTS that are written down in Table 6. The author validated if the modules in the prototype that will also be included in the MVP cover the legal requirements set in the AML regulations.

Using the business register module, a customer can request to verify the following:

- LR1 – Legal entity name, registration code and date of registration need to be provided.
- LR2 – Board members and directors need checked.
- LR3 – UBO information, control structure, structure of the company checked. Basic needs will be covered and additional UBO databases will be added in the future versions of the product.
- LR9 – Checking whether the representative has the right to represent the company.
- LR10 – Company contacts information.
- LR11 – Information is collected from a business register or a national database of companies, information source needs to be trustworthy. Registration card, extract from business register, company registration documents.

Using the AML screening module, the customer can validate the following:

- LR4 – Check whether involved parties are politically exposed (PEP).
- LR5 – Check whether relatives or close associates of involved parties are politically exposed (RCA).
- LR8 – Sanctions lists check for all involved entities.

Using the identity verification module, the customer is able to verify:

- LR6 – Identity verification of the representative of the legal entity.
- LR 7 – Identity verification of the UBO.

Using the KYB questionnaire module the customer can validate the following:

- Everything covered by the business register module, but directly from the end–customer. Shouldn't be used on its own and always in addition to the business register check.
- LR3 – UBO information, control structure, structure of the company checked. UBO information often has gaps in the business register, therefore needs to be asked from the end–customer.
- LR12 – Information can be asked from the end–customer, but then the documents need to be digitally confirmed (notary). If information is gathered from the business register, then it is not required to ask from end–customer. Notary feature will be added in a future version of the solution, therefore the KYB questionnaire feature needs to be used together with the business register module.

As mentioned in previous chapters the prototype of the KYB Platform dashboard doesn't have real databases connected, therefore contains test data. However, in the MVP launching in Q2–Q3 of 2021 there will be databases and business registers connected and the information will come in real time straight from the official sources.

12.2 Prototype Validation with Customers

Secondly, the author conducted product demos for the same customers that were interviewed during the first phase. Here the author added the interview method described by Knapp *et al*. [88], where the prototype is shown to the user as a regular demo or the user has the option to test the prototype on their own. The interviewer shouldn't ask any guiding questions or point out anything that the user should notice. Instead, the interview should be as natural as possible, like if a user would use the actual working product. The user is notified beforehand, the product may not be fully ready or that they will be testing a prototype. In the end of the session, it is allowed to ask additional questions about what the user liked or disliked, what changes they would add.

Appendix 21 shows the prototype validation testing plan. The author showed the prototype to the customers and then analysed the recordings of the sessions together with the KYB Platform team. The results of the analysis of the interviews are shown in Appendix 22. Using an online whiteboard tool, the team members and the author added their sticky notes with their remarks about the 5 product demos they have looked at. 37 sticky notes were collected, and they were then grouped into four categories: things that the customers liked; minor improvements that need to be made; features that were already planned to be added to the MVP; other ideas for future releases.

Customers responded positively to the sign in process from the KYB Platform website (Figure 19) and different billing idea that will be added into the MVP. While searching the company the customers liked that the while they type in the company name the system already searches for possible matches in real time (Figure 25). When looking at the report the customers liked seeing the information categorised into tabs (Figure 21) and not provided in one long report. Also, the fact that the data had sources and timestamps added an aspect of trust to the solution. The customers thought that KYB questionnaire (Figure 27) is a useful source of additional data in case there are gaps in the business register data, or something was updated before reaching the business register. Also, the customers, who were already using an existing tool, were happy to hear that it is possible to turn off modules and combine their existing solutions into the dashboard.

Based on the product demos the team discovered that some minor design and text changes need to be made to the KYB Platform website and the dashboard. The website needs a better explanation of what the solution is and who it is meant for. Inside the dashboard the customers said that it is not clear of what the two different search options (direct and indirect) mean and what their difference is. Especially the indirect search was confusing to most customers, as it was not clear what countries can be searched there and what is the expected waiting time for the report. Customers found that adding the link to the source will make the report more trustworthy. The modules need to be explained better in the form of verification levels.

Some things that the customers mentioned were already planned for the MVP. For example, the customers wanted to come back in a few months and test the solution with real data. Also, the customers mentioned that global country coverage is important to them. UBO information was one of the most requested features and identity verification

feature was second most popular request. Most customers also wanted to be able to request an audit trail to have a confirmation that the data was not changed before reaching the report. The customers also wanted to be able to request original documents straight from the legal entity that is being verified. Finally, the customers also wanted to have a copy of the report in PDF.

Many great ideas came out of the product demos, which will act as input for future releases. The customers wanted more sources to be added to the solution, including UBO databases. Customers requested highlights of the risk associated with the legal entity and seeing a risk score or a risk assessment. This added an idea of having a real compliance specialist from KYB Platform side that would validate and explain the context of the report. At some point, this compliance officer can be turned into an AI compliance officer. Customers also wanted to have a notarial confirmation of the original documents when requesting them from the end–customer. Also, digital signature addition was a high request, as most of the customers use the verification when assessing if they want to sign a contract with the legal entity.

Monitoring of legal entities was also requested, together with email notifications if something changes in the legal entity that was verified. Finally, the customers wanted the solution to grow with them and requested an API (Application Programming Interface) integration possibility, so the KYB Platform solution would be integrated into their existing solution.

13 KYB Platform Roadmap

Based on the results from the prototype validation phase the author created a goal–oriented roadmap, described project progress roadmap and the Key Performance Indicators (KPIs) that will allow to measure the effectiveness of the MVP.

13.1 Goal–Oriented Roadmap

Firstly, the author drafted a general goal–oriented roadmap for KYB Platform, which is shown in Figure 28. During the Q2–Q3 of 2021 a first version of the KYB Platform dashboard MVP will be launched internally with the first customers.

Figure 28. KYB Platform 3–year gaol–oriented roadmap (by author).

The goal by Q3 is to onboard around 50 customers and let them test the MVP for at least 3 months. For the first version business register, AML screening, identity verification, KYB questionnaire and original document upload module need to be fully functioning.

For KYB Platform team to have an administrative overview of customers and verifications, a back–office environment needs to be developed. A back–office will act as a dashboard where only the KYB Platform support team members will have access.

During Q4, once the first customers have tested and validated the MVP, there will be an external launch of the KYB Platform solution. At first the solution will target primarily FinTech, crypto business, and investment firms as customers, concentrating on the Baltic States region. The planned features include easy billing, API integration, risk assessment and risk scoring systems, more databases added.

In 2022 the emphasis will be on growth and expansion to other markets in Europe, even the AML non–obligated ones such as logistics and eCommerce. The team will concentrate on adding to the UBO aspect of the product and the possibility to get a notarial confirmation of the original incorporation documents. KYB Platform will allow more customisation of risk assessment features and the customisation of the KYB questionnaires.

In 2023 the biggest goal is to begin the work on an AI Compliance tool, as well as adding more attributes and alternative methods of verifying legal entities in regions where there is not a lot of data available. Possible attributes to be added include social media, sustainability data and history of the individual or legal entity.

13.2 Project Progress Roadmap

Secondly, the author created a project progress roadmap that describes the order in which the tasks need to be performed by the KYB Platform team to launch the MVP in 8 weeks. The project plan is shown in Figure 29. It is important to mention that the project plan was made according to the resources of the team of KYB Platform. The team consists of 1 analyst and project manager, 2 full–stack developers, 1 front–end developer, 1 tester.

	W1	W2	W3	W4	W5	W6	W7	W8
		Sprint 1	Sprint 2	Sprint 3	Sprint 4	Sprint 5	Sprint 6	Sprint 7
1. Preparations								
1.1. Requirements specification and analysis	██							
1.2. Backend preparations	██							
2. Integrations								
2.1. Business registers		██	██	██				
2.2. AML databases		██	██					
2.3. Identity verification partner		██	██					
3. Development								
3.1. Link generation and sending				██	██			
3.2. Requesting original documents				██	██			
3.3. KYB questionnaire					██			
3.4. Search functionality			██	██				
3.5. Report generating functionality			██	██				
3.6. Document upload functionality					██	██		
3.7. User password generating							██	
3.8. Backoffice		██	██	██				
4. Frontend								
4.1. Report modules				██	██			
4.2. Verifications overview					██	██		
4.3. Log in functionality							██	
4.4. Billing overview							██	
5. Testing					██	██	██	██
6. Release								██

Figure 29. KYB Platform MVP release project progress roadmap (by author).

The project was divided into 7 sprints with an additional 1 week of preparation, so total is 8 weeks. During the preparations stage the requirements should be specified and preparations of the databases and backend need to be made. The first sprint will include integrations to business registers and other required databases. Also, the back–office should be included already into the first sprint. Most of the development tasks will be performed during the second, third and fourth sprint. Frontend tasks will start on the fourth week, as well as extensive testing. Release preparations will begin 1 week before the release, during which the first customers can already be onboarded.

13.3 KPIs

Finally, the author described the KPIs that will help the team to measure how successful the MVP is. The KPIs are presented in Figure 30.
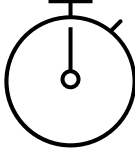
KPI	# of bugs per feature	# of reports generated per month	% of customer growth per month	average customer onboarding time	average verification time
Description	Not more than 5 bugs per feature.	Q2–Q3 of 2021 there should be at least 100 reports generated per month.	+20% new customers per month.	A new customer should be onboarded in under a week.	The speed of a verification needs to be under 3 min.

Figure 30. KYB Platform KPIs for the MVP (by author).

Regarding the quality of the product, the number of bugs per feature need to be measured and the number should be held under 5 bugs per feature. The bugs need to be fixed fast and tested before confirming to the customer that the bug was fixed. The verifications need to be performed automatically and the average verification time should be kept under 3 min per verification. During this time the report needs to be generated.

Speed of onboarding a new customer during the MVP stage should be under a week. By customer onboarding the author refers to the process after the signing of the contract, when the customer receives all the necessary account information, passwords, training on how to use the product, and can use the product independently. The customer growth factor is also important, and the team will measure how many new customers have joined per month. Ideally, the growth rate should be around 20% per month. Also, if the number of customers will grow, then the number of reports being generated every month will also grow. During the MVP testing phase, the volume of generate reports per month should be at least 100 reports.

14 Conclusion and Further Use of the Thesis Results

In this chapter the author will summarize the main conclusions made based on the results of the project and will provide an overview of how the results can be re–used in future research or other projects.

14.1 Conclusions

The main goal of the project was to offer an automated all–in–one approach to legal entity verification that would be user–friendly and approachable by a small business. The problem that the thesis described was that certain businesses are considered AML obligated and therefore require to check the background of their business customers, partners, and investors. The existing business verification processes are time consuming, manual, lack usability and are meant for larger financial institutions that have the resources to spend on the manual processes. However, as specified in the thesis through customer interviews, SMBs often lack the knowledge about how they should fully verify a business customer or partner and what solution they should chose. Also, as the research showed, the full KYB process consists of multiple modules and to be compliant with the AML regulations, a business needs to combine several solutions.

The interviews with the customers allowed the author to see that there is a need for a simple user–centric solution for legal entity verification, as small businesses opt for the manual approach, even though there is a variety of existing solutions on the market. The main takeaway from the interviews was that even though speed of verification is important, the users care more about the quality and the trustworthiness of the solution.

The author achieved the first objective and was able to combine several solutions into one single dashboard that can also be considered compliant with the AML regulations of Estonia, since the requirements set in RahaPTS acted as a base for the whole solution. The author combined the following modules into the dashboard:

- Business register module;

- UBO module;

- AML screening (PEP, Sanctions, Adverse media) module;

- Identity verification module;

- KYB questionnaire module;

- Original incorporation documents requesting module.

Together with the mentioned modules, the author also created a roadmap for future developments, including some improvements to the existing modules. For example, more UBO databases are planned to be added to the UBO module. Also, the original documents module will have an e–notary confirmation feature added in a future release.

The author has achieved the second objective of collecting requirements for the MVP of KYB Platform dashboard. Not only did the author collect theoretical requirements, but together with the KYB Platform team the author also created a high–fidelity prototype and tested it with real users. This test painted a more realistic picture of the actual needs of the customers and will make the MVP development process faster. Also, the test with real users has disproven some of the assumptions initially made by the team and therefore will decrease the chance of the MVP failing or being unneeded after the launch.

KYB Platform team has already started development during Q1–Q2 of 2021 while the thesis was being written. Following the roadmap provided by the author the MVP is planned to be launched in June of 2021.

14.2 Further Use of the Thesis Results

Primarily this thesis was written for KYB Platform OÜ and its team as input into the development of the KYB Platform dashboard MVP. The team now has an overview of the legal AML requirements set in the RahaPTS that should act as a base of the solution. RahaPTS is changed according to the EU AML directives and therefore with these base requirements the company can offer the solution in the whole EU. Using the results from the first interviews with the customers the team now also understands the needs of the customers. Also, the product demos with the same customers showed KYB Platform that they are on the right track and can continue working on future developments using the roadmap created by the author.

The thesis can also act as a guide for future projects by teams both in the business world, as well as academics, that wish to get a better understanding of design thinking principles.

The author tested the limitations of design thinking by adding her own preferred methods and tools into the design thinking framework, such as SWOT, PESTLE and Porter's Five Forces, creation of a roadmap, KPIs, which are quite typical for business development and business planning. Some untraditional tools were added as well, such as Gartner's Quadrant, Harvey Balls, which are known to be used in start–up presentations. Personas, brainstorming, prototyping, and testing activities can be considered traditional in the design thinking framework. All in all, the author has achieved the goal of presenting the design thinking methodology in an approachable and flexible way to prototype and validate ideas quickly. This is especially useful for team members working more on the business side of the company who may not be familiar with software development methodologies.

The thesis can act as an example for teams wishing to build an all–in–one solution and combine different solutions into one single space. The digitisation trends and the generation of 2021 are leaning more towards easy solutions that require as few steps as possible, so it is understandable why the all–in–one solutions are gaining popularity.

Finally, as the KYB market and its standards are still being established, the author is sure that this academic work will become a contribution into the popularisation and development of the KYB industry and a valuable input into the RegTech environment.

Summary

The thesis described the problem of manual legal entity verification that is in the process of being solved by a start–up called KYB Platform OÜ. The start–up wishes to offer a new approach to legal entity verification by combining several KYB solutions into one single space and making this solution accessible to SMBs, who don't wish to use the traditional existing AML tools on the market. Therefore, the big goal of the thesis was to propose a new automated all–in–one solution for easy verification of legal entities that would appeal to SMBs.

The author of the thesis is the founder of KYB Platform OÜ, and the practical goals of the thesis were to gather requirements for the KYB Platform MVP, create a prototype and test the prototype with real users. The requirements were collected from AML regulations of Estonia, brainstorming sessions with KYB Platform team and interviews with potential customers. A high–fidelity prototype was created and tested through showing product demos to the same potential customers.

In the first chapter the author described the background of the problem. The legal entity verification need comes from the Anti–Money Laundering requirements. Also, the problem was described in more detail, as well as the scope and the tasks of the project.

The second chapter described the legal entity verification industry, also known as Know Your Business (KYB). The author showed the traditional KYB process and compared KYB to other tools that tackle money laundering, such as KYC, AML screening and transactions monitoring.

The third chapter provided the overview of design thinking, which was the chosen methodology for the project. The fourth chapter described the methodology applied to the thesis. The author divided the project into design thinking steps: Explore, Define, Ideate, Prototype, Test and Reflect. Both design thinking activities, as well as other tools were added to every step of the project.

The fifth chapter analysed the business environment of RegTech using PESTLE, the industry of KYB analysis using Porter's Five Forces method. Also, KYB Platform's risks were analysed using the SWOT tool.

The sixth chapter included the analysis of direct and indirect competitors of KYB Platform solution using Harvey Balls and Gartner's Quadrant methods. The seventh chapter included the Lean canvas and the ideal customer personas of KYB Platform solution. The main personas were customers from FinTech and investment sector.

The eighth chapter included the results of the business analysis. Stakeholders were listed, interviews were made with the potential customers and a few brainstorming sessions with KYB Platform team were made. The requirements were also gathered by analysing AML regulations of Estonia called RahaPTS. This chapter also described the business requirements and TO–BE processes of how the solution will work. In this chapter the author concluded that the solution needs to be in the form of a dashboard.

The ninth chapter described the results of the system analysis, which included the functional and non–functional requirements. The tenth chapter provided a visualisation of the KYB Platform dashboard MVP architecture and an overview of how the data will be stored in the databases.

The eleventh chapter included screenshots of the high–fidelity prototype that was made according to the requirements. In the twelfth chapter the author validated the solution with the same customers that were interviewed before by performing prototype demos and validation according to AML regulations was performed.

In the thirteenth chapter the author described the goal–oriented roadmap, progress roadmap and KPIs for both the first MVP launch, as well as future releases. The fourteenth chapter described the author's conclusions of the project and how the results can be used in future projects.

The goal of the thesis was to propose a new automated all–in–one solution for easy verification of legal entities, that would be accessible to SMBs. The goal was fulfilled, and the prototype was validated with representatives of SMBs.

During the writing of this thesis KYB Platform OÜ already started development of the MVP and the first launch is scheduled for June of 2021.

References

[1] Riigi Teataja, *Rahapesu ja terrorismi rahastamise tõkestamise seadus – Riigi Teataja*. 2021.

[2] European Commission, "Anti-money laundering and counter terrorist financing | European Commission." https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-supervision-and-risk-management/anti-money-laundering-and-counter-terrorist-financing_en (accessed Dec. 08, 2020).

[3] J. Parra Moyano and O. Ross, "KYC Optimization Using Distributed Ledger Technology," *Bus. Inf. Syst. Eng.*, vol. 59, no. 6, pp. 411–423, 2017, doi: 10.1007/s12599-017-0504-2.

[4] K. Tirmaste, L. Voolma, L. Laidroo, M.-L. Kukk, M. Avarmaa, and FinanceEstonia, "Fintech Report Estonia 2019," 2019.

[5] E. Chivot, "How Including the 'Know Your Business Customer' Requirement in the DSA Could Help Address Some of the Web's Biggest Problems – Center for Data Innovation," *Center for Data Innovation*, 2020. https://datainnovation.org/2020/11/how-including-the-know-your-business-customer-requirement-in-the-dsa-could-help-address-some-of-the-webs-biggest-problems/ (accessed Nov. 26, 2020).

[6] Finantsinspektsioon, "TÄIENDAVAD MEETMED RAHAPESU TÕKESTAMISEKS KREDIIDI- JA FINANTSEERIMISASUTUSTES," 2009. [Online]. Available: https://www.fi.ee/failid/rahapesu_juhend_AK1RK1.pdf.

[7] M. Miller and OWI Labs, "KYB market to approach $12 billion by 2022, OWI research finds," *One World Identity*, 2018. https://oneworldidentity.com/kyb-market-approach-12-billion-2022-owi-research-finds/ (accessed Nov. 26, 2020).

[8] Finantsinspektsioon, "Finantsinspektsiooni aastaraamat 2019," 2019.

[9] Invest in Estonia, "FinTech — Invest in Estonia." https://investinestonia.com/business-opportunities/fintech/ (accessed Nov. 26, 2020).

[10] Eesti Advokatuur (Estonian Bar Association), "Eesti Advokatuur - About Us," 2019. https://advokatuur.ee/eng/frontpage (accessed Nov. 26, 2020).

[11] Refinitiv, "KYC compliance: the rising challenge for financial institutions," 2019. [Online]. Available: https://www.refinitiv.com/content/dam/marketing/en_us/documents/reports/kyc-compliance-the-rising-challenge-for-financial-institutions-special-report.pdf.

[12] S. Rajan, T. Ramachandran, K. Moyer, and Deloitte, "Automation in Onboarding and Ongoing Servicing of Commercial Banking Cliets," 2018.

[13] M. Harrop and B. Mairs, "Thomson Reuters 2016 Know Your Customer Surveys Reveal Escalating Costs and Complexity," 2016. https://www.thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html (accessed Nov. 26, 2020).

[14] Refinitiv, "Know Your Customer (KYC) | Refinitiv." https://www.refinitiv.com/en/know-your-customer (accessed Nov. 26, 2020).

[15] Dow Jones, "Dow Jones Risk & Compliance." https://professional.dowjones.com/risk/ (accessed Nov. 26, 2020).

[16] Bloomberg, "Compliance | Bloomberg Professional Services." https://www.bloomberg.com/professional/expertise/compliance/ (accessed Nov. 26, 2020).

[17] FATF, "What we do - Financial Action Task Force (FATF)," 2019. https://www.fatf-gafi.org/about/whatwedo/ (accessed Dec. 08, 2020).

[18] M. Alfaro and Veriff, "A Guide to Anti-Money Laundering (AML) Compliance," *Veriff Blog*, 2019. https://www.veriff.com/veriff-times/aml-compliance-amld5 (accessed Feb. 28, 2021).

[19] Eesti Pangaliit, "Rahapesu ja terrorismi tõkestamin: Korduma kippuvad küsimused — Eesti Pangaliit," *Eesti Pangaliit*. https://pangaliit.ee/rahapesu-tokestamine (accessed Dec. 08, 2020).

[20] Thales Group, "What is KYC in Banking?," *Thales Group*, 2020. https://www.thalesgroup.com/en/markets/digital-identity-and-security/banking-payment/issuance/id-verification/know-your-customer (accessed Dec. 08, 2020).

[21] Trulioo, "Reducing KYB due diligence from weeks to minutes," *Trulioo*, 2021. https://www.trulioo.com/blog/kyb-due-diligence (accessed Dec. 08, 2020).

[22] Deloitte, "RegTech is the new FinTech How agile regulatory technology is helping firms better understand and manage their risks," 2016.

[23] Burnmark and Alvarez & Marsal, "RegTech 2.0," 2018. [Online]. Available: https://www.alvarezandmarsal.com/sites/default/files/regtech_2.0_report_final.pdf.

[24] Complyadvantage, "What are Relatives and Close Associates (RCAs)?," *Complyadvantage*. https://complyadvantage.com/knowledgebase/politically-exposed-persons/rcas-relatives-and-close-associates/ (accessed Feb. 28, 2021).

[25] Deloitte, "Data management: Why it matters for effective sanctions screening," 2020. Accessed: Feb. 28, 2021. [Online]. Available: https://www2.deloitte.com/ch/en/pages/forensics/articles/data-management-sanctions-screening.html.

[26] Refinitiv, "Why is adverse media screening for regulatory compliance so complex? | Refinitiv Perspectives," *Refinitiv*. https://www.refinitiv.com/perspectives/regulation-risk-compliance/why-is-adverse-media-screening-for-regulatory-compliance-so-complex/ (accessed Feb. 28, 2021).

[27] ComplyAdvantage, "AML Screening and Monitoring | ComplyAdvantage," *ComplyAdvantage*. https://complyadvantage.com/aml-screening-onboarding-monitoring/ (accessed Mar. 01, 2021).

[28] Trulioo, "Global Business Verification," *Trulioo*. https://www.trulioo.com/product/global-business-verification (accessed Feb. 28, 2021).

[29] ShuftiPro, "Know Your Business |," *ShuftiPro*. https://shuftipro.com/know-your-business (accessed Feb. 28, 2021).

[30] P. Johnson and Veriff, "What is identity verification? And why is it necessary? – Veriff," *Veriff Blog*, 2020. https://www.veriff.com/veriff-times/what-is-identity-verification (accessed Mar. 04, 2021).

[31] Electronic Identification, "What is Know Your Business (KYB) and its relation to KYC," *Electronic Identification*, 2021. https://www.electronicid.eu/en/blog/post/know-your-business-kyb/en (accessed Mar. 04, 2021).

[32] GetID, "Identity and Documents Verification Online - GetID," *GetID*. https://getid.ee/ (accessed Mar. 04, 2021).

[33]   IDnow, "Online Ident-Check via video | IDnow VideoIdent," *IDnow*.
         https://www.idnow.io/products/idnow-videoident/ (accessed Mar. 04, 2021).

[34]   Holvi Payment Services, "Required documents for business verification – Holvi
         Support," *Holvi*. https://support.holvi.com/hc/en-gb/articles/360001248565-
         Required-documents-for-business-verification (accessed Mar. 04, 2021).

[35]   GetID, "ID Document Verification - GetID," *GetID*. https://getid.ee/solutions/id-
         document-verification/ (accessed Mar. 04, 2021).

[36]   Republic of Estonia Ministry of the Interior, "Population Register | Ministry of
         the Interior," *Ministry of the Interior*.
         https://www.siseministeerium.ee/en/population-register (accessed Mar. 04,
         2021).

[37]   Registrite ja Infosüsteemide Keskus, "Äriregistri teabesüsteem," *RIK*.
         https://ariregister.rik.ee/ (accessed Mar. 04, 2021).

[38]   Veriff, "Flexible Plans and Pricing - Identity Verification – Veriff," *Veriff*.
         https://www.veriff.com/pricing#starter-plans (accessed Mar. 04, 2021).

[39]   Fenergo, "Infographic: Client Onboarding - Time and Cost Study - Fenergo,"
         Fenergo. https://www.fenergo.com/infographic/infographic-client-onboarding-
         time-and-cost-study/ (accessed Mar. 04, 2021).

[40]   Complyadvantage, "What is AML Transaction Monitoring -
         Complyadvantage.com," *Complyadvantage*.
         https://complyadvantage.com/knowledgebase/anti-money-laundering/transaction-
         monitoring/ (accessed Mar. 01, 2021).

[41]   Salv, "Product: The new standard for AML • Salv," *Salv*.
         https://salv.com/product/#kyc-risk-scoring (accessed Mar. 01, 2021).

[42]   F. Dolak, F. Uebernickel, and W. Brenner, "Design Thinking and Design Science
         Research," *Position. Pap. DESRIST 2013*, pp. 1–11, 2013, [Online]. Available:
         https://www.alexandria.unisg.ch/Publikationen/223547.

[43]   P. Rodgers and E. Winton, "'DESIGN THINKING' – A CRITICAL
         ANALYSIS," in *INTERNATIONAL CONFERENCE ON ENGINEERING AND
         PRODUCT DESIGN EDUCATION 2 & 3 SEPTEMBER 2010, NORWEGIAN
         UNIVERSITY OF SCIENCE AND TECHNOLOGY, TRONDHEIM, NORWAY*,
         2010, p. 6.

[44]   J. Liedtka, "Perspective: Linking Design Thinking with Innovation Outcomes
         through Cognitive Bias Reduction," *J. Prod. Innov. Manag.*, vol. 32, no. 6, pp.
         925–938, 2015, doi: 10.1111/jpim.12163.

[45]   X. Pavie and D. Carthy, "Leveraging Uncertainty: A Practical Approach to the
         Integration of Responsible Innovation through Design Thinking," *Procedia - Soc.
         Behav. Sci.*, vol. 213, pp. 1040–1049, 2015, doi: 10.1016/j.sbspro.2015.11.523.

[46]   T. Brown, *Change by Design, Revised and Updated : How Design Thinking
         Transforms Organizations and Inspires Innovation*. New York, United States:
         HarperCollins Publishers Inc, 2019.

[47]   R. L. Martin, *The Design of Business: Why Design Thinking is the Next
         Competitive Advantage*. Boston, MA, United States: Harvard Business Review
         Press, 2009.

[48]   N. Cross, "The nature and nurture of design ability," *Des. Stud.*, vol. 11, no. 3,
         pp. 127–140, 1990, doi: https://doi.org/10.1016/0142-694X(90)90002-T.

[49]   A. Crady, "Doing the right things and doing things right: a design researcher's
         process model | by Allison Crady | UX Collective," *UX Collective*, 2018.
         https://uxdesign.cc/doing-the-right-things-and-doing-things-right-a-design-
         researchers-process-model-abd222699bbf (accessed Nov. 10, 2020).

[50]   M. Lewrick, P. Link, and L. Leifer, *The Design Thinking Toolbox : A Guide to Mastering the Most Popular and Valuable Innovation Methods*. New York, United States: John Wiley & Sons Inc, 2020.

[51]   M. Lewrick, P. Link, and L. Leifer, *The Design Thinking Playbook : Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems*. New York, United States: John Wiley & Sons Inc, 2018.

[52]   D. Sandino, L. M. Matey, and G. Vélez, "Design thinking methodology for the design of interactive real-time applications," in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 2013, vol. 8012 LNCS, no. PART 1, pp. 583–592, doi: 10.1007/978-3-642-39229-0_62.

[53]   IDEO, "Design Thinking – IDEO U," *IDEO*. https://www.ideou.com/pages/design-thinking (accessed Nov. 10, 2020).

[54]   L. Naiman, "Design Thinking as a Strategy for Innovation," *Creativity at Work*, 2019. https://www.creativityatwork.com/design-thinking-strategy-for-innovation/ (accessed Nov. 10, 2020).

[55]   G. H. Steinke, M. S. Al-deen, and R. C. Labrie, "Innovating Information System Development Methodologies with Design Thinking," *5th Int. Conf. Appl. Innov. IT*, no. March, pp. 51–55, 2017.

[56]   50Minutes, *PESTLE Analysis: Understand and plan for your business environment*. Plurilingua Publishing, 2015.

[57]   J. Downey and Technical Information Service, "Strategic Analysis Tools," 2007. doi: 10.1093/acprof:oso/9780199232567.003.0003.

[58]   M. E. Porter, *On Competition, Updated and Expanded Edition*. Harvard Business Press, 2008.

[59]   50Minutes, *Porter's Five Forces: Understand competitive forces and stay ahead of the competition*. Plurilingua Publishing, 2015.

[60]   MindTools, "SWOT Analysis - How to Develop a Strategy For Success," *MindTools*. https://www.mindtools.com/pages/article/newTMC_05.htm (accessed Mar. 01, 2021).

[61]   MindTools, "Using the TOWS Matrix - Developing Strategic Options From an External-Internal Analysis," *MindTools*. https://www.mindtools.com/pages/article/newSTR_89.htm (accessed Mar. 13, 2021).

[62]   Business-to-you, "SWOT Analysis: Bringing Internal and External Factors Together," *Business-to-you*, 2017. https://www.business-to-you.com/swot-analysis/ (accessed Mar. 13, 2021).

[63]   S. Bresciani and M. J. Eppler, "GARTNER'S MAGIC QUADRANT and HYPE CYCLE," *Collab. Knowl. Vis. Case Study Ser.*, no. 2, pp. 1–17.

[64]   A. Malhotra, "How to Use Harvey Balls in PowerPoint [Harvey Balls Templates Included] - The SlideTeam Blog," *Slide Team*, 2018. https://www.slideteam.net/blog/how-to-use-harvey-balls-in-powerpoint-harvey-balls-templates-included (accessed Mar. 08, 2021).

[65]   M. Dumas, M. La Rosa, J. Mendling, and H. Reijers, *Fundamentals of Business Process Management*, 2nd ed. 2018.

[66]   LEANSTACK, "Lean Canvas | LEANSTACK." https://leanstack.com/lean-canvas (accessed Mar. 08, 2021).

[67]   A. Maurya, "Capture Your Business Model in 20 Minutes - Lean Canvas - YouTube," *Youtube*, 2013. https://www.youtube.com/watch?v=7o8uYdUaFR4 (accessed Mar. 08, 2021).

[68]   H. Winter, *The Business Analysis Handbook Techniques and Questions to Deliver Better Business Outcomes*, 1st ed. Kogan Page, 2019.

[69]   *A Guide to the Business Analysis Body of Knowledge (BABOK Guide)*, 3rd ed. International Institute of Business Analysis, 2015.

[70]   Vertabelo SA, "Vertabelo Database Modeler," *Vertabelo*. https://vertabelo.com/documentation/ (accessed May 11, 2021).

[71]   Usability.gov, "Prototyping | Usability.gov," *Usability.gov*. https://www.usability.gov/how-to-and-tools/methods/prototyping.html (accessed Mar. 08, 2021).

[72]   P. G. Maropoulos and D. Ceglarek, "Design verification and validation in product lifecycle," *CIRP Ann. - Manuf. Technol.*, vol. 59, no. 2, pp. 740–759, 2010, doi: 10.1016/j.cirp.2010.05.005.

[73]   R. Pichler, *Strategize: Product Strategy and Product Roadmap Practices for the Digital Age*, 1st ed. Pichler Consulting, 2016.

[74]   Refinitiv, "Financial Technology, Data, and Expertise | Refinitiv." https://www.refinitiv.com/en (accessed Mar. 19, 2021).

[75]   "KYB Solution | Sumsub." https://sumsub.com/kyb-solution/ (accessed Mar. 19, 2021).

[76]   Centre of Registers and Information Systems of Estonia, "e-Business Register | RIK," *RIK*. https://www.rik.ee/en/e-business-register (accessed Mar. 19, 2021).

[77]   Financial Services Regulatory Commission of St. Kitts, "Financial Services Regulatory Commission of St. Kitts - Companies," *Financial Services Regulatory Commission of St. Kitts*. https://www.fsrc.kn/companies (accessed Mar. 19, 2021).

[78]   Dun & Bradstreet, "D-U-N-S Number Lookup," *Dun & Bradstreet*. https://www.dnb.com/duns-number/lookup.html (accessed Mar. 19, 2021).

[79]   Bureau van Dijk, "Orbis | Compare Private Company Data | Bureau van Dijk," *Bureau van Dijk*. https://www.bvdinfo.com/en-gb/our-products/data/international/orbis (accessed Mar. 19, 2021).

[80]   LexisNexis, "Welcome to LexisNexis - Choose Your Path," *LexisNexis*. https://www.lexisnexis.com/en-us/gateway.page (accessed Mar. 19, 2021).

[81]   Thomson Reuters, "Home | Thomson Reuters," *Thomson Reuters*. https://www.thomsonreuters.com/en.html (accessed Mar. 19, 2021).

[82]   Complyadvantage, "Home | ComplyAdvantage," *Complyadvantage*. https://complyadvantage.com/ (accessed Mar. 19, 2021).

[83]   Veriff, "The AI-powered Identity Verification Platform – Veriff," *Veriff*. https://www.veriff.com/ (accessed Mar. 19, 2021).

[84]   Onfido, "Onfido | Document ID & Facial Biometrics Verification," *Onfido*. https://onfido.com/ (accessed Mar. 19, 2021).

[85]   Jumio, "Jumio: End-to-End ID and Identity Verification Solutions," *Jumio*. https://www.jumio.com/ (accessed Mar. 19, 2021).

[86]   J. Nielsen, "Why You Only Need to Test with 5 Users," *Nielsen Norman Group*, 200AD. https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/ (accessed May 13, 2021).

[87]   D. Zacarias, "20 Product Prioritization Techniques: A Map and Guided Tour," *career.pm*. https://foldingburritos.com/product-prioritization-techniques/ (accessed Mar. 13, 2021).

[88]   J. Knapp, J. Zeratsky, and B. Kowitz, *Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days*. Simon & Schuster, 2016.

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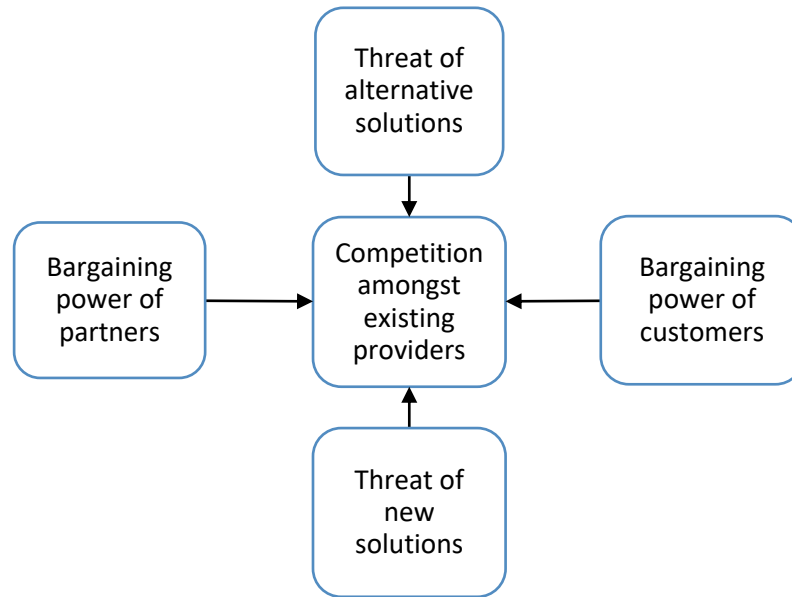
Appendix 2 – Project phases with methods and tools

Phase of the project	Goal of the phase	Method	Tool
Explore	Understand the market	Business Environment Analysis	PESTLE
		Industry Analysis	Porter's Five Forces
		Risk Analysis	SWOT and TOWS
Define	Understand the competition	Competition Analysis	Gartner Magic Quadrant Harvey Balls
	Understand the customer	Customer Analysis	Interviews Personas Lean Canvas
	Understand the requirements of the customer and the business	Business Analysis	Interviews Brainstorming session RahaPTS analysis
Ideate	Generate ideas for prototype and MVP	System Analysis	BABOK Functional Requirements Non–Functional Requirements MoSCoW
		Architecture	ERD Component Diagram
Prototype	Build a prototype	Prototype	Low–fidelity High–fidelity
Test	Get feedback on the prototype	Prototype Validation	Product demos Validation with RahaPTS
Reflect	Build a roadmap for MVP and future	Roadmap	Goal Oriented Roadmap Project roadmap KPIs

Appendix 3 – Project plan

Phase	Activity	Month	Result
Problem definition and research goals.			
Choosing the research methods and tools, defining the research sample size.			
Literature & legislation overview		June–September 2020	Chapter 1–3.
Explore	Brainstorming session	September 2020 (2h) October 2020 (3h) December 2020 (2h) March 2021 (2h)	Chapter 6–8, Chapter 8.3 Chapter 12 Appendix 9
	PESTLE analysis	October 2021	Chapter 5.1 Appendix 10
	Porter's Five Forces	October 2021	Chapter 5.2
	SWOT and TOWS analysis	October 2021	Chapter 5.3
Define	Competition analysis	December 2021	Chapter 6
	Interviews	October 2020– February 2021	Chapter 8.2 Appendix 12
	Personas and Lean Canvas	February 2021	Chapter 7 Appendix 13
	Business analysis	February 2021	Chapter 8 Appendix 14–17
Ideate	System analysis	February 2021	Chapter 9 Appendix 18
	Architecture	February 2021	Chapter 10 Appendix 19
Prototype	Low–fidelity	February 2021	Appendix 20
	High–fidelity	March 2021	Chapter 11
Test	Interviews & product demos	March 2021	Chapter 12 Appendix 22
Reflect	Roadmaps	April 2021	Chapter 13

Appendix 4 – Porter's Five Forces diagram template

```
              ┌──────────────┐
              │  Threat of   │
              │ alternative  │
              │  solutions   │
              └──────┬───────┘
                     │
                     ▼
┌──────────┐   ┌──────────────┐   ┌──────────┐
│Bargaining│   │ Competition  │   │Bargaining│
│ power of │──▶│  amongst     │◀──│ power of │
│ partners │   │  existing    │   │customers │
│          │   │  providers   │   │          │
└──────────┘   └──────▲───────┘   └──────────┘
                     │
              ┌──────┴───────┐
              │  Threat of   │
              │     new      │
              │  solutions   │
              └──────────────┘
```

Bargaining power of customers	Threat of alternative solutions
How many customers are there? How price–sensitive are the customers? Switching costs for the customer Customer profile, demographic	Switching costs for the customer Variety of alternatives, costs of alternatives
Bargaining power of partners	**Threat of new solutions**
How many partners are there? How many alternatives? Switching costs for the business Cost–volume ratio Self–cost and selling cost	Switching costs for the customer Trends, economy Patents, certificates, legal requirements How easy is it to enter the market? How much capital needed?
Competition amongst existing providers	
Number of providers, their size and profile Industry growth Industry exit strategy Variety of providers, how are they different?	

Appendix 5 – SWOT matrix template

STRENGTHS	WEAKNESSES
What do you do best? What value do you bring to your customers? What is unique about you? What resources can you utilise? What positive things have customers said about you? Example: experience in the industry, team, product	What do you need to work on? What do you need to still add to your product or company? Where are you lacking resources in? What have customers or investors said as your weakness? Example: lack of experience in the industry, some team members missing, product lacking certain features
OPPORTUNITIES	**THREATS**
What opportunities do you see? What trends in the world are happening that affect your business in a positive way? What strengths can you utilise as opportunities? What opportunities do you see that will help you with your weaknesses? Example: Covid–19, digitization trends, regulations, and laws	What threats do you see for your product or business? What are your competitors doing that affects you? What weaknesses can make your vulnerable towards threats? Example: regulations changing, building a not scalable business

- Strengths list as S1–Sn
- Weaknesses list as W1–Wn
- Opportunities list as O1–On
- Threats T1–Tn

Appendix 6 – TOWS matrix template

	Opportunities (O) O1 O2	Threats (T) T1 T2
Strengths (S) S1 S2	SO – Maxi–maxi strategies	ST – Maxi–mini strategies
Weaknesses (W) W1 W2	WO – Mini–maxi strategies	WT – Mini–mini strategies

Appendix 7 – Lean Canvas template

PROBLEM (2)	SOLUTION (4)	UNIQUE VALUE PROPOSITION (3)	UNFAIR ADVANTAGE (9)	CUSTOMER SEGMENT (1)
3 problems, customer segment pains, frustrations	3 possible solutions, according to every listed problem	One–liner that would make a new person interested in the product	Something unique about your business (patents, team, knowledge, experience)	Target customer Early adopters
	KEY METRICS (8) A few numbers that indicate to you how your business is doing		**CHANNELS (5)** How will the customer receive the product? How will customers know about the product? Customer support	

COST STRUCTURE (7)	REVENUE STREAMS (6)
Fixed and variable costs	Sources of money. business model

Appendix 8 – Brainstorming session plan

Part 1: Business Environment Analysis

Objective: To understand the trends of the industry, risks associated with the business, opportunities.

Tools: PESTLE, SWOT/ TOWS, Porter's Five Forces

Questions: What is influencing our business? What can make or break our business? What do we know about the industry and competition? What are our strengths and weaknesses?

Part 2: Competition Analysis

Objective: To understand who the competitors are and how we can differentiate our business.

Tools: Internet search using keywords e.g., "business verification", "KYB", "legal entity verification", using our experience with some competitors, Gartner's Magic Quadrant and Harvey Balls.

Questions: Who are our competitors? What are they doing? How are we different?

Part 3: Customer Analysis

Objective: To understand who customer segments are and what their needs are.

Tools: Using our previous experience in the industry, interviews, persona, Lean canvas.

Questions: Who are our customers? What are their needs? What are their problems?

Part 4: Business Requirements

Objective: To understand what the requirements for the MVP are.

Tools: Using our previous experience in the industry, interviews with customers.

Questions: What are our main requirements as a business? What requirements did we already know? What new requirements have we discovered from the interviews?

Appendix 9 – Brainstorming session with KYB Platform

Appendix 10 – PESTLE analysis for KYB Platform

	External factors	Regtech specific factors	Importance
POLITICAL	Government policy New AML directives Taxes Definition of Fintech and Crypto Global trade agreements, restrictions, sanctions Covid–19 restrictions Support of start–ups Fines for not complying with regulations	Monitoring of crypto businesses has become stricter. AML directives being updated, the product needs to keep up with new requirements. Lockdowns, travel restrictions, face–to–face contact restrictions adding to the need of more and better verification solutions. Start–ups getting more support from governmental funds. Fines for money–laundering or lack of compliance with regulations.	Medium Medium High Low High
ECONOMIC	Globalisation Economic growth Cost of living Cost of starting a business Consumer trends, buying habits	Businesses are able to afford more expensive high quality Regtech solutions. Cost of starting a business is lower and easier in Estonia. Customers are used to convenient access to Regtech products. Covid–19 restrictions are pushing businesses to go digital.	Medium Low Medium High
SOCIAL	Trend for convenient access to digital products All–in–one product trend Lifestyle	Consumers of financial services want to verify their information conveniently, fast, in the comfort of their home. They don't want to request copies of documents, get notary confirmation, send documents by post etc. Our customers want to get one solution for all their needs, instead of going to 5 different providers and combining the solutions and building their own process.	High High

TECHNOLOGY	Risk of fraud is higher Automation Artificial Intelligence (AI) and Machine Learning (ML) Security trends Blockchain Access to data and data analysis Digitisation trends Emphasis on user experience Scalability of the product	Due to digitisation trends more businesses are going online. Risk of fraud is higher online. A person or a company can provide fake documents, websites, photos – in order to strike a deal.	High
		Speed has become important in verification, process needs to be automated, fast. This can be achieved with AI and ML.	Medium
		Customers want to know where their data is stored, what are the security measures, is there blockchain used.	Medium
		Users want the verification product to grow with them. They may want to start with low volumes and then go to higher volumes.	High
		Trends of easy analysis of complicated large amounts of data.	Low
LEGAL	AML laws KYC principles GDPR	Financial sector businesses are obligated by law to perform background checks on their customers. Meaning of "financial sector" has expanded.	High
		KYC principles are even moving outside of the financial sector and even non–obligated customers doing business abroad want to know who their dealing with.	High
		Data storing methods, especially when it comes to sensitive personal data, is now highly monitored.	Medium
ENVIRONMENTAL	Sustainability as part of risk scoring Gender equality Knowing your customers and partners	ESG (Environmental, Social, Governmental) factors are becoming part of risk assessment of legal entities. CO2 emissions, waste, gender equality of a company and many more will become datapoints that we will need to collect.	Low
		Conscious partnerships are important, you need to know who your customer is, partner, investor, where their money is coming from.	High

Appendix 11 – Customer interview plan

Sample size

Potential customers of KYB Platform from Estonia, Latvia, and Lithuania. Industries include the financial sector, fintech, investment firms, law firms. Small and medium size businesses, 1–10 employees and 10–50 employees per office.

Introduction

We are developing a solution for verifying business customers called KYB Platform. For me to understand your needs better, I would like to ask you some questions regarding your current business customer verification process. You can answer as general or as specific as you wish. The answers will be used in my master's thesis. The interview will be recorded. You can stay anonymous if you wish.

Questions

1. Can I have your permission to record this interview?

2. In the thesis can your name and position be used, or would you like to stay anonymous?

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

4. Describe your current business customer verification process.

5. What tools do you use to verify customers?

6. How long does the verification process take?

7. What do you not like in the current process or what is lacking in it?

8. What would you definitely want to see in KYB Platform?

Appendix 12 – Customer interview summaries

Interview 1

Customer: Anonymous 1

Industry: Fintech

Questions

1. Can I have your permission to record this interview?

   Yes

2. In the thesis can your name and position be used, or would you like to stay anonymous?

   Anonymous

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

   Fintech industry, offering fintech products, verify customers and investors.

4. Describe your current business customer verification process. What tools do you use to verify customers?

   Manual, mostly internet sources. No tools used. Lawyer performs the checks manually.

5. How long does the verification process take? How much do you currently spend on verifying your business customers?

   3 hours at least of manual work + time we spend waiting for information and communication with the customer. Can take days or weeks in total.

6. What do you not like in the current process or what is lacking in it?

   Manual, expensive, many sources, spending too much time, not having access to official sources, not knowing how to properly perform the verifications.

7. What would you definitely want to see in KYB Platform?

   Digital signatures, questionnaire, API integration or some form of a widget option, access to all necessary sources, timestamping, audit trail.

   PEP, Sanctions.

Interview 2

Customer: Victoria Saue

Industry: Financial institutions, banking, Regtech, law office

Questions

1. Can I have your permission to record this interview?

    Yes

2. In the thesis can your name and position be used, or would you like to stay anonymous?

    Use my name and industry

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

    I have years of experience in banking, Regtech and law offices.

4. Describe your current business customer verification process.

    Mostly I see a lot of manual work, where the end–customer who needs to be verified should provide their company documents to the bank or law office.

5. What tools do you use to verify customers?

    Typical tools used are identity verification providers, such as Veriff. Some institutions with more resources build their own verification solutions. Dow Jones is a popular tool used in banks.

6. How long does the verification process take? How much do you currently spend on verifying your business customers?

    Process can take days, weeks, sometimes months. It is all because it takes the end–customers some time to provide all the documents and it takes some time for the bank or law office to check these documents. Also, the communication part where you send emails and ask for additional documents or explanations – this is one of the reasons this process is so slow.

7. What do you not like in the current process or what is lacking in it?

    Manual, many sources, spending too much time, not having access to official sources. A lot of paperwork, everything needs to be confirmed, stamped, notary confirmation, apostille etc.

8. What would you definitely want to see in KYB Platform?

Business register extracts, structure of the company, representation rights, board members, does the company exist, is it active, who are the people behind it. There needs to be a possibility to easily ask the end–customer to provide additional documents or answer questions. Maybe e–notary. Asking for power of attorney.

Possibility to translate documents into English, because original documents of incorporation come in their native language.

PEP, Sanctions checks.

Interview 3

Customer: Yrjö Ojasaar

Industry: Investment fund

Questions

1. Can I have your permission to record this interview?

   Yes

2. In the thesis can your name and position be used, or would you like to stay anonymous?

   Use my name and industry

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

   Investment fund. Need to verify investors of our fund, some companies that we co–invest with, also some of our portfolio companies.

4. Describe your current business customer verification process. What tools do you use to verify customers?

   We are using GetID to verify the identity of the individuals. They also have PEP, Sanctions check. Also, we ask the businesses to send us the documents. Also, we check the business registers and other public records.

5. How long does the verification process take? How much do you currently spend on verifying your business customers?

   Days/ weeks, depending on the company. Communication and research take a lot of time.

6. What do you not like in the current process or what is lacking in it?

   There are not tools that is easy to test, let's say 20–50 companies. All tools seem to be for thousands of checks.

7. What would you definitely want to see in KYB Platform?

   I think it should be a system where you upload an Excel with all the companies you need to verify, instead of manually typing every name and making spelling mistakes.

   The checks should come in levels. Level one is like basic check of the company, level two is more in–depth etc. I also think there should be some sort of red flags if

something is higher risk in the company. And then based on those red flags I could go more in depth with the search.

PEP, Sanctions.

Also, PDF reports are important, there needs to be a copy of the report with all the board members and UBOs as a PDF, not only in your online system.

Interview 4

Customer: Anonymous 2

Industry: Financial institutions, banking, consultation

Questions

1. Can I have your permission to record this interview?

   Yes

2. In the thesis can your name and position be used, or would you like to stay anonymous?

   Anonymous

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

   Worked in consulting offices as a legal specialist – customers and partners needed to be verified. Also have worked in financial institutions where customers had to be verified.

4. Describe your current business customer verification process. What tools do you use to verify customers? How much do they cost?

   Consulting offices – documents are provided by the customers; also, face–to–face verification is done. Some business registers are used, PEP & Sanctions lists.

   Financial institutions, specifically banks, have mostly local clients. And if it is a client from abroad, they ask for original documents, check registers.

   Dow Jones and Orbis are used.

5. How long does the verification process take? How much do you currently spend on verifying your business customers?

   Can take days, weeks, months.

6. What do you not like in the current process or what is lacking in it?

   It is manual.

7. What would you definitely want to see in KYB Platform?

   All in one place, all necessary registers and databases, possibility to request original documents either from customer or from register.

PEP, Sanctions.

Rule of at least 2 sources and 2 pairs of eyes.

Interview 5

Customer: Anni Säär

Industry: Law offices, start–ups, start–up accelerators, lecturer at university

Questions

1. Can I have your permission to record this interview?

    Yes

2. In the thesis can your name and position be used, or would you like to stay anonymous?

    Use my name and industry

3. What is your business activity? How does business verification fit into the business activity? Why do you need verification?

    Start–up accelerator at the moment, so verifying start–ups, investors, partners. We invest into start–ups, so we need to know the start–ups, but also, we need to check who we are investing with (other investors). Also, when a new business needs to be established in a new country, we help with that.

4. Describe your current business customer verification process. What tools do you use to verify customers?

    Checking the UBOs, does the company exist, business registers. Some registers are easier to access than others. In some cases, documents with apostilles need to be provided to us.

5. How long does the verification process take?

    Days, weeks, months. The research, communication, waiting, emailing, notary confirmations – all takes time.

6. What do you not like in the current process or what is lacking in it?

    Often times the people in the business send us the wrong documents or don't understand what type of original documents we want. In every country it is different and even the names and types of the documents are different.

    It is not only about the documents, but also about understanding the context of that country.

7. What would you definitely want to see in KYB Platform?

Some e–notary solution, so that notaries would confirm the original incorporation documents.

The solution needs to be trustworthy; it needs to assure me as a client that the information is correct, from the national register, and has not been changed.

I would also like to easily request all the documents and confirmations I need and then get notified when its ready.

Representation rights is also a very important thing.

Business registers and official databases. Definitely the sources need to be noted down everywhere. I want to understand where the data comes from.

Search needs to be good as well, you can't always use only the name or the trademark.

PEP, Sanctions.

Appendix 13 – Lean canvas for KYB Platform

PROBLEM (2)	SOLUTION (4)	UNIQUE VALUE PROPOSITION (3)	UNFAIR ADVANTAGE (9)	CUSTOMER SEGMENT (1)
1. Obligation to comply with AML and KYC regulations, obligation to check business customers. 2. Inconvenient, slow and costly to request and store data about business customers manually, too many sources. 3. Existing solutions are not meant for SMBs.	1. All–in–one: just one tool instead of 5 different solutions 2. Data from 200+ countries: business registers, UBO databases, PEP, Sanctions 3. Automation, speed – decisions in just 30 seconds	Unlike the traditional tools out there that require a time–consuming and expensive onboarding/ integration, as well as a larger prepayment – with KYB Platform you are able to just purchase the subscription and start using the solution immediately. Also, we know that analysing bulks of company data can be a headache, thanks to KYB Platform's AI solution you will be able to make a decision in just 30 seconds!	1. AI technology 2. Connections to databases 3. Our team, experience and great relationships/ partnerships	AML obligated SMBs: 1. Law firms 2. Investment funds, VCs, syndicates 3. Digital banking, payment platforms 4. Crypto business 5. Art dealers
	KEY METRICS (8) # of purchased subscriptions # of paid verification requests (PAYG)		**CHANNELS (5)** Direct corporate sales, LinkedIn, landing page	Non–obligated but doing business abroad and want to know their business partners: 6. Logistics 7. Manufacturing 8. e(Commerce)

COST STRUCTURE (7)	REVENUE STREAMS (6)
Product development costs Databases costs Team	Monthly subscriptions Pay–per–verification option Integration, customisation, white label

Appendix 14 – Requirements from customer interviews

ID	Customer requirement	Requests
IR1	Information from business registers/ official national commercial databases.	5
IR2	Information about UBOs.	5
IR3	Information about the people in company e.g., board members.	5
IR4	Checking people in the company against PEP, Sanctions lists.	5
IR5	Using legitimate trustworthy sources with proof of them being trustworthy.	3
IR6	Timestamping, proof that the data has not been changed.	2
IR7	Representation rights, proof that the representative has the right to represent.	3
IR8	Possibility to ask a customer to provide additional documents.	3
IR9	E–notary, digital confirmation from a notary that the documents are valid.	2
IR10	Asking the customer additional questions, a form, or a questionnaire.	2
IR11	Possibility to integrate the solution into an existing product, API integration.	1
IR12	Digital signatures.	1
IR13	Uploading a list of companies from an Excel spreadsheet.	1
IR14	Checks in levels, more basic check at first, then an in–depth check.	1
IR15	Translation into English if documents come in a foreign language.	1
IR16	Highlighting risks if something was found.	1
IR17	PDF reports, information can also be downloaded as a PDF.	1
IR18	Rule of at least 2 sources, a business register + customer provided information + another database.	1
IR19	Company searches with multiple parameters.	1

Appendix 15 – Requirements from KYB Platform brainstorming session

ID	KYB Platform requirement
KYB1	Business register needs to be the base where the information is gathered from.
KYB2	Information is gathered in real time straight from the source.
KYB3	Information is provided as a report, report is divided into tabs, because it can be long.
KYB4	AML screening implemented and can be done for all the representatives, directors, board members and UBOs.
KYB5	Checks need to be modular, you start with one level of check, but then can purchase additional information.
KYB6	KYB questionnaire – a form that you send to the customer to ask for additional information.
KYB7	Pay–as–you–go purchasing option.
KYB8	Monthly subscription purchasing possibility.
KYB9	Identity verification is implemented into the process. Sending a verification link to the customer so they would show their identification document.
KYB10	Possibility to log into the dashboard and start the verification.
KYB11	Possibility to ask the end–customer to provide additional documents, by sending them a link so they would upload the documents.

Appendix 16 – Analysis and prioritisation of requirements

ID	Requirement	Priority
KYB10	Possibility to log into the dashboard and start the verification.	MH
KYB3	Information is provided as a report, report is divided into tabs, because it can be long.	MH
LR10	Company contacts information.	MH
IR1	Information from business registers/ official national commercial databases.	MH
KYB1	Business register needs to be the base where the information is gathered from.	
LR1	Legal entity name, registration code and date of registration need to be provided.	
IR2	Information about UBOs.	MH
LR3	UBO information, control structure, structure of the company checked.	
IR3	Information about the people in company e.g. board members.	MH
LR2	Board members and directors need checked.	
IR4	Checking people in the company against PEP, Sanctions lists.	MH
KYB4	AML screening implemented and can be done for all the representatives, directors, board members and UBOs.	
LR4	Check whether involved parties are politically exposed (PEP).	
LR5	Check whether relatives or close associates of involved parties are politically exposed (RCA).	
LR8	Sanctions lists check for all involved entities.	
KYB9	Identity verification is implemented into the process. Sending a verification link to the customer so they would show their identification document.	MH
LR6	Identity verification of the representative of the legal entity.	
LR7	Identity verification of the UBO.	
IR5	Using legitimate trustworthy sources with proof of them being trustworthy.	MH
IR6	Timestamping, proof that the data has not been changed.	
KYB2	Information is gathered in real time straight from the source.	
LR11	Information is collected from a business register or a national database of companies, information source needs to be trustworthy.	

	Registration card, extract from business register, company registration documents.	
IR7	Representation rights, proof that the representative has the right to represent.	MH
LR9	Checking whether the representative has the right to represent the company.	
Comment	Information not available in most business registers, therefore, will be resolved with BR7 and BR8.	
IR8	Possibility to ask a customer to provide additional documents.	MH
KYB11	Possibility to ask the end–customer to provide additional documents, by sending them a link so they would upload the documents.	
IR9	E–notary, digital confirmation from a notary that the documents are valid.	CH
IR10	Asking the customer additional questions, a form or a questionnaire.	MH
KYB6	KYB questionnaire – a form that you send to the customer to ask for additional information.	
LR12	Information can be asked from the end–customer, but then the documents need to be digitally confirmed (notary). If information is gathered from the business register, then it is not required to ask from end–customer.	
IR11	Possibility to integrate the solution into an existing product, API integration.	SH
IR12	Digital signatures.	SH
IR13	Uploading a list of companies from an Excel spreadsheet.	CH
IR14	Checks in levels, more basic check at first, then an in–depth check.	MH
KYB5	Checks need to be modular, you start with one level of check, but then can purchase additional information.	
IR15	Translation into English if documents come in a foreign language.	CH
Comment	The dashboard and report will be in English. This is meant as the PDF original documents.	
IR16	Highlighting risks, if something was found.	CH
IR17	PDF reports, information can also be downloaded as a PDF.	CH
Comment	Customer can make screenshots or make a PDF from inside the browser.	
IR18	Rule of at least 2 sources, a business register + customer provided information + another database.	WH
Comment	Is resolved by previous requirements.	
IR19	Company searches with multiple parameters.	SH

KYB7	Pay–as–you–go purchasing option.	SH
KYB8	Monthly subscription purchasing possibility.	SH

Priority as per MoSCoW:

MH – Must have

SH – Should have

CH – Could have

WH – Wouldn't have

Merged with the same colour means that can be solved by the same feature.

Appendix 17 – Business glossary of KYB Platform

Term	Definition
AML screening	PEP, sanctions and adverse media Module.
AML databases	A database where KYB Platform system requests information regarding PEP, sanctions and adverse media.
Business register	A national database of legal entities. Also called a commercial register. Or any alternative legitimate source of legal entity information according to the legislation set in the jurisdiction.
Business register check	Sometimes referred to as "company information check". Includes information about the legal entity, such as incorporation details, status, contact information, board members, directors, shareholders.
Customer	A customer of KYB Platform who is using the solution. Can include one person but can also mean a group of people using the solution under the same account.
Dashboard	A self–service environment where the Customer logs in using an internet browser and conducts the Verifications.
End–customer/ Representative	The customer of the Customer. Can also be referred to as the end–user. A user that is not a customer of KYB Platform. End–customer is usually the representative of the Legal entity that is being verified.
Identity verification	The process of a private person verifying their identification document in order to prove their identity. Usually done by the End–customer but can also be applied to UBOs. Is a Module.
KYB questionnaire	A questionnaire that asks about the Legal entity, its connected entities, control structure, source of funds etc. Should be filled by the End–customer. Is a Module.
Legal entity/ Company	A legal entity that wants to start a business relationship with the Customer and therefore needs to be verified by the Customer using KYB Platform.
Module/ Product/ Check	Part of the Report that the Customer purchases.
Original documents/ Documents	Any document connected to the Legal entity, such as articles of association, business register extracts, shareholder's agreements, founders' agreements, UBO documents etc. Is requested via a verification link from the end–customer.
UBO	Ultimate Beneficial Owner, a majority shareholder, private person that has direct or indirect control over the Legal entity. Is a Module.
Report	An overview of the Legal entity that the Customer has purchased.

Role	Admin or User. Admin is able to manage Users. Users only have the rights to perform verifications.
Update (of Report)	An event when the report is updated by adding a new Module.
Verification link	A link that is sent to the end–customer that contains identity verification, KYB questionnaire or original documents Module.
Verification	The process of verifying the Legal entity. Starts with the Customer searching the Legal entity, then purchasing the Report, looking at the Report and finishes when the Customer makes the final decision.

Appendix 18 – Use cases for KYB Platform dashboard

ID and name	**UC1 Registering with KYB Platform**
Primary actor	Customer
Secondary actor	–
Description	A Customer creates a KYB Platform account.
Frequency of Use	Once per Customer.
Preconditions	Customer is located on www.kybplatform.com
Postconditions	Customer account is registered, customer details saved in KYB Platform system. Customer is able to log into the dashboard.
Main Flow	1. Customer clicks the button "Sign up" on the KYB Platform website. 2. Customer enters their details: legal entity name, registration code, country of registration, e–mail address. 3. Customer confirms the validity of their data. 4. Customer receives log in link to their email address. 5. Using the link customer creates a password. 6. Customer logs into the dashboard using the password.
Alternative Flow	3a. Customer is shown a message that this legal entity has already been registered and to contact the admin of this account. 4a. Customer is shown a message that this email has already been registered. Prompted to log in or reset the password.
User story	As a customer I would like to register an account in KYB Platform in order to start using the legal entity verification solution.
Business requirements	BR1 – It is possible to log into the dashboard.

ID and name	UC4 Sending a verification link
Primary actor	Customer
Secondary actor	–
Description	Customer sends a verification link to the end–customer.
Frequency of Use	According to the Customer needs.
Preconditions	Customer is logged in. Customer has purchased a report.
Postconditions	A verification link is sent to the end–customer.
Main Flow	1. Customer sees the list of verifications. 2. Customer clicks on one of the verifications. 3. Customer goes to the Identity verification tab. 4. Customer clicks "Add identity verification". 5. Customer enters the name and the email address of the end–customer, clicks Confirm. 6. Customer sees the sent link in the tab.
Alternative Flow	Alternative 1: 3a. Customer goes to the KYB questionnaire tab. 4a. Customer clicks "Add KYB questionnaire". Alternative 2: 3b. Customer goes to the Documents tab. 4b. Customer clicks "Request documents".
User story	As a customer I would like to send a verification link to the representative of the legal entity in order to get answers to my questions and fill in the gaps in the report.
Business requirements	BR7 – It is possible to send an identity verification link to the end–customer's email. BR8 – It is possible to send a KYB questionnaire link to the end–customer's email. BR14 – The report is updated every time a new module is purchased by the customer inside the report and a verification link is sent to the end–customer. BR16 – The customer can request original documents from the end–customer.

ID and name	**UC5 Using the verification link**
Primary actor	End–customer
Secondary actor	Customer
Description	End–customer opens the verification link and performs the tasks that are asked in the link.
Frequency of Use	Whenever the link is received by the end–customer.
Preconditions	End–customer has received the verification link to their e–mail. End–customer is in their e–mail.
Postconditions	The task in verification link is performed. The report is updated with the information provided by the end–customer.
Main Flow	1. End–customer clicks on the verification link. 2. End–customer is asked to perform identity verification. 3. End–customer takes pictures of their document and a selfie photo, finishes the process. 4. Customer receives a notification to their email that the report has been updated. 5. Customer goes into the dashboard and sees the updated report.
Alternative Flow	Alternative 1: 2a. End–customer is asked to fill in the KYB questionnaire. 3a. End–customer fills in the KYB questionnaire and confirms it. Alternative 2: 2b. End–customer is asked to upload some original documents. 3b. End–customer uploads original documents and confirms. Alternative 3: 1c. End–customer ignores the e–mail.
User story	As a customer I would like the end–customer to receive the verification link in order to provide me with the information as soon as possible. As an end–customer I would like to easily open and use the verification link in order to start a business relationship with the customer.
Business requirements	BR14 – The report is updated every time a new module is purchased by the customer inside the report and a verification link is sent to the end–customer.

Appendix 19 – Definitions of entities and attributes in the physical data model

Entity/ Attribute	Definition
Business_Register	Business register entity.
ID	Primary key for Business_Register entity.
SourceRegister	The national business register of the specific country.
RequestRegister	Timestamp of when the request was made into the business register.
ResponseRegister	Timestamp of when the response from the register was received.
BasicRegister	The full response from the business register.
AML_Screening	PEP, sanctions, and adverse media screening database entity.
ID	Primary key from AML_Screening entity.
RequestAML	Timestamp of when the request was made into the AML database.
ResponseAML	Timestamp of when the response from the AML database was received.
BasicAML	The full response from the AML database.
Report	The legal entity verification report.
ID	Primary key for Report entity.
Name	Name of the legal entity that was verified.
RegCode	Registration code of the legal entity that was verified.
Country	Country of registration of the legal entity that was verified.
Status	Status of the report: In progress, Completed
Updated_at	Timestamp of when the report was updated by identity verification or KYB questionnaire.

Created_at	Timestamp of when the report request was submitted.
Business_Register_ID	Foreign key, cross–reference to Business_Register entity.
AML_Screening_ID	Foreign key, cross–reference to AML_Screening entity.
Identity_Verification_ID	Foreign key, cross–reference to Identity_Verification entity.
KYB_Questionnaire_ID	Foreign key, cross–reference to KYB_Questionnaire entity.
Customer	The customer of KYB Platform, is a legal entity.
ID	Primary key for Customer entity.
Name	Legal name of the customer of KYB Platform.
RegCode	Registration code of the customer of KYB Platform.
Country	Country of registration of the customer of KYB Platform.
Email	Email address of the KYB Platform customer that they use to log into the dashboard.
Report_ID	Foreign key, cross–reference to Report entity.
Subscription	The subscription that the customer has purchased to use KYB Platform dashboard.
ID	Primary key for Subscription entity.
Type	Type of the subscription: S package, M package, L package, free trial, etc.
Updated_at	Timestamp of when the subscription was changed, switched, upgraded, downgraded.
Created_at	Timestamp of when the subscription was purchased.
Identity_Verification	Identity verification of the representative of the legal entity that is verified.
ID	Primary key for Identity_Verification entity.

Status	Status of the identity verification: Done, Approved, Declined, etc.
PhotosURL	URL where the photos of the identity verification are stored (third party solution).
VideoURL	URL where video recording of the identity verification is stored (third party solution).
VerificationLink_ID	Foreign key, cross–reference to VerificationLink entity.
KYB_Questionnaire	A questionnaire that the representatives of the legal entity need to fill in for verification.
ID	Primary key for KYB_Questionnaire entity.
Response	Filled in questionnaire, responses in the questionnaire that was filled in by the legal entity representative.
VerificationLink_ID	Foreign key, cross–reference to VerificationLink entity.
VerificationLink	The verification link that contains either the identity verification process or the KYB questionnaire.
ID	Primary key for VerificationLink entity.
URL	The verification link URL.
FullName	Full name of the end–customer (representative of the company being verified).
Email	Email address where the verification link is sent to.
Status	Status of the verification link: Used, Expired, etc.
Created_at	Timestamp of when the verification link was generated and sent.

Appendix 20 – KYB Platform low–fidelity prototype

All verifications listed:

Start new verification page with modules and a search bar:

Searching a legal entity and already being offered possible matches:

A direct match not found, customer is asked to provide registration code and country:

Report purchasing page:

START NEW

Verifications

AML screening

Identity verification

AML questionnaires

Customisation

Billing

YOUR VERIFICATION

Please make sure you have entered the correct company information and that the identity verification link is being sent to the correct e-mail address.

Input information

Company name: Test Company LTD

Registration code: 102

Country: British Virgin Islands

Chosen products

☑ Company information, board members and directors ⑦

☑ Ultimate Beneficial Owners ⑦

☑ PEP, Sanctions and Adverse Media ⑦

☑ Identity verification ⑦
   Full name: Amazing Test User; e-mail address: amazingtestuser@testing.com

Average waiting time

The average time for the chosen company country is 12 days.

Your total: 150.00 EUR

BACK   PURCHASE

Legal entity report, full report and all modules divided into tabs:

KYB PLATFORM

TEST USER
Account Settings

START NEW

Verifications

AML screening

Identity verification

AML questionnaires

Customisation

Billing

COMPANY REPORT   Finished

Last update: 01.01.2021 14:21

| Full report | Company information | UBO | AML screening | Identity verification |

Input information

Company name: Test Company OÜ

Registration code: 12345678

Country: Estonia

Basic company information

Company name: Test Company OÜ

Registration code: 12345678

Country: Estonia

Business activity: 6209 Other information technology and computer service activities

Company status: REGISTERED

Incorporation date: 01.09.2020

Source: Äriregister

Request made: 01.01.2021 14:12:22

Response received: 01.01.2021 14:15:56

Sending a verification link to the end–customer:

Appendix 21 – Solution validation testing product demo description

Welcome

Hi X! Thank you for your previous thoughts and ideas regarding an ideal legal entity verification solution. Now we have built and prototype for a solution and we would like to show you a demo and hear your opinions. This meeting will be recorded as well and only will be looked at by myself and KYB Platform team.

Demo

Just so you would know, this prototype doesn't have actual databases connected to it, so unfortunately, we can't currently show you your own company being verified. However, I have prepared some example reports for you to see.

Julia shows the prototype in the following order:

1. *Log in from the test website*

2. *Overview of the verifications*

3. *Searching company (direct and indirect search)*

4. *Purchasing report*

5. *Report (all tabs and explanation of what they mean)*

Additional questions

Let's say you have 10–20 customers you need to verify; how would you verify them using KYB Platform dashboard?

How would you describe this product to your team?

What did you like about this product? What did you not like?

What would be the top 3 things you would love to see in this product?

Appendix 22 – Solution validation testing results

Things that customers liked

Sign in/ sign up on website	While typing in the search you get options in real time	Source of data and timestamps are shown
Report is divided into tabs, not one full report	Easy billing, credit card adding	KYB questionnaire is useful
Possible to combine and integrate with other solutions		

Easy minor changes

Specify business customer verification on website	Showing actual product on website	Rephrase direct/ indirect search
Indirect search is unclear, managing expectations	Source needs to include a link, original name of the source	Different levels of check need to be clearer
Text during search needs to be clearer	Explaining business verification concept	Pricing and time of delivery clearer

miro

Already planned for MVP

Asking for original documents straight from end-customer

Full report as a PDF

Requesting an audit trail/ logs to present to inspections

Real data

Worldwide data coverage

UBO feature

Identity verification to verify representatives

miro

Future releases

More sources/ databases

Adding risk scoring, risk assessment

Adding an assessment by a Compliance Officer

Partnerships with notaries in every country

Digital signature option

Integration into Docusign

Notary confirmation when asking for original documents

Adding Excel spreadsheets with list of companies

API integration, not only dashboard

UBO feature, adding to it

AI Compliance Officer

Monitoring of the companies that were checked

Email notifications when report is ready

Email notifications when monitoring

miro