White paper

Customer Journey Analytics in Banking

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The new demands of the digital era

Today's banking customers have high expectations when it comes to their brand interactions. From young digital natives who barely remember paper checks to seniors who depend on their voice-activated digital assistants, the modern customer expects a seamless, intuitive, and deeply relevant experience. And they get frustrated easily when brands don't deliver.

In fact, 32% of customers will walk away from a brand they love after merely one bad experience.[1] And 73% of customers expect companies to understand their needs and preferences.[2] At the same time, the potential upside is significant for organizations that consistently create highly tailored, meaningful customer experiences (CX) to rapidly strengthen customer loyalty and maximize business value; in fact, brands that create a personalized CX may see up to a 10% increase in revenue.[3]

So, how can banks better understand customers' wants and needs to deliver better experiences? **Customer journey analytics**. The goal of customer journey analytics is to evaluate the effectiveness and efficiency of the bank's service delivery process with the aim of expediting issue resolution and eliminating channel friction, thereby radically increasing customer satisfaction and engagement.

But this is not without its challenges. Implementing a successful customer journey analytics program requires a specialized data transformation process. The evolution from traditional branch-based services to modern digital banking delivery has engendered the need to integrate and harmonize customer activity across disparate channels using a common framework to identify the actual experience of customers at the most granular level possible. To deliver on customer expectations, banks must overcome the challenges of legacy systems, a strict regulatory environment, and a complex array of digital and in-person touchpoints.

What's customer journey analytics?

The organizing principle of customer journey analytics is to identify one or more customer tasks that arise during a channel interaction (i.e., a customer session) and to identify progress toward the normative path of successful task resolution.

To understand this, let's unpack the terms used in that statement. First, a customer journey is the holistic process necessary for a customer to achieve a financial goal, such as to send money to a relative. A customer task is any activity within a bank-defined business process required for a customer to progress within their customer journey, like enrolling in the bank's person-to-person payments service. And the normative path is defined as the optimal path for successful resolution of a customer task given the bank's service delivery model.

Banks can calculate the direct cost of the friction in customer task resolution and develop reporting to directly and exhaustively measure the cost to serve and the impact on customer profitability. Poor customer service design is what economists identify as a "dead weight loss" that benefits no one; it neither increases customer revenue nor decreases the banks' operating expense.

To deliver on customer expectations, banks must overcome the challenges of legacy systems, a strict regulatory environment, and a complex array of digital and in-person touchpoints.

The bank's 35+ million customers have an average of one sojourn per day, which is defined as customer journey across multiple channel interactions within a finite period of time. Every sojourn is labelled with one or more customer tasks (and relevant subtasks) based on the entirety of available channel and customer profile data. The bank identifies the descriptors of the sojourn labelled by customer task that's associated with customer dissatisfaction and bank attrition. For example, in the phone channel, these negative descriptors include long sojourn duration, call transfers to multiple agents, and the customer recontacting the bank within the next 24 hours.

1. XM Institute
2. Salesforce
3. BCG

Harmonizing channel data to drive analytics

Banking channels evolved over time as a way for banks to compete for customers based on convenience. Less than 50 years ago, customer service meant a neighborhood bank branch that closed at 3:00 p.m. on Friday and didn't open again until 9:00 a.m. on Monday. There was literally no customer expectation for access to banking services during the weekend.

We can classify banking channels across two dimensions: the mode of delivery (at a physical location or remotely) and the means (whether an agent intermediates for the bank or the customer acts on their own behalf via self-service).

Channel taxonomy:

	Physical	Remote
Agent	Teller, branch banker	Phone agent
Self-service	ATM	IVR, digital, email, chat

ATMs arrived as a self-service alternative to tellers in the late 1960s, banks initiated 24/7 phone agents in the 1980s, and the arrival of the internet in the 1990s resulted in the deployment of the digital banking channel. Each channel emerged to address a specific need for customer convenience, and all channels need to be incorporated to effectively deliver customer journey analytics.

Challenges with channel data

Banks face challenges wrought by their own history in the agglomeration of data cobbled together during multiple mergers. Legacy data repositories, incomplete documentation, and poor data product descriptions have resulted in a technical debt that frustrates access to, and the incorporation of, the complete set of channel interaction data that's necessary to fully document the customer journey.

For most banks, legacy channel data exists in silos largely in the form in which it was originally collected, with sparse and outdated documentation. The primary usage of this channel data is basic reporting of volumes and trends. Getting from traditional channel reporting to customer journey analytics requires the interweaving of legacy channel data so it can be interrogated by models of customer behavior. Moreover, realizing value from legacy channel data requires research into the business context and mechanism of how the data is collected—a validation exercise known as "exploring the source of the Nile."

The data for each channel interaction must be interrogated to determine:

- **Who:** identification of the "enterprise customer identifier" in the channel interaction
- **What:** description of the channel interaction sufficient to assign one or more customer tasks in the sojourn
- **When:** time-stamp that's conformed to GMT
- **Where:** for the physical channels, the precise geolocation
- **How:** the modality used to access the channel (e.g., digital desktop, mobile app, or mobile browser)

The customer is simply a natural person related to a bank account owned by a legal entity, so the "who" is generally delivered as an enterprise customer identifier. While critical for customer journey analytics, the specification and assignment of an enterprise customer identifier is a huge challenge, as the customer must be derived by matching names and addresses across accounts within products. We need to recognize that it's always a "natural person" (e.g., Joe Smith) who interacts with the bank in a channel, often while representing a "legal person" (e.g., Joe's Bar & Grill) who is the bank's customer.

The evolution and nature of the channel influence the creation and availability of data for the channel, as identified in the following table:

Data types	Channels
Structured data: tabular largely monetary transactions	ATM, teller
Semi-structured data: key value pairs requiring decoding	IVR, digital, branch banker, chat
Unstructured: text or speech	Email, phone agent

Semi-structured data requires substantial effort to consult documentation to interpret the key value pairs and maximize the ability to classify the details of the interaction appropriately. It's very likely that some channel data resides in silos that's not easily accessible, and this discovery can be successfully supported by Teradata QueryGrid. Unstructured data, such as text or speech, is the most challenging of all.

Leveraging digital channel data

The scope of digital channel data includes secure session (authenticated desktop and/or mobile) activity, online product applications, and public website navigation in the bank's domain.

In order to transform raw digital data into a framework for customer journey analytics, it's necessary to:

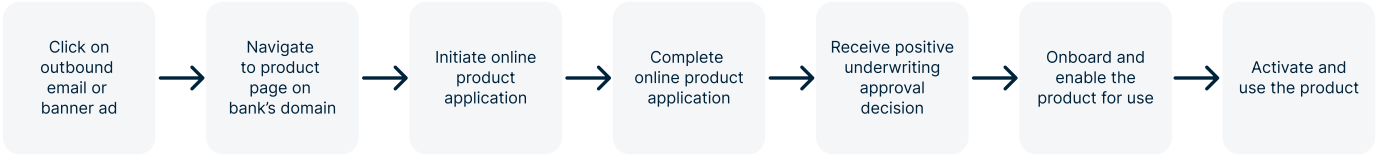
- "Customerize" or resolve the unique session identifier (UUID) to an enterprise customer identifier
- "Sessionize" or organize activity into a meaningful unit of analysis
- "Sojournize" or sequence the digital banking sessions into the sequence of the customer's broader channel activities

Tying this data together can be very difficult, and Teradata's ClearScape Analytics™ provides a robust sessionization toolkit that's especially useful to conform time stamps. The ClearScape Analytics nPath sequence logic is unparalleled in its ability to harmonize channel interactions data at any scale. A top four U.S. bank exposed all of its channel interaction data for the retail bank to nPath, generating over two billion sojourns per month.

Given the demise of the web cookie as a tracking device, Teradata's partnership with Celebrus addresses the requirement for a more cohesive approach to monitoring digital banking channel interactions by capturing first-party digital data without having to place tags on the website and mobile app. Celebrus enables an identity graph that resolves digital identities spawned on multiple devices to the enterprise customer identifier within the bank. The digital data are structured into a data model and loaded directly into the Teradata VantageCloud database in near real time for immediate action.

While the normative path appears straightforward, customers often pause to consider requests for additional information, and the bank may find it beneficial to proactively intervene via chat or an invitation for a phone conversation. The ability to reach out to customers stuck in an online product application can be facilitated by direct response marketing, notably with Teradata partner ActionIQ and the composable data platform (CDP).

Normative path for the new account opening customer task (i.e., the sales funnel)



Analyzing phone agent channel data

Conversations in the phone agent channel are the one time that customers express their wants and needs in their own words directly to a representative of the bank. The phone agent channel is often the "escalation" channel for customers who are not able to self-service in digital banking or who feel the need to speak directly to a bank representative to demand the resolution of a customer service issue.

Most inbound calls are front-ended by an interactive voice response (IVR) unit, which often provides "speak phrase" capabilities for callers to access banking services. Customer telephony integration (CTI) software manages the inbound call, including the transfer of voice-over internet protocol (VOIP) digital telephony across the IVR and phone agents.

Automated speech recognition (ASR) processes the digital call recording to generate a quasi-transcript of the call with duplex (agent and customer) talk tracks. The transcript is evaluated by natural language processing (NLP) via application of a large language model (LLM), which can be used to extract caller sentiment and to identify call topics via name entity recognition. Common applications of speech-to-text include the ability to identify emerging customer service issues and to track the adherence of phone agents to the bank's regulatory compliance policies.

Customer journey analytics identifies the customer tasks surfaced during the phone agent call and provides the ability to persist these tasks for evaluation as to whether the task was successfully resolved downstream in a future sojourn.

ClearScape Analytics provides text analysis tools (e.g., vector embeddings like Word-to-Vec) as well as exposure to ASR and NLP models via Teradata's Bring Your Own Model (BYOM) interface to open-source LLMs.

Advanced applications include the ability to route inbound calls to the appropriate servicing queue based on the customer task identified during digital banking channel interactions or by identifying likely customer tasks for customers segmented by bank tenure and product holding. Harvesting and analyzing these inbound phone agent calls are the single most valuable resource in accelerating the success of the bank's service delivery process.

Chat channels and generative AI

Agent chat was deployed originally as an alternative to live phone agent calls, where customers could chat directly with agents, and agents could support multiple customer channel interactions asynchronously.

Chatbots are an emerging channel where customers engage directly with an application interfacing with generative AI that leverages an LLM. The key success factor for chatbots in banking is the extent to which the chatbot is aware of the context of the channel interaction and can engage in the appropriate resolution path for the customer task. Chatbots are most effective for "bounded" monetary transactions, low-ambiguity information retrieval requests, or other tasks that have been successfully addressed by the IVR channel. Successful deployment will address customer task resolution effectiveness by shortening sojourns and not generating negative spillovers, such as driving additional inbound phone calls.

Tellers, ATMs, and branch bankers: an evolving channel

The teller and ATM channels are designed to facilitate monetary transactions (deposits, withdrawals, transfers, etc.). While the demand for paper checks and cash is slowly declining in the U.S., these channels are still very important, especially to affluent customers, small businesses, and in communities where the cash economy is still prevalent.

A critical consideration is the audience for a particular branch or ATM, which is identified via an "empirical trade area," often a polygon of census tracts that collect 65% of the branch's regular patrons. Cost pressures have led to branch consolidation programs for many banks. For a branch rationalization program to be effective, it's critical to assess the impact on the branch's patrons (via marginal customer attrition of the impacted customers) as well as new customer acquisition in the geographical area that the branch has historically served. Effective analysis requires the geographic organization of all relevant transactions and payment behaviors, which can be very demanding. Fortunately, ClearScape Analytics provides advanced spatial data algorithms that can effectively support this type of analysis.

At many banks, the role of the branch banker is evolving from a generalist focused on traditional banking accounts to that of a specialist advisor for high-value-added business lines such as mortgage, private banking, and wealth management. The branch banker channel generally suffers from a paucity of channel interaction details and is, in one sense, the last frontier. Customer and regulatory resistance preclude digital recordings of conversations in a branch environment, and banker notes to CRM systems are generally rudimentary. The ability to connect to adjacent digital and phone agent channel sojourns via customer journey analytics can help to illuminate the customer task for branch banker channel interactions.

Evaluating customer task resolution effectiveness

To determine if the bank resolved a task to the customer's satisfaction, we need to distinguish between attitudinal loyalty, which is measured indirectly via customer satisfaction surveys, and behavioral loyalty, which is observed directly by exhaustive and continuous tracking of customer retention. Customer satisfaction surveys are biased toward the most engaged customers and are sensitive to the framing of the questions asked. Yet customer satisfaction surveys are valuable when they're evaluated within the context of the customer journey.

Effective measurement of behavioral loyalty requires the development and deployment of a robust customer attrition model, which can be facilitated by ClearScape Analytics. The application of product profitability allows the extension to an estimation of the models to include customer lifetime value, along with other diagnostics of customer engagement such as deposit balance diminishment, diminished card payment activity, etc.

The reality of customer task resolution is complex. A top-four U.S. bank discovered that roughly 65% of customers speaking with a phone agent were currently or very recently engaged in a digital banking channel interaction with the bank. However, the phone agent had no awareness of or insights regarding this coincident digital banking activity.

Beyond the task of acquiring, interweaving, and evaluating channel interaction data, banks need to design an analytical methodology that can authoritatively measure whether a customer task is resolved. This requires an evaluation of whether the customer journey is currently on the normative path of successful customer task resolution, and the bank must be prepared to intervene with the customer if necessary.

The bank's ability to infer the customer task evolves with the breadth and depth of the channel interactions in the sojourn, notably as agent channels are involved in the resolution path. The key for successful customer journey analytics is to persist the inference of the customer task during the sojourn from an initial guess to a refined assignment as the sojourn evolves. This evolving assignment of customer task is amenable to advanced analytics that model how behaviors transition over time, such as Markov chains or neural architectures such as recurrent neural networks.

The complexity of customer task resolution varies widely depending on the nature of the customer task. Many tasks are monetary transactions (e.g., cash withdrawal, transfer from savings to checking) in which the bank's service delivery process is straightforward and transparent. Other customer tasks are more complex and have a greater impact on customers (e.g., fraud mitigation) and may require the bank to make a financial accommodation to successfully resolve the issue (e.g., immediately refund the fraud loss amount to the customer).

The critical question to address is whether it's even possible for a customer to resolve a given customer task purely in a digital channel; if not, major changes in CX are required to avoid friction and the eventual abandonment of the task.

Effective measurement of behavioral loyalty requires the development and deployment of a robust customer attrition model, which can be facilitated by ClearScape Analytics.

Assessing customer task efficiency

Here, the objective is to understand how much time and resources were spent on the customer task resolution. The call center environment illustrates how generally accepted performance metrics are insufficient to achieve this. A common performance metric in the phone channel is the average handle time (AHT) tracked independently for each agent call. However, what really matters is the length of the call from the customer's perspective—a phone sojourn that includes the time in the IVR, the initial phone agent call, and warm or cold transfers to subsequent phone agents.

The common "first call resolution" metric is expedient but incomplete, as it's impossible to determine whether a customer task is resolved during the initial call without monitoring subsequent channel interactions in the entirety of the phone sojourn and any adjacent digital sojourn.

Another common performance metric is the average speed of answer (ASA), or the elapsed wait time from when the call drops from the 800 number into the IVR or into an agent desktop. What really matters is the elapsed time from when a customer calls until their task is resolved, and customers will accept a longer wait time if they're routed into a process that's aligned with the customer task that they need to resolve.

Providing relevant contextual information, like the specific customer task the caller is trying to resolve, promotes phone agent productivity. An early production application of generative AI was for the knowledge management systems that support phone agents.

A study by Eric Brynjolfsson of Stanford University found that the "staggered introduction of generative AI conversational assistant to 5,179 customer support agents led to a 14% increase in productivity, as measured by issues resolved per hour with the greatest impact on novice and low-skilled workers; the AI assistance improves customer sentiment, reduces requests for managerial intervention, and improves employee retention."[4]

With a modicum of effort, it's feasible to estimate the marginal cost of a channel interaction, e.g., $0.01 per second for the phone agent channel. Computing the marginal cost of a channel interaction allows the ability to fully identify the direct cost of sojourns by customer task and provides a cost pool to fund improvements in service design and delivery.

Fully realized customer journey analytics infrastructure provides applications to enhance customer task efficiency. Observations of sojourn duration and successful resolution by defined customer task leads to explicit expectations of phone agent performance via service standards of wait time, sojourn duration, and cost. These service standards can be exploited in workforce management staffing and scheduling systems to produce greater customer satisfaction at lower direct cost.

According to a Stanford University study, using a generative AI conversational assistant at a call center "improves customer sentiment, reduces requests for managerial intervention, and improves employee retention."

4. E. Brynjolfsson, D. Li, LR Raymond, "Generative AI at Work", 2023.

Realizing the full value of customer journey analytics

To fully realize the value of the investment in customer journey analytics, the modeled inference of the customer task within the customer journey should generate a "signal of customer intent" that can be consumed by downstream workflows within the bank.

For example, whenever the customer journey analytics engine identifies "fraud mitigation" as the salient customer task, this should inform downstream banking processes such as:

- Fraud case resolution workflow (e.g., ServiceNow)
- Multidimensional customer data repository (Teradata VantageCloud)
- Premier banker CRM application (e.g., Salesforce)
- Marketing engine that identifies the direct marketing next best action (e.g., ActionIQ)

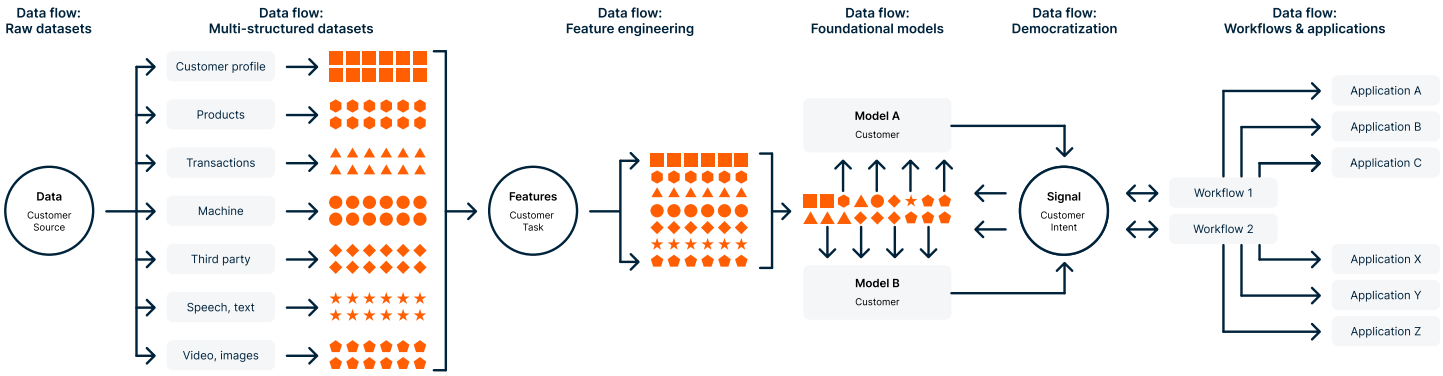
The persistence and proliferation of the customer task identified as a signal of customer intent will allow the bank to provide a more consistent and personalized resolution workflow at a moment of truth that drives customer loyalty and engagement.

The broad array of information that a bank has on every customer could be considered long-term memory, with recent events and potential offers being short-term memory. Real-time data provides contextual, in-the-moment understanding for the bank to leverage advanced analytics in the moment of decision.

Flagging a signal of customer intent within ActionIQ adds the impacted customer to a discrete audience. This allows for explicit monitoring of the customer's advancement within the customer journey in order to:

- Update the universal contact history so that the bank has updated institutional knowledge of the signal and can take relevant action
- Suppress paid media spend for the customer until the customer task is resolved
- Deprioritize other communications to the customer until the customer task is resolved
- Stage appropriate messaging (and next best actions) in all inbound channels should the customer utilize any of the bank's touchpoints to self-service their customer task

Customer task within customer journey generates the signal of customer intent



It's imperative for the bank to act on newly detected signals of customer intent very quickly. Research in the financial services industry has shown that for every 24 hours after a signal can be detected from customer behavior, the customer's response rate to the bank's outreach effort declines by half.

Digital migration and effective CX

A major goal of most retail banks is to migrate customer channel behavior from expensive agent channels to less expensive self-service channels, a strategy known as digital migration. To resolve customer tasks, customers generally prefer the convenience of self-service channels (so long as they work!) over agent channels. Product redesign that produces a monetary incentive for customers to migrate to digital channels can also be highly effective.

The key to successful digital migration is to design and deliver a customer service strategy that can effectively resolve customer tasks while minimizing customer time and effort.

Changing customer behavior requires:

- Disciplined channel data capture made accessible via VantageCloud's flexible database architecture
- Dynamic, robust models, such as customer attrition, customer lifetime value, and purchase propensity, supported by ClearScape Analytics
- An experimental design discipline that promotes effective test-and-learn initiatives driven by a "differences in differences" methodology that identifies the impact of the change on customer attrition after controlling for the baseline propensity of the customer to churn over time, supported by ClearScape Analytics and ActionIQ
- A response-driven customer journey that routes the customer through the best path based on responses to each outreach effort; this allows automatic course correction when outbound messaging isn't persuasive in modifying the customer's disposition toward digital migration

Banks can promote successful digital migration by facilitating the following:

- The deposit of paper checks in the mobile banking application via image capture, which displaces ATM and teller deposits
- Online bill payments, which increase customer retention via the avoidance of the hassle of "switching costs"
- Person-to-person payments, which decrease the use of currency and paper checks and promote customer social networks

4 keys to successful customer journey analytics

- Resist the expediency of CSAT surveys and instead strive for empirically driven analysis of customer's experience in attempting to resolve customer tasks
- Resist the fractured picture of customer behavior provided by siloed channel data; customer task resolution generally involves more than one channel—a process that often evolves over several days
- Embrace the identification of a normative path for the resolution of each customer task; embrace "design for measure" where the data architecture is developed to portray the complete customer channel experience.
- Embrace the customer task framework, which provides unparalleled insight into the moments of truth in which customer task resolution drives customer engagement and loyalty, as customers with unresolved customer tasks are likely to be dissatisfied and won't purchase additional products from the bank

Summary

Customer journey analytics requires the incorporation and harmonization of disparate channel interaction data with the overarching goal of identifying customer tasks within customer journeys. Additionally, developing customer attrition and customer lifetime value models enables robust payback analysis for investments in improved customer service. Finally, Investment in customer journey analytics identifies the effectiveness and efficiency of customer task resolution driving service process and channel interface redesign.

How Teradata can help

Teradata partners with businesses in financial services and many other industries to create impactful customer experiences through AI, machine learning, and advanced analytics. Using customer journey analytics, we help banks evaluate and improve their service delivery processes by expediting issue resolution and eliminating channel friction to radically increase customer satisfaction and engagement.

We empower banks' customer journey analytics through:

- **Complete data harmonization:** Integrate data and accelerate data preparation with the most resource-efficient cloud platform and advanced in-database analytics
- **Rapid AI innovation:** Use preferred model training tools and technologies via our open and connected ecosystem
- **The most cost-effective performance:** Operationalize and scale Trusted AI through robust governance, automated lifecycle management, and massively parallel processing

Teradata provides the flexible, proven solutions banks need to innovate faster, enrich customer experiences, and deliver value—all with the transparency and security of Trusted AI that banks need.

To learn more about how Teradata can empower your customer experience with customer journey analytics, visit **teradata.com/industries/financial-services** or talk to an expert at **teradata.com/about-us/contact**.

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