How can Financial Service Providers improve the KYC onboarding experience?

Challenges and technological solutions

Leena Kawamura

Master's Thesis

International Business Management

2022

TABLE OF CONTENTS

TABLE OF FIGURES

TABLES

MASTER'S THESIS	
Arcada	
Degree Programme:	International Business Management
Identification number:	8451
Author:	Leena Mimmi Kawamura
Title:	How can Financial Service Providers improve the KYC onboarding experience? Challenges and technological solutions
Supervisor (Arcada):	Minna Stenius

Abstract:

This qualitative research explores the current and critical business problem of Financial Service Providers; How to improve customer experience (CX) during the Know Your Customer, KYC, onboarding process, considering both customer and regulative expectations. Moreover, the challenges of and potential technological solutions for KYC onboarding are in focus. The research is relevant and timely as an increasing number of Financial Service Providers, fintech companies, neo banks, and incumbent banks are focusing their services on online environments and platforms. Simultaneously, the service providers operate in a highly regulated environment, which affects their service delivery possibilities while competing for the empowered consumer's attention and patience online. Based on 11 semi-structured expert interviews, the current struggles of meeting customer expectations during the KYC onboarding process are explored by evaluating current tools, technologies, regulations, and digital benchmarks. The thesis reveals how the current regulation within the EU affects customer experience in connection to digitally distributed financial services and explores the implementation possibilities and implications of technologies that are presented to bring aid to the business problem.
Resulting from the gathered textual data, the research reveals five main dimensions, which impact the customer experience during KYC. The dimensions include views on 1) KYC in the intersection of regulation, technology, and business evaluations, 2) Customer Relationship Management, 3) data-driven optimization, 4) CX challenges and solutions, as well as 5,) KYX factors, which affect the KYC experience from the customer's point of view. As the research focuses on exploring various onboarding touchpoints from a customer experience angle, further service usability and possibilities for customer experience improvement with the help of technology, as well as correlations between onboarding efforts and service usage and potential customer-related doubts towards fintech solutions are pointed out as further subjects of research. The research contributes to current knowledge around customer onboarding and successful digital customer flows, specifically in the context of regulated financial services and KYC, and sheds light on industry trends and future focus points that affect the consumers in the understudied intersection of regulation, technology, and customer experience.

Keywords:	eIDAS, electronic identification, customer experience, customer funnels, financial regulation, fintech, Know Your Customer, KYC, KYX, onboarding
Number of pages:	94
Language:	English
Date of acceptance:	31.05.2022

FOREWORD

The dilemma between growth and regulation is encompassing many daily interactions and operations related to my field of work. As customers have gained more power due to digitization and social media, Customer Experience (CX) cannot be overlooked when working in a SaaS environment. Wholesome customer flows and Customer Experience drive me for many reasons, partly due to the depth of current digital tools, platforms, and dimensions, and how they are experienced by the customers.

In addition to my own interest in the subject of 'how to improve customer experience in digital onboarding of new customers in a highly regulated sector', the topic has risen to be burning hot, firstly due to the 'new normal' in a semi post-pandemic world, where live interactions with customers are becoming rare. In this time, financial services must find a balance between regulation and commercial activities in a competitive market space, where new technology constantly creates new benchmarks that impact the customr expectations. Secondly, the timeliness of the research is enhanced because of the sad, recent, development through the war in Ukraine, which pushes millions of people to seek asylum in Europe, where core services, such as banking and other financial services are essential for people with refugee status, looking to integrate and to find shelter in their new home countries. As a premise, fintech should, at least in theory, be helpful for developing fast, safe, and scaling solutions for the current needs.

While this thesis is not about politics, it reveals the impact of political dimensions on KYC and notes the cruciality of diligent KYC processes of European financial services, which need to cater to customer experience and consider new CX dimensions of a digital and disruptive time. The research reflects on how innovations within fintech can be and are used to support to solve the issues between compliance and customer experience in the KYC onboarding context, but also considers the role of the underlying customer needs when building KYX – the customer experience during KYC.

The data for the research was gathered through 11 in-depth interviews with field specialists, to whom I want to address my deepest gratitude for all the interesting discussions and deep insights that were shared around the topic (and sometimes also on the side of it). Thank you all for your valuable contribution to my work!

1 INTRODUCTION

The ‘Know Your Customer’ process, also known as ‘KYC’, which banks and Financial Service Providers (FSPs) follow, is ultimately designed to prove the potential customer’s identity and to assess the customer’s eligibility before starting a business relationship with a Financial Service Provider. KYC helps the financial actor to comply with anti-money laundering (AML) and other business-specific regulations. As KYC tends to be slow and demand customer participation throughout the process (Bilali 2012: 319), it sets modern digital financial services up for a challenge. While being vital for risk assessment of the FSP, it also slows down or even prevents the creation of customer relationships.

Consumers and businesses of today have learned to expect swift, targeted, and responsive services (Bolton et. al: 2018: 777). This has made FSPs and banks to increasingly focus on the quality and ‘stickiness’ of their digital platforms to meet customer expectations during the service encounters (Bauer et.al 2005: 155-156). The quick digitization and ‘platformization’ during the last decade are evident when viewing the rise of smartphones and application development. Predictions are, that by 2026, 91% of the world’s total population will have a smartphone, and authentication for different services should be easy to do through digital wallets and ‘superapps’ (JPMorgan Chase & Co. 2021).

The “mobile first” philosophy concerning development of financial services is recognized as an industry trend (Fourthline 2021). While online services and mobile apps are designed to provide instant access to new services, gaining initial access to financial and banking services is generally hard and requires many actions from a potential customer (Jumio 2018; Nets 2021). The inconvenient and time-consuming checks during onboarding can result in up to 63% of consumers to abandon an application (Aware 2021: Accenture 2019). This depicts KYC in connection with onboarding as a potential bottleneck that hinders the growth of financial institutions.

Financial Service Providers operate in a highly regulated, but also highly competitive field. Optimizing the onboarding service seems like a crucial differentiator in the digital customer journey. A non-satisfying onboarding experience might lead to distrust towards the service provider, reputational damage, and customer churn. Thus, each churn and service abandoning customer equals to lost time spent on onboarding activities and a missing

business opportunity for the Financial Service Provider (Jumio 2018). For the customer, the consequences of a time-consuming KYC process are equally costly. Delays in the service opening can have effects on future personal or business activities considering how crucial financial services are for daily operations. This, in turn, creates consumer criticism related to the data collection process during KYC (Sciurba 2018: 222-225, 227).

The quickly evolving technology of today has branched its' own field of specialism around financial technology. *Fintech* companies focus on providing tailored solutions within financial services and have created new points of interest and initiatives within the banking and financial sector for companies and regulators (European Banking Authority 2020). Various fintech solutions can today support incumbent banks and financial players and enable solutions for KYC, which are expected to speed up, and partly replace the time-costly operational and manual work of banks and financial institutions.

Lately, various suggestions on solutions that can tackle the conflict between customer experience and regulative aspects during KYC have emerged within fintech. For instance, data mining tools, modular KYC services, Near Field communication (NFC) solutions, Machine Learning, Artificial Intelligence, and Blockchain technology are suggested to provide improved digital solutions for unified and fast customer experiences during customer onboarding. Yet, the potential of the mentioned solutions has not been fully exposed in the intersection of KYC and customer experience.

The dilemma between legally complying and customer-oriented solutions is a current and crucial business problem that affects individuals, businesses, and cross-border services, as well as instances such as the EU, where many FSPs provide their services across local borders. The needs to develop digital customer authentication and verification services have been accentuated through the Covid19 pandemic and the recent geopolitical development in the EU, which makes accessibility to core banking and other financial services vital for integrating new residents to EU member countries. Knowing the implications that solutions within fintech can bring to improve to the customer experience during KYC and customer onboarding, benefits product development, sales, marketing, operations, and other stakeholders of financial service providing companies. Simultaneously, the research touches upon vital points that have not been studied extensively in this context: the potential of new solutions to improve customer experience during KYC, which can

impact the customer's engagement with the service provider. Also, political, and regulative dimensions, where critical solutions might need to be implemented on a quick basis to be able to serve new customer groups who might not comply to the traditional compliance standards of the current regulations in the EU, are noted.

1.1 Research aim and research questions

This thesis explores the existing relation and dilemma between operations in a highly regulated field and customer experience in the context of onboarding new customers through usage of the designated Know Your Customer (KYC) process of Financial Service Providers. The thesis aims to identify aspects that impact the customer experience and to find technological solutions that can improve the customer experience during the KYC onboarding process of European Financial Service Providers. Moreover, an objective is to identify industry best practices that comply with KYC regulations and can help Financial Service Providers to meet customer expectations in a fast-paced digital time.

Through describing the KYC process and the needs to improve the customer experience of its initial phase, the onboarding of the prospect customer, the thesis explores the digitized tools and solutions, which can improve customer experience and bring efficiency to the back-offices of FSPs, which typically handle the onboarding of new customers. More specifically, the thesis aims to answer the following research questions:

1. *What are the current challenges of the KYC process for European FSPs?*

2. *How can solutions within fintech support the KYC process of Financial Service Providers, in relation to customer onboarding experience?*

1.2 Scope and limitations of the research

Financial regulation and anti-money laundering (AML) guidelines and rules are cross-border phenomena and global issues. This makes the KYC process and the struggles related to embedding it as a part of digital customer onboarding a reality for all financial services (European Commission 2021). Hence, the research presents the background for

the needs for KYC and the current restraints related to the implementation of it, as well as possible solutions, with reference to prior international studies.

As anti-money laundering rules, fintech, regulation, requirements, and technology affect globally, international studies and sources are likely to suggest solutions that can be adapted in the European Union, which is in the interest of the research. Due to mutual regulations and directives within the EU, the research scope is set on European service providers and solutions that can be implemented within the EU. While the regulations that are applied to financial services varies depending on the service and its geographical scope, the research reflects on the effects of the research problem through viewing perspectives of companies that can provide their service in the digital landscape, including for instance payment service providers, banks, and different fintech companies.

The research excludes in-depth analyses on potential monetary losses that current KYC processes can result in through customer churns, even though these are mentioned as a crucial part of the business problem. Although the thesis describes the operational structures and background to the needed KYC processes from a perspective of risk control and safety of the FSPs, the focus is on how customer experience can be improved through technology and fintech solutions and not on the regulation or anti-money laundering activities. Hence, the thesis will not provide a deep dive to the regulations or the 'fraud economy' (Kumar & Lee 2021) which the KYC rules are built up to fight against. The research recognizes the needs for KYC during the ongoing KYC operations and monitoring (such as Enhanced Due Diligence, 'EDD') throughout the customer relationship, but focuses on the onboarding. The emphasis is on how to improve the customer experience diligently *before* the customer relationship starts.

Customer experience in relation to KYC has, in prior studies, focused on quantitative research related to the customer's intentions to use digital banking or financial services (e.g. Komulainen & Saraniemi 2019: 1083). The focus has been on numeric data instead of customer experience. Similarly, quality measures of electronic services and digital banking tend to focus on the customers' evaluations on the service while already using it, not during onboarding (Mbama et. al. 2018). As the intersection of onboarding experience and regulations has so far been researched scarcely, this thesis includes learnings from

research around service quality measures and customer experience from other digital domains, such as e-commerce. The service quality and perception dimensions presented in the literature review in sections 2.3.2 & 2.3.3 mainly originate from research within online banking and mobile banking but can be applied also to other financial service platforms. When presenting technological solutions, the research aims to describe the respective solution and the underlying technology in short. The focus is, rather than to understand each solution and technology in-depth, to understand how each technology can be embedded in the customer onboarding and how it can help to create an improved customer experience during KYC onboarding.

1.3 Thesis structure

This thesis consists of six chapters. The first chapter of the thesis presents the existing dilemma between regulation, KYC onboarding processes, and customer experience and describes the aim of the research. The second chapter presents an overview of prior research and current literature in relation to the regulations, requirements, Anti-Money Laundering, KYC processes and customer experience. In the following third chapter, the methodology and the approach of the research is described. The motivation behind the data gathering technique and the data analysis technique is defined, motivated, and assessed based on criteria applied to qualitative studies. In the fourth chapter, the findings from the gathered data, and the results of the research are outlined. The fifth chapter discusses the findings and places them in the of context earlier studies. Furthermore, limitations of the present study are discussed and recommendations for future studies are made for industry practitioners. The last chapter presents some final remarks and concludes the thesis.

1.4 Definitions

AI/ Artificial Intelligence*: Developed through computer science, AI refers to "intelligent machines" that can work and react like humans. AI consists of many fields of specialization, such as Machine Learning, Deep Learning, and Natural Language Detection. (Feedzai 2020; Omdia 2020)*

AML/CFT: *Anti-money laundering and countering financing of terrorism. (European Banking Authority, 2021(c)). AML policies require a risk-based approach in relation of financial services and their customers who should be evaluated through factors and parameters such as: sector, occupation, types of business, geographical origin and residency, potential political risk, delivery channels for services and services which the customer intends to use. (Sciurba 2018)*

API*: Application Programming Interface. A combination of protocols, tools and routines that are used for building software applications. (European Banking Authority 2018a)*

Customer Experience: *Abbreviated as CE or CX, customer experience refers to the customer's interactions with the different touchpoints of a service, and the experience during the interactions. Customer Experience consists of multiple subjective and internal responses to the organization and includes several dimensions, such as an imaginative side, i.e., the expectations which the customer has towards the service before starting the usage (Bolton et. al. 2018; Komulainen & Saraniemi 2019)*

Customer due diligence: *The measures and factors through which the customer risk is evaluated through by Financial Service Providers. Includes parameters that help the service providers to detect risk of money laundering or terrorist financing (European Banking Authority 2021b)*

Electronic trust services: *Electronic services, through which individuals can verify, validate, and authenticate their consent for usage of online services. (eIDAS 2014a)*

Fintech: *Financial technology and innovation within the financial markets and institutions. Enables development and creation of new business models, applications, processes, or products. (European Banking Authority 2018a)*

FSP/ Financial Service Provider: *An institution which provides financial services. Typically include, but are not limited to credit institutions, banks, and non-banking companies, such as payment service providers (PSPs). FSPs follow standards, regulations, and authorisations granted by regulators within the financial sector. (Lawinsider 2021)*

KYC & KYB / Know Your Customer & Know Your Business*: The process through which FSPs aim to verify the identity, the suitability, and risks related to business relationships with an individual customer. This involves following rules and guidelines set by international, and national bodies. The processes are a part of the risk-based approach, which financial institutions follow for minimizing harm to the business. (Fintech FinCrime Exchange 2021; Sciurba, 2018) In addition to verifying and identifying the individual customer, the KYB process involves verifying the company ownership structure and origin of opening deposits for company accounts in a B2B context. (Bilali 2012).*

ML / Machine Learning: *Machine learning is a versatile category of Artificial Intelligence and bases on computerized prognostic or categorical mathematical algorithms. Through its capabilities, machine learning addresses many current business problems and is divided into four categories: supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning. (Feedzai 2020; Omdia 2020)*

Onboarding: *Actions and processes related to getting an individual to become a paying customer of a service. For financial services and banks, onboarding typically includes methods and processes such as: ID verification, document provision and validation, creation of account and profile, communication and campaigns through apps, email, chats etc. For companies, all risks related to a customer relationship should be assessed, evaluated, and recognized during the process. (Aware 2021; FinTech FinCrime Exchange & Jumio 2021)*

Open APIs / Open banking: *Global direction of open sharing of financial data between markets, their banks, and financial institutions. Standardized and initiated by the European Union's revised payment services regulation (PSD2) and the Open Banking scheme in the UK. (JPMorgan Chase et. Co 2021***)**

2 LITERATURE REVIEW AND PRIOR RESEARCH

This chapter presents prior research, existing literature and studies related to the regulative requirements that affect KYC as well as customer experience in a digital context. The chapter is divided so that it gives an overview of the digital customer journey in digitally provided financial services. The backgrounds to regulatory requirements and the effects they have on the KYC process are also outlined.

Subsequently, the chapter explains the current restraints and costs related to KYC from the FSP's and the customer's perspective. A specific section is dedicated to literature and research related to customer experience in digital services. By this, an extensive overview on elements that effect customer experience is given. Simultaneously, elements which potentially need to be improved during KYC onboarding are introduced.

The elements that affect customer experience are mirrored through seminal business and marketing theories, such as the GAP model, AIDA, SERVQUAL and newer applications of the service quality and perception theories applied specifically to online services and online and mobile banking. In addition, approaches towards KYC and an overview on technical solutions that have been presented in prior research, and their potential to improve customer experience, are discussed briefly in a separate section of the chapter. The description of technologies and solutions is followed by conclusions on the information provided in the chapter.

2.1 The digital KYC funnel

Banks today are setting an increasing amount of focus and investments to innovation. The relationship between digital banking, customer experience, and the bank's financial performance and possibilities for growth have recently gained research focus. The impact of banks' marketing efforts and digital banking is emphasized in research by, for example, Mbama et. al. (2018: 437), where the possibilities of interactive services that digital banking can provide through different customer interfaces, is discussed. This suggests that customers can be 'pulled' into the banks onboarding funnels and to use financial services through banners and advertisement when visiting other sites or applications online.

The fast-evolving internet-based and digital services affects the general expectations of consumers that use various services (Bauer et.al. 2005: 163-172; Foroudi et al. 2018: 271). Good customer experience, which the customer can participate in creating through her own input with a service, is expected to enrich the service or value of it (Foroudi et. al. 2018: 272-273). The new ways to engage with and target the customers pushes banks and financial institutions into new marketplaces, and the popularized multichannel banking services have lately impacted decisions behind bank branches closing (in Mbama et. al. 2018: 432-433: BBC 2016; Stone & Laughlin 2016). As almost half of the earth's population are using their smartphones for managing daily businesses (Aware 2021), offering multichannel services provides *functional quality*. Simultaneously, digital financial services are more scalable as they are accessible to many customers without visits to branches. This creates more business traffic, higher customer volumes, and makes information easily available as customers can access new services and products online (Mbama, et. al. 2018: 438).

Current predicaments related to KYC pushes Financial Service Providers to investigate alternative solutions for customer onboarding. The digitization services of the Northern-European Payment & Financial Service Provider Nets Group describes the imbalance between the regulative requirements and customer experience as follows: "*None of your customers are likely to be motivated to fill in forms, attach copies of documents, click on multiple 'next'-buttons before they have even tried out your service. We live in an instant world where our attention spans are short. The younger generations (read Millennials and Gen Z) may expect the opening of a bank account, or similar, to be as simple and fast as the opening of a social media account*." (Nets 2021a).

The cruciality to develop digital services in the midst and in the aftermath of Covid19 comes up in several recent whitepapers, seminars, and webinars, where many service providers reflect on the decreased live interactions with their customers. The quick adaptation of digital strategies and the shift of service availability from branches to digital environments has resulted in battles for swiftness and frictionless customer onboarding online (Nets 2021a). For embedding customer experience (CX) factors into the KYC process, new terms, such as *KYX,* have emerged to describe the intersection (Kumar & Lee 2021).

2.2 The fundamentals of KYC, regulative requirements, and related costs

Know Your Customer, 'KYC', describes the regulatory process set up for financial institutions and banks to analyse, collect and audit information about their customers in order to comply with anti-money laundering (AML) regulations and to fight other forms of financial crime, such as terrorist financing, drug trafficking and identity theft. The initial phase of KYC, the authentication and verification of the customer before the relationship is started, involves 1) properly identifying the customer before opening a deposit account or other services, and 2) reviewing and verifying the source of the customer's funds.

Although, often experienced as poor by customers, a key objective of the KYC customer authentication is to equally protect the FSP and their customers (e.g. Parra-Moyano & Ross 2017: 417). Simultaneously, the KYC process supports the mentioned entities in their evaluation related to risks involved with their business partners when they consider lending or investing in their customers' activities. By verifying that the funds which the customer wishes to deposit into the accounts, are lawfully obtained before starting a relationship and when the customer is already using the service, FSPs aim to prevent unlawful funds to enter their monetary systems. (Bilali 2012: 320-321.)

In relation to deposit accounts, the KYC process relies on the financial institutions to obtain and verify various pieces of information provided by the customer. In Europe, the needed information relates to the customer's country of residence and origin, addresses, social security numbers (SSNs), information on employers, and copies on official documents, such as a passport, which proves the customers identity. In addition, information on the potential customer's age, political relations, and informed tax liabilities (FATCA checks) can impact the service granted, either through limited access or follow ups through ongoing or enhanced due diligence (FinTech FinCrime Exchange & Jumio 2021; Nordea 2021). Examples on the gathered data points that affect the customer evaluation are depicted in Figure 1. Also, referrals from earlier banks, or copies of bank statements are often needed as assurance on the pay-back capability and the liability of the customer when applying for a loan. The 'Know Your Business', KYB process, additionally includes proof of the ownership structure, legal

entity, address, and source of funds of a company that opens an account for business purposes. (Bilali 2012: 322-325; FinTech FinCrime Exchange & Jumio 2021)

Figure 1: Customer data gathered by the FSPs prior to starting a customer relationship

2.2.1 Global standards and gatekeepers behind KYC

The need to and reasons for ensuring the customer legitimacy has been emphasized in academic articles especially after the economic crisis of 2007-2009. Failures in implementation of compliance related to KYC practices are mentioned to partly have led to the global economic depression. Banks and financial institutions have since then been expected to obey stricter KYC principles and exposed to harder rules and regulations. The rules and checks, which the KYC process follows, can provide so called red flags which incline risk related to the potential customer relationship as well as the customer's financial history or business relationships. (Bilali 2012: 319, 322-325; FinTech FinCrime Exchange & Jumio 2021)

Although varying in implementation, processes and rules of customer onboarding, due diligence (CDD), and enhanced due diligence (EDD) have global standards affected by recommendations of the Financial Action Task Force (FATF). FATF represents an inter-governmental body which drives anti-money-laundering and fights terrorist-financing. To meet the recommendations, the regulative processes for FSPs and banks are thus referred to as the "risk-based approach", which is clearly recommended by FATF. (FinTech FinCrime Exchange & Jumio, 2021). To unify processes, and to find ways to work with the KYC regulations and requirements, guidelines and agreements have been set up by global officials, such as the bank secrecy acts in Europe, and the AML directive and Basel agreements set up by the EU and G20 countries (Bilali 2012: 326; Sciurba 2018: 225).

The EU sets up common frameworks, directives, and regulations for the European Financial Service Providers. Such are, for instance, the European Money Laundering Directives and the revised Payment Service Directive (PSD2), which are set up to minimize fraud,

protect consumers, and to support information exchange between financial services. By following the requirements, companies can offer their service across the union with some local controls. (FinTech FinCrime Exchange & Jumio 2021; JPMorgan Chase et. Co, 2021; Nets 2021b). Local regulations affect the customer experience through several elements. For instance, the needed documentation from the customer during onboarding and the third-party data systems, may vary depending on the market (Bilali 2012: 322-325; FinTech FinCrime Exchange & Jumio 2021; Fourthline 2022).

2.2.2 European supervisors and initiatives in relation to KYC

While the regulative instances vary from local to European and global levels, supervision in Europe is local (European Commission 2021; eIDAS 2014b). Actors, such as FIN-FSA, the Financial Supervisory Authority in Finland, cater for the stability of the financial market and supports implementation of new EU directives in respective European countries. (FIN-FSA 2021). EU-wide supervision is handled by the European Banking Authority (EBA), which is "*committed to ensure integrity, transparency, and orderly functioning of financial markets*" (European Banking Authority 2018b). For consistent outcomes, to enforce a risk-based approach and to support implementation of its policies, the authority aims to provide guidance to competent authorities and financial institutions across Europe. In addition, the European Banking Authority aims to detect, mitigate, and defeat vulnerabilities in the AML actions through information exchange and cooperation between relevant authorities around risks related to money-laundering and terrorist-financing (European Banking Authority 2018b).

The EU has set up its' own initiative for being able to provide safe and consistent electronic interactions between businesses, citizens, and public authorities. The union justifies the regulation, *eIDAS (electronic Identification, Authentic and trust Services)*, enforced in July 2014, through its effects on the Union's public and private online services, electronic businesses, and commerce. In this regard, eIDAS aims to ensure that individuals and businesses can use their national electronic identification schemes (eIDs) for access to public services in other EU countries. The regulation's objective is to promote an internal market for electronic trust services, which can be used by individuals for consent validation online to create signatures, timestamps, and seals which would replace paper-based processes. (eIDAS 2014a)

Whereas already around 60% of Europeans can benefit from their local electronic identification systems, a current restraint in EU are the discrepancies caused by the lack of interoperability between the different local digital ID verification systems of the member states. As a solution, the European Commission has proposed the development of a *European digital wallet* as a part of its initiatives and targets gathered under the EU's 'Digital Compass'. A target is set up at 80% of Europeans using the digital ID for proving their identity, for sharing documents and accessing online services by the year 2030. The digital wallet would allow Europeans to use one digital service, which can be linked to individual personal attributes and identity and be reached through a click on the phone. The initiative is driven by factors related to both convenience and security. (European Commission 2021)

2.2.3 Restraints and costs related to KYC

Authentication and verification of both customer identities as well as documents proving business relationships and funds typically include many manual and operational tasks, and consist of costly processes, such as collection and validation of documents, assessment of data, monitoring, and reporting. For the customers, opening a financial account has traditionally involved many touchpoints or even physical visits to branch offices before the KYC has been completed. Especially through limitations to office hours, KYC consumes both time and money. (Nets Group 2021a; Parola 2021)

In their research, Parra Moyano and Ross (2017) refer to a survey from 2016 by Thompson Reuters, which mentions US banks to spend around 60 million US dollars per year to cover for direct operational costs related to KYC. Yet, 89% of the survey respondents were dissatisfied with their KYC experience (Parra-Moyano & Ross 2017: 411). The European KYC field is also criticized for being fragmented. The processes are said to lack common standards and generally accepted measures for implementation and application, which forces banks and financial institutions to make their own risk assessments (European Union 2014).

Whereas the lost business opportunities caused by operational heaviness and a prolonged KYC process can become costly, the price for KYC can increase significantly through

fines and other sanctions in case banks or financial institutions fail to meet their AML and KYC obligations (Parra-Moyano & Ross 2017: 411-414). Costs affected by fraudsters who successfully enter the banking systems are significant, calculated at $6 billion in 2016 (to date, around € 5, 3 billion) (Altexsoft.com 2017). According to recent studies, identity and verification solutions represent around 3-5% of the overall compliance costs and 1/10 of bank employees are employed due to compliance needs. The heavy investments in compliance sets banks and other financial services to look for ways to develop more efficiency and to save costs through automation (Fourthline 2021).

2.3 Customer Experience: dimensions, expectations, and service encounters

Modern consumer expectations in the technology-oriented world have lately been studied specifically within retail and with reference to seminal *technology and innovation adoption theories.* In these theories, the customers' adoption of new innovations is described through different consumer or user categories. The consumers' adoption of new technologies and services is described as a phase depicted through an S-curve, on which the different customer categories land depending on their willingness to try out new innovations (Rogers 2003: 575- 589). Applied to customer experience, adoption related research focuses mainly on the users' acceptance and willingness to try out new services, not on the user experience *during* the trial or usage of the service (Mbama et. al. 2018).

Prior research related to customer experience and value evaluation within online financial services mostly focus on studying cases, where the customers have already been onboarded and granted access to financial services provided by the FSP. According to Halvorsrud et. al. (2016), the literature is scarce on human-computer-interaction and customer experience in relation to multi-channel services, which a majority of the FSPs implement today (Bauer et.al. 2005). Relevant findings in relation to this research can yet be found, especially when reflecting on theories around customer experience dimensions and the perceived value of online services. The following section focuses on identified parameters and factors, which seem to affect customer experience during the customer's interactions with the services and views dimensions which affect the customer when using digital financial services.

2.3.1 Theories related to customer experience

Known marketing theories, such as the AIDA model, explain the dependencies between the customers' *awareness, interest, desire,* and *action.* AIDA has strongly served as a base when new frameworks have been set up for planning customer experience also in digital services. Different *customer funnels*, which describe the customer journey throughout a digital service encounter make use of the relations between the AIDA dimensions. In current terms, also the *customer-decision making process* and the *purchase* or *marketing funnels* aim to encompass all the customer touchpoints in the customer journey that need to be considered to improve customer experience and to encourage the customer towards a longer engagement with a digital service. (Lemon & Verhoef 2016)

The *customer journey* approach is described to evaluate the planned service solely from the customers' point of view and aims to understand the discrepancies between the customer's expectation and the service provider's planned service (Halvorsrud et. al. 2016). Customer experience can have imaginary dimensions, which describe the expectations for and speculations around a service that the customer has. In this view, the customer plays a key role in building the experience when interacting with a service. The customer experience consists of several touchpoints, which are affected by the customer's cognitive dimensions (Bolton et. al. 2018: 777-778; Komulainen & Saraniemi 2019:1086).

Komulainen and Saraniemi (2019) reflect on interpretations around customer experience and customer value through internal and subjective experiences of an individual. In their research related to customer experience in mobile banking, Komulainen and Saraniemi refer to prior definitions of customer experience by Verhoef et.al. in 2009, who describe customer experience as "*holistic in nature and involving the customer's cognitive, affective, emotional, social and physical responses to the service provider*". (Komulainen & Saraniemi 2019: 1084, 1087). The same view has been emphasized by Bolton et. al. (2018:777-778), who also emphasize the multiple "moments of truth" during the customer-service exchange, originally introduced by Voorhes et.al. in 2017.

Based on their research from 2019, Komulainen and Saraniemi suggest that experience can be created through social constructions which build up through the individual's connections to a service. Experience builds up through dimensions that can be emotional, physical, intellectual, or spiritual. As human interaction is removed from digital services; hedonic and social values are in core of the value creation. Thus *usefulness*, *pleasantness*, and *social rewards*, as depicted in Figure 2, need to be fulfilled for customers while using mobile banking or similar services that are provided through a software or digital platform. (Komulainen & Saraniemi 2019: 1085-1086.)

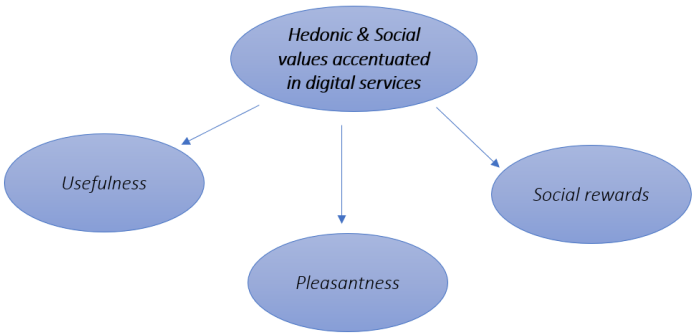


Figure 2: Values that affect Customer Experience (cf. Komulainen and Saraniemi, 2019).

Findings of cultural differences in quality and value perception through different dimensions are highlighted in Sangeetha's and Mahalingam's review on service quality models from 2011. The study highlights the importance of seminal marketing and service quality theories, such as, the *GAP model* from 1985, and the following *SERVQUAL* model developed by Parasuraman et al. in 1988.

While the GAP model presents the variation in the customer's satisfaction versus the service delivery, SERVQUAL is presented as a useful tool for indicating which 'gaps' exist and should be filled between the service delivery and the customer's perception. SERVQUAL has originally been designed to depict the consumers expectation for service quality through a five-dimensional structure. The model includes different service characteristics and dimensions: *reliability, responsiveness, tangibles, assurance* (consisting of *communication, competence, credibility, courtesy, security*), and *empathy* (e.g. Zhou, 2004). The model has later been revised, and the service quality models are in these reproductions adapted to a digital time (Sangeetha & Mahalingam 2011: 86-88, 96, 99-100; Hammerschmidt & Falk 2005: 156, 158).

In addition to SERVQUAL, the performance focused *SERVPERF* model is a popular measurement scale in Europe for validation of service quality (Amin 2016: 281). SERVPERF is described to be a unidimensional tool to analyse *performance only* through service dimensions as used in the perception-expectation-gap-based SERVQUAL. Both models are context reliant. According to Zhou (2004) SERVPERF, was identified by Cronin and Taylor in 1992 and replicated by Brady et.al in 2002. The model is praised for its ability to capture the variance in consumers overall perceptions and to validate the conceptualization of service quality versus consumer satisfaction and the predictive use of a service (Zhou 2004: 534-535, 539-542).

As customer experience is gaining more focus with Financial Service Providers, research related to how the customer perceives the service is getting more attention. New dimensions and indications on *customer priorities*, *expectations*, and *needs* which affect the customer experience can thus be found. *Social interactions* between the customer and the service have been suggested to be important factors that affect the customer experience. The relationship between the customer and employee is also highlighted, in addition to technology and the physical presentation of the service. (Bolton et. al. 2018:778)

To learn as much as possible from the customers, companies need to consider the customer feedback and engage with the customers in several channels. Social media is seen as just as an important channel for collecting customer feedback as the encounters with the customers inside the service channels. The *employee-customer engagement* relationship seems to be a valued source for obtaining knowledge related to the customers' requirements when looking at current business literature, which emphasizes communication at all stages of the customer funnel (Jumio 2018; Mbama 2018: 441). Current views also pinpoint the holistic, *total experience.* This unification of four disciplines; *customer experience, user experience, employee experience* and *multiexperienc*e creates interconnections and engagement of all stakeholders for a holistic experience throughout multiple touchpoints (Gartner 2021).

2.3.2 Service measures and evaluation of customer experience applied to digital services

To improve customer experience in digitally produced financial services, it is important to recognize the main dimensions which measure unified service quality. Additionally, it is vital to understand, how the customers evaluate the related service processes. Service quality in digitally produced services has been evaluated through new versions of the SERVQUAL model and new dimensions, such as, *access, web interface, trust, attention,* and *credibility* are suggested to be applied specifically within digital banking and echoed in studies related to service quality online as well as analyses around customer retention, stickiness, and churn. (Amin 2016: 281-283; Bauer et. al. 2005; Hammerschmidt & Falk 2005: 158).

Herington and Weaven have introduced four new dimensions applied to electronic services and specifically to online banking in their research from 2009. The measures aim to give implications on the customer satisfaction, consumer pre-purchase behaviour and consumption decision-making and is renamed as *E-SERVQUAL* (in Herington & Weaven 2009: 1221: Cronin & Taylor 1992 and Caruana 2002). The identified E-SERVQUAL dimensions are divided into *personal needs, site organization, user-friendliness,* and *efficiency*. 'Personal needs' are linked to the need of a secure experience and has significance when considering digital financial services where customer data is being used and distributed. The 'site organization' factor involves the experience related to *ease of access to the web site*. The third factor 'user-friendliness' relates to the *ease of navigation on the*

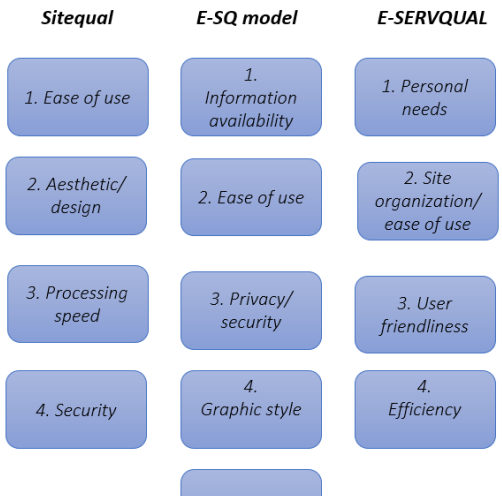


Figure 3: Identified service categories for digital/web services categorized by the a) SITEQUAL, b) e-SQ, and E-SERVQUAL models (cf. Herington & Weaven 2009).

site, where as *efficiency* is related to the *efficiency of the website* – for instance the search functions or other functions which show a result of the customer's interactions with a website (Herington & Weaven 2009: 1222, 1225,1226).

Similar web site experience characteristics are gathered under the *SITEQUAL* scale developed by Yoo and Donthu from 2001. Subsequent studies have been introduced on this by Zeithaml et al. in 2002 by their *e-SQ* service quality measure consisting of five dimensions (Herington & Weaven 2009: 1222). The three models and the respective dimensions applied to them are described in Figure 3.

2.3.3 Identified digital service categories and dimensions applicable to financial services

In their study related to quality of digital banking portals, Bauer et. al. (2005) identifies three generic service categories which pinpoint six specific service dimensions. In this study, the *security/ trustworthiness* of the service and *core use* repeats as aspects of most importance to digital banking portal users and form the category of *basic services.* Attractive *cross-buying services* and *added-value* stand for the second category of *additional (supplementary) services*, whereas *transaction support* and *responsiveness of the service provider* present the third value category, *solution services* (Bauer et.al 2005: 158, 163-172) as presented below in Figure 4.

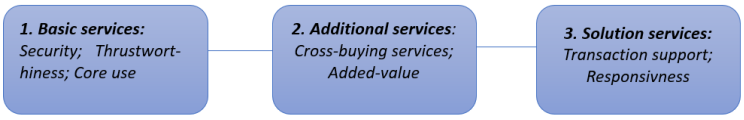


Figure 4: Identified service value categories and dimensions in e-banking (Bauer et.al 2005).

Through their research, Komulainen and Saraniemi (2019) have made several findings on interconnected and repeated topics on customer experience in the context of mobility of financial services. The *ease of use,* and *real-time operation,* which creates benefits in practice, such as, speed and saved time for the customers, are identified as clear value drivers for the customers that use mobile banking. In this context, also the *sense of control, trust, social status, security,* and *context (time, and place)* related to the service create value for the customers (Komulainen & Saraniemi 2019: 1089-1091). Customer experience in mobile banking can be evaluated through the customer's interaction with different

service dimensions such as the *process, interaction, outcome, time,* and *location*. The 'process' dimension describes how the experience is created and what the interaction with the customer and her actions is like. Regarding mobile usage, the process is defined further to describe *how the user interacts* with the banking application, which in mobile banking is not tied to any given place or hour. Thus, flexibility potentially improves the customer experience with the service. (in Komulainen & Saraniemi 2019:1086–1097: Heinonen, 2004; Helkkula et al. 2012; Laukkanen & Kiviniemi, 2010)

Similar findings are made by Mbama et. al (2018: 438), who highlight *service convenience,* the freedom of choice in relation to time and location when using digital banking. Service quality is also affected by *accuracy and service capabilities* as important factors that have improved through the digitization of financial services. According to Mbama et.al, the *perceived value* of digital banking is linked to value-added services that the customer can experience while using digital banking; for example, saved money and time, and better experience through mobility. For ensuring *service usability,* the customer experience throughout the full customer journey is accentuated. Halvorsrud et. al (2016) pinpoint and echo the findings in relation to the *subjectivity* of the customer experience from the previously mentioned sources: it is dynamic and context dependent.

2.4 Technology to support more seamless KYC

The opportunities that financial technology brings in terms of optimizing different services has lately created new types of cooperation between companies, innovators, and authorities. This is noted by the European Banking Authority, who has outlined its priorities to include facilitation of digital and data-driven innovation. In their *'2018 FinTech Roadmap'*, the EBA set out their fintech priorities to focus on solutions related to artificial intelligence, digital identities, regulatory technology, and supervisory technology (European Banking Authority 2018a; European Banking Authority 2020)

System infrastructure seems to be vital when assessing the applicability of new solutions to be embedded in to, or to replace the KYC processes of FSPs. This section is dedicated for familiarising with some of the recently proposed solutions or technologies that occur in business whitepapers. The aim of presenting them is linked to evaluation of how the

solutions can support better customer experience during KYC onboarding in a compliant way. As data availability in different online environments is increasing and significantly impacts the FSPs in their KYC work, data-driven technologies, and tools, that enable effective data management, usage, and validation are in the focus of this chapter.

2.4.1 Data forms the customer relationship and experience

In recent years, financial services have increasingly started to rely on technological solutions for means to create relationship personalization. KYC can be considered as one form of communication with the customers as it allows FSPs to gain valuable data about individual customers, the customer's background, and financial situation (Bilali 2012: 320). Through Customer Relationship Management, marketing, and customer service activities, FSPs seek to add value to themselves and their existing and prospect customers and to build long-term customer relationships (Aware 2021). In this context, data management and automation are seen to bring improvement to KYC and the customer journey also through the potentially saved time in operations and data processing during onboarding. Examples of data processing methods that can support the risk-based approach of FSPs are described in the following sub-section.

As data becomes more reliable and faster to process, Application Program Interfaces (APIs) can manage the behaviour of financial service platforms by bringing information to the FSPs backend systems by 'calling' other systems (e.g. databases). The info of the required actions in the platform can then quickly be brought to the customer's interface, such as a screen on a mobile app or a web site, which describes how to proceed in the service. In addition to the communicational content and for assessing the customers eligibility for service usage, data is needed for campaigns. Sophisticated, modern campaigns are supported by a unified view on the customer action points and data which considers the different steps of the customer funnel (Strachan and Byrne 2022). How data can be leveraged in effective ways in interaction with the customer, is also evaluated as a part of the chapter.

2.4.1.1 Data and analytics to support the risk-based approach

Retrieved data of the customer gives FSPs many advantages when setting rules for customer risk classification during onboarding. While machine learning tools can be trained to detect

risks by cross-checking data from various sources, FSPs often face the challenge of imbalanced data. This creates extra risk alerts and operational workload for the FSPs. As a result, the customer experience suffers, as customers who are flagged are forced to stay in the onboarding funnel longer. This, on the other hand, results in customer churn. (Minastireanu & Mesnita 2019: 6-7; Villalobos & Silva 2017)

The current availability of online data brings both opportunities and new challenges for FSPs in terms of creation of robust fraud detection mechanisms to support their risk-based approaches and for mapping and categorizing the customers (low risk versus potential high-risk). Through categorizing different elements that the customers present trough retained or provided data during KYC, also different actions and communications should be planned for customers in the different categories. (FinTech FinCrime Exchange & Jumio 2021)

For analyzing risk factors, different *data mining* techniques, that can search for patterns from large sets of data through usage of statistics and machine learning, are becoming increasingly popular. Techniques, such as *decision trees*, can be used to analyze the customer risk factor through given prerequisite, as described in the example in Figure 5, which has originally been introduced by Jayasree and Balan (2017:100). These types of methods can be used when starting a customer relationship and during it. Variables, such as false positive rates, can be considered by different calculations and algorithms that result in a comprehensive risk evaluation of a customer. (Jayasree & Balan 2017: 99-100)

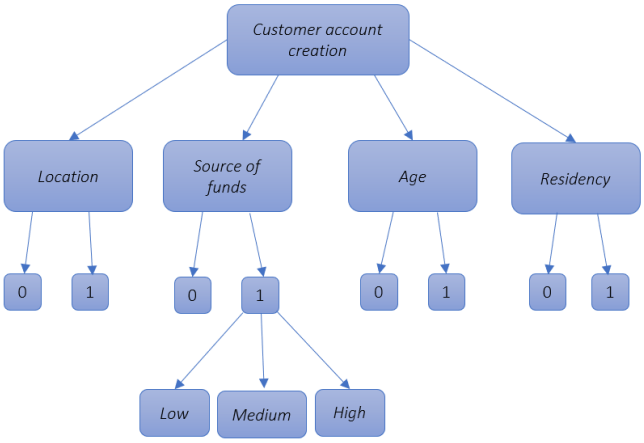


Figure 5: Decision tree to support customer risk evaluation based on given customer data and parameters.

2.4.1.2 Machine learning, Artificial Intelligence, analytics, and automation to support KYC and Customer Experience

As FSPs compete for the best customer experience amongst their customers, the initial verification and onboarding activities come to focus and should be protected. This leads to adaption of more robust and efficient methods, where machine learning (ML), tools driven by Artificial Intelligence (AI), and data analytics are to support or replace human-created algorithms (Altexsoft 2017). AI engineering, optimization through operationalizing updates to artificial intelligence, is predicted to be a critical strategy for businesses aiming to gain business value from AI (Gartner 2021).

Available and upcoming technical solutions can support the holistic approach to find harmony between crucial business elements, operations, and communications. In financial services, analytics and artificial intelligence can "learn" client behaviour and respond to the actions the customer makes in the funnels. The situations can simultaneously be used for creation of training replications for the staff. When identity services are unified, customers can move through onboarding by themselves, and be integrated to the view of an advisor or Customer Service agent across numerous touchpoints. (Gartner 2021)

When comparing machine learning based approaches to rule-based algorithms for skimming through different data sets, machine learning is prone to detect suspicious, hidden correlations, and can automatically detect possible fraud scenarios. This leads to a reduced need for verification steps for the user and more real time processing of data (Altexsoft 2017). According to Gartner (2021), the current technology trends predict, that by 2023, over a third of large companies will utilize AI-augmented *decision intelligence* and *decision modelling* to support and automate decisions as well as evaluate historic decisions.

In their recent whitepaper, Nets Group (2021a) describes how machine learning can be used in image recognition and identity verification through applied face, fingerprint recognition, and *optical character recognition* (OCR) when identity documents are scanned through devices, such as mobile phones with specific readers designed for the purpose. Optical Character Recognition is evaluated to need development especially considering the abilities for OCR to combine deeper, more sophisticated artificial intelligence and machine learning for trustworthy crosschecking of data validity of documents. There is also a risk that OCR is experienced as invasive as the KYC is performed simply through a device, without human

interaction. Also, face recognition based on artificial intelligence is evaluated to have risks, due to difference in quality of the used hardware and the built-in capabilities of mobile phones that are used by the customers for performing facial recognition. Additional sources discuss the differences in the jurisdictional requirements of the documents which the customer must present during KYC. This brings challenges for applying optical character recognition for KYC, as automation might not be able to detect or read certain watermarks or other special patterns that are unique for country-specific legal documents (e.g. Ephesoft 2021a).

Machine learning can also be used for text recognition or processing and through this support validation of data given by the customers. *Intelligent document processing*, which involves restructuring data for further usage in other company systems (Ephesoft 2021b), is mentioned as an example of *hyperautomation* in a technology trend report for 2022 by Gartner. Hyperautomation is described as a business-driven approach that aims to automate the IT-processes of a company as much as possible. It is motivated through increased focus on growth, digitalization, and ability to create outstanding operations. (Gartner 2021)

2.4.1 Platformization and modular services

The rise of the service economy has added pressure for companies to provide customer-centric services to ensure success (in Halvorsrud et.al. 2016: Gustafsson and Johnson, 2003). Digital banking and platforms for financial services help banks and financial institutions to meet customers' demands and to maintain long-term customer relationships. Simultaneously as customer experience and innovation are prioritized at banks and Financial Service Providers (Mbama et. al. 2018: 439-441, 444), the conflict between customer experience and compliance often results in cannibalization of either one for the benefit of the other (Discover® Global Network 2019).

Through their platforms, companies can add increased flexibility and responsiveness to their services, which assists them in gaining market shares from their competitors (cf. Pekkarinen & Ulkuniemi, 2008: 89; 1998; Jumio, 2018). In recent evaluations on the development and risks in the banking and payment sector within the EU, EBA has exposed vulnerabilities in relation to platforms and AML/CTF, privacy, and issues relating to protection of consumers and data (European Banking Authority 2021c).

As such, the increased platformization of financial services creates new dependencies, which set supervisors and FSPs up for new challenges. Terms such as the 'Fraud Economy', 'Shadow Economy' and 'Cyber Crime' are widely used to describe different networks or malicious acts, which fraudulent or bad actors operate in, with the aim to gain monetary or other benefits from either the FSPs or individuals, who become victims of fraud or identity theft. (Kumar & Lee 2021)

Application Program Interfaces can be used for adding banking products and services under the brand of various software companies. Hence, KYC-type authentications are needed in various platforms, whereas sharing of financial data is getting more traction globally through the second payment service directive (PSD2), that allows open APIs between financial services (cf. JPMorgan Chase & Co. 2021; Jumio 2021). APIs allow building reusable modules, which can be used for creating composable applications with low-cost and little or no changes to the code. The modules can present repeatable capabilities, such as fraud alerting (Gartner 2021).

FSPs can choose to use already developed or more personalized modules, 'parts' of technologies, to support their own process. Solutions that are modular, are typically Software Development Kits (SDKs), which can be embedded into the FSPs current infrastructure to support specific parts during KYC (Nets 2021a). This type of distribution of systems and technologies is pinpointed as an increasing technology trend. The *"virtual-first, remote first architectural approach"* supports products through improved reach and experience via digitized customer touchpoints (Gartner 2021). The communication in- and outside the service needs to be explanatory, comprehensive, and considered in a multichannel context (cf. Kumar & Lee 2021). Multichannel delivery considers any digital channel and should happen quickly. This 'hybrid model' should convey one source of content and can empower multiple teams (Stratchan & Byrne 2022).

FSPs exist and operate in an ecosystem, where KYC solutions are needed at different levels of the industry. Modular services can be used to support, replace, or solve issues with legacy systems, disconnected data, complex manual processes and to "rethink KYC" (Parola 2021). An example of a modular KYC solution is the recently introduced 'Nets Passport Reader', that can be embedded in KYC onboarding processes of, for instance,

banks. The service is facilitated through *Near Field communication* (NFC), which allows reading of RFID (Radio-frequency identification) tags in the identification document of the customer, such as a passport, with the customer's mobile phone. According to Nets Group (2021a), "*NFC technology is the most secure on the market and is the only trusted component certified at eIDAS High"*.

2.4.2 The potential of decentralized solutions in the KYC context

The possibilities of distribution of data and the benefits it can bring to onboarding experiences has lately reached the interest of FSPs. Blockchain, including Distributed Ledger Technology (DLT), allows new ways to store, record, and transfer digital assets, such as, customer data through encrypted data storage. Some practitioners expect Distributed Ledger Technology to reach mainstream adoption within around 5 years to date. The wider implications on financial services are met by great interest of business practitioners and scholars as blockchain is increasingly getting admittance in different business areas, such as supply chain financing, and payment transactions (Fourthline 2021; Mills et al. 2016; Kittu & Rao, 2018). Hughes et al. (2019: 275) highlight the foundations of blockchain to lay in the secure signing of transactions or agreements. The mechanism relies on the hashing algorithms, which require a public and a private key by each signing which, by anonymous parties in the blockchain, validates the previous 'block'. Each party of the chain thus verifies information, that is stored in the block and the technology bases on peer validation. This makes Distributed Ledger Technology resilient to malicious actors and cyber-attacks. (Hughes et al. 2019: 274-275)

Parra Moyano and Ross (2017) have proposed a decentralized distributed ledger solution to facilitate an improved customer journey and KYC experience especially applied to use cases which involve cross-border services. In the suggested solution, Distributed Ledger Technology would allow bypassing national requirements related to identification documents and info. Instead, *smart contracts; "computer protocols that facilitate, verify, or enforce predefined clauses whenever a set of conditions is given"*, which customers would own, would be used. Customers would have control over their own data, which could be used only with the consent of the customer. Thus, the proposed solution also considers the General Data Protection Regulation (GDPR) which was enforced on

companies inside the EU in 2018. Through smart contracts, customers could open several service agreements with different unique FSPs as the same authentication method and info that is stored in one contract, could be used when operating with a new service provider. DLT would in this type of usage reduce cost and facilitate operational efficiency in KYC processes of banks and FSPs. This would potentially affect the customer experience positively. (Parra Moyano & Ross 2017: 413- 422)

In addition, blockchain can provide swiftness, transparency, and traceability. The system can benefit regulators and auditors, who could "pull out" stored compliance data for enquiries or reviews from the blockchain unlimited to time or date. A migration towards the technology, however, is expected to be challenged through the current legacy systems and the sub-processes related to operative work in the financial industry, which is not simple to automate. While smart contracts can drive automation, they do not yet meet the security requirements in the industry. (Kittu & Rao 2018)

2.5 Conclusions on prior research

As described in this chapter, financial services provided through digital channels and platforms are impacted by global trends in consumer behaviour and expectations related to services provided online, where reliability, trust, ease of use, value-added services, and cross-services are highlighted to bring value for customers of digital financial services. The rising mobility and platformization (Bauer et.al. 2005: 155-156; JPMorgan Chase & Co. 2021) creates freedom and flexibility for the customer but emphasize considering the security measures of the service providers (cf. European Banking Authority 2021c).

Digitally produced financial services have the potential to onboard customers with high scalability and speed, which can affect the revenue streams and business opportunities of FSPs extensively. Yet, dimensions related to the regulative requirements, customer expectations, and customer experience during KYC are in conflict and hamper the creation of solid, holistic funnels, which hinders the growth of FSPs due to customer churn and onboarding halts (Jumio 2018). In a digital time, the seminal SERVQUAL and SERVPERF dimensions described at the beginning of the chapter are met by new alterations, which emphasize performance related and communicational aspects of onboarding

sites (Jumio 2018; Mbama 2018: 441), as well as consideration of customer interaction through various platforms and channels (cf. Herington & Weaven 2009).

As outlined in the chapter, effective management, storage, and accessibility of data is vital when it comes to improving customer experience during KYC as data also gives new possibilities to improve communications, which should be emphasized in a digital service (Komulainen & Saraniemi 2019). To manage, store and access data, firms rely on calculations which can be based on big data sets for creation of categories on their prospect customers. Through the capabilities of performing efficient calculations through metrics related to specific KYC data, such as expected financial behaviour and risks related to the customer, artificial intelligence and machine learning have lately been proposed to help in collection and validation of data (Altecsoft.com 2017). Also, decentralized ways to store and access data (cf. Parra-Moyano & Ross 2017), better known through fintech and blockchain, are suggested to improve customer experience during certain use cases of KYC. In these solutions, the customer can benefit from the technology in cross-border and cross-service KYC. As the security measures of these types of solutions are yet not mature enough, the technology is not yet widely implemented or tested by banks or regulators, who could benefit from it (Kittu & Rao 2018).

KYC onboarding experience is, in the light of prior research, affected by several dimensions which influence customer experience and can through negative impact affect the financial performance of Financial Service Providers (Minastireanu & Mesnita 2019: 6-7; Villalobos & Silva 2017). Many of the causes for a poorer customer experience are related to the requirements in the financial industry, which drives banks and FSPs to ask question and documents from the customer. On the other hand, the circumstances and curiosity to try out new services and tools, are factors that impacts the customer's expectations and through this the experience.

The prior research presents customer experience as a circumstantial, emotional, and personal experience by the customer (Bolton et. al. 2018: 777-778; Komulainen & Saraniemi 2019: 1086). The technological tools that are presented in this chapter, such as data mining, AI, machine learning and distributed ledgers, are expected to improve customer experience through mainly functional capabilities, which affect components around

efficiency, flexibility, and speed. The factors that affect the full ‘KYC funnel’ as mentioned in this chapter are summarized in a visualisation in the *Appendices (1).*

3 METHODOLOGY

This chapter focuses on presenting the chosen design and methodology of the research. The chosen methods of research – the qualitative approach consisting of semi-structured expert interviews, as well as the data analysis method, which consists of thematic analysis, are described, motivated, and assessed through discussing the applications of ethicality, trustworthiness, and generalizability of the research. Through the gathered data, the research aims to answer the following research questions:

1. *What are the current challenges of the KYC process for European FSPs?*

2. *How can solutions within fintech support the KYC process of Financial Service Providers, in relation to customer onboarding experience?*

Understanding the scarcely researched relation of customer experience, regulations and solutions that can improve the KYC onboarding holistically, helps to form an important business differentiator and growth enabler for financial institutions operating online. Therefore, complementing research in this area is highly motivated through its' ties to a crucial and present-day issue and can have significance for Financial Service Providers who evaluate tools, solutions, and approaches in the digital age.

3.1 Research approach and design

The prior research presented in chapter two proves the existence of the current contradiction between regulation and customer experience during KYC onboarding and justifies further research around the topic. Yet, consensus over available technological solutions, that can support the regulatory and customer experience dimensions of KYC, have not yet been reached in academic or business publications. As information around present day and tomorrow's solutions is hard to evaluate from solely academic literature, the research topic is studied further through data, which has been gathered through semi-structured in-depth interviews with industry specialists.

The research aims to fulfil and to deeper understand relationships and patterns that can support or question the theoretical framework. Making numeral generalizations or

proving existing or designed models is not intended. Instead, the research focuses on qualitative data, which can reveal connections and dependencies on different elements subject to the research. As such, the research is inductive of nature (Saunders et. al. 2019: 51-52) and aims to understand the research problem in-depth through the perspectives of different industry stakeholders through the gathered textual data.

Through the qualitative research approach, I intend to recognize and explain the impacting elements that affect the research phenomena and to share insights to the business problem. To establish relationships between the discovered elements that affect customer experience and the technologies that can improve the experience for KYC in the onboarding context of FSPs, is a part of the aim. For the purpose to explore and explain, the research should be extended through open-ended questions aiming to solve the 'what', 'why' or 'how' around the problem. (Saunders et. al. 2019: 186-187.)

The elements important to the research are best described and identified by people, who see the work related to and have efficient knowledge and experience of the research problem (in Richie, et. al. 2013: Yeo et.al. 2013). Interviews are likely to stimulate open conversation, which allows revealing and focusing on complex viewpoints and meaningful topics for the interviewee. (in Richie, et. al. 2013: Yeo et.al. 2013) For this research, 11 industry specialists were interviewed with the help of an interview guide. The semi-structured interview method was applied to enhance the possibility to adapt the questions to the experience and seniority of each interviewee. The choice of the interviewees and the interview guide are described further in the chapter.

3.1.1 Data collection

In-depth interviews with business specialists have been the primary method for collecting the research data during the winter of 2022. The intention is to explore the dilemma from the viewpoints of various business stakeholders who can bring insights and recommendations on ways to improve the customer experience while reviewing the capabilities of current fintech technology in the crossing of KYC and customer experience. The interviews were recorded for future transcriptions, translations, processing, and analysis. Notes, including my observations and 'highlights' from the interviews, as well as the records of the interviews were used as a base to recognize important themes in the data.

3.1.2 Motivation of data collection method

As the research focuses on a multifaceted field from a business perspective, interviews with field experts (as opposed to consumers or service users) are motivated. Customer experiences in mobile and online banking have already been researched from usability perspectives, and the problematization related to the poor onboarding experiences are known and being evaluated by Financial Service Providers. As the requirements concerning KYC onboarding vary in terms of documents and information that need to be provided and validated during the process (e.g. Bilali 2012: 320-321), the research can neither be done through exploring or comparing the technologies that different FSPs use. Also, testing the solutions practically, would likely shift the focus from evaluating the potential of technology, or options for future solutions, to the customer and user experience itself.

Open-ended questions and semi-structured in-depth interviews are a powerful method to generate descriptions and interpretations on people's social worlds and are even described as the core of qualitative research. (in Richie, et. al. 2013: Yeo et.al. 2013). Semi-structured interviews allow the respondents to describe different phenomenon from their own or their business' perspective. This can reveal patterns and unlocked demands and allow the researcher to explore complex phenomena, which otherwise might be left unseen (Saunders et.al. 2019: 444; Tracy 2019) Consequently, different stakeholders of financial service providing companies can through the results of the conducted interviews gain insights on ways to improve the customer experience while reviewing the capabilities of fintech technology and solutions in the crossing of KYC onboarding and customer experience.

3.1.3 Choice of interviewees

For the means of this research, requirements related to the choice of the interviewees were set up before initially contacting industry experts. Senior industry experts, who partake in choosing, building, or evaluating suitable solutions for the customer funnels in their place of work, satisfy the give requirements and will hypothetically help to test, and fill gaps in the existing theories. Companies of interest, where interviewees would be found were outlined as follows: FSPs who are obligated to use KYC, fintechs that support the FSPs through solutions they provide for KYC onboarding, and companies that are

focused on technology, customer experience and improvement of digital solutions, or the implementation of them.

The professional network site LinkedIn was used as the primary source to find suitable interviewees. Based on the profiles of potential interviewee's, I initially contacted people inside and outside my own professional network and asked for the chance to interview them or if they could refer me to other suitable interviewees. An announcement was also made in the professional network group of Helsinki Fintech Farm with the same approach. This yielded an interview with two industry experts, who also referred me further to another interviewee who met the set conditions.

The interviewee sample of the research is supported through contacts in my own network and through references of these contacts. As such, the approach can be assessed to be opportunistic or to have characteristics of snowball sampling. Through the mentioned methods, a skewed sample might become a risk if the existing contacts present too much similarity as a demography. On the other hand, the data access method is low in cost and using existing own contacts and creating new ones for the purpose of the interview, is described as an effective tactic to gain access to data (Saunders, et. al. 2019: 243; Tracy, 2019). In this research, the approach was motivated through the need to find experts with specific knowledge and networks. The fit and purposefulness of each interviewee was assessed during the primary contact and interview requests.

3.1.4 Criteria for interviewees

In this research, customer experience is viewed upon through responses the customer gives during various service touchpoints. KYC onboarding experience is also highly impacted by back-office tools and capabilities of the staff, and efficiency and applicability of new solutions affect customer experience. Senior level experts or managers with experience of customer experience, operations, and solutions are thus evaluated to give rigor and debt to the collected data. The research also focuses on digital services and the implications of technological solutions. People with experience of FSP digitization, automation, and creation of holistic customer onboarding funnels in are likely to give valuable inputs for evaluation of the solutions. Senior technical experts or product managers thus also represent prospect interviewees.

To summarize, the below requirements where set for the interviewees:

1) *The interviewee should represent a senior expert or manager and work / have worked closely tied to onboarding, KYC, or customer experience*
2) *The interviewee has an extensive understanding of the operations of FSPs and understands the interdependencies between customer actions, customer categories or segments, the onboarding funnel, regulative requirements, and the impact and use case of technological solutions*
3) *The interviewee takes part or has partaken in production, monitorization, validation or testing KYC products, funnels, or solutions either from a technical or business perspective with focus on customer experience*
4) *The interviewee should have a broad understanding of digitization, customer touchpoints and product multichannel delivery*

3.1.5 Interviews and interview guide

The interviews took place during January and February of 2022 through face-to-face, or pre-decided digital meetings through Google Meet and Microsoft Teams. Altogether 11 industry experts were interviewed. The roles and expertise of each interviewee are presented in table 1. In addition, a shorter pilot interview was conducted with a representant of a KYC solution providing company for evaluation of the quality of the interview questions. Before the actual interviews, consent over participation and for recording of the interviews was confirmed with each participant – a custom that supports good research ethics in addition to presenting the questions in beforehand (Tracy 2019).

For keeping the discussions afloat during the interview, an interview guide (cf. Tracy 2019) was created for stimulation and guidance of conversation around the research problem. The pre-defined frame with the interview questions, which can be found in this thesis under the section ‘Appendices’ (2) was presented to the interviewees before the meetings to endorse research ethics. 16 questions were prepared for the interviews. The questions were pre-categorized to support the interviews and to help application of the themes during the interviews according to the experience of each interviewee. The questions were altered after the two first interviews for adding more room for the respondent’s interpretation of the themes. The interviews were planned, but not limited, to take around an hour.

#	Interviewees job description	Presented experience	Code
1	Senior developer	Expert 1	E1
2	Compliance & onboarding analyst	Expert 2	E2
3	KYC & AML solutions lead	Senior Manager 1	SM1
4	ICT Risk & Compliance lead	Senior Manager 2	SM2
5	Trust services, product lead	Senior Manager 3	SM3
6	Senior Product Manager	Senior Manager 4	SM4
7	Digital identity lead	Senior Manager 5	SM5
8	Senior Payment Solutions Consultant	Senior Consultant 1	SC1
9	Senior Payment Solutions Consultant	Senior Consultant 2	SC2
10	Digital services/transformation lead	Executive 1	EX1
11	Fintech Co-Founder	Executive 2	EX2

Table 1 Code of Interviews

3.2 Data analysis

Considering the interactional side of customer experience, social constructs and 'realities' created by people can explain different dimensions of customer experience and the needed considerations when planning customer onboarding funnels. Hence, grounded theory and specifically, *thematic analysis*, which is a set of techniques used for examining textual data through explained human experiences and meanings (cf. Saunders et. al. 2019: 205-211; Vaismoradi et al. 2016), was applied when examining the data. Through the method, hidden themes that are a part of the data content, can be revealed, but require the researcher's efforts to process them to understand their contextual meanings. Meanings are conveyed through themes, subthemes, or categories, which the researcher identifies in and throughout the analysis process (Vaismoradi et. al. 2016: 101-104).

In the data analysis process, statements of the participating interviewees were examined through principles of the *Gioia Methodology* (Gioia et al. 2012: 21: Corley and Gioia 2004). In this method, codes and categories are outlined from the interview transcripts and the data is compared, combined, and interpreted by the researcher for creating first order codes, second order themes and aggregated dimensions which demonstrate the connection between the raw data and theory in a visual way (Gioia et al. 2012: 26).

In this empirical research, I have followed the mentioned Gioia methodology and the main dimensions of thematic analysis. The first phase of the data analysis has been inductive and consisted of connecting and collecting codes and concepts. The code clusters have, in the second phase, been compared to each other as well as the whole data set and been connected under bigger underlying and identifiable themes. In the third phase, the themes have been connected under aggregate dimensions, which reflect the identified dimensions that affect the customer onboarding experience during KYC based on all the collected data. An example of the outlined codes, structured themes, and collected dimensions that were generated through processing the raw data are explained through an extract of the thematic model in Figure 6.

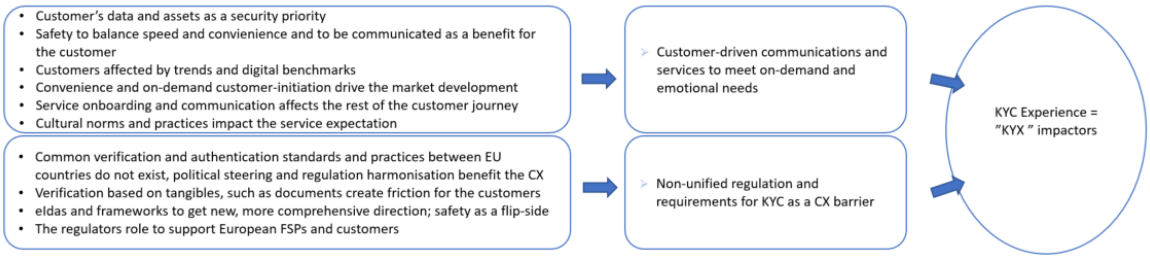


Figure 6: Excerpt of aggregated data structure of codes.

As noted by Vaismoradi et. al. (2016:103), the analysis process of qualitative research is cyclic, and the data might need to be visited, processed, and investigated repeatedly. These stages related to the data processing have, in this research, included organization of the data, creation of categories, and grouping the data for the purpose to create theories (in Saunders 2019: 206: Strauss & Corbin 1998). The data analysis stages used in the research follow the model of Vaismoradi et. al (2016: 103-107) and include 4 phases: *initialization*; *construction; rectification* and *finalization* as described below in Figure 7.

Phases	Stages
Initialization	- Going through transcriptions, finding highlights in data - Coding and looking for concepts in contributors' accounts - Reflective notes
Construction	- Classifying - Associating - Creating labels - Translating & transliterating - Defining & explaining
Rectification	- Engagement and distancing - Connecting themes to established knowledge - Alleviating
Finalization	- Development of the story

Figure 7: Stages of data analysis (Vaismoradi et.al. 2016)

3.3 Research and data quality evaluation

The research approach of the thesis is inductive and qualitative in nature. For explaining and exploring the research problem, best practices around it, as well as possible solutions to come, I have interviewed industry experts – initially through outlining a pre-set criterion for suitable interviewees and with some variance in their levels of expertise and type of work to enhance research rigor and to allow evaluating business and data dependencies. For the interviews, an interview guide was created to support a semi-structured approach and to enhance research ethics. Other aspects related to characteristics of a 'good research practices', such as the validity, transparency, reliability, and generalizability are evaluated in this section. In this research, the data has been collected, digitally recorded, and transcribed to ensure that it can be re-assessed and accessed for cross-checking and for finding possible new angles to the theory. The applied approach of thematic analysis is discussed in the previous section.

Although semi-structured interviews benefit the research, they can be criticized for allowing subjectivity to enter the research through the mutual "story", constructions, and biases created by the interview parties (Tracy 2019; Brinkmann 2018; Saunders et. al. 2019: 448). The quality of the research – its reliability, validity, trustworthiness, and research rigor, can in such relative circumstances, be backed up through descriptions of the data collection process. Through thorough data process descriptions, I intend to prove my abilities to conclude meanings from the in-depth interviews (cf. Saunders et. al. 2019:

449). The transcribed quotes from the interviews are presented in chapter *4; Results,* which motivates storing of the data for the time of conducting the research and for a fair amount of time after this. After the finalization of the thesis, the recordings will be deleted. This section further explains and evaluates how the research quality is prevailed.

3.3.1 Reliability

A research is typically evaluated as reliable if it can be replicated over time (Tracy 2019). Considering the contextuality of customer experience and the temporary nature of the solutions and tools presented in this research is important when evaluating its trustworthiness. Given the fast evolution of technology, some trends or expectations for solutions are likely to change rapidly along with development of both hardware and software. Also, customer experience is prone to dependencies of values and contexts during the customer's interaction with the financial service, which uses different tools depending on many aspects related to the business and service requirements. The research results mirror the current state of customer expectations and possible solutions, based on the conducted interviews. No single truth is expected to answer the research questions although the literature review gives inclinations on trends, interdependencies, and repeating topics.

Reliability of the research is also affected by the consistency and solidity of the researcher, research tool, or method. Avoiding assisting, assuring, or confronting is important for maintenance of the objective stance. 'Naivety' of the researcher is encouraged, and has, to some extent, been used when forming the interview questions. Being able to connect specific themes and outcomes (*coding)* has allowed creation of some estimates and overviews around the research problem. The process should include taking measures that protects the data and analysis from biases that are subjective of nature (Tracy 2019). In this research, the interviewees have been encouraged to, as much as possible, explain their answers in their own terms and examples. To some extent, confirming questions were asked to make sure the answers were properly interpreted. Yet, it is noteworthy, that subjectivity, is to an extent, a part of the qualitative and interpretive stance. As some of the data gathered in the interviews has been translated, some risk of slight nuance differences to enter the results exists.

3.3.2 Transparency and ethics

Research *transparency* is prevailed through the accessibility of the data (Ritchie et. al. 2019). For this purpose, quotes from the transcriptions of the collected data have been added to support the data analysis in the text and enhance transparency when presenting the data. The data accrued from the interviews are evaluated to be 'enough' when *saturation* was achieved. This means that the new data retrieved during the interviews does not bring much change to the already gathered findings (Tracy 2019).

To ensure research *ethics*, it is important to consider what kind of effects the data collection and interviews can have on the interviewees. To assure an ethical research practice, permission to conduct the interview by the potential company, where the interviewee works is advisable (Saunders et.al. 2019: 212-213; Tracy 2019). In the case of emerging or invented solutions or technologies, it is evident that revealing too much of the underlying technology and development of KYC products, funnels, and solutions, could cause potential harm to the business whose employee take part in the interview, and the employers of the interviewees are not revealed. As KYC is set to protect financial and institutional stability, revealing too many details related to risk-assessments or ways to reveal malicious tools and acts, can also be harmful as it can benefit fraudsters.

To avoid leakage of business-critical secrecy or data on the interviewees or the company they work in, confidentiality, a chance to prepare for the questions, as well as a chance to withdraw from the interview are recommended to be granted for the interviewees. (Tracy 2019). Granting secrecy and anonymity for interviews conducted for this research aims to protect the involved FSPs' business critical information and operations of the interviewee's employer and customers. In addition, anonymity protects the individuals, who due to their work might become victims of phishing, social engineering, and other acts of fraudsters. The research data has been accessed only by me and been stored for the purpose of the data analysis. The data is to be removed from my personal folders after the finalization of the research project.

4 RESULTS

This chapter presents the findings of the research, based on the collected textual data. The customer experience during the onboarding and KYC process of FSPs is mirrored through the interviewees' perspectives on different business aspects, dilemmas, and opportunities. As a result of the data analysis, five aggregated dimensions related to the KYC process are revealed. The results of the data analysis are presented by starting from the dimensional aspects, where the results are discussed through the revealed themes and further through more detailed examples.

To answer the research questions, the gathered data is combined in dimensions that include interconnected topics and examples on KYC challenges and solutions that can support the KYC onboarding process both from the customer's and the FSP's point of view. These are mapped based on identified themes related to business versus regulative, and technological evaluations, CRM, industry affecting trends connected to, for instance, mobility, and multichannel communication and delivery, data, as well as possible solutions that can ease the work related to KYC onboarding and affect the customer experience through customer-initiation. The fintech solutions and challenges related to KYC are revealed to be affected by regulative and political bodies and initiatives, as outlined further in the chapter. Figure 8 describes the data structure of the identified codes, themes, and dimensions.

The leading section *4.1 KYC experience in the intersection of regulation, technology, and business evaluations,* presents the current premise of the market as well as the restraints related to KYC for FSPs and how the current situation affects the customer. The second dimension presents KYC as a part of the customer communication and the needed activities around CRM and customer expectations management (section *4.2*). The subsequent dimensions present data-driven optimization as a solution to improve both the FSP operations and the customer experience (sc. total experience, section *4.3*). Further solutions and challenges of KYC are discussed through the fourth identified dimension (section *4.4*). The data also supports defining so called *KYX factors* to explain the KYC experience of customers, which as the fifth identified dimension concludes the data analysis (section *4.5*).

Figure 8: Aggregated data structure

4.1 KYC experience in the intersection of regulation, technology, and business

The first identified dimension *presents KYC in the intersection between business needs, technological capabilities, customer experience, and regulation* that drive the decisions behind KYC planning and execution. The requirements for customer data and parameters for KYC create complexity for the service providers who want to deliver smooth KYC experiences for their customers and often result in compromises.

> The anti-money laundering and terrorist financing protection lays the foundation for having to know who the customer is, what the customer is doing, plus for monitoring their events and transactions. […] That you get sufficiently high probabilities to be able to identify a customer in a way that meets the requirements but at the same time becomes as smooth as possible. – EX2

4.1.1 Diverse KYC solutions and services under similar regulation create a KYC partner ecosystem

KYC as a process, needs to consider several layers of tools, interfaces, touchpoints, and parameters, that both the customer uses, and the service provider's back-office team needs or uses during the customer onboarding. As such, digital KYC exists and can be improved in the surrounding partner ecosystem, where the identification, and authentication is also affected by local requirements. Businesses can focus on a specific piece inside the KYC 'value chain', or provide services, where they try to solve most of the KYC questions for their customers (typically financial, or payment service providers).

> They [the FSPs] have a first layer which is the frontend, so all integrations and existing customer CRM [actions] or whatever to make it very smooth in the communication to the user. Then they have a middle layer, which is the complicated one. That's the orchestration tool to do a risk engine assessment, or to hand all the API calls. […] And then the bottom layer is KYC. […] But then you also need to do more, like add data attributes and checks. You have credit scoring, maybe PEP or sanction lists, maybe you have proof of addresses or whatever is regulated in the market – SM5

> You have the customer data vendors, such as Experian (private data vendor) et cetera, that you know that do a lot of work in this. They are the data aggregators, the data resellers. […] And then you have their workflow tools that then plug into digital identities…So, there are number of players in that space and then you have some players trying to aggregate across. – E1

Third-party service and modules

Modular services provided by FSPs play a big part in the KYC processes from the FSP's point of view. Modularity refers to service modules that are built play well with other

pieces. Modular solutions can also limit the service scope, as modules allow limiting the service delivery to specific parts of a product. Thus, the different KYC pieces, require a business decision in terms of inhouse and external deliveries. Certain tools and usage of third-party services are necessary in the name of process efficiency.

> An absolute tool is a third-party service like this, where all these potential problems [related to the customers] are listed. [..] It would be an impossible task for us to manually start Googling this or to check if this specific guy [customer] has been involved in a crime say 10 years ago. – E2

> It [starting to use a third-party verification service] improved our conversion drastically. At the same time, it got way cheaper for us as well. […] I think it dropped it to 7 euros per verification, which is high, but it's still really good cost compared to if you were doing it yourself. And the verification time…instead of waiting for three days or so, now we had 5 minutes [for verification] for most of the customers. – E1

Integration umbrellas and other choices for the service provider

As business needs change, the FSP's needs for KYC might evolve, and the KYC tools and flow might need reconsideration. Business evaluations are constant and driven by measures that calculate the effects of the different parts of the KYC flow, and how they correspond with new customers who start using the service.

> It's going to be quite an 'integration umbrella', even if you do it yourself, because that PSP side has to be bid anyway, unless you're applying for a licence for that payment side yourself. [...] Then the bank or those banks where those customer reserve accounts are run, need to be compared. Then on the side of identification: who will be your partner that triggers the strong identification? [...] Plus, then for scoring, and for classifying the customers and their transactions, you can use tools, solutions, and services that are ready-made services, or you can do them yourself. – SC2

The service architecture is planned with consideration to the services. Different services applied to by the customers, require different back-up checks and thus different integrations. The effectiveness can be steered through partnership decisions and in case an electronic identification of the customer can be retrieved quickly.

> So, you need an integration to the bank identification, then you need an integration to do the PEP and sanction [screening] and then you need to do the [payback capability or risk] scoring. […]. If it's a prepaid service customer, you do not have to do this scoring; two [integrations] are enough. […]. So, the actual KYC itself takes maybe 2 minutes, all on the same application. – EX2

Technical versus communicational aspects

In addition to integrations, partnerships, and technical decisions, the service providers must consider the different parts and modules of their KYC flow on a detailed level. The

considerations encompass product-internal information and extends, for instance, to the marketing activities. Communication and the touchpoints are emphasized in the evaluation, and for this, the FSP needs good analytics tools and metrics.

> If you think about SaaS (Software as a Solution) services, the most important metric is the customer acquisition cost versus the customer lifetime revenue. This becomes the lifetime value. It defines for you, which mandatory steps – as you have in the KYC, you should analyse those as closely as possible. […] That is there anything you can do at that specific touchpoint, is the choice poorly articulated, so that they choose 'wrong' because they don't understand, or what? – SM4

The fragmentated European KYC field

Many experts point out several cases, where the regulation steers KYC to an extent, where the service providers struggle to see through, how to implement and interpret the different rules for staying compliant, and for optimizing customer experience while implementing new solutions. The tightened regulation is partly seen as a hinder for development and implementation of technology that could improve the customer experience by some interviewees. The current regulation is described as 'airy' and as a reason to push many FSPs to implement steps and pieces to the KYC, that might feel unnecessary to the customers and hard to do effectively by the FSPs.

> [After the tightened regulation] A lot of the banks and financial institutions ended up almost reverting to a more physical process in the sense that, to open a bank account, in many cases you had to go to a bank branch to show your passport to open a bank account. Which, in 2019–2020 is completely crazy, as a process, right? – EX1

> However, as it is based on anti-money laundering and anti-money laundering legislation, and compliance, which is critical for all players in the sector, then it is not possible to try out [different approaches] that much…. it's a bit of a hassle to keep playing safe, which also means perhaps more difficult processes from the customer's perspective. – EX2

The complexity around KYC onboarding is, as agreed by the experts, added through the difference in regulation across the European countries. The retrieved *digital,* or *electronic identities* (e-IDs), can support usage of the authentication method in several services. The service delivery in terms of KYC onboarding can be speeded up significantly depending on if the customer has an electronic identification, which bases on the prior authentications and verifications done by banks or in specific local registries. The e-IDs and the Finnish trust network and banking authentications, that can be embedded in the mobile customer flows, are dominant in the Nordics and preferred as solutions by the experts.

> I personally like the Swedish BankID…That there is one solution which is agreed upon that everyone should use and that you can't do anything without it. It's very much tied to a mobile device and the penetration is pretty strong when almost everyone already has an app and the equipment. – SC2

> Well, everyone in Europe was just praising the Finnish banking authentication, as it can access an electronic service directly, so it's the easiest and best of them all. – SM4

In general, the problems related to creating wholesome and functional KYC funnels are mentioned to increase in central Europe due to the local regulation in the area.

> In regard to electronic identification, using a digital medium, the Nordics and the Benelux countries are the most mature regions. Like the Baltic countries, they are in good shape and we have the online banking credentials in Finland and their own BankID in Sweden. […] But if we talk about these big EU countries: France… There it is quite immature. Not to mention Germany. There, a very common way to identify is based on a document, even the passport is read optically. – SM5

> But when you go out to Europe, then there is not always access to things like these [e-IDs]. […] Also, in some countries they do not have, as we [in Finland] have, a social security number. Then it is important to that you have received enough information. – EX2

4.1.2 Multidevice KYC requires technical and business evaluations and customer readiness

In many cases, it is not possible to create fully digital customer flows, even though the FSP would operate online. If the customer journey is reliant on devices, extra touchpoints, or live meetings, friction and drop-outs are often caused by the need for the customer to take 'extra steps' and access to devices, or service calls. Similar cases for authentication, are mentioned to be found and within the public and banking sectors of Central Europe and for so called e-Estonians, who need specific *smart cards* and USB readers for being able to access services they have registered to. When starting a service relationship, all these devices and cards must be registered in the service.

> Because you need the device ID card and then you need a special dongle to read the ID card. Now, this is hard difficulty! […] Where we noticed the most drop [out rates], was the video chat, because then it is… the second most complex function, as you need to be dressed, in a well-lit area where there isn't that much noise, and then you need to have good internet traffic. – E1

> Many people are troubled about starting a video call with someone unknown. – SM4

The experience for the customer can be vulnerable due to functional and situational reasons, for instance the internet coverage might not be adequate for running services as planned by the FSP. There might be issues in the hardware the customer uses, as older versions in the camera of the mobile phones do not take sharp enough images or videos

which can be verified. Also, software inside the mobile phone might not support the newest application version of the FSPs or verification provider's service, which adds focus on evaluations related to accessibility. In the less-digital flows, data-driven optimization (discussed further in section *4.3*) is harder.

> It is different to have a video chat compared to having a SaaS-service. You can wait for that solution, but you cannot wait a minute to send a frame of video… Other issues are phones that are old and incompatible. It is usually easier to support with web different versions of hardware because you are not doing the compatibility all by yourself. – E1

> Then, if you have an old phone, or some web cam, what are you using. it gives much less data to any product that ever evaluates that image and other [parameters]… – SM4

4.1.3 Role of electronic IDs and preparation for specific cases

Especially in digital payment services, KYC is often done by the help of electronic identities. If they are not supported in the region, other means to identify the customers are needed. In such cases, the FSPs needs to consider several options based on their business needs, customers, operative environment, the readiness to use different solutions in the market, as well as 'tech savviness' amongst their customers. Yet, digital touchpoints for different KYC cases are in the core of today's development within financial services.

> …We are not talking only about the times when the customer comes to the bank for the first time, but about different types of events, both during the relationship and during the customer events. – SM4

The fact, that the digital IDs are not supported or used to the same extent in all countries makes planning KYC hard and the processes reliant on manual work or human verification based on customer documents. This is by some experts seen to hinder the development of customer friendly KYC remarkably, and the regulation can feel somewhat 'unfair' from the service provider's point of view.

> It can be dependent on the customer, their passport copies or other documents, and other factors. That they [the documents] are unclear, or false documents are being submitted. An individual can also have a technical problem every now and then. That the [verification service's] system does not work, and customers get stuck. – E2

> The uploading of documents, for example has some factors…even if it is done electronically, it is very old fashioned. Plus, it requires that there is an application that can load this document and encrypt, and forward it, and only after this the process will start. – EX 2

Regulation vagueness hinders technological advancement

KYC and the cumbersomeness as a customer process, is, to an extent, excused due to that it is needed only when starting the service. However, there are some specific cases, which force the customers to be reverified by the service provider and do KYC again. Reverification, and situations where the FSP cannot use the original verification of the customer are especially tricky, partly due interpretations of the industry specific rules that require the customer to visit the branch. Optional ways on how the service could function in a more customer friendly way and allow remote service and high safety for the user and financial service, is already technically possible.

> Technology can be helpful here. Instead of needing a person to read a passport, it can be read remotely; either optically or even more electronically. Most EU passports have an RFID (Radio-frequency identification) chip inside, and we practically have an NFC (Near Field communication) reader in our pockets, that is a smartphone that can read this [info]. It also leaves a seamless mark on that identification event. – SM5

Different FSP company use cases are not in the core when the rules and KYC scenarios are considered by the European regulators. The several use cases and special edge cases that concern KYC are a big challenge for the FSPs when trying to interpret the KYC regulation and to implement it in a customer friendly manner.

> It [the regulation] is often quite inflexible, or it is so complicated that there is a challenge to understand the essence in the regulation, which needs to be followed. [...] How to get it [right], especially in such an end-user B-to-C market, how to understand what should be really considered, still doing it user-friendly, and account for it in the user interface? Those are probably the first challenges for companies and the product managers… – SM4

> This actually might be a fintech killer. – E1

4.1.4 Mobile-first development

Mobile is mentioned to be the new interface, which most of consumers have easily at hand most of the time. The KYC should be planned, as well as other customer actions, to be such that it can be done through the phone. Accessibility, clear indicators, and functionality issues are highlighted in the interviews.

> Nowadays everyone has a phone, but not everyone has the computer, so in that sense, the more mobile, the better. And of course, it's also a matter of accessibility that not everyone may have that computer with them, but they have their phone, and you can take care of the matters on the go. – E2

> And then on the mobile, because there is a lot less space on the screen, then it is more important is with a progress bar; '*How long do I have this left?'*. That I see if it takes 15 minutes or 2 minutes. – SM4

The development of a good mobile KYC flow is dependent on many technical details, and the integrations between the different modules play a big role in providing a good customer experience. Software development kits (SDKs) can be used to support more unified experience when switching between the service providers, for instance for doing the actual verification in another system, than the FSPs' own. The experts stress the impact of the technological capabilities and quality of the kits to impact the experience.

> And then there in the [the verification service provider's service] they [the onboarded customers] did their biometric authentications. This all happened nicely through an SDK, which made the user experience to look very much like it was done in that client application. – SC2

> Especially when it comes to transitions at different stages of the process, what quality the service provider's SDK is and what capabilities it has may show strongly to the end customer. I would say that there are a lot of differences from this in the small details of how it hands over at different stages of the IT process [between the services], how the service transitions from your own application and your own systems to your service provider's [applications] work... – SM2

Mobile and biometric verification supports future experience

The benefits with developing the KYC with a mobile focus is backed up with the fact the same device, that the customer has done their initial verification on, can later be used for accessing the service provider's services easier through second factor verifications. This ties the phone and for instance biometric data that has been stored to it by the user, to the customer. Hardware capabilities affect the experience also in these cases. Different applications and wearables can be used for *liveliness detection*, that is as additional proof for the FSP, that the person behind the camera is who they claim to be and acting in real-time, synchronous to KYC and applying for the service, but not in continuous service use.

> There is for instance a watch that reads the blood vessels and is able to identify them to a very accurate level. – SC 2

> Because there needs to be also liveliness detection. To prove that the person is alive. That adds to the costs. It is not enough that the data of that person is compared to that [passport] image, but also, we need verification on that the person is alive. […] It gives you random tasks, like *'turn your head to the left'* and then the customer must turn their head to the right and so on. […] The service grabs that video and compares it to the passport data. – SC1

> There [on mobile] you end up having a better compatibility for limited number of devices. One of the things is that usually the phone cameras are far better quality than PC (computer) cameras, this is the first thing to start with. Second thing, you have a lot of these phones that now have like machine learning and AI capabilities, like we can see for example like with the Apple facial ID, which can work even in dark. E1, 2022

> The smartphone is the platform. […] And when we move to electronic signatures, then the fact is, that we have that signature tool, that is we have it here [on the phone]! I mean, why should the other

> processes then be on a computer or somewhere else, as it will need this [smartphone] for that process anyway? – SM 5

The smartphone can additionally read documents, either optically or through Near Field communication (NFC), which gives the service added security. The phone can as an interface have a big impact on fighting identity theft and financial fraud, when different components of KYC are combined in the same KYC flow, but the more advanced additional modules come with a cost.

> If we have that optical reading, then it is accepted to a certain point. But then we have EU regulation, as the eIDAS regulation. According to eIDAS, NFC is at a higher level, it meets the requirements of regulation. – SM5

> For onboarding cases that require a very high level of security, it is quite good, but not for daily use. And there is also the cost side; a passport reader is not free, it's maybe a few Euros per case. Many business cases would probably stumble upon this [if it was applied to all authentication cases]. – SC2

The security aspects that relate to hardware-based recognition are also mentioned by many. KYC onboarding requires a strong identification and authentication through different parameters, which can be provided through second factor authentication. This info can be saved on the device the customer uses, which enables better experience for the customer in throughout the service usage.

> …I know your date of birth, and all of that, so then I can tell you [the customer]: *'Hey from this point on, instead of having a code or something, do you trust the Apple facial recognition for KYC?'* and you tell me '*Yes*'. – E1

Switching between services and applications

The mobile as a KYC tool is also emphasized to improve the KYC experience of the customer due to that the switching between applications, that are needed for KYC, is smoother when the customer who uses a smartphone can constantly stay in the same interface. It is acknowledged, that not all segments prefer to use the smartphone when handling their financials, which also creates challenges for KYC type of services.

> It depends a bit on the case, whether it is related to payments, where it is getting better anyway, then there will be new versions after October where the app switch is supported in 3 DS [security adding standard for payments] and then again, these types of services are designed, where then there is no need to identify oneself with each payment. – SC1

> …The older people might prefer to do business via a computer and then do the authentication on mobile devices, so then they do not need to jump from one screen to another inside the mobile phone, but you have [the site] in front of you and then there is a QR code or other [second factor authentication method], which then makes it easier to do it. – SC2

The 'one application approach'

The interviewees agree that development of a mobile application that could be used across Europe would potentially serve many cases for cross-border KYC and authentication to various FSP services. However, the maturity in the market is generally believed to be inadequate for a pan-European solution. In addition, the amount of and the potential competition between different applications are seen to bring challenges for only one app to become a leading method for both authentication and access to financial services. This is not viewed as realistic, at least soon. The lack of unified standards due to market fragmentation is further discussed in section *4.4, CX challenges and solutions*.

> It is still far too fragmented. – EX1

> How a regulated service provider, like banking and financing, would accept something like that, where it is unclear who's going to pay and where the cost for enrolment and everything is in that, there's difficult to say… – SM5

> A pan-European platform like that would be great, but then it's like...to get that live. It will take a lot of time as there are tens of thousands different systems, and it needs to be implemented. And then there are different capabilities in the countries to take this in use. – SC2

4.2 Customer Relationship Management

The second identified dimension affecting business evaluations and customer experience during KYC onboarding is related to Customer Relationship Management (CRM). This domain is wide and involves categories such as *end-to-end communications, indicators and measures on the KYC investments, customer expectations management*, as well as *benchmarks of the digital time*, that encompass especially communicational and functional aspects.

According to the interviewees, communications is connected to brand awareness around the service provider and to know-how around the KYC processes that the customer has. In the onboarding flow, expectations should be managed, and questions should be motivated with reference to the laws and regulations, especially in the digital space, where the customer might not distinguish the FSPs as financial services.

> The legal basis for asking these questions must be told to the customer. […] The more information there is about the basis for KYC and for explaining why the customers must provide this information in the different channels, the better. – SM1

> It [why customers need to verify themselves] needs to be told to the customers. – SC1

4.2.1 KYC as a part of the full customer journey

Especially in the case of onboarding, the KYC authentication and verification steps are often motivated by that the customer usually must do KYC only once. This ties the process to customer expectations management.

> However, it only happens once, at the beginning of the customer relationship. They are just things that are needed these days... – SM4

Yet, KYC during onboarding is basically the starting point of the customer journey. The data retrieved during the customer due diligence process in onboarding, have a huge impact on the continued due diligence processes that are followed during the customer relationship by the service provider. As such, KYC during onboarding prepares the customer for follow ups, and gives the service provider strong implications on the needed measures for 'knowing the customer'. This emphasizes the potential of KYC to safeguard the FSPs operations through indications on cases where enhanced due diligence is needed further in the customer relationship.

> It's enhanced customer familiarity in situations where the customer is seen as a higher risk customer. And these are usually corner cases, but they present at the time it 1% of the bank's customers. Then in a truly big company, it's a pretty big number of customers. – SM1

The role of KYC as a starting point also for business-to-business relationships, where the designated *KYB process* is built on top of KYC, is highlighted by the interviewees. As more data is needed for verifying business customers, the needed identifications on the beneficial owners are mentioned as a big bottleneck. This can affect the whole onboarding flow experience for the customer, usually due to lack of knowledge and poor indications.

> Because the customers [of the company] many times did the KYC properly, but they didn't realize it wasn't enough, and that it still includes that KYB part. […] There was nothing that would have indicated that you are not able to use anything until you have done KYB. – SM4

> There is a lot of those, who are stuck in the process, because we don't get the necessary documents either and that company hasn't been registered yet. Then we have to wait. – E2

4.2.2 Customer expectations management at all stages

For the actual KYC onboarding, the interviewees are aligned on that technology cannot solve all current challenges. Communications inside the service provider's platform is emphasized. Oftentimes, the customers and their capabilities to provide the required information is a matter that affects the KYC experience. FSPs experience delays in getting the information from the customers, which slows up the KYC and harms the customer

experience. In non-traditional services, where the background of the service provider's responsibilities might not be too clear, the customer expectations can still be managed by clear signals on what is needed from the customers, when it is needed, and why.

> I think the most important thing is that we communicate transparently, and the whole flow is as clear and customer friendly as possible. There must be super clear indications on the different steps; what happens next, and what we need from the customer, what documents for instance. That we give them a realistic estimate that it will not create any unnecessary expectations either. – E2

> It just needs to be instructed by text in the bank's interface, so the customer knows, what they need to do next and then… It's not a technical solution. – SC2

The service provider must consider, where the different pieces around KYC should be added for supporting the most customer friendly onboarding flow possible.

> Probably the most sensible place to have info on those KYC issues is probably somewhere on a blog that is then linked to the product page and feature pages and the *'interested in?'* pages, so that it is then what you go and read [when interested]. It cannot be right there at the very beginning. – SM4

The image of the service and the brand of the service provider, who needs the KYC to be done, affects business decisions in relation to in which part of the customer flow the KYC should be done, and in case the own brand is strong enough to gain the customer's trust when asking to accrue personal data from the customer.

> And the question to be addressed, is always, whether those sensitive questions should be addressed inside the service of the trader [e.g. online merchant], or in the service of an outside provider.
>
> And it probably depends a lot on that brand, how strong and reliable it is for their consumers. In some cases, it may be better to do it in a third-party service than in some repair shop's service. But then, if there is a strong brand, consumers will trust it and dare to give it information. – SC1

4.2.3 Trends and benchmarks for engagement and CRM

Due to digitalization, softer user authentications and verifications are in use in several services online. For financial services, strong authentications, where the identification needs to be backed up by something that the customer presents or possesses, such as PIN code delivered to their device, or a biometric verification in addition to other login information, are needed when logging in. According to the experts, identifying oneself is thus well known to customers, which to some extent eases up planning customer friendly KYC onboarding and allows planning customer friendly KYC authentication throughout the customer's service usage.

> And for consumers, fintech is starting to be commonplace in many ways. –SM5

> However, the strong identification is quite mainstream now and it will come as a surprise for very few [...] Now it's almost everyone who can do it one way or another, because it's required by Kela (Finnish Government agency) the Tax Administration, and banking, et cetera. – SC2

> Around 2014 when KYC questions started to be asked more systematically, it provoked a lot of surprise in the customers and in some even anger, like: '*Why are you asking all this?*'. Today, customers understand and are much more accustomed to it. – SM1

Real-time and mobile flexibility

New applications and services take over the marketspace which sets the benchmark for quick and smooth service delivery higher for the customers. In addition, the Covid19 -pandemic has added the need to provide services non-physically, which has forced FSPs to re-evaluate their service delivery channels, as well as to figure out new touchpoints for onboarding customers diligently.

> And then at the same time here you're sort of getting those more digital type solutions around this, reading out a passport with your mobile phone, et cetera. So, I think we're really at a point where you know that process isn't really working across the banking landscape and especially with Covid, everything was shut down, people didn't have access to bank branches. – EX1

The megatrends of mobile and remote services seem to also affect the customers' expectations of service availability, swiftness, and real-time communications or reactions to the inputs they have given the FSPs' system. KYC onboarding can, by the help of APIs, automation, and robotization be done close to real time, with a 2–3-minute onboarding times. Delays in the onboarding funnel are mainly caused by people.

> If you look at the world, we are increasingly going more and more towards mobile or remote. […] And then it is also this with real time that is the future. – EX2

> When there are all the different services that are moving towards mobile, then people's expectations are in a way quite different. As in: *'This is really easy as and I can do this on the subway, or I can identify and get IDs from any online service, so I also get bank IDs that way too'*. The services are getting closer to each other. […] Nowadays people expect to take care of it (banking/ financials) on the spot, as soon as possible. – SM2

> With KYC a few minutes [of onboarding time] can be expected…Of course if you now need multiple signatures and others, then it is due to the people's delay… But the system should not cause delays. […] The aim is to get both the risk classification and the transaction monitoring and other to the level that there are interface checks. And sometimes, software robots are used.... However, the goal is not to have people in between. – SC1

4.2.4 Clear indicators and measures for return on the KYC investments

The interviewees agree that KYC during onboarding is far from as customer friendly or friction-less as it could be. The issues related to KYC adds cost to the service provider, and companies seem not to acknowledge all the dimensions of KYC and the potential in investing in it.

> Because the business case here is obvious. You know? …That this is a cumbersome, cost heavy, process and the customer acquisition cost for a bank is quite high, relative to others. Because just the onboarding costs… It's quite high. – EX 1

> We are more focused on what happens when the customers get on with the service, what happens to them, and how we get them to use the service itself, but perhaps not on the customer experience at the start of the service. That has somehow received less attention. – E2

Any disturbances or discrepancies during the experience when becoming a customer, can affect the full experience of the Financial Service Provider, create distrust, and lead to the customer to drop-off from the onboarding funnel or leave the service.

> That it should be thought through; all that information in advance and the customer knows where this info is. That they know their salary, they know their tax rate... They know that you [the service provider] will ask for this, and the customer has figured out how to get it. – SM 4

According to industry experts, the value and importance of a good KYC flow is not fully recognized by many FSPs, as the business focus often is on the value the customer will bring to the business *during* the business relationship. Nonetheless, without properly onboarded customers, the business value cannot be achieved as the customers cannot use the product properly.

> In a way that is the first touch of the service. If we think about the payment service world: before you can see whatever reporting tools or the merchant panel types of things, then KYC and the 'merchant onboarding' is the first and makes the first impression. – SM5

Measures to consider

The churn risk is generally high in digital services and customers tend to compare different services by visiting their websites and registering as customers, and through this 'start the process of becoming a customer. In the process of measuring churn, the success is dependent on what is considered as a measure of successful onboarding. For example, the site visits might be frequent when the customer is still looking into options.

> You get the conversion or click-through rates; how many clicks there on the campaign page itself, or if it redirects you directly to the login page. That is up to marketing. But after this, you look at the traffic to that login page and then you have different metrics; how many have started filling out that form, and

> how many have dropped out of it and how many then have filled out that form and done the sign up. – SM4

While data-analytics support decisions for the user interface, more practical drop-out calculations are done in the back-office based on the number of finalized applications compared to unfinalized. This ratio affects the popular measure of service delivery time.

> When I start having 100 tickets there in 'pending' state and have asked for more information, and customers from a month back never reply…Then they stay there (pending) until we close them. –E2

4.3 Data-driven optimization to support the total experience

The third identified aggregate dimension accentuates the relation of optimization of data as part of the total experience of both customers and FSPs. Mapping the customer data and making classifications on customers have become a reality for FSPs. These operations provide benefits for cross-platform customer engagement, but also provide indications on risk and helps in the customer communication. The data, which is given by the customer, and assessed and reviewed by third-party vendors, supports the most important duties of FSPs, facilitation of a safe monetary system. Data thus represents as factor, that can benefit all actors entwined in the KYC work. For the customer, the data optimization reflects as more speedy processes, which benefits the experience, but requires adapting to newer technological solutions.

Inharmonious processes & overlapping workflows

KYC consists of many pieces of data that need to be accrued from the customers or from different databases and are saved into different systems of the service provider. In many cases, the lack of inharmonious processes or systems creates overlapping workflows, which counteract a seamless customer experience and affect both the customer and personnel experience, thus affecting the total experience around the process.

> There is a lot of duplication and manual work involved in onboarding now. If the customer decides 'that now he becomes a customer' – then first it must be, not only the customer but also the vendor, and in some cases the service provider's customer service and onboarding team, who fills out the same information for different forms, different databases, and different systems. So, it causes clumsiness everywhere. – SM5

Too much reliance on third party data retrievals can also create manual work for the FSPs. A flow that is planned as customer friendly as possible, might miss out on inputs given by the customer, and as such result in other double checks needed by the operations for

instance if the adverse media or sanction checks trigger an alert. On the other hand, both answers given by the customers, and info that can be retrieved from the registries can create needs to double check parameters and evaluate the customer eligibility.

> When [retrieving data from a third-party system], there may be results where there is not even a date of birth… That we only have our person 'A' and the person 'B'. And even the name can match completely…If we have no other information than this, however, it cannot be ruled out, but as it must then be checked manually. – E2

> It is a bit double-edged in that way, how much the customer should do. […] That you might perhaps need both, that you ask the customer to be able to verify and evaluate how much is such data that you do not need to ask that you may be able to get from other places. Such that is needed, one should ask. It is just how it is. But try to minimize the irrelevant questions. – EX2

> I guess there is always some grey area there which then requires it to be manually checked. – SM4

Validation through rules, machine learning, and AI

The KYC data retrieved during onboarding gives the service provider important data points that are used when mirroring the customers continued behaviour inside the service.

> For example, the customer's transactions would show that they have constantly been abroad for the last year, but the address still shows that they are in Finland. Then the addresses need to be updated… And then a lot [of following up] based on transactions [is done], in case there would be big transactions to a foreign country, for instance. So, the bank is obliged to find out what their purpose for those. – SM1

Machine learning and artificial intelligence are expected to support especially this side of KYC, where the customers behaviour can be predicted, and different situations can trigger alerts in the system or changes to the product logic and through this enforce automation.

> Today the limitations might be in a slightly different place than with artificial intelligence… Perhaps artificial intelligence right now is not yet so relevant. Its' benefits will perhaps still be the next step. Perhaps its greatest potential is then at the stage of ongoing due diligence. – SM2

> Usually, the most errors occur during the manual processes. Someone wants to go out for lunch or such and goes through [the process] a bit carelessly. Well-defined artificial intelligence and monitoring is certainly a better way to do it. – SC1

Automation and rule-based decisions in the customer flow and usage of ready KYC solutions and identification services, has the potential to speed up the KYC verification process remarkably. The service providers must consider the desired clientele when implementing the logic and some specific customers might be left out of the service scope due to the rules.

> You can automate them most of the time, but customers get dropped because, I mean you cannot automate everything, or you can, but then you don't you never have resources to do, so… – E1

Real-time feedback based on the customer initiative

Implementing functioning algorithms for artificial intelligence or machine learning in the systems of the service e provider can ease up the general customer communications during KYC and other situations, where the service provider's system should react to any input from the customer.

> Then you get it instant feedback to the customer. If there's something on the customer's side done wrong, then don't have to wait for some email or phone call from someone saying: *'Hey; do this (next)!'* At its best, that service advises on what should be done. – SC2

Generally, well planned and implemented rulesets and validations can support the customer in many phases of the KYC. Also, in this case, the choice of wording, visualization, and other customer communication needs to support the technical decision. Showing the customer's progress in the onboarding through mirroring the results data-driven outcomes is mentioned by many experts to support a better customer experience.

> We made clear progress bars to show: 'Hey, here are these steps, do these' and then it was forced (for the customer to) go through the mandatory fields. [...] The fields should be validated. […] Then there should be dropdowns and tooltips to guide the customer so that the chance of error and the possibility of typos is also minimal or as small as possible. – SM4

Customer data supports the customer journey

Gradual KYC is suggested and already used by some services to allow more instant access to the service based on customer inputs and information. In this approach, the KYC should happen once the customer already has entered the service or product based on rules set for when full KYC is needed. Full verification could be based on the customer requests and actions inside the service and would thus also minimize the KYC efforts for the FSPs at the start of the customer relationship.

> Many decide that you can become a customer, but you are not allowed to do anything. You can see what it might look like and then if you are really interested, then you go through KYC […] When you specifically require it, then highlight it. Not to like (as a business), start with KYC. – EX2

Ideas on how to smoothen up the customer entry and product usage are not considered with reference to the regulative requirements, but from a standpoint of the technical capabilities enabled by for instance biometric authentication data that can be saved on the customer's device.

> [In the] First phase, the customer doesn't need to do anything aside from looking at the phone. […] Now it's like basically hitting a fly with a cannon as a customer who would like to transfer maybe 1000 euro every five months will need to go through the same thing as a millionaire will need to go through. – E1

4.4 CX Challenges and solutions

The fourth identified KYC affecting dimension is related to the current challenges and potential solutions that can improve the KYC experience. Examples that came across in the data retrieval phase were evaluated based on the possibilities to implement the different solutions. Most of the solutions mentioned by the experts are enabled followed by the general technological development and trends. Fintech has a role especially through the collected data parameters, that are discussed further in the upcoming chapter. On the other hand, the databases which are used to retrieve KYC info, have a big impact on the suggested solutions. The main solutions encompass a more unified database for KYC as well as customer-initiated sharing of KYC related data, where mobile applications and so-called wearables have a role through interfaces that enable biometric verifications.

4.4.1 Existing mindsets and legacy technology as barriers

The experts agree on that the KYC customer experience, is often tied to regulation, and hard to improve without improvement in the regulatory framework and guidelines. The current market dependent differences in KYC practices are viewed as a factor, that makes improving certain KYC elements hard.

> It would almost have to be sort of a regulatory push to say, you know: *'All financial institutions, all everyone you need to get together! This is the database!'* […] This is important to fix on a European scale. *'Let's do something about it together'*. – EX1

Obstacles for fintech implementation and breakthrough

The competition between the different service providers can hinder usage and implementation of open APIs and through this wholesome cross- service customer journeys are less enabled. Open APIs are enforced through PSD2 and can, for instance, allow some of the customers bank data, such as account certificates, to be shared amongst FSPs. Yet, Open Banking seems not to be invested in as much, that it can clearly benefit the KYC experience of customers.

> It [open APIs] doesn't work that well, right? I mean, it doesn't. You take [corporate bank's] APIs right there. It's not like they have invested. […] There is still a way to go before or that is completely smoothed around open banking. – EX1

> However, those standards are completely new and not based on anything you already have. Then you would have to adopt one new technology, but you have no guarantee that the benefits will come although the investment is relatively high. – SM4

> It has not really kicked off as we expected. [...] It is complex to make those integrations and each bank is different. – EX2

Similar views by the experts rule the discussion around *distributed ledger technology* (DLT). In the case of blockchain, also the validation of the value of the block that happens in the network, is viewed to be hard to implement when it comes to KYC services. The concerns in relation to implementing new technologies evolve around similar examples as in the case of open banking and around risks that come with new, unused technology.

> There may be a blockchain in those [service's] systems, but then in a way the bigger thing is that how do we get these items into the blockchain? [...] I see that blockchain can be an advantage in many ways, but also risks, which evolve also around political dimensions, as in who regulates the regulators. There is indeed a lot of hype around blockchain, but the reality does not yet match that hype. – SM5

> It still feels a bit like a distant idea, at least for traditional players who want to play it safe. Then it is not worth going to do so [to implement DLT], but certainly in the future and for new players, of course, new opportunities and ways to stand out from other players can be found. – SC1

> If you take KYC and all the data needed around that, that is not as stable data set. It varies over time, you know. '*Are you a politically exposed person?*' …That can be dynamic. I believe more personally in a more sort of bottom up the technology driven approach to it where, all the financial institutions around Europe [would adapt] ... – EX1

4.4.2 Data standardization, regulative, and process complexity

Banking and financial services are built on top of old systems, which when being applied to new systems require focus on migration work. Unification of databases, customer systems, and the information exchange between the different systems requires a lot of upkeep, updates, and internal capabilities.

> In my experience, it applies especially to bigger banks that when the original customer systems were developed a long time ago. […] And then some systems have been bundled together and all the customer data has been migrated even though the data has been in a slightly different format. So, then it takes quite a bit of work to take advantage of such an entity. – SM1

> The IT architecture itself is a part of this. If you want to take advantage of some modern technology, then [it should be considered] how those integration interfaces are built and how that data travels between different systems. […] I think it that you need skilled architects who can build and maintain such environments and then a lot of internal staff is needed to maintain and build those different interfaces. – SM4

For services offering fintech solutions, the legacy systems and high competition in the market are also viewed as issues when trying to enter the market and the KYC ecosystem, both considering customer accrual and creating partnerships.

> Breaking through is quite difficult. [...] And then we get to the synergy between the small fintechs and the big banks. A newer fintech has to convince quite a few people out there in the big banks so that they can even start negotiating. – SM5

The non-digital parts of KYC (also mentioned in section 4.1.2) of a seemingly digital KYC process create more work also for the KYC providers and the Financial Service Providers. Due to less safe methods used for customer verification, more backing up and manual work need to be done.

> Sometimes some quite vague documents go through [the third-party systems]. If you look at that picture yourself and can't read that person's name, it has still gone through the authentication, which is worrying. […] I have learned that I will always do it manually still, to make sure it is the same person. – E2

> Many still rely on a lot of manual checks where they say: '*Just take a selfie with your phone and then we have an agent that makes sure that you are you and we do the other stuff!*' […] Then in reality you see like: *'OK, but you're biometric is actually quite weak. So, this is what you do behind the scenes? You have a team of manual people reviewing and sending input and parameters*.' – SM3

The fact that fintechs and neo banks often offer services that might not be targeted towards certain segments, which banks, on the other hand, are obliged to serve, is also considered.

> But someone has to be responsible for this initial identification to get an identification … Here the authorities should take their responsibility. For instance, when you go and pick up your passport, you would in this connection get an e-ID. […] There you need from the authorities' side to come up with a solution so that the burden is not then on these companies who have other primary customers. – EX2

The effects of pan-European applications are seen to bring potential for easier access to and more stabilized data for the FSPs, but also consumer benefits are considered by the interviewees. In general, KYC and the solutions around fintech would, according to the experts, need more guidance from local and European authorities working together with different FSPs. KYC and authentication services touch upon political dimensions. The European verification and financial services are facing new challenges and competition. Technological aspects are entwined with current global events and political development in the European infrastructure as the financial services are reliant on external factors, such as leading American financial and payment service companies.

> I see that this [European Digital Wallet initiative] and the European Payment Initiative are intertwined in many ways. That it is a clear direction. [...] I think this regarding the Digital Wallet has perhaps partly awakened to the fact that these things are not in our own hands, but they need to be gotten into our own hands.– SM5

Some solutions, such as open banking and blockchain that could bring efficiency to especially cross-service authentication through mutual databases between the actors, are not used enough yet for the experts to form unified opinions on them. In general, the penetration of emerging technologies is hard within the financial services. This seems to be partly due to technological challenges and partly due to business stakeholder's attitudes towards new or unestablished solutions.

4.4.3 Customer initiation and human-like contact

A 'bubbling under' trend, mentioned by several experts to be getting investments by FSPs, is a new type of proprietary or sovereign digital identity. The self-sovereign identity can hence support both the private individuals who need to prove their eligibility before opening a service, as well as the service provider to get information about their customer. In the designed solution, the customer can through their phone be given the prompts in relation to cross-service KYC, through which they can initiate the service to access their data through a centralised ledger or data base. The solution thus stations on similar ideologies as the distributed ledger technology, but bases on a centralised, more controlled database, which allows the customer to be the initiator of the data sharing.

> A lot of those blockchain, distributed ledger… a lot of those initiatives are built on that. […] I'm sure there are other types of more 'centralized ledger' type of things that can also work for this purpose. […] It's sort of based around blockchain and blockchain technologies and decentralized ledgers. – EX1

The role of eIDAS and other established standards within Europe are described to benefit the development of the solution. The development of the eIDAS regulation is also seen to enable consideration towards the full KYC experience. Also, in the case of more 'customer driven' solutions, such as the self-sovereign identity, the customer's capabilities, and willingness to use the services or the applications, hardware, and devices that enable it, are echoed as factors that impact the customer experience.

> Having that portable KYC would mean that when used at another bank, they can simply reuse my attributes, my verification from the other bank, and be shared through a secure protocol. [...] I can just do it (the authentication) once and use it all the time. – SM3

> A thing that is already coming is this Self-Sovereign Identity (SSI), sort of a distributed identity management. It's also part of the eIDAS process, which means that it will be developed and then you would have a truly digital identity that you could utilize in different contacts. – SM2

Help-when needed and 'human-like touch'

When digitalizing channels and automating actions, also agreements and other contexts in the service relationship, that need to be recorded and signed, should be considered by the FSPs. An option for the missing live human-interaction can be in video calls, but also more developed touchpoints based on developed machine learning or artificial intelligence are mentioned.

> Like a chat bot or conversational AI platform […] It's a superhot trend and a lot of, both government and private service providers, are looking at it because they understand that the new generation, millennials, and so on…They are especially keen on having that type of faster response and the chat bot in a way can replace that human interaction in a in digital world – SM3

> That may be through some application, it may be through the traditional means of electronic identification, online banking, or mobile certificates. In general, Corona has shown that more and more is being done over video. But then the fact that they are face-to-face trade elements, so they have to be digitized at the same time. – SM5

Certain cases remain, where the customers should be able to get help from agents or through touchpoints that can simulate the human contact as far as possible.

> Typical examples are perhaps for some politically influential person, where, however, processes are needed. If anyone, even the Prime Minister, wants to sell their vehicle, then it must be possible in a way, even if they do not get through [the onboarding funnel at once]. Then it is needed as a backup there. – SC1

> We already have practically all the tools there for that automation, but a person must continue to be involved [in the process] in my opinion. In a way, we can't take everything to the point [that it is automated], no matter how cost-effective it is. We will always have situations where people are needed. And, of course, people are happy to deal with people. – SM5

4.5 Factors that impact the KYC experience

The experience that the customer has during KYC, is intertwined around many aspects mentioned in the prior sections. Yet, specific factor, that affect the customer's emotions and expectations can be identified from the interviews. The fifth identified aggregate dimension is hence mapped to evolve around the impactors of KYX, which forms the KYC experience. Many aspects under this dimension relate back to the local requirements, where automation or full digitization is not possible. On the other hand, cultural and political aspects, which affect the flows also impact the experience. Customer know-how, digital benchmarks, and need for safety and convenience is also emphasized.

4.5.1 Customer-driven communications to meet on-demand and emotional needs

The benchmarks of digital and mobile solutions create a widening gap between old and new and between how customers perceive the traditional solutions. The private expectations of the individuals who use different digital services and data storage tools, applications and their interfaces and functionalities, are affected by service delivery capabilities of fast reacting services, where high individualisation is possible in the service. This creates constant need for FSPs to evaluate their different touchpoints to enable improved customer experience. This, on the other hand needs to align with the needs of the 'on demand' market trends and expectations.

> Especially when the customer experience has improved [generally online], it leads to expectations growing all the time. That when the whole world kind of speeds up this thing, the expectations are that it [opening a service relationship with an FSP] would be as easy as any other thing. It may not be as easy to sign up for TikTok to get a bank account, but still... – SM2

> To keep away from sort of the Googles and the Facebooks of the world, as they are not direct competitors by any means in this space, but they set the bar for customer expectations. – E1

> Everything goes against digital. […] I mean then, you can do it at home but that is almost the same as you would have to go into the bank and show your passport. – EX2

On-demand, needed, and customer-driven service

Normally, the customers want to start a relationship with the FSPs for practical reasons; for instance, account openings are applied for when the customers need to transfer funds, or in connection to loan applications. In such cases, the expectations from the customers are that the process should be quick and the onboarding to happen instantly.

> I feel that most people seem to be in a hurry. They might start the whole process pretty much at the last minute. Like, '*I am opening an account today and I have to send my first bill tomorrow'*, which isn't that realistic. – E2

The more appealing, interesting, or necessary the service is for the customer, the more likely it is that the customer finalizes KYC. Also, the cultural variances considering behaviour online and expectations towards services affect the willingness of customers to perform certain actions.

> It probably depends so much on the service. As an example of what we are working on right now, it [doing KYC] is the only condition to get inside the service or be able to do anything at all. And if it's a significant marketplace like this, customers do not drop that easily. They want to list their product there and get their money out of it. – SC1

> It [the customer action] was then mainly related to what is the most common way of doing things in the country where the customer comes from and what people are used to. In Finland, for example, if you would need to make a video call, a lot of people would wonder why as everyone is used to the fact that there is a mobile authentication and electronic bank identification. – SM4

4.5.2 Non-unified regulation and requirements for KYC as a CX barrier

When things are planned to be done digitally, many aspects of the non-digital world still affect the customer flow and the conversion rates of successful onboarding. The document-based authentication, which is normal in Central Europe, comes up often as an issue, which, in addition to being slow, adds risks for data breach and forgery.

> One acquaintance was opening a cryptocurrency account. He was authenticated by reading the passport optically with the phone's camera. He then had to take a picture of his electricity bill, or some similar utility bill to verify that his address was the same one he reported. That it's not terribly mature. – SM5

Although, as outlined in section 4.1, the customers should know, why they should go through KYC and what it is based upon, the requirements of KYC should not clog the customer flow. Functional capabilities and the expected speed of the process should instead be emphasized, as far as possible considering the device and local controls.

> I think if you become a customer somewhere, you need to give some information. And that you get an explanation of 'why we ask; '*That we need to identify you, that it is legal requirement and that in this way we secure both you, but also your payment services'*. – EX2

> No one is going to do mobile onboarding unless it knows it will take 5 minutes maximum. – SM4

Security and safety are mentioned as underlying dimensions that must be emphasized in the service in the digital time. These dimensions are highlighted especially for services that are more sensitive and Covid19 has brought its own requirements also for the personnel handling the customer data due to a shift to remote work.

> The feeling of security is really important considering whatever you are being asked for. It should bring a feeling of security, it should be in the context of that thing [that is being done], plus then it should in that way bring that sense of security about what is being asked: *'Because I am doing this thing, therefore this info is needed'*. – SM4

Safety is presented as a flip side that can be communicated as a positive option to differentiate from services that promise quick solutions to prospect customers. In addition to trust and security dimensions, functionality is highlighted. Motivating and communicating KYC is a balancing game, considering the customer's patience and interest.

> If you get a 'one-click mortgage' or a 'one-click loan', do you really want to partner up and get a loan from a provider or banking provider that is willing to do that sketchy terms with the € 300K loan? [...]

> I think people, generally, if it's serious stuff, are willing to invest the time to do that process. But it needs to be, available and needs to work. – EX1

The priorly discussed solutions, that would be customer-initiated emphasize the customer's own decision making and ownership of data. As a theme, this relates back to the customer's willigness to try out and trust new services. A more comprehensive direction of the regulation and upcoming solutions, are seen to bring improved customer experience through the customer control of their data.

> For example, the data would be such that you can limit what they [the service providers] do to your personal information in various services… – SM2

An underlying issue that affects customer experiences during KYC, is according to the interviewees related to the experienced vagueness in the current regulations. The ambiguity around the regulative definitions and boundary conditions is seen as one reason that creates poorer customer experiences, because FSPs, and especially established institutions rather avoid than take risks when they apply the KYC processes. Although the FSPs might have the desire to improve the customer experience, the open questions around guidelines, often hinder this. It is expected that stricter definitions and guidelines can, in fact, improve the customer experience of KYC, as this allows a more straightforward approach for the FSPs when implementing the rules in their processes. To establish this, a regulative 'push' is hence motivated to support the FSPs, but also the customer experience.

> But then, once they are more clearly defined; what is needed; what are the boundaries and conditions, and what are the definitions, of what is meant even for a particular process, such as authentication. [...] We then know them, and within them it is easier to act. – SM2

5 DISCUSSION

The aggregate dimensions based on the first order codes and second order themes that are discussed in the previous chapter, outline five dimensions that affect the KYC onboarding experience and the required considerations by the service providers. The dimensions include themes related to regulative, technical, and business decisions, industry trends, multichannel delivery, solutions, hindering aspects of fintech development, as well as outline the aspects that impact the so called *KYX factors, the customer experience during KYC*. Based on the research, options, and suggestions on how customer experience can be additionally improved during KYC through the help of technology and possible obstacles are evaluated further in this chapter. First, the chapter gives a direction of the development within fintech, KYC, and customer expectations. Suggestions, options, and propositions are followed by the discussion. Conclusionary, the chapter ends with outlining the limitations, interesting angles for further studies, and answers to the research questions.

5.1 Needs and requirements in the market

As discussed in the theoretical part (cf. Parola 2021) and during the interviews; functional, business driven, but regulatory compliant KYC flows require many considerations. Effective flows are built together by several parties in the 'KYC ecosystem'. KYC services are not likely to be made inhouse by one single service provider, as the different functions require specific expertise, networks, infrastructure, validation, and development of the interfaces. Planning the KYC funnel needs to be done case-by-case, with consideration and calculations on a business-by-business basis. Solutions, that are built on the trust network, biometrics, and mobile capabilities utilizing machine learning and AI can be highlighted as customer-friendly and scalable through the gathered data.

Crucial KYC evaluations need to consider inhouse delivery versus outsourcing work, local laws, and needed licenses. As business needs change, changes to the KYC tools are normal. The business evaluation needs to be constant and driven through different measures that calculate the effects of the different parts of the KYC flow and how it corresponds with new customers who start using the service. As such, measuring KYC onboarding steps and success tangents with prior theories on how meeting customer

experience and expectations can be leveraged through service quality and performance measures for digital services, such as Sitequal, E-SQ, and e-SERVQUAL (cf. Herington & Weaven 2009). Tracking the customer experience during KYC onboarding through metrics is, based on literature sources and the interviewee perspectives, still undervalued in many FSPs, although it is acknowledged that KYC has a big impact on the customer journey.

Although regulation affect all aspects of the financial services, tightened regulation can be a benefit for FSPs when aiming to solve many aspects that priorly have been steered by the rationale of operating with a 'risk-based approach'. As mentioned also in some of the interviews, currently the European Commission is re-iterating some of the KYC criteria in their *eIDAS 2.0 proposal* (European Commission 2022). Potential improvements to the KYC onboarding process that can follow, benefit the development of widespread electronic identification and improved guidelines and infrastructure for FSPs to operate in. Yet, many of the aspects of the proposal consider public services and leaves private service providers out of the scope. Open questions also arise around how banks and fintechs can implement and benefit from, for instance, the proposed EU wide digital wallet (European Commission 2021). eIDAS does play a big part as a referenced framework by the interviewees when evaluating tools and parts of FSP's KYC onboarding flows. The regulative aspects related to KYC represent both a challenge through the less pragmatic assessments of the regulators, as well as opportunities through improved guidelines that can support enhanced customer experience for the customers of the service providers.

As outlined in the prior research (cf. Kumar & Lee 2021), the all-encompassing digitalization creates risks in the digital channels and platforms. As customers are more accustomed to giving out personal information, considerations of what info should be asked and in which touchpoints, need to be rigorous. When operating in an environment, where malicious acts are increasing, FSPs need to minimize risk and loss of data for the customers as well as reputational damage. Risk affects the FPSs businesses on all aspects, and companies need to define their so-called risk appetite when making business decisions. These choices can affect, for instance, acquisition channels, messaging, as well as definition in terms of preferred customer segments. The decisions related to the wanted customer base should also consider the preferred and developed interfaces as well as

communications channels through which the customers are pulled into the KYC onboarding flow. To avoid unwanted customers, the implementation of rules and automation is at its core but does not solve all onboarding questions, especially for specific ‘corner cases’.

During the KYC process, the reasons for KYC to be taken seriously and for being implemented in each KYC process and step, should be communicated clearly to the customer. The security of the customer, their data as well as the safety of their assets and the warranty in relation to the FSPs capabilities to safeguard these, are mentioned by many experts as important focus points. Businesses often struggle with balancing this communication, as it must always consider not ‘tipping off’ the customer in case risk in the potential customer relationship is detected during KYC.

In addition, considering service delivery channels is vital as it will help the customers to evaluate the impact of the KYC process for themselves. Planning a functional and customer friendly KYC onboarding flow is dependent on knowledge of the prospect users and their *preferred methods and platforms* to handle finances. Although every prospect customer does not own or prefer using a smartphone, the quality and efficiency that can be achieved through mobile often override the needs of this customer segment. The business evaluations should consider *inclusiveness* and *accessibility* when it comes to platforms, such as mobile before web browser, and communicative aspects to be adapted to a level that is appropriate to the target group. In this work, fintech companies often benefit from serving more niched segments, who they can target and adapt their communication towards, starting from marketing through banners and ads in the digital space.

In general, the comparison of fintechs, payment service providers, and traditional banks is hard in relation to service delivery touchpoints and onboarding requirements, as these vary amongst the different service providers. This impacts the business decisions related to which types of KYC onboarding elements can be used. The banks have a legal responsibility to provide consumers with a bank account. Hence banks are obliged to serve wider demographics and segments through core banking and must adapt to a wider audience and stricter risk evaluation. Segmenting the services and products clearer could create chances to plan, reiterate, and distribute KYC per the needed product and customer segment, which has the potential to improve the KYC experience. This approach could

potentially also allow premium services to certain segments and allow defining retention metrics to support customers stuck in the KYC flow.

5.2 Megatrends affect KYC expectations

As mentioned in the introduction (e.g., in Aware, 2021: Accenture, 2019) and backed up in the interviews, customers of the digital time are prone to test and compare different services, which means that high drop-out rates during the KYC process are quite normal for the service providers. KYC should, in this context, be considered with benchmarks to other general user experience standards, and to the high competition online, where customers can easily compare many products to each other. The megatrends of mobile and remote services affect the customer's expectations of service availability, swiftness, and real-time communications. The benchmarks highlight the shift from traditional delivery channels including email correspondence and dependency on personnel, to services provided through platforms, which can encompass wearables and mechanisms that provide instant feedback to the customer on their inputs or choices.

Today's KYC processes are often hidden inside other services and a prerequisite for that, the various services can be used. The role of mobile is immense when considering the abilities to use the inbuilt mechanisms in the hardware and the additional software specific capabilities for verifying the customer during KYC with the help of biometric data. The trend of shifting services online and especially to *mobile-first* therefor represent a trend driven business decision, where high scalability and capabilities of the supported devices give the service quicker penetration in certain segments, while other segments are left behind in the consideration. Customer experience in mobile KYC flows should hence consider *service availability* through, for instance, different device version support and backups. As its best, mobile and wearables have the potential to *democratize* possibilities for KYC onboarding through the wide usage of the devices globally as highlighted, in both prior research (cf. Komulainen & Saraniemi 2019; Mbama et. al 2018) and by the experts. This can support customer experience through factors that are affected by consumer expectations of *convenience* and *flexibility*.

The private expectations of the individuals who use different digital services and data storage tools, applications and their interfaces and functionalities are affected by service delivery capabilities of services such as Google, Instagram, Facebook, and other fast reacting services, where high individualisation and interactions are possible in the service. Still, as revealed in the interviews, some segments lack the newest features and capabilities in to use the latest technology, which drives service providers to a situation, where they might need to support many interfaces for KYC. For more traditional players, fintech companies and deepened c*ooperation across the partner ecosystem* gives opportunities to develop modern and more niched services, which allows triaging and possibilities to serve new segments. This allows testing out trends and new technologies a 'lower barrier of entry' before potentially shifting the service or business focus towards digital.

5.3 Multichannel

For the service provider's point of view, the digitalization and followed platformization creates a race, where the different service providers battle for the customers and aim to provide the possible best customer experience. Improving different customer touchpoints is hence vital in the race for the customer's attention and their patience. In this battle, consideration on the *total experience* (Gartner 2021) and full customer journey (Lemon & Verhoef 2016) must be considered and include touchpoints from before the customer even lands on the service site, such as marketing and communications, and to tools offered to the customer to interact with the service provider once they are onboarded. As KYC consists of many pieces of data that need to be accrued from the customers, the lack of inharmonious internal processes at the FSPs create overlapping workflows. This counteracts a seamless customer experience, affect the personnel experience, as well as the customer's perception of the service provider.

The interviews and prior research incline, that focus on multichannel delivery, where data runs more in real-time between both the customer and back-office platforms seems to be a point of development for many Financial Service Providers. The total experience touches upon employee experience, and through this on internal tools and capabilities of the service provider, which can also improve the employee experience. In this work, the multichannel approach must consider the safety of each tool and platform and mitigate

breaches of data of individuals, their financials, as well as the employees, and the used systems of the service provider.

Especially customers of less traditional payment and financial technology services, might not know that the KYC process is needed for service access. In such services, the customer expectations might lean towards faster services as compared to traditional service providers but should be managed by clear indications on what is needed from the customers, and why, through initiations that support each other. Communications can be supported by online banners, mobile push-notifications, email campaigns, intelligent chat bots, and other guidelines in the service, which push the customers on different automated paths. Video calls or shared screens together with an advisor could be considered as 'premium touchpoints' where customer experience, integrity and data security need to be considered at the highest level. The communication should be focused on visual guidance that is supported by triggers that activate in the touchpoints when the customer gives inputs to the service. Services need to consider what makes sense to display so that the usability of is not hindered, but also to give enough information to the customer about the applied logic in their service, without revealing parameters that affect the customer risk evaluations during KYC. *Harmonization of the data* of the systems, how it is displayed in all tools and what kind of triggers different parameters create, seems vital for improving the multichannel delivery as well as internal effectiveness, but is a current challenge.

All the customer touchpoints, tools, and interfaces should be examined carefully to learn as much as possible of the customers. While marketing measures can show great penetration from an ad to a service, measuring click-through rates is inadequate as the customer starts to create revenue only after they are onboarded. Thus, focusing on onboarding data metrics in the different touchpoints should be a part of the multichannel approach, but consideration must be also on the *end-to-end service delivery* and how the product appeals to the customer once they are onboard.

5.4 Improvement to KYC experience: solutions and options

Automation and real-time 'discussions' with the customer inside the service are seen by industry experts to support the costumer journey and the KYC experience. Support for

the choices that the customer makes during KYC, can be helped through rule-based validation and machine learning algorithms (Jayasree & Balan 2017). This allows a system to only accept certain parameters or to categorize the customer according to their inputs. This allows real-time feedback and possible featurisation and personalization of the customer messages, which was pinpointed to be important by the interviewees. Through usage of artificial intelligence and machine learning, optimization can be done to support accuracy and conversational *human-like capabilities*.

The so-called *hyper automation* (Gartner 2021) can benefit the risk appetite that is decided for the service. This is due to capabilities of automation to, based on rules set by business and regulatory decisions, decline, or accept customers in an effective way. On the other hand, through different implementations, the customer group that is accrued can also decrease through the implemented rules. As highlighted by the experts, the decisions are strategic, and align with earlier customer segment evaluation theories related to technology and innovation acceptance (cf. Rogers 2003). Considerations are needed, for instance, to the possible back-up options for customers who are affected by the rules and in case they are onboarded in a manual way. Automation often effects edge-cases, that relate to the predefined higher risk evaluations but represent a big part of the customer base.

Although *electronic identities* are available as authentication methods in the Nordics, the Central European services are relying on usage of tangible documents and identification cards during KYC verification. Replacing the service access method with electronic identity verification approaches or electronic reading of documents with a phone would bring security and accessibility to the customers. Simultaneously, more digital solutions would bring scalability for the service providers. The fragmented European regulation and solutions are today, as agreed by the experts, the main showstoppers for these types of fintech solutions. Once the initial KYC and access to services are done, the digital flows can continuously support the customers in their actions, as the system can through site cookies and other mechanisms remember the customers inputs and suggest different actions on behalf of the customer. The verification steps that have initially been taken by the customer during KYC, will allow *easier access to the service later* for the customer through usage of *biometrics* and other PSD2 compliant login solutions.

Many solutions can steer the efficiency of the KYC process and improve the customer experience during KYC onboarding. Networks, which combine identity services of bank IDs and mobile verification, are frequently mentioned as developed ways of KYC authentication that can solve issues related to manual processes and document signing. Validation of verification documents digitally instead of optical mechanisms, has huge potential and considers factors related to security and integrity – critical measures that are emphasized in the data. Replacing current standards and practices is yet not possible in all the European countries due to local differences in KYC requirements. As highlighted by the interviewees, in many cases, legacy systems, integration of data between the services, technology acceptance, and even differences in efficiency of the data transmission networks, are the main hinders for new solutions to be accepted and used in the markets.

The interviewees aligned on that new initiatives around financial service infrastructure, such as Open Banking, which has the potential to replace for instance the time-consuming retrieval of customer account certificates, have been met with scepticism and resistance in for instance leading banks. The stagnancy and resistance seem to relate to attitudes and competition as sharing data can be a risk to lose CRM advantages. Yet, new approaches that approve this type of data sharing through customer-initiated actions, are on their way through centralized actors and eIDAS. Industry experts are aligned on that these solutions are more likely to gain market adaption, as opposed to decentralized options, such as blockchain. The stiffness in applying new technologies into existing ones, in addition to the insecurities and lack of rigorous knowledge and slow testing from the regulators side, incline that blockchain will not reach the masses soon, as suggested in some of the prior research (in Mills et al. 2016: Gartner 2016).

5.5 KYX factors

KYC experience seems strongly related to the customer's *need* for the service. Normally, the customers want to start a relationship with the FSPs for practical reasons, and the expectations from the customers tie back to quick service delivery and decisions. Positive drivers of a good KYC experience are highlighted by the experts as the *service's capabilities* to 'understand' the customer context and its' functional capabilities, which relate to modern usability and user experience evaluation. *Expectations management* is

highlighted as an important factor, that can improve the KYC experience when managed well. The mechanisms supporting expectations management can be supported by both technical and communicational decisions, which give the customers *personalized* indications on what will happen next in the service. As supported by the interviewees, the guidance mitigates customer created bottlenecks.

The customers eagerness and *willingness* to go through all the required steps during KYC is related to how much they need the service, but also *curiosity* and service comparison is noted as characteristics that drive the customers towards the onboarding funnels of the different service providers. These dimensions can be considered product centred and are linked to prior research around values that affect customer experience and the identified service value categories and dimensions (Bauer et.al. 2005). Customer *patience* and *motivation* to go through service specifically designed onboarding steps is also accentuated by the interviewees. These dimensions might need encouraging in the digital channels and benchmarks can be sought from for instance social media platforms and sales platforms. The KYC experience tangents with the *overall product experience*, where user experience dimensions are tied to the *additional features* and *value* that is expected to come with the product as mentioned in prior and seminal research (e.g. in Bauer et.al, 2005: Parasuraman et al. 1988). These values and features can also be formed by the customer's experience of the value that they get when using the service (Bolton et. al. 2018). *Functional qualities of the service delivery* were emphasized by the interviewees; KYC must work through the customer given inputs be *in context with the customer's actions* as well as *cultural norms*. It must consider the platform and interface it is being conducted through and leverage real time communication towards the customer, by emphasizing safety, yet another dimension highlighted in the data and research.

The service delivery in terms of KYC can significantly be speeded up depending on in case the customer has an electronic identification, which proves their identity and bases on the prior authentications done by, for instance, banks or in specific registries. The role of the e-IDs and the Finnish trust network (European Union 2014) is repeated as significant by the interviewees. The varying ways to implement KYC based on local requirements, might through various touchpoints increase friction for the customer across the European region. On the other hand, the *cultural aspects* tangent with the customer's

expectations, as the customers are accustomed to expecting certain types of digital service deliveries depending on the region they reside. On this note, the regulative requirements are motivated to mention as a part of the specific *KYX* paradigm, *KYC experience.*

The expert interviewees highlight the fragmented European KYC solutions as a dealbreaker for creating harmonious and easily scalable solutions. The needs to develop more intact services across the region is highlighted in the geopolitical environment, which has changed in the EU after the data gathering. The new needs to develop KYC processes for supporting, for instance, unbanked population or refugees, give the KYC experience work new dimensions, which have not been in the scope of the research. In addition to regulation and driving market demand, *political dimensions and the role of decision-making bodies* have a big impact on how the KYC onboarding can be delivered.

New ways to serve the customers, which rely on *customer-initiated* service delivery are, by the experts, seen as one possible solution, that can promote easier service delivery especially for cross-market and cross-services. This will be increasingly important through consumer demands on frictionless service delivery. The interconnected *key elements that affect the KYC experience during onboarding,* that have been identified through the prior research and interview data, are mapped in Figure 9. All the elements that affect the customer experience dimensions and their connection to the KYC onboarding funnel are represented in a closing image in the appendices (3).

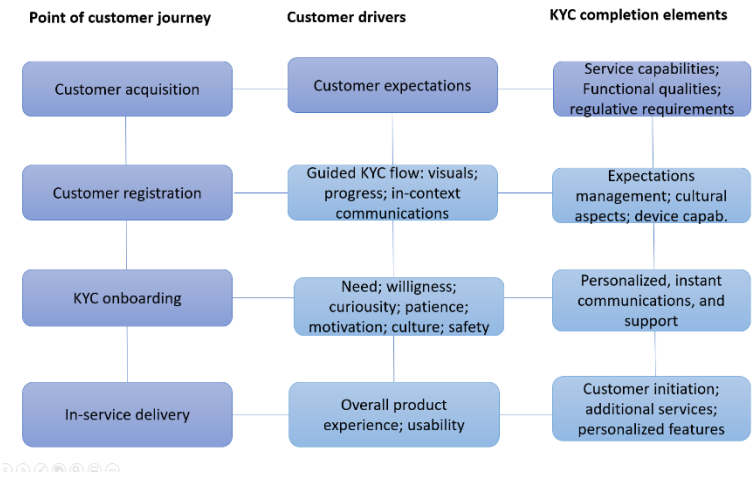


Figure 9: Identified KYC experience factors.

5.6 Limitations and further research topics

The issues of onboarding in a regulative field impacts many financial service providing companies. For instance, transfer services, and online payment platforms struggle with similar issues in customer and merchant onboarding as traditional banks and other FSPs. The research focus on onboarding limits the results of the presented use cases and services, which could be examined more in detail by limiting the research to a specific type of FSP or company. In this research, different FSPs were intentionally clustered collection of rigorous data, that allowed comparing the challenges and solutions for different types of service providers. As discussed in section *1.3 Research scope and limitations*, the details of the technical solutions are not in focus and the research limits to presenting the dependencies between data, the implementation options, and the technical solutions.

KYC onboarding data is revealed to support especially the ongoing and enhanced due diligence activities of the FSPs through machine learning and AI. The optimization parameters are not in focus of this research but would make interesting topics for further research. The prior research and interview results supports developing clearer indicators for KYC success. The measures were not a focus of this research, and the correlation between measures of successful KYC and further service engagement could be examined in further studies. As the data also pinpoints the costumer's role as a potential blocker for fintech or super-app adaptation, this dimension could deserve more focus through, for instance, consumer research. Also, the regulators' role as the steerers of KYC has an impact on the total experience and could be examined more closely with reference to current geopolitical fluctuation, as discussed further in the conclusions.

5.7 Responses to research questions

This research contributes to the current knowledge around customer onboarding flows and focuses specifically on how they can be improved for customers of regulated, financial entities. The focus was on the current challenges for customer friendly KYC flows online, and on how financial technology can be supportive for the KYC process. Through the research results, fintech presents itself as an enabler for digital financial services growth through the vast networks focused on specific financial service needs, cases, and

specific data. Fintech allows solutions for both the customers and the Financial Service Providers, and hence can present as a competitor and enabler for FSPs. Based on the research, each company, also fintechs, have somewhat similar issues and struggles related to providing customer friendly KYC flows. The biggest differentiator affecting the solutions, is the possibility to implement e-IDs. The main identified challenges are related to non-harmonized data, legacy systems, industry stagnancy, regulative vagueness, and differences in market maturity for adapting to specific fintech focused services. So called KYC ‘edge cases’ are revealed to take up a lot of business evaluations and resources, as automation, which is one of the more obvious solutions, cannot be implemented for everything. Thus, the discussed KYX dimensions are affected by business, regulative, and technological evaluations, where the customer experience can be improved through case-to-case evaluations of needed parameters, inputs, implemented modules and solutions.

CONCLUSIONS

The cruciality of securing a safe and reliable monetary and financial system benefits all players in the financial service network. The underlying reasons for service providers to take all the aspects of KYC seriously, is a benefit for the future customer. Digitalization, enforced by Covid19, the high level of personalization of digital services, as well as speedy deliveries of softer authentications in different service and social platforms, affect the customer expectations and creates a market demand, where the power is in the consumer's hands. These megatrends affect the whole marketspace and digitally provided financial services need to follow new logics, where the consumer empowerment affects consideration of acquisition tools, platforms, and delivery time, which must align with all service touchpoints of the KYC funnel of the FSPs.

Safety, security, and speed are highlighted as differentiators, which the FSPs need to implement in the battle for customer engagement and stickiness. Yet, the KYX factors are a result of numerous inputs and actions. The different service funnel stages interconnect with service capabilities and functional qualities, the customer's motivation, curiosity, willingness and need to get onboarded to a specific service, culture-related expectations, and customer expectations management. Many aspects can be nurtured by multichannel communications, visual representations, and displaying the progress of the KYC process. Overall, the discovered KYX factors align with current views on customer experience trends, where data, mobile and the customer is king, but also the importance of personnel engagement, tools, and empowerment is highlighted.

The KYC onboarding experience affects the wholesome overall product experience, which can be viewed to affect the customers willingness to engage further with the FSP's services and affect the FSP's performance. Possibilities to personalize the customer interface, which partly can happen already during KYC, could be one option for creating the wanted customer engagement and stickiness towards the service provider. Especially non-traditional fintech companies can benefit from their market position when trialling different approaches. Artificial intelligence and machine learning algorithms support individualization and additional servitization of KYC already, as well as they support and boost the efficiency of personnel. By recognizing possibilities by customer inputs,

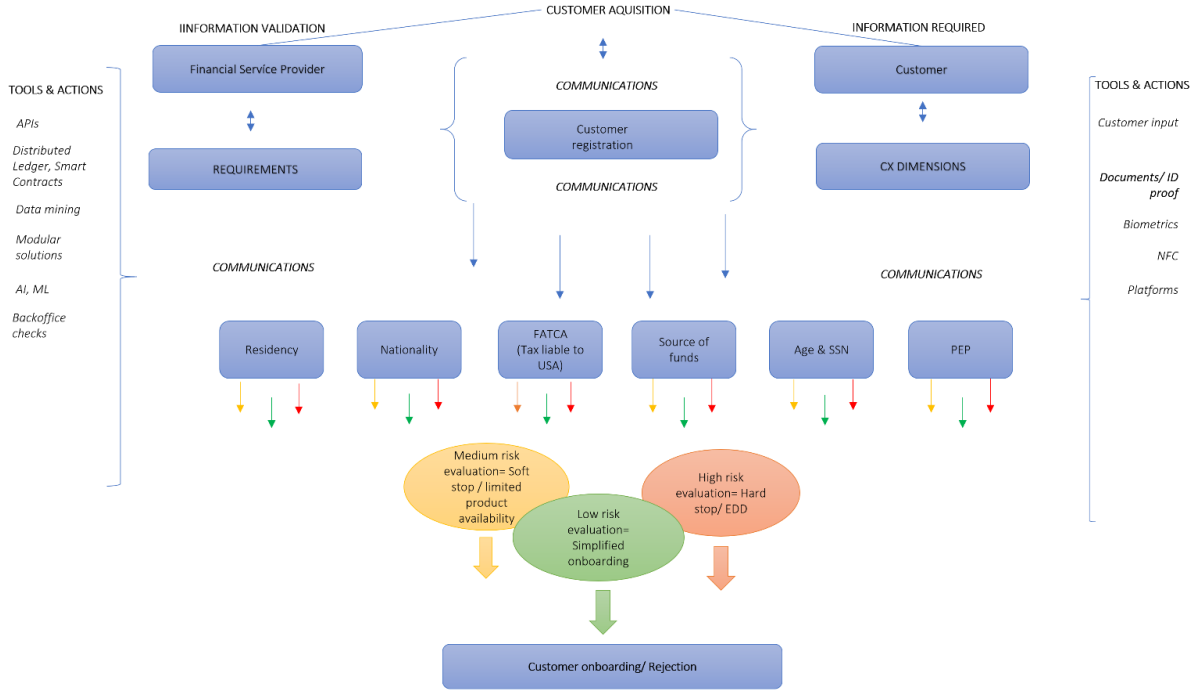
modern systems can give suggestions and value-adding and differentiating predictions to the customer, especially considering parameters that relate to the financial history of the customer. For this, specific fintech providers play a big role. Usage of KYC data is not possible for sales pitches online, yet the customer might be given previews on how they can use the different service features without needing to be fully onboarded to see them. Automation allows more personalization and faster response, which can boost the feeling of security and wholesome communications in several service touchpoints. Diligent data management is in the core for the FSPs and requires holistic considerations to the customer journey and interfaces, as well as refurbishing legacy systems in the industry.

The new platforms require FSPs to account for the balance between risk and customer experience. In addition, the development towards mobile KYC and financial service delivery shifts the customer experience to questions around accessibility and service egalitarianism. This work needs to be guided through the authorities and connects the KYC onboarding experience to the European Commission's initiatives around more synchronised services and a 'digital Europe'. Here, for instance, network speed and connectivity are highlighted as points of improvement. In addition, more swift and less bureaucratic approaches by the regulative and political instances are needed due to the current development in Europe with increasing people in need of swift cross-border and cross-service KYC. The cruciality for adopting easily accessible and 'democratic' KYC services within the EU has risen due to the increasing geopolitical instability caused by the war in Ukraine, which drives the need of accessible core financial services for people in humanitarian need. In this matter, customer-initiated KYC checks with more open access to data for the KYC, is a possible solution of interest, that could through increased business analysis be pushed by governmental bodies to support current KYC methods and capabilities.

Harmonizing solutions to support electronic identification seems to be a way out of the dilemma of the fragmented European KYC provision but requires more work and focus from regulators and governmental bodies across the region. The focus of this research has been, how fintech solutions can support the customer experience during KYC. A natural follow up question would hence be how regulation and political steering supports fintech in the crucial task to enable customer onboarding with less friction yet ensuring the service's safety immutability and other security aspects of the Financial Service Provider.

APPENDICES

1) Summary of KYC experience elements and tools



2) Pre-defined semi-structured interview questions

Customer experience during KYC – elements & dimensions

1. Which are the key elements of good customer experience during digital KYC?
2. What are the biggest challenges for FSPs /your business in this context currently?
3. How are the possible restraints in the KYC funnel dealt with considering customer experience?
4. What do you think might improve customer experience in the onboarding context of KYC?
5. How is the customer experience measured in the context of KYC onboarding? When is KYC considered successful?
6. Considering customer experience in e-/mobile banking/financial services, what do you think affects it?

Churn & negative business effects

7. What about customer churn? (what are the measures?)
8. How do you know what happens after KYC onboarding in the customer end?
9. What kind of customers cannot typically get through KYC? How are the situations handled?

Customer experience during KYC – tools & solutions & planning / building the funnel

10. What can be done to improve customer experience during KYC through usage of fintech solutions to support the customer experience?
11. What is the role of customer data?
12. What is the role of automation?
13. What is the role of platforms / modules?

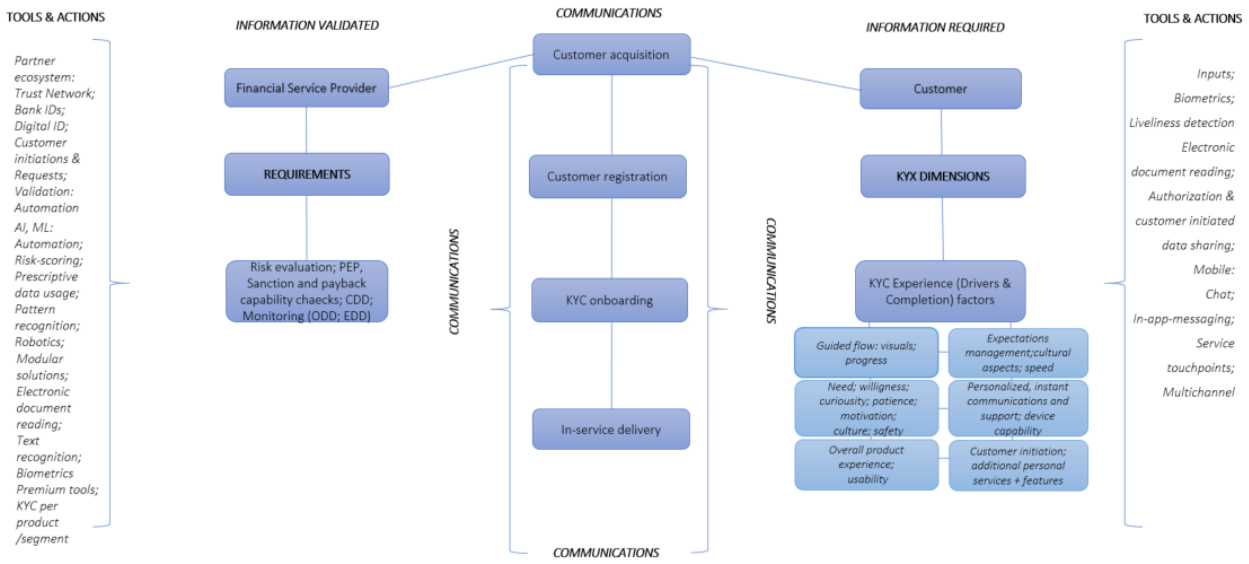
Emerging technologies & new solutions

14. According to your knowledge, how could blockchain, Distributed Ledger Technology, smart contracts or secure signing benefit the customer experience dimensions of KYC?

15. What risks vs. benefits do you see for the customer experience when using tools based on Machine Learning or Artificial Intelligence (i.e., optical character recognition, biometrics, etc?)

16. Which other emerging tools/solutions do you find beneficial in the context of KYC onboarding considering customer experience?

3) Map of KYX factors



REFERENCES

AltecSoft.com, 2017. *Fraud Detection: How Machine Learning Systems Help Reveal Scams in Fintech, Healthcare, and eCommerce.* [Whitepaper] Available at: https://www.altexsoft.com/whitepapers/fraud-detection-how-machine-learning-systems-help-reveal-scams-in-fintech-healthcare-and-ecommerce/
Accessed: 16.11.2021.

Amin, M., 2016, Internet banking service quality and its implication on e-customer satisfaction and e-customer loyalty: *International Journal of Bank Marketing*, Vol. 34, No. 3, pp. 280-306.

Aware, 2021. [White Paper] *Improving Financial Onboarding and Authentication Through Biometrics.* Available at: BranchlessBanking-Knomi_WhitePaper_0821.pdf (biometricupdate.com) Accessed at: 02.01. 2022.

Bauer, H., Hammerschmidt, M., and Falk, T, 2005, Measuring the quality of e-banking portals: *International Journal of Bank Marketing*, Vol. 23, issue 2, pp: 153-175.

Bilali, G., 2012. *Know your customer - or not*, University of Toledo Law Review, Vol. 43, issue 2, pp. 319-366.

Bolton, R., McColl-Kennedy, J., Cheung, L., Gallan, A., Orsingher, C., Witell, L., and Zaki, M., 2018. Customer experience challenges: bringing together digital, physical, and social realms: *Journal of Service Management*. Vol. 29, No. 5, pp. 776-808.

Discover® Global Network, 2019. [White paper] *Fraud Prevention – Balancing Security and Usability.* White Paper. Published: 29.10.2019. Available at: Balancing Fraud Prevention and Usability | Discover Global Network Insights. Accessed: 29.07.2021.

eIDAS, 2014a. [Online source] *Regulation (EU) No 910/2014 of the European Parliament and of the council of 23 July 2014. Chapter 1, Art. 3 (16).* Available at: https://www.eid.as/#article3. Accessed 16.07.2021.

eIDAS, 2014b. [Online source] *Regulation (EU) No 910/2014 of the European Parliament and of the council of 23 July 2014. Chapter 2, section three, Art. 17.* Available at: https://www.eid.as/#article17. Accessed 16.07.2021.

European Banking Authority, 2021a. [Online source] *Guidelines on customer due diligence and the factors credit and financial institutions should consider when assessing the money laundering and terrorist financing risk associated with individual business relationships and occasional transactions ('The ML/TF Risk Factors Guidelines') under*

Articles 17 and 18(4) of Directive (EU) 2015/849. Available at Final Report on Guidelines on revised ML TF Risk Factors.pdf (europa.eu). Publication date: 01.03.2021. Accessed: 07.12.2021.

European Banking Authority, 2021b. [Online source] *EBA sees rapid growth in the use of digital platforms in the EU's banking and payments sector and identifies steps to enhance the monitoring of market developments*. Available at: EBA sees rapid growth in the use of digital platforms in the EU's banking and payments sector and identifies steps to enhance the monitoring of market developments | European Banking Authority (europa.eu). Publication date: 21 September 2021. Accessed: 01.12.2021.

European Banking Authority, 2021c. [PDF] *Report on the use of digital platforms in the EU and banking sector.* Published: September 2021. Available at: EBA Digital platforms report - 210921.pdf (europa.eu). Accessed: 01.12.2021.

European Banking Authority, 2020. [Online source] *Financial innovation and fintech*. Available at: Financial Innovation and FinTech | European Banking Authority (europa.eu), Accessed: 01.12.2021.

European Banking Authority, 2018a. [Online source] *Glossary for financial innovation.* Available at: Glossary for Financial Innovation | European Banking Authority (europa.eu). Accessed 07.12.2021.

European Banking Authority, 2018b. [Online source] Available at: Anti-Money Laundering and Countering the Financing of Terrorism | European Banking Authority (europa.eu) Accessed: 27.09.2021.

European Commission, 2021. [Online source] *Commission proposes a trusted and secure Digital Identity for all purposes.* Press release. Published on 03.06.2021. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_2663. Accessed: 10.07.2021.

European Commission, 2022. [Online source] *Shaping Europe's digital future.* Available at: eIDAS Regulation | Shaping Europe's digital future (europa.eu). Updated: 14.03.2022. Accessed: 04.04.2022

European Union, 2014. [Online source] *REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.* Official Journal of the European Union. Available at: https://ec.europa.eu/futurium/en/system/files/ged/eidas_regulation.pdf. Accessed: 10.07.2021.

Ephesoft, 2021a. [Online source] *Meeting the data challenge in financial services.* Available at: MEETING THE DATA CHALLENGE IN FINANCIAL SERVICES - Finance Derivative. Accessed: 01.12.2021.

Ephesoft, 2021b. [Online source] *How Intelligent Processing helps government organizations.* Available at: Intelligent Document Processing in Government | Ephesoft. Publication date: November 2, 2021. Accessed: 01.12.2021.

Feedzai, 2020. [Online source] *Demystifying the Fields of AI for Banks*. Available at: Demystifying the Fields of AI for Banks | Feedzai. Accessed: 31.03.2021.

FIN-FSA, 2021. [Online source]. Available at: Financial Supervisory Authority - www.finanssivalvonta.fi. Accessed: 03.10.2021.

FinTech FinCrime Exchange & Jumio, 2021. [White paper]. *How to design effective, risk-driven onboarding flows*. Available at: jumio-fintrail-onboarding-flow.pdf. Accessed: 05.10.2021.

Foroudi, P., Gupta, S., Sivarajah, U., and Broderick, A., 2018. Investigating the effects of smart technology on customer dynamics and customer experience: *Computers in Human Behavior,* Volume 80, 2018, pp.: 271-282. Available at: https://doi.org/10.1016/j.chb.[2017].11.014.

Fourthline, 2021. [White paper] *The digital KYC paradox: why manual processes have grown despite digital first demand?* Available at: Fourthline - The Digital KYC Paradox.pdf (hubspotusercontent40.net). Accessed:01.02.2022.

Gartner, 2021. [White paper] *Top Strategic Technology Trends for 2022. 12 Trends shaping the future of digital business.* Gartner, Inc. 2021.

Gioia, D., Corley, K., and Hamilton, A., 2012. *Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology.* Organizational Research Methods, vol. 16, no. 1, pp: 15-31.

Halvorsrud, R., Kvale, K., and Følstad, A., 2016. Improving service quality through customer journey analysis*: Journal of Service Theory and Practice,* Vol. 26 No. 6, pp. 840-867.

Herington, Carmel and Weaven, Scot Keith W., 2009. *E-retailing by banks: E-service quality and its importance to customer satisfaction.* September 2009. European Journal of Marketing 43, issue 9/10, pp: 1220-1231.

Jaya S, and Mahalingam, S., 2011. Service quality models in banking: a review:

International Journal of Islamic and Middle Eastern Finance and Management. Vol. 4 no. 1, pp. 83-103.

Jayasree, V. and Balan, S, 2017. Money laundering regulatory risk evaluation using Bit-map Index-based Decision Tree*: Journal of the Association of Arab Universities for Basic and Applied Sciences.* Vol. 23, pp. 96-102.

Jumio, 2018. [Whitepaper] *A different kind of bank requires a different kind of customer onboarding.* Monzo | Case Study. Available at: jumio-monzo-case-study.pdf. Accessed 08.11.2021.

JPMorgan Chase et. Co, 2021. *Payments are eating the world*. Available at: Payments are eating the world (jpmorgan.com). Accessed: 31.01.2022.

Kittu, M., and Rao, S., 2018. Blockchain Technology for the Mutual Fund Industry*: National Seminar on Paradigm Shifts in Commerce and Management 2018 in Congruence with Block Chain Accounting*, pp. 12 - 17.

Komulainen, H. and Saraniemi, S., 2019. Customer centricity in mobile banking: a customer experience perspective*: International Journal of Bank Marketing, vol. 37 no. 5, 2019*, pp: 1082 -1102.

Kumar, B. and Lee, J, 2021. [Oral, online webinar] *Digital Trust & Safety: Building an end-to-end solution for fintech businesses.* Webinar by fraud solution providers Jumio & Sift. Recorded at 16.05.2021. Available at: Digital Trust & Safety: Building an end-to-end solution for fintech businesses (brighttalk.com).
Accessed: 04.10.2021.

Lawinsider, 2021. [Online Dictionary] Available at: Financial Service Provider (FSP) Definition | Law Insider. Accessed. 09.12.2021.

Lemon, K. and Verhoef, P., 2016. Understanding Customer Experience Throughout the Customer Journey: *Journal of Marketing,* Vol. 80, issue: 6, pp: 69-96.

Mbama, C., Ezepue, P., Lyuba and Beer, M., 2018. *Digital banking, customer experience and financial performance: UK bank managers' perceptions*. Journal of Research in Interactive Marketing. Vol. 12 no. 4, pp: 432-451.

Mills, D., Wang, K., Malone, B., Ravi, A., Marquardt, J., Chen, C., Badev, A., Brezinski, T., Fahy, L. Liao, K., Kargenian, V., Ellithorpe, M., Ng, W., Baird, M., 2016. [Online source] *Distributed ledger technology in payments, clearing, and settlement,*

Finance and Economics Discussion. Series 2016-095, Washington: Board of Governors of the Federal Reserve System. Available at: https://doi.org/10.17016/FEDS.2016.095 Accessed: 16.10.2021.

Minastireanu, E. and Mesnita, G., 2019. [White paper] *An Analysis of the Most Used Machine Learning Algorithms for Online Fraud Detection*. Informatica Economica. Vol. 23. pp: 5-16. Available at: http://revistaie.ase.ro/content/89/01%20-%20minastireanu,%20mesnita.pdf. Accessed: 04.10.2021.

Nets Group, 2021a. [White paper] *Rethinking KYC. Improving the customer journey with seamless digital ID*. Available at: https://www.nets.eu/solutions/digitisation-services/Pages/Rethinking-KYC-whitepaper.aspx. Accessed: 04. 10. 2021.

Nets Group, 2021b. [Online source] *New eID regulation open opportunities in EU*. [Blog]. Published 08.10.2021. Available at: Perspectives New eID regulation open opportunities in EU (nets.eu). Accessed: 02.03.2021.

Nordea, 2021. [Online source] *Know your customer – why does the bank ask?* Available at: Know your customer – why does the bank ask? | Nordea. Accessed: 02.01.2022.

Omdia, 2020. [White paper] *The Industrialisation of AI business white paper*. Available at*:* View The Industrialisation of AI business white paper | HPE Finland. Accessed: 31.03.2022.

Parola, F., 2021. [Online blog] *Modularity matters: which emerging technologies will change the KYC landscape?* Perspectives by Nets. Published, 14.06.2021. Available at: Perspectives Modularity matters: which emerging technologies will change the KYC landscape? (nets.eu). Accessed: 01.11.2021.

Parra Moyano, J. and Ross, O., 2017. KYC Optimization Using Distributed Ledger Technology*: Business & Information Systems Engineering*. Vol. 59, issue 6, pp: 411–423.

Richie, L., McNaughton N., and Ormston, R., 2013. *Qualitative research practice. A guide for Social Science Students and Researchers.* 2nd edition. Sage Publications. Thousand Oaks, CA.

Rogers, E.M., 2003. *Diffusion of innovation*. 5th edition, Free Press, New York, NY.

Sangeetha, J., and S. Mahalingam, 2011. Service quality models in banking: a review*: International Journal of Islamic and Middle Eastern Finance and Management*. Vol. 4 No. 1, 2011, pp: 83-103.

Saunders, M., Thornhill, A. and Lewis, P., 2019. *Research Methods for Business Students*. 8th Ed. Pearson Professional Limited, pp: 51-52, 144.

Sciurba, M., 2018. The Heart of Know Your Customer Requirements: The Discriminatory Effect of AML and CTF Policies in Times of Counter-Terrorism in the UK*: European journal of crime, criminal law, and criminal justice*. Vol. 26, pp. 222-235.

Strachan and Byrne, 2022. [Oral, online webinar] *2021 CX Report: Resilient Digital Customer Experiences in Disruptive Times.* Webinar by marketing technology & CX providers Acquia & Vanson Bourne. Available at:2021 CX Report: Resilient Digital Customer Experiences in Disruptive Timesbrighttalk.com). Accessed: 06.01.2022

Tracy, S., 2019. *Qualitative Research Methods. Collecting evidence, crafting analysis, communicating impact,* 2nd edition. Wiley Blackwell, Hoboken, New Jersey.

Vaismoradi, M., Jones, J., Turunen, H. and Snelgrov, S., 2016. Theme development in qualitative content analysis and thematic analysis: *Journal of Nursing Education and Practice 2016.* Vol. 6, No. 5, pp. 100-110.

Villalobos, M. and Silva, E., 2017. [PDF] *A Statistical and Machine Learning Model to Detect Money Laundering: An Application.* Actuarial Sciences Department Anahuac University. Published: 15.06.2017. Available at: http://hddavii.eventos.cimat.mx/sites/hddavii/files/Miguel_Villalobos.pdf. Accessed: 04.10.2021.

Zhou, Lianxi, 2004. *A dimension-specific analysis of performance only measurement of service quality and satisfaction in China's retail banking.* Journal of Services Marketing Volume 18, number 7, 2004, pp: 534-546.