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Process analysis

Paving the way towards a superior customer experience

MAKING AN IMPACT THAT MATTERS since 1845

This document outlines how banks can leverage process analysis and process mining techniques to swiftly identify areas of improvement and work towards becoming a customer-centric organization.

Contents

Introduction

Banks around the world are embarking on a transformation journey to balance between cost optimization and customer experience.

With a focus on meeting emerging customer needs, particularly after recent disruptions and challenges caused by the COVID-19 pandemic, banks are looking at thoroughly analyzing their processes to unearth direct and indirect improvement opportunities.

This document sheds light on selected key approaches used by Deloitte to identify key pain-points and understand process inefficiencies, thus enabling banks to simplify processes, eliminate waste and strive for continuous improvement to meet customer expectations and maintain business profitability.

Disruption in the Financial Services Industry

Disruption in the Financial Services Industry

Today, banks are faced with numerous challenges resulting from evolving customer expectations, growing competition related to digital banking, increased pressure to reduce cost, and most recently, major world-wide disruptions related to the COVID-19 pandemic. Such challenges have forced banks to adopt new strategies to remain innovative and deliver new service offerings that transform the customer journey to meet their expectations. To cater for this transformation, process improvement approaches, that are holistic and agile, are crucial to adapt to changes in customer needs, to face the competition, and to help banks reduce their costs, improve the customer experience and tackle market changes.

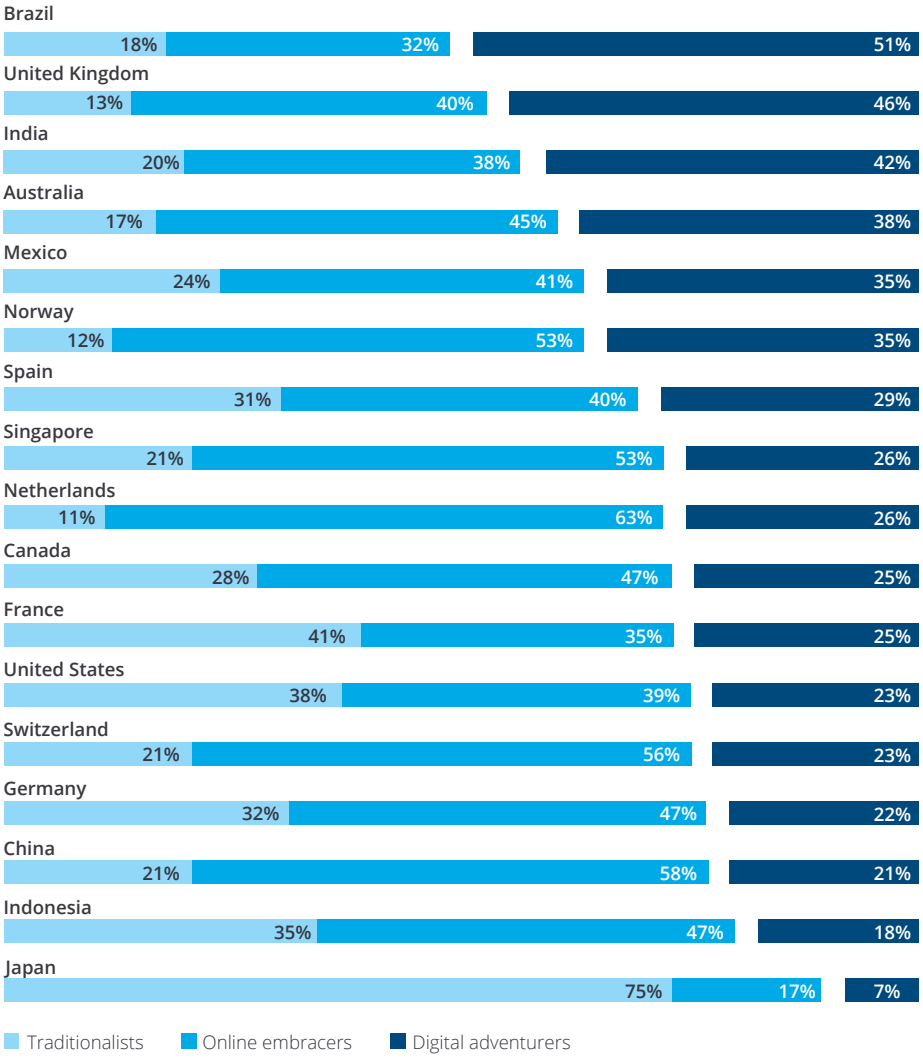
In the following sections, we will highlight 4 key challenges faced by banks today that can be tackled through end-to-end process improvement methodologies.

1. Evolving customer trends

In order to provide customers with optimal experience, banks should place the customer at the heart of their business by implementing customer-centric approaches.

To understand the latter, research conducted by the Deloitte US Center for Financial Services in May 2019, querying 17,100 banking customers in 17 countries, showcased the following distinction between customer preferences across 17 key countries.

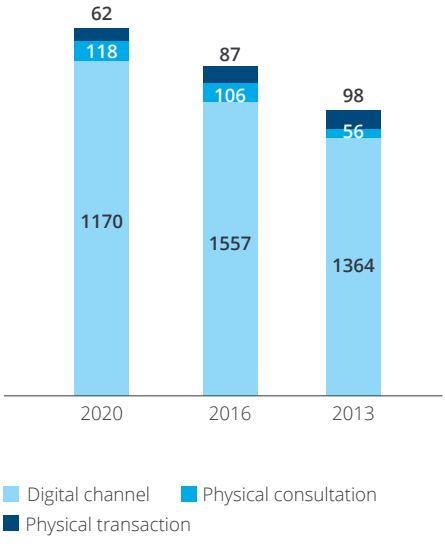
Figure 1: Country-by-country comparison of customer segments



Note: Percentages may not total 100% due to rounding.
Source: Deloitte Center for Financial Services analysis.

Online Embracers and Digital Adventurers (Figure 1), who are more digitally engaged with their banks and prefer online and mobile apps to conduct banking services respectively, represent around 70% of most countries' populations. On the other hand, Traditionalists, who prefer to do most of their banking in branches, represent less than 30% of the customers across most countries. This shows that it is more likely that bank customers are heading toward a path where they would conduct most of their transactions via digital channels whilst expecting a superior customer experience that integrates the benefits of digital and physical environments for banking.
Similarly, figure 2 shows how customer-bank interactions are continuously changing over time with a 30% increase in digital channel usage from 2013 to 2020 (which was already the main used channel as opposed to physical consultation and transactions).

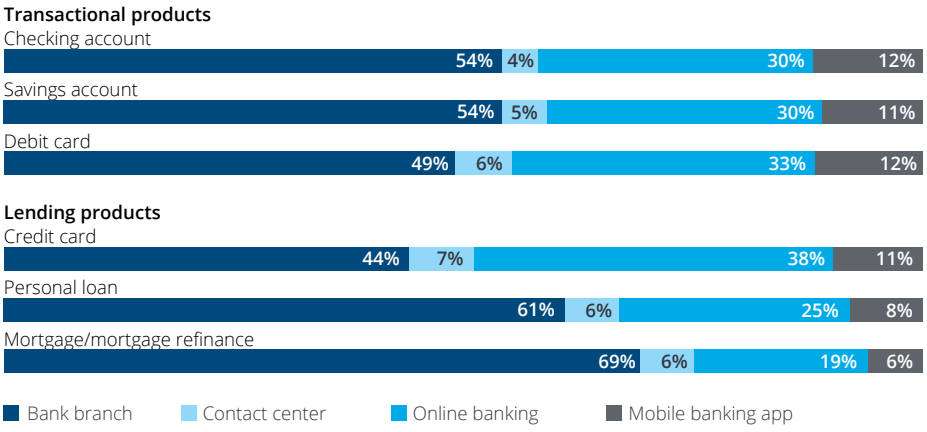
Figure 2: Average monthly banking channel usage per 100 customers



Source: Deloitte France Survey, April 2020.

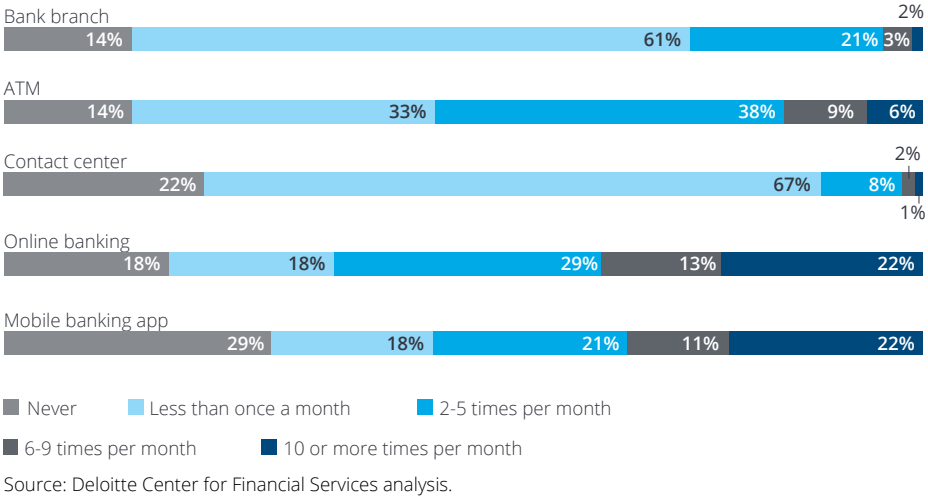
Although the frequency of digital channel usage is a positive sign, it is important to make the distinction between the quantity versus the quality of the interactions.
In fact, the survey showed that digital channels are mostly limited to informal and transactional services such as transferring money, checking account balances and updating account details (Figure 3). Many customers still prefer traditional channels over digital channels for complex and advisory services. For instance, in order to get a personal loan, 61% of customers chose 'visiting the bank branch' as a preferred channel. This trend also applies to the process of applying for new products, especially loans that require multiple verification and documentation steps.

Figure 3: Most respondents prefer traditional channels to handle complex or advisory services
Channels where respondents go to buy new products



Source: Deloitte Center for Financial Services analysis.

Figure 4: Respondents used mobile and online channels most frequently



Source: Deloitte Center for Financial Services analysis.

2. Increased Competition for high-tech services

Customer expectations for digital services are continuously being shaped by superior experiences provided by tech giants such as Google, Apple, Facebook and Amazon. Such companies set the bar high for digital experiences and therefore customers expect similar experiences from their financial services providers. While digitally savvy millennials are responsible for the enhanced service expectations, it is by no means restricted to them. The widespread use of digital technologies across various industries has led the different generations to adopt these digital trends, therefore making it imperative for banks to be on top of their digital service delivery.

"Singapore-based Bank, OCBC, has started allowing voice-based commands for iPhone users, enabling them to do basic transactions such as checking bank accounts, credit card details and making e-payments via Apple's virtual assistant Siri. The transactions are authenticated using biometrics such as facial-recognition and fingerprints, thus providing a great customer experience"

Banks previously used to personalize customer interactions through the branches; however, as digital banking has become more popular, banks had to identify other means to maintain that personal touch. With the use of predictive analytics, artificial intelligence and machine learning, they will increasingly personalize their offering for customers.

"Standard Chartered Bank has an interactive, location-enabled mobile application that prompts users with real-time and personalized offers from nearby retailers"

Today, top tier banks are competing with "challenger banks" which operate on full digital capacity and focus on delivering personalized services that reinvent the customer experience and attract new customers from all segments. Digital banks are capable of rolling out new and enhanced money management, savings, investment and lending products, at much lower costs than their traditional rivals. Top tier banks have worked hard to keep pace with their own investments in Fintech, app-based banking and acquisitions; however, to compete on efficiency or experience they will need to embrace a transformation journey in which they either replace their legacy systems or adopt massive simplification supported with intelligent automation to complement their legacy systems.

A major step towards transforming the financial services industry in the region is open banking, which would enable greater transparency and inclusivity through open data.

"NatWest, one of the leading UK banks, launched "Mettle", an innovative digital platform that allows small and medium size enterprises to open a business current account in minutes, forecast their business performance, create invoices from their mobile phone and provide reminders for chasing payments."

Challenger banks, often starting from scratch, have been able to base their services on powerful, predictive and secure ecosystems that cloud-based technologies offer. This has left traditional banks at a significant competitive disadvantage due to their owned IT infrastructure, data centers, legacy hardware maintenance and costly payrolls.

Further, with the continuous change in customer preferences, competition from Fintech startups and changing regulations, banks in the Middle East have also been forced to innovate through digital platforms. In particular, banks in the United Arab Emirates (UAE), Saudi Arabia, and other GCC countries including Bahrain are emerging as leading their transformation by undertaking numerous digital banking initiatives and producing real-time digital solutions to meet their customers' banking needs.

A major step towards transforming the financial services industry in the region is open banking, which would enable greater transparency and inclusivity through open data. Bahrain is the first in the region to adopt open banking regulations, and Saudi Arabia is moving more aggressively towards similar regulations within the next two years. According to research by Finastra in June 2020, 88% of UAE banks expect to enable open banking and open API capabilities in the next 12 months. Other examples of Middle East banks embracing digitization trends are as follows:

United Arab Emirates

Emirates NBD launched Liv., a digital banking proposition for millennials; Abu Dhabi Islamic Bank (ADIB) partnered with Fidor Bank to launch the Middle East's first community-based digital bank, Commercial Bank of Dubai launched CBD NOW, also targeting millennials and digitally connected customers with a mobile proposition, and Mashreq Bank launched Mashreq Neo, its full-service digital bank. Emirates NBD recently launched a contactless export trade collections capability – a new digital feature

that will support smartTRADE clients with business continuity through the COVID-19 pandemic. Emirates NBD's smartTRADE clients can access smartCollections from the safety of their homes or offices, to submit an export collections request. Documents can be safely uploaded on the trade finance portal, with real-time updates on transaction status, thus completely avoiding the need to visit a bank counter. ADCB partnered with Silicon Valley's Plug and Play, known for connecting the best technology startups with the world's largest corporations to boost digital transformation programs. The partnership comes at an exciting time for the UAE's financial services industry when technology like artificial intelligence, robotics, machine learning and data analytics offer many new opportunities.

Saudi Arabia

Al Rajhi Bank and Samba Bank launched digital customer onboarding experiences this year whereby banks are able to start new relationships with customers and create current accounts while requiring minimal customer input by using customer information automatically extracted through the integration with Absher and Saudi Post. Al Rajhi Bank also launched the Digital Document Signature service, which allows customers who applied for personal financing to digitally approve the promissory note through an electronic platform for the Ministry of Justice (Nafith) without the need to physically visit the branch. Saudi Payments, a fully owned subsidiary of SAMA, has teamed up with a MasterCard company, Vocalink, to enable instant payments between financial institutions, businesses and customers, with instant credit transfers, e-invoicing and billing, real-time payment acknowledgement, remittances, bulk payments and peer-to-peer money transfers.

Bahrain

SADAD Bahrain launched its latest technology-driven service, 'Sadded', a new online invoicing system that provides businesses and their customers with a convenient payment solution through a secured payment channel (via SMS or email, with a URL/link to process the payments).

Jordan

The Central Bank of Jordan launched a bill payment service "eFAWATEERcom" available through Jordanian banks' mobile and internet banking platforms. With this service, customers have the ability to make inquiries and payments to a wide range of billers on the spot. Customers can also create their own profile and manage their bills accordingly.

Lebanon

Fransabank-Lebanon launched a biometric credit card, which has an embedded fingerprint sensor that eliminates the need for cardholders to rely on their pin code or signatures to complete a purchase.

Egypt

Emirates NBD Egypt launched a MasterCard World Switch Card for the first time in the Middle East, enabling customers to switch from Debit to Credit at the touch of a button embedded in the card.

Banks in the Middle East are likely to look at more sophisticated ways in which costs can be managed through the use of robotics, analytics and Fintech amongst others.

According to a survey conducted by YouGov that took place at GITEX Technology Week, "businesses in the GCC are expected to place a high priority on customer experience in 2020", with 80% of respondents depicting customer experience as "very important".

With the recent introduction of new payment processes and technologies to the financial industry along with a millennial population making one third to half of the total population in the GCC region, banks are now being pushed to develop strategies on where to play and how to adapt to the wider competition of Fintech startups that are "expected to attract $2 billion in private funding over the next ten years in the Middle East region". Banks that continue to adhere to traditional business models are at imminent risk of becoming obsolete.

3. Cost reduction initiatives

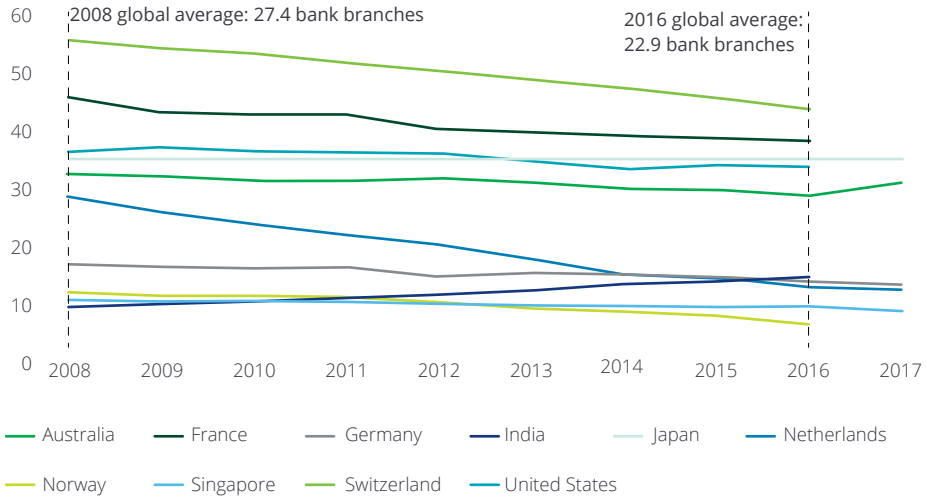
Amid the low interest earnings, which have persisted for a long period, as well as the recent market and economic uncertainties, banks are under constant pressure to find innovative ways to increase earnings and significantly reduce cost. To achieve this, banks need the right balance between short-term tactical cost decreases, such as headcount reductions, and longer-term strategic cost initiatives, such as streamlining processes or outsourcing certain non-core functions without compromising the quality of service delivered. Accordingly, banks are re-evaluating the traditional role of back-office operations to strive for cost optimization while improving both back-end and front-end service quality and speed. The traditional function of the back-office, which is to improve efficiency, will be positively impacted by technologies such as robotic process automation (RPA) to reduce the dependency on manual processes. With rapidly evolving technologies, major improvements and efficiencies in operational processes are expected to lead to significant cost savings for banks.

"BNY Mellon has deployed 220 bots developed by Blue Prism to handle repetitive tasks such as data requests from external auditors and correcting formatting and data mistakes for fund transfers, leading to $300K in annual savings"

The decline in use of physical branches by customers and the high costs of branches are pushing banks to take real steps towards following the trend of shrinking their branch networks (see Figure 5) and embracing the digital era. As shown by the World Bank's graph, between 2008 and 2016 the branch density of banks decreased globally from 27.4 branches per 100,000 adults to 22.9 branches per 100,000 adults; representing an approximate decrease of 19.65 percent.

Figure 5: Branch density continues to decline globally

Average number of bank branches per 100,000 adults



Source: World Development Indicators, World Bank.

This trend is balancing the voice of the customer (VOC) and the voice of the business (VOB) as it is bringing benefits for both the banks and their customers; these include enabling banks to rid themselves of a significant cost, increase their performance, and simplify their operations, as well as preserve a high quality and persistent customer experience.

4. COVID-19 Accelerating Digital Transformation

With the many challenges that 2020 has sprung upon our communities and organizations; from decreasing bond yields, oil and equity prices and the COVID-19 pandemic, comes a large uncertainty that has driven banking institutions to come up with rapid business continuity and resilience measures. Banks are figuring out how to enhance the customer experience through automation and the integration of a digital paradigm shift in their day-to-day operations.

With the pandemic and social distancing measures, banks are pushed to temporarily close branches, and are faced with a dilemma of prioritizing employee and customer safety versus financial strength and growth. 'Work from home' policies have resulted in significant business resilience challenges with additional risks of operating as well as less direct visibility on operational processes and performance. At the same time, the pandemic has created huge surges in demand for mortgage or payment loan holidays and debt management operations that cannot be met by increased full time equivalent (FTE) capacity. Amongst some of the rapid changes that banks have implemented globally and in the region is the evolution towards direct sales, self-service, digital advice, and digital payments.

Responses of banks have been particularly noteworthy with each bank prioritizing their ability to help their customers get through this difficult period; here are some examples:

- **Natwest** in the UK launched a donation-matching program of £5m for a National Emergencies trust from donations made by its Reward customer scheme and paid full salaries to staff who took time out to look after their families.

- **ABN Amro** in the Netherlands has offered an automatic six-month deferral on payments from commercial clients with a credit facility of up to €50 million.
- **UniCredit** in Italy has put in place an extension of credit for imported goods of up to 120 days to support working capital management.
- **Bank of Georgia** in the UK closed its customer service support in express branches while keeping the self-service terminals and ATM areas open. The bank's main branches remain open but under strict safety guidelines
- **America bank** in Armenia immediately put its business continuity program into place when COVID-19 broke out in the country. The bank was the first in the country to offer a two-month "credit vacation" for its individual clients and for legal entities in the more vulnerable sectors to defer principal payments for three to six months.
- **Center Credit Bank (BCC)** in Kazakhstan joined the response efforts as soon as COVID-19 began to spike in the country. The bank set up a platform so that people could open online accounts that allow them to stay at home and still receive social financing support.

In Saudi Arabia, the Saudi Arabian Monetary Authority (SAMA) announced a set of measures and guidelines for banks to limit the negative impact of the crisis. SAMA unveiled a package to allow banks to defer loan payments for six months and instructed commercial banks to support businesses and individuals affected by the crisis through restructuring loans without charges and reviewing various fees to adjust to the drop in interest rates. SAMA also launched a serious of circulars requesting banks to enhance different aspects of their customer service, such as the automatic update of expired IDs and customer addresses through integrating with the governmental platform to alleviate branch workloads, as we as initiatives that promote cashless payments.

COVID-19 restrictions are pushing customers towards digital channels for services and sales (Figure 6). Radical changes in customer behavior have been witnessed throughout; customers who were initially reluctant to adopt digital interactions have gained more interest and comfort in using such methods out of necessity due to limited alternatives. Such interactions include using contactless cards or digital payments instead of cash, and online/mobile banking and investments instead of paper-based/ in-branch transactions. Some banks (e.g. Canadian banks) have been effective in leveraging existing technology investments (e.g. AI, RPA) to drive responsiveness and improve the quality and control over their data (e.g., to improve authentication, know your customer (KYC). In addition, there have been enterprise-level investments that will likely accelerate to ensure greater reach and consistency of key technologies across lines of business and operating units (e.g. workforce management, digital interfaces).

Further, banks in the Middle East region are partnering with technology companies to offer digital platforms and services to enhance the customer experience: In June 2020, UAE's Mashreq Bank launched the Middle East's first AI-powered digital engagement banking bot to make banking easy for Mashreq customers.

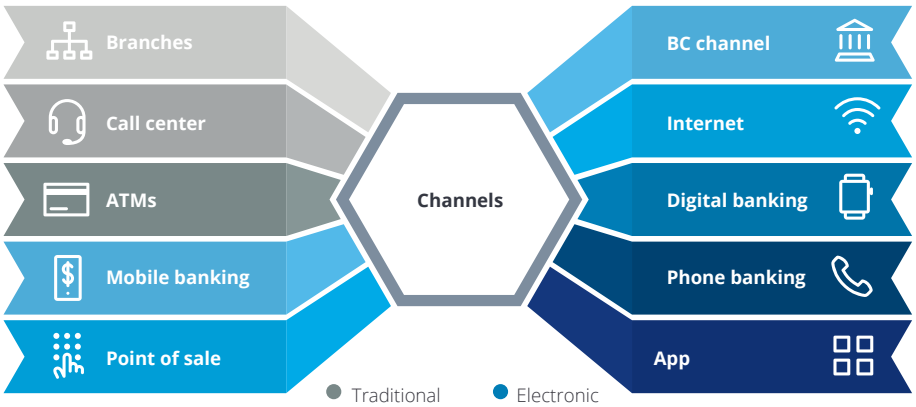
Banque Saudi Fransi (BSF) selected TCS BaNCS™ Global Banking Platform to provide seamless and contextual customer experiences.

Abu Dhabi Islamic Bank (ADIB) partnered with Etisalat to launch new covered cards called ADIB Smiles. Through these cards, ADIB aims to provide savings to its members via various rewards.

Oman's Bank Nizwa has rolled-out additional features on its e-wallet solution to encourage contactless payments. The e-wallet is a digital extension to its Islamic solutions and allows instant fund transfers.

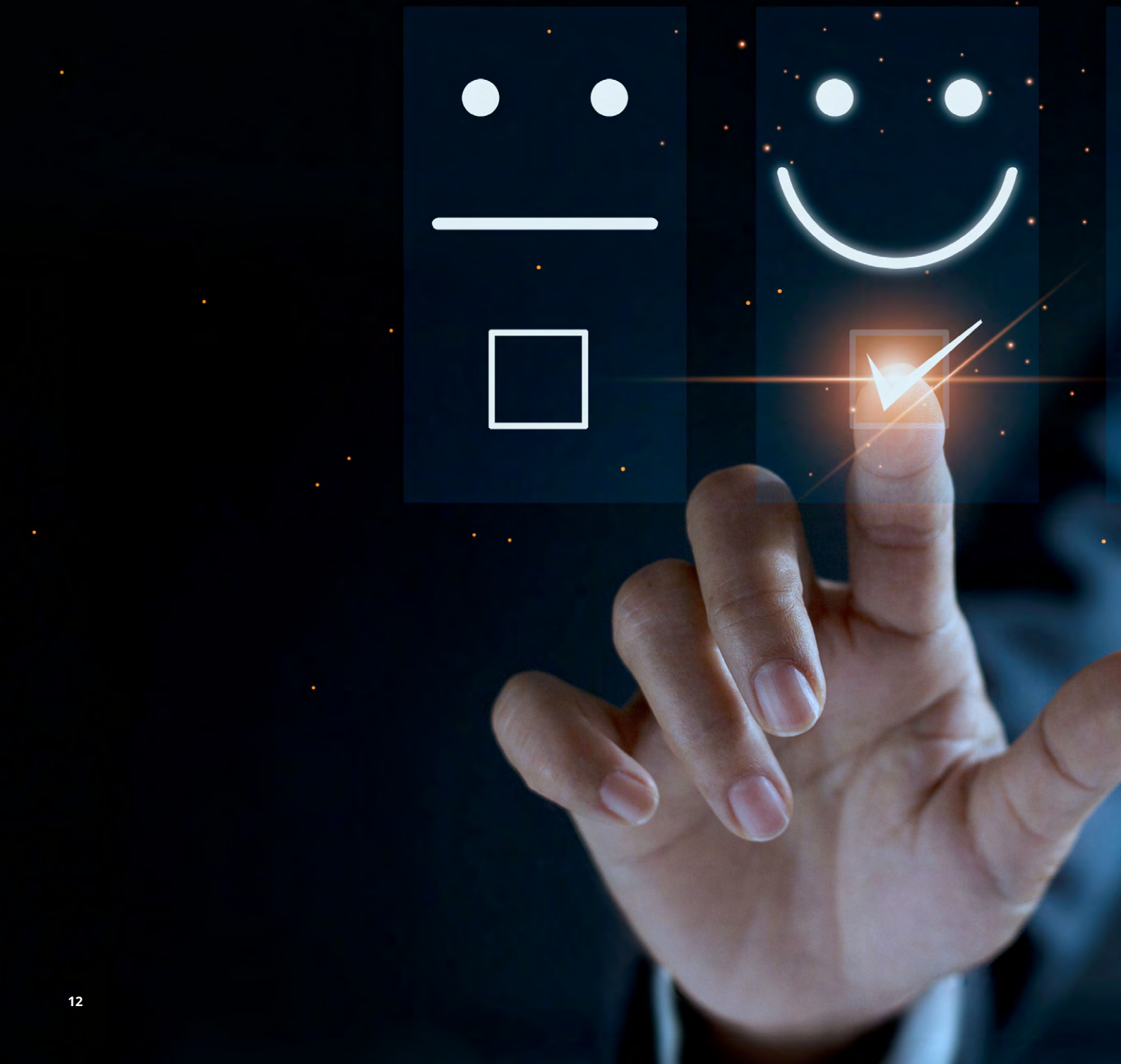
The COVID-19 pandemic has created a dynamic shift in customer expectations and therefore instigated a live test to the existing digital platforms, omni-channel functionalities and mobile capabilities. The exact shape of the future is still uncertain, and mainly depends the severity and pattern of progression of the pandemic. The expectation is that banks will continue to aggressively pursue technological advancement and use revamped business platforms (e.g. robotics, AI, analytics) partnering with various Fintech firms to transform and venture into the new age of digital banking.

Figure 6: Multi-channel presence – electric channels are accounting for a greater share of bank's transcations



Source: Banking of the future: Vision 2020 | CII – Deloitte.

Process analysis: A stepping-stone for transformation



Process Analysis: A stepping-stone for transformation

With so many industry challenges to contend with, banks must strive to fundamentally transform the way they operate through embracing new technologies and process automation initiatives to maintain their competitive advantage and market leadership. From using artificial intelligence to optimize credit decisions, and automating manual processes that previously required human intervention, to using chatbots for revamping the customer experience, process automation is becoming a real game changer.

Before this transformation can emerge, an important initial step is to identify processes that can be measured, analyzed and improved.

At Deloitte, we have developed ground-breaking integrated approaches to help Financial Services customers tackle disruptions and create opportunities to factually analyze performance and identify improvement opportunities. Our approaches that are flexible, structured and data-driven, place the customer at the heart of the transformation journey. Some approaches rely more on hands-on process analysis and improvements such as the Value Stream Improvement Method (VSIM), while others rely more on process and task mining such as the Deloitte Digital Discovery Approach. Below we will detail each of these two approaches as applied by Deloitte.

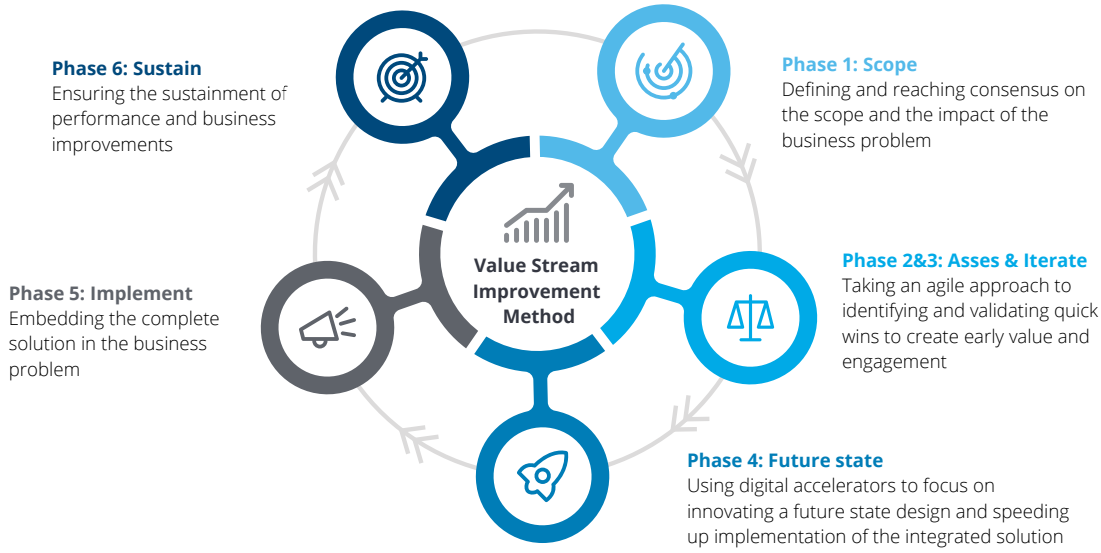
1. What is VSIM and how can it help uncover automation opportunities?

VSIM is a flexible approach widely applied by Deloitte in the Financial Service industry to deliver results from traditional productivity improvements to disruptive design innovation. This approach consists of 6 phases that can be completed in 8-12 weeks and serves to identify and resolve complex, hidden root-cause problems. The first 3 phases shed light on the current state of the organization, whereas the remaining 3 serve for designing and implementing a sustainable model that addresses the issues identified earlier. A massive part of this model relies on automation to strive for operational excellence, increase customer satisfaction and drive cost reduction.

Key benefits for organizations following the implementation of VSIM include the following:

- Cost and TAT (turnaround time) reduction, as VSIM uncovers hidden inefficiencies, bottlenecks, and process wastes that can be eliminated or automated
- Streamlined and standardized processes across the organization
- Enhanced controls for operational risk and regulatory compliance
- Enhanced quality data and transparency as duplicate information will be centralized in a single source of truth that feeds all peripheral systems
- 360-degree customer visibility (e.g. integration with other banks for credit information, governmental systems)
- Quick wins that can be implemented with minimum effort and in a timely manner

Figure 7



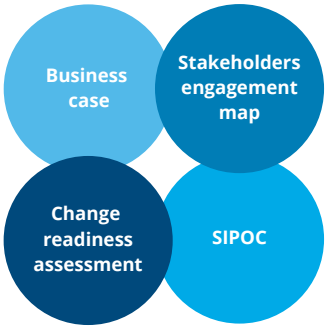
Phase 1: Scope

The first phase of VSIM serves to define and reach consensus on the scope and the impact of the business problem. Banks specifically face many issues related to complaints management and resolution, product performance, market demand, digital transformation, etc.

What are the key activities performed during this phase?

- **Defining the problem statement** and agreeing on the scope to align on the objective at a very early stage: e.g. a bank could be facing an increased number of complaints related to personal lending and wants to enhance the related processes to resolve this issue.
- **Defining measurable targets and critical success factors** to drive accountability across the business and enable monitoring and steering of business processes (e.g. defining a target time for personal financing file approval, or number of rejections).
- **Outlining the project governance and project plan**, identifying key risks, dependencies and key outputs.
- **Identifying the types of data expected to support documentation of the as-is process**, such as user manuals, documented procedures, organization structure, charters, etc.

Examples of tools used



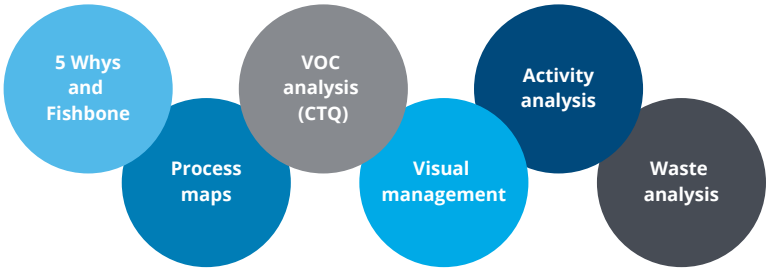
Phase 2&3: Asses & Iterate

These two phases apply an agile and iterative approach in identifying and validating quick wins to create early value and engagement. During these phases, it is critical to understand the business processes to identify barriers to efficiency, identify how value is created and illustrate the capability of the process and performance against baseline measures and targets.

What are the key activities performed at this phase?

- **Mapping the as-is process(es)** to help visualize the tasks and shed light on the sequence and interdependencies. Deloitte has its own IndustryPrint tool (ARIS-based) that can be used to draw the process flows.
- **Understanding the voice of the customer**: e.g. "We need faster answers to our queries", or "the customer service representative did not have an answer to my questions"; such statements highlight an issue related to response time and requires a service level agreement (SLA) to be defined as critical to quality (CTQ).
- **Performing waste analysis and 'go-sees'**. This includes performing on-floor observations, finding out what really happens, and identifying the waste aspect of activities. An example would be inspecting the motion occurring while printing a loan application at the bank branch.
- **Performing pain-point identification and root-cause analysis** to help understand the actual cause of the issues and ensure that the problem is addressed rather than the symptom (e.g. inputting the same customer information more than once on multiple systems).
- **Analyzing data and establishing a performance baseline against CSFs and targets.** The analysis focuses on process effectiveness, identification of process leakage, waste and time efficiency (e.g. applications which are lost or canceled in the middle of a process generate unnecessary costs).
- **Identifying quick wins and prioritizing** based on value and ease of implementation, such as improving the template of an Excel sheet used throughout a manual process.

Examples of tools used



Phase 4: Future state

This phase consists of designing, validating and approving the process improvements, as well as providing a clear understanding of the impact the proposed change(s) will have. During this phase, the automation opportunities will be highlighted and incorporated in the to-be processes.

What are the key activities performed at this phase?

- **Defining solution requirements for the future state design**, e.g. defining the approval layers and rules in the approval workflow related to personal financing files.
- **Creating a future state process map** according to the improvement opportunity identified to visualize the automation efforts and enhancements which can be measured versus the baseline metrics defined in the "Assess" phase.
- **Determining the organizational impact of the solution** as some automation initiatives might replace human functions or some processes might be eliminated: e.g. fully automating an approval process based on a predefined risk model might lead to a severe decrease in FTE.
- **Validating benefit generation** from the business case: the automation of a specific process will enhance the quality of data, reduce the required number of FTE and accordingly generate a cost saving for the organization.
- **Testing/piloting the future-state design** as an integrated solution. Completing a pilot on 1-2 quick wins or processes in order to prove the benefits of the to-be phases. A popular example would be the application of RPA technology for repetitive tasks.

Examples of tools used

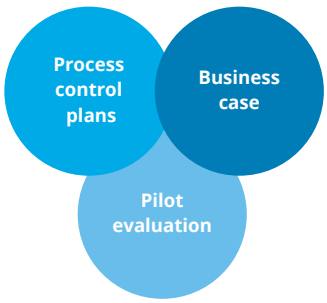
Phase 5: Implementation

The implementation phase embeds the complete solution to resolve the business problem, address the business change impact of the solution and close implementation gaps to ensure problem resolution.

What are the key activities performed at this phase?

- **Building a Work Breakdown Structure (WBS)** and implementation plans and defining responsibilities: a deliverable-based WBS clearly demonstrates the relationship between the initiatives and the scope (i.e. implementing a new simulator for car leasing system).
- **Implementing project/program governance and KPIs:** this activity defines the governance structure of the projects/initiatives.
- **Developing and deploying training communications**: a communication plan should be developed to keep all the stakeholders updated with the program progress.
- **Identifying and addressing gaps during implementation**: based on the solution selected and the capabilities of the organization, the implementation plan may vary slightly from the to-be design.
- **Formalizing benefits realization** and the business case.

Examples of tools used



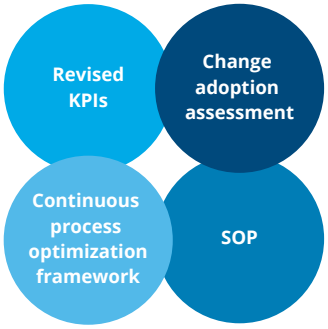
Phase 6: Sustain

This phase ensures the sustainment of the process and business performance, maintaining improvement momentum and capturing the change journey and adoption process.

What are the key activities performed at this phase?

- **Identifying key behaviors required to maintain improvements**, track process performance and adjust improvements to align with the process vision.
- **Integrating management disciplines** into leadership objectives.
- **Coaching stakeholders** on behaviors that instill a continuous improvement culture.

Examples of tools used



In case the VSIM approach is not relevant for the context of some customers, for example, in cases of simple processes or pre-identified issues such as complaints related to personal financing, Deloitte can use the Rapid Improvement Event Approach (Kaizen), which can be completed in 2 weeks.

	Value stream improvement method	Rapid improvement event
When used	• Need to resolve complex issues • Root cause of the issues not known • Process that involves multiple parties	• Pilot on one process • Issues are known in the process • Within the same unit
Effort	Medium - high	Low
Process coverage	Medium - high	Low - medium
Process step details	Medium - high	Medium

2. The alternative: Using a data-driven approach to business process analysis

Over the last few decades, IT systems have grown from residing in people's garages to powering the world's most complex industries, and by doing so are producing vast amounts of data that can be harnessed to analyze processes with accuracy and volumes that could not possibly be produced using traditional approaches such as VSIM, due to their human-centric nature. To enable us to move ahead to an always-on, digital future where robots take care of full end-to-end processes, people need to be able to accurately pinpoint the most valuable areas for intelligent automation to maximize the return on investment. To be able to do this, we have developed the Deloitte Digital Discovery tool, specifically for intelligent automation transformations that can accurately model processes by utilizing big data to capture millions of cases and how each one flows through a process, thereby enabling us and our clients to accurately and confidently decide on the highest value opportunities to automate. Once Digital Discovery is set up for a process, it can then be easily switched into continuous data-feeds for monitoring and continuous improvement.

What is Deloitte Digital Discovery™?

Deloitte Digital Discovery™ tooling is unique in the market in providing a data-join between process and task mining (refer to the below table for more information on process and task mining), to provide fully visualized E2E processes down to a transaction level.

Process mining has been a sub-section of data science since the late 1990s and has a wide variety of use cases (i.e. modeling a purchase-to-pay process). We have helped clients build their process mining capability, analyze processes and employ predictive analytics for the last decade with the help of the Deloitte Process Mining Framework. This framework helps the extraction, transformation and visualization of data from clients. It has been refined with over nine years of experience and includes features such as standardizing timestamps and currencies across multiple regions, as well as templates for extracting data from large IT systems to significantly reduce the time it takes to get insights from client data.

Naturally, this framework has been adapted for Digital Discovery, enhanced with task-mining agents to give unrivaled analysis and understanding of true end-to-end (E2E) processes.

Why do I need both task and process mining?

To illustrate this point, we have to look at the definition of a task and process. One such definition is as follows:
A process is an upper level description of a series of major steps required to accomplish an objective. Processes are generally made up of tasks. Tasks are made up of actions or steps.

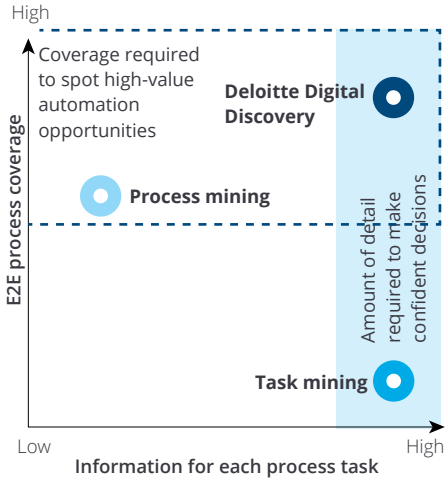
Taking the above and placing it into context, it easily illustrates how both task and process mining reveal different parts of a true end-to-end process and are necessary to spot high-value opportunities. Figure 8 overleaf shows this graphically. The y-axis shows the complete E2E process coverage down to a transaction level, whilst the x-axis shows the process step details, i.e. the coverage of steps that take place within a task.

A higher value on the E2E process coverage axis represents the higher completeness of the whole E2E process (i.e. if there are 100 steps in a process, the highest value would show that the solution captures all 100 steps).

	Process mining	Task mining
	Major systems: salesforce, ORACLE, SAP → Process mining tools: SIGNAVIO, celonis, UiPath	Desktop applications: Excel, Internet Explorer, Outlook → Task mining vendors: NICE, UiPath, Fortress IQ
What is it?	Digital activities executed by people, machines, and software leave trails in so-called event logs. Process mining techniques use such logs to discover, analyze, and improve business processes using data science.	Out-of-system activities, such as updating Excel and sending e-mails, are captured through desktop recording over a two-week period and then processed with AI and machine learning to build process diagrams, improve business processes and spot opportunities for automation.
What is it used for?	To model end-to-end processes by using data-driven insights. More than a million cases can be modeled on one process diagram, showing each variation, where the bottlenecks are, and much more.	To spot automation opportunities by identifying the most common and rule-driven tasks that occur on an employee's desktop.
Why is it significant?	As we move into an always-on future, process mining enables the development of digital process twins, continuously monitoring processes. It is often referred to as 'process hygiene'. In the future, process mining tools will allow the monitoring of the robot workforce.	In order to automate first, we need to understand the task down to a transaction level so that rules-based robots can be developed. Omitting information from the initial as-is analysis can lead to unexpected robot failures and failed intelligent automation transformations.
What are its limitations?	Process mining only reveals the steps taken during a process that are available in IT systems; it doesn't drill into the detail. For example, it will note that a mortgage application has been approved, however it won't show the steps taken to ensure it can be approved.	Whilst it is exceptionally well-suited to drill into the detail to reveal user activities, users need to ensure they are deploying it in the area that will bring the most value. To do this, the whole end-to-end process needs to be analyzed. For example, task mining reveals the out-of-system checks taken to approve a mortgage.

In contrast, a higher value on the process step details axis shows the level of steps that are included within each specific task (i.e. if one task in a process has 10 steps, the highest value on this axis would represent that all 10 steps within the task are captured).

Figure 8: How Digital Discovery allows for the spotting of high-value automation opportunities



Both values of measurement are correlated; however, it is important to distinguish between them as both have two different functions. The first measurement of E2E process coverage allows us to pinpoint tasks with the highest inefficiencies in a process, whilst the second measurement is used to drill down into each task and understand how and if intelligent automation can be deployed to remove these inefficiencies. The sweet spot for intelligent automation is the area where the empty, green dotted rectangle and green-filled rectangle meet. Deloitte Digital Discovery is currently the only tool able to combine both data-sets to reap the benefits of both mining techniques to spot high-value opportunities.

How does Deloitte Digital Discovery™ work?

Digital Discovery uses data science and software to capture tacit and explicit knowledge to model the as-is process landscape. There are three distinct stages involved:

Phase 1: Connect and extract the data

During the first phase, SMEs utilize both core and non-core systems to connect, extract and process the data required for Deloitte Digital Discovery. A combination of both sources enables a view of the true processing time at every core and non-core system touchpoint.

- **Systems to extract process mining data** will be identified and data extraction points agreed (i.e. a bank's internal mortgage approval system: Pegasus).
- **Data will need to be extracted** from these systems with the agreed method and timeframe (i.e. extract two weeks' worth of data from the bank's internal mortgage system).
- **Task mining software** will need to be set up on teams' desktops/virtual environments (it may be deployed on 20 employee desktops within the mortgage department).
- The software will run for two weeks to **capture the out-of-system activities** that are not visible with traditional process mining software (i.e. the steps taken to approve a mortgage).

Once both task and process mining data has been extracted it is time to process each individually and then combine to give one holistic end-to-end data model.

Phase 2: Data modeling

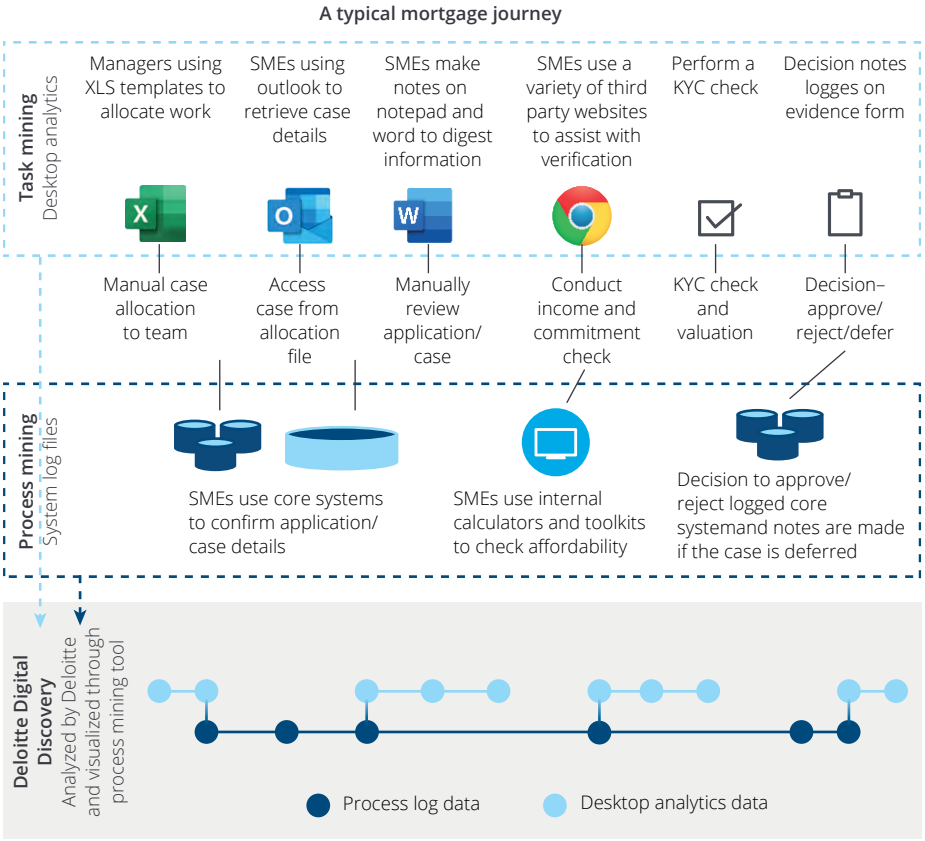
Combine the data sets

During this phase, data scientists build new data-models from the extracted data (by utilizing the Deloitte Process Mining Framework) and then apply machine learning techniques to produce a unique data join.

The main events of the data science revolve around data upload and configuration:

- **Creating a data pool**: data is imported into a secure environment to be processed. In order to obtain efficient results, the system log data is transformed to include a unique case ID, activity, and timestamp; other information may be added as it will help deep diving into the data analysis for better understanding of the issues and process turnaround time.
- **Task mining data** is obtained following a two-week recording period, after which it is sent for processing using the latest machine learning, AI and optical character recognition (OCR) techniques available.
- **Both data sets are subsequently combined** using the Deloitte data-join method to give a holistic data model.

Figure 9: An illustrative example of how task and process mining are used to build a holistic end-to-end process model



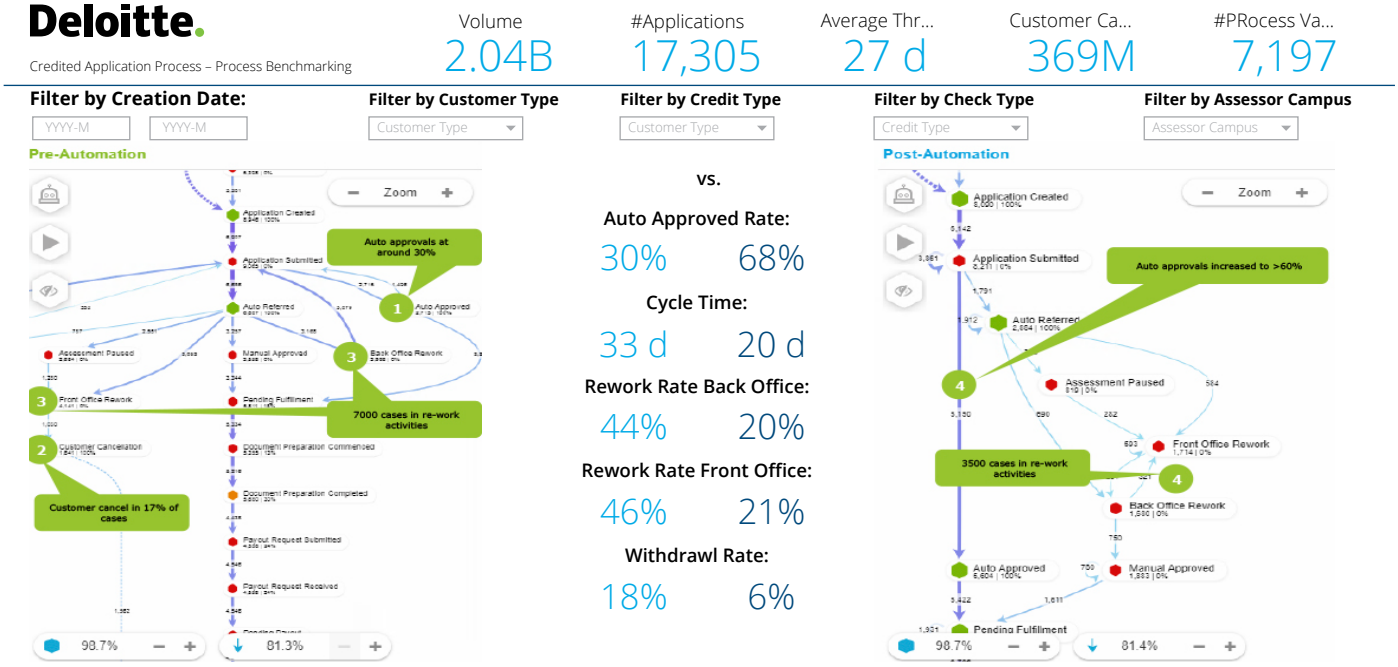
Phase 3: Digital Discovery Insight

During this phase, domain SMEs obtain a visualized analysis of the end-to-end process flow inclusive of processing time, elapsed time, process variants and rework time, and in combination with suggestions from the visualization tool SMEs are able to make informed, data-driven, simplification and intelligent automation recommendations.

Through the use of the mortgage example above, SMEs can easily spot bottlenecks and frictions, i.e. once a mortgage application has been made, SMEs may be able to tell that some applications have a three-day delay due to missing information between departments due to human error. A robot could be deployed here to automatically move a mortgage application between different teams involved in the process and improve processing time.

Benefits of using Deloitte Digital Discovery Process analytics goes beyond basic process efficiency metrics like throughput time calculation to show how a friction in a process affects key business outcomes. Key benefits for our clients include:

- **Significantly reducing the cost of discovery activities**: the process analysis alleviates the process improvement efforts by identifying manual tasks and rework, so clients can automate smarter with robotic process automation (RPA) and other types of automation by focusing on the steps that matter.
- **Understanding the impact of process friction on KPIs**: availability of both pre-configured and custom KPIs that enable clients to build and track metrics according to management or divisional goals.
- **Identifying upstream root causes of friction**: AI-powered root-cause analysis that helps clients drill deeply to highlight the upstream causes of



process variations, and to set prevention measures for those issues in the future.

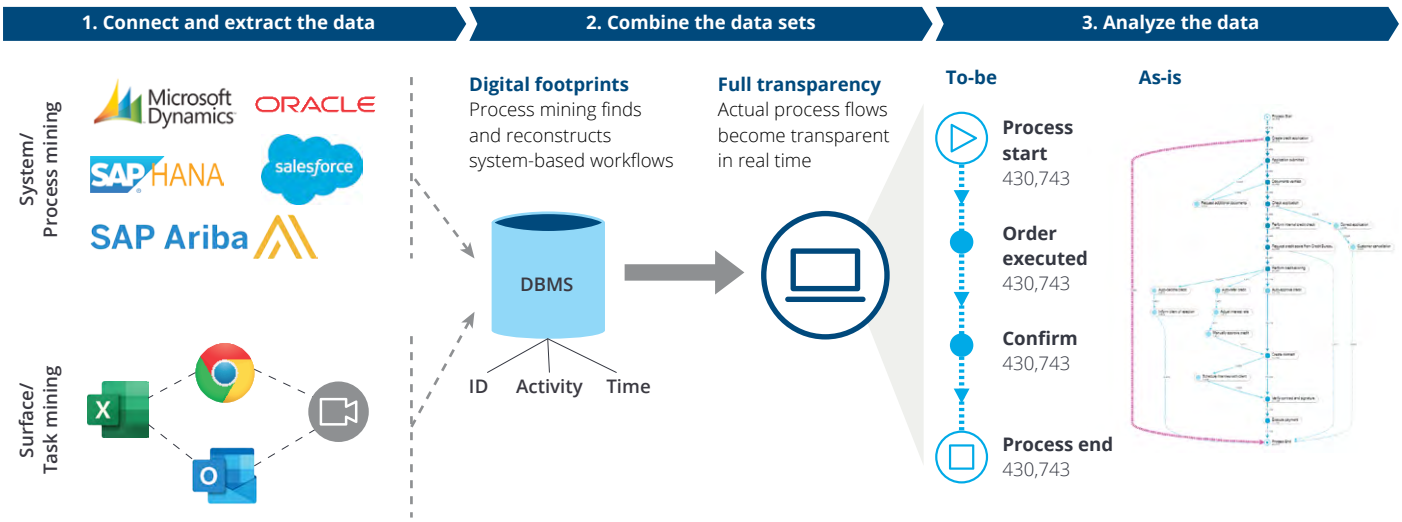
- **Increasing compliance and reducing risks**: automated conformance checking, based on process mining AI, evaluates current process performance against the reference process model designed and based on best practices, and instantly highlights areas that fail to conform, so clients can drive process standardization.
- **Measuring internal performance of entities**: process benchmarking enables each function to see how the performance of their processes compares across departments, regions, teams, and even compared to industry-leading companies, so they can apply best practices and increase process standardization.

Once the data is loaded, processed and analyzed, a hypothesis of opportunities can be built and implemented to eliminate, simplify and automate processes. The below shows such an example for a mortgage department within a European bank, comparing the pre- and post-automation landscape.

Phase 4: Monitor and improve

Once Digital Discovery is set up for processes it is recommended to integrate with continuous data-feeds for monitoring and continuous improvement.

Figure 10: Summary of how Deloitte Digital Discovery works



3. Comparing Deloitte Digital Discovery to hands-on-process analysis

We have developed Deloitte Digital Discovery with intelligent automation treatments in mind; however, this method can be applied cross-purpose and cross-industry to take on any transformation program.

There are two key distinctions between the hands-on process analysis and the data-driven approach Digital Discovery employs. Whilst hands-on-process analysis used to be the gold standard for business analysis, the end-to-end process coverage and accuracy significantly exceeds the hands-on-manual process analysis in modeling volumes as it utilizes a data-driven approach, combining task and process mining, as opposed to a human-driven approach, which can miss steps and can be subjective (for example, it may miss exception paths and can be subjective as it relies on employees' recollections of how a process is completed).

This, in turn, means that the entire end-to-end process shows process step details on the granular level like never before, giving the users an accurate state-of-the-art process landscape that can reveal bottlenecks and irregularities and ensure conformance on an unprecedented scale.

True end-to-end process analysis results are delivered at a speed not seen before

Using a data-driven approach has several advantages, the least of which are accuracy and coverage. Deloitte Digital Discovery has been developed to specifically help our clients implement successful automation initiatives whilst keeping an eye on the high-value return-on-investment opportunities. Previous market research indicated that one of the biggest hurdles of business leaders taking on these initiatives is the time (and thereby also the cost) associated with spotting these opportunities in the first instance. However, that does not mean methods such as VSIM are obsolete. Our experience shows quite the contrary, with both methods being suitable tools for different use cases. This is further explored in the table below.

	VSIM	Deloitte Digital Discovery
Description	*Map as-is process state by conducting interviews, holding workshops and talking to SMEs*	*Combines both task and process mining to reveal the true, holistic E2E business process enabling process analysis across different teams, systems and applications*
Implementation cost	 High	 Medium - high
E2E process coverage	 Medium - high	 High
Process step details	 High	 High
When to choose which approach	• Dealing with multiple processes applicable across one geographical area • Majority of the activities done manually or data is unstructured • Customer has concerns related to data privacy (e.g. sensitive data, financials, etc...) • Highly complex processes for which the organization doesn't know how they're completed	• When activities are predominantly digital (i.e. taking place in IT systems or desktops) • For continuous monitoring and predictive and subscripted analytics • To analyze millions of cases and how they flow through processes • When dealing with one process across multiple geographical areas
Pros	• Often no sensitive data to deal with • No need to map current IT infrastructure and deploy software • In some cases, the cost will be lower than Deloitte Digital Discovery	• Captures both process and detailed steps within each task in the process • Can be used to check the performance and conformance with the ideal process • Captures tacit and implicit knowledge • Process and task mining can be completed in parallel • Uses available data and captures real-time data to build a holistic business process model
Cons	• Time-consuming (as it involves workshops and on-site visits) • Relies on information provided by staff which sometimes can be subjective • Requires a high level of involvement from the client	• Potentially sensitive data that is captured that needs to be hashed • Potentially need to install task-mining software on user applications if full Digital Discovery solution is required
Considerations before use	• Do we know the complexity of our processes? • Who are the main stakeholders that should be involved in the workshops? • Does the voice of the customer uncover all issues?	• Will sensitive data be collected? Do we know which applications to whitelist? • Can this easily be deployed in IT infrastructure? • Does HR need to be involved for privacy statements? • Are systems known and can logs easily be extracted? • Is the relevant information captured in system logs (Case ID, activity and event time)?

Project examples

Project examples

Case 1: Digital retail client acquisition, onboarding, maintenance and servicing in wealth management

Engagement summary

A global bank suffered from manual sales and processing of wealth products across the Americas and Asia which resulted in their advisors relying on manual and inconsistent processes, with high time and cost factors to onboard clients and with 60% of applications incomplete, a lack of a scalable platform hampering expansion and a high compliance risk.

The client strategy was to digitize sales of wealth products globally to gain market share while lowering operation costs through onboarding new clients via digital channels, enabling client self-service capabilities and utilizing analytics to better understand customer behavior and improve sales.

Approach

- Deloitte used the VSIM method to study the client's current processes and systems through reviewing existing documentation and conducting interviews to validate and refine the understanding and/or fill gaps as required.
- Deloitte then developed an end-to-end automated application incorporating suitability, investment selection, account opening, KYC and funding.

Value delivered and impact

- Less than 5 minutes expedited account opening
- Drastically improved productivity of advisors leading to an increase in sales volume
- Zero application processing errors
- Reduced operation risk with the automation of the control framework
- Enhanced client experience through modern UI and self-service capabilities

Case 2: Process optimization for a capital markets division

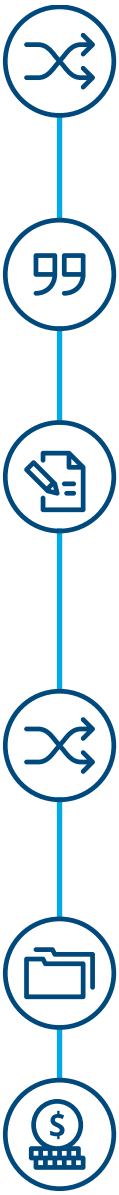
Engagement summary

The capital markets division of a global investment bank launched an organization-wide initiative to reduce operating costs by 30% over the next three years. The client engaged Deloitte to accelerate existing cost reduction opportunities and identify new ones within key target areas of its capital markets operations.

Approach

- The VSIM approach was used to target, analyze, and identify improvements. The Deloitte team collected operational data through process interviews with subject matter experts within each middle- and back-office team.
- Process bottlenecks, pain-points, dependencies, resourcing, and tasks were analyzed to determine root causes and the ability to mitigate or eliminate the causes.
- Recommendations were compiled into function-specific implementation roadmaps with execution recommendations for realizing the expected cost reduction benefits within the next 12 months.

Value delivered and impact



- Current state process models were constructed and validated live during subject matter expert interviews
- Post-interview, volume and cost data were collected and overlaid on the process models
- Pain-points were highlighted and a Lean Six Sigma root cause analysis was conducted to identify optimal process modifications
- Future state process models were constructed to reflect the recommended changes and to showcase the efficiency and cost savings expected
- At the end of the project, the client had a repository of process models for continuous improvement
- Identified new cost savings ~50% for selected processes

Case 3: Process improvement for auto leasing in KSA

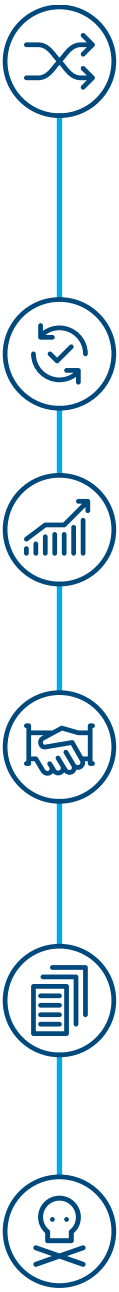
Engagement summary

A leading bank in KSA was facing increasing complaints related to its auto leasing product and therefore wanted to improve the related processes and aligns its capabilities with strategic and organizational goals and objectives

Approach

- The VSIM approach was used to assess the as-is situation and design a to-be state. The Deloitte team conducted workshops with key contacts involved in the processes to capture the as-is status and mapped 33 processes across 4 areas.
- Process bottlenecks, pain-points, dependencies, resourcing, and tasks were analyzed to determine root causes. On-premises visits were also made to capture the waste related to movement at showrooms and branches.
- A quantitative and qualitative data analysis for complaints and surveys were conducted to understand the root cause of the issues and issues in the CRM system design.
- Recommendations were compiled into function-specific implementation roadmaps with execution recommendations for realizing the expected cost reduction benefits within the next 18 months.

Value delivered and impact



- Future-state process models were designed to reflect the recommended changes and to showcase the efficiency and cost savings expected (e.g. instant approval, integration with government systems, automated workflow for credit approval, etc...)
- Quick wins related to insurance claims and other admin areas
- Clear KPIs were set that can be measured and used to monitor the auto leasing processes
- Enhanced SLAs for all functions involved in the auto leasing processes, which directly impact the turnaround time of the process
- Implementation plan to support the bank in the deployment of automation, specifically related to loan simulation and application workflow
- Reduced number of customer complaints after three months of the engagement

Case 4: Mortgage analysis for a European bank

Engagement summary

Deloitte was engaged by a large European Bank to perform a process analysis in order to identify efficiency and cost savings using Deloitte Digital Discovery.

Approach

The work we performed:

- After process workshops tasks were split into value add, non-productive, "waste") and we found that a lot of time was invested in quality assurance of submitted mortgage applications
- Established a management cockpit on process efficiency with cancelation rates, re-work efforts on submitted applications, automation, etc.
- Re-structured the back-office along newly developed organization criteria with internal shared services and specialist task forces for complex loans
- Changed submission criteria for loan brokers and applied higher quality standards vs. internal re-work within the mortgage bank
- Retrospective data analysis before/after applied changes with the process mining tool (one time)

Value delivered

Confirmed headcount reduction of around 25% which was invested in the growing business

Auto approval rate went up to 68%

The count of re-work activities in front- and back-office could be reduced by ca. 50%

Case 5: Finance process analysis

Engagement summary

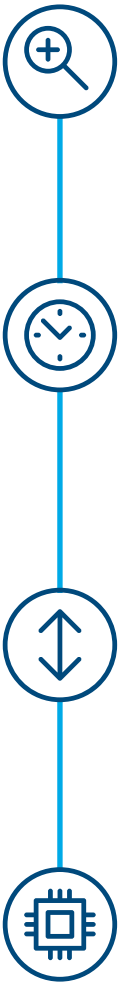
This client was utilizing process mining across the organization, aiming to drive operational excellence by creating full transparency of as-is processes, but realized that process mining alone does not provide the true end-to-end view required that includes activities outside of core systems.

Deloitte supported the client to select a process and implement a Digital Discovery approach (with combined task mining and process mining).

Approach

- Digital Discovery was implemented on the invoice bookings process specifically focusing on invoices that couldn't automatically be booked in the system and needed manual processing on applications outside of core systems.
- Key focus areas for the process analysis were: workflows/activities causing the most manual effort, process quality issues, throughput time vs. processing time, communication time, automation opportunities.

Value delivered



Only ca.60% of the process was visible with process mining. Combined process and task mining revealed 100% of the process

Handling time vs. throughput time is only visible with the combination of task mining and process mining. Average handling time = ca.3 minutes, average throughput time = ca.60 hours

Identified 'ping-pong' cases (cases that go through multiple departments and reoccur in the work list) to increase handling time to ca.7 minutes and average throughput time to ca.96 hours

Identified automation opportunities to transfer data between SAP windows and attaching notes to invoices

Case 6: POC implementation of finance process for a major bank in Jordan

Engagement summary

The client is the leading banking firm in Jordan with operations across the Middle East region.

In its endeavor to be leaner and more efficient, the client was looking at reducing the manual effort involved in its payroll process by using a process-mining approach to implement automation as a proof-of-concept. The process included working with Outlook and its core banking software.

Approach

- Deloitte focused on conducting a process deep-dive to capture the keystroke-level details of each and every step taken by the payroll team.
- The as-is process was then documented and analyzed to identify the potential areas for redesign to ensure automation
- After the process analysis was finalized, the to-be processes were defined and a

Value delivered

Given the 24x7 working capacity of the robot, the initiative helped:

Decrease the processing time by almost 66%

Increase the processing capacity of the team by 225%

Case 7: Automation implementation in procurement in KSA

Engagement summary

Deloitte was engaged to review and analyze the end-to-end procurement operation (using process mining) to improve case handling productivity by 20% or above to address the existing case backlog and meet regulatory requirements.

The productivity increase was required to be designed and implemented as operations continued with no material impact on quality or customer outcomes

Approach

- Deloitte reviewed and baselined operational and process performance of the end-to-end procurement process
- Appraised quality issues causing significant rework and resulting in inefficiencies
- Identified improvement opportunities to aid overall efficiency and pinpointed key activities for potential automation using robotics process automation software
- Designed, built and tested a proof-of-concept prior to wider roll-out

Value delivered and impact

40% productivity uplift, ca.80 FTE activity automated

50 robots executing over 25,000 operational requests per week across 10 sub-processes at 30% FTE cost

2 of top 5 quality failures eliminated

24/7 operational production

Ability to scale up and down robots to deal with future demand

Acronyms and definitions

Acronym	Expansion	Definition
SLA	*Service-Level Agreement*	*A commitment between a service provider and a service user that stipulates particular aspects of the service level such as quality, availability, responsibilities.*
CTQ	Critical To Quality	Standards or requirements that determine customer quality needs from a value perspective.
FTE	Full-Time Equivalent	A unit that indicates the workload of an employed person in a way that makes workloads or class loads comparable across various contexts.
CSF	Critical Success Factor	A management term for an element that is necessary for an organization or project to achieve its mission.
SIPOC	Suppliers-Input-Process-Output-Customer	A high-level flow diagram that displays cross-functional activities in a single, simple diagram. Provides an "at-a-glance" perspective of the process steps incorporating suppliers, inputs, outputs, and customers.
UAT	User Acceptance Test	A type of testing performed by the end user to verify/ accept the software system before deployment and to determine if the requirements are met.
KPI	Key Performance Indicator	A measurable value that demonstrates how effectively a company is achieving key business objectives.
E2E	End to End	End-to-end coverage of a process down to a transaction level.
RPA	Robotics Process Automation	A form of process automation technology that enables the creation of software robots (bots) to automate any business process.
AI	Artificial Intelligence	The ability of a machine to simulate intelligent human behavior.
UI	User Interface	The user interface is the graphical layout of an application.
SME	Subject Matter Expert	Individuals who are experts in a particular domain.

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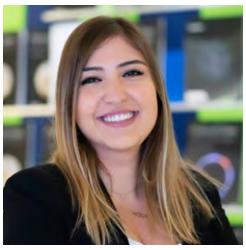

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