

SUPERCHARGING THE PAYMENTS MODERNIZATION WITH AI

Introduction

Payment systems modernization is a top priority for bank CIOs, irrespective of their size and span of presence globally. Their agendas often include tech debt reduction through legacy modernization and operational efficiency, which in turn is connected to improved customer experiences. This can be an overwhelming endeavor. Hence most leaders prefer to modernize payment systems incrementally. However, the foundation must first be laid for next generation of payments processing, lest it should be a kodak moment* for banks, and it is a big-ticket item for many.

This is the reality for most Tier 2 banks worldwide, and the North American banking industry is no exception. Let's start by examining an average customer journey: Customers seek out banks that offer the most convenience at the lowest cost, and they will likely research multiple alternatives, often resulting in customer attrition.

As artificial intelligence (AI) continues to evolve, it can help mitigate customer attrition. The opportunity lies with pioneers who can capitalize on being early adopters in the field.

At Infosys, we have observed that AI accelerates these transformations. Drawing from global experiences, we have identified three key areas where specific AI interventions can improve payments modernization for banks:

- 1. The power of LLM (Large Language Models) for legacy modernization** – Be it mainframe stack.
- 2. A case for enhanced internal efficiency** – Accelerated payments operations modernization with the combined strength of analytical and conversational AI solutions.
- 3. Customer experience** – AI can be the tip of the spear in this dimension.

These three areas of improvement of enterprise architecture can accelerate modernization with AI and large language models (LLM), which can significantly optimize CTA (Cost To Achieve).

The Power of LLM for Legacy Modernization

One in three banks in nations with advanced banking systems still have their payment engines embedded in COBOL/RPG code of mainframe. Whether it be high-value payments clearing and settlement, liquidity or rules for payments throttling, they are all within COBOL code procedures. These procedures are complex tree structures, and manually analyzing and extracting functional and variable views can take years.

LLM can accelerate this process. It is however, it is not a silver bullet. Current LLM models that are prevalent in the market are more focused on static code analysis, optimization and/or simplification of programs written in Object-oriented programming

languages. So, legacy payment systems require a different approach. Possible methods include isolating and extracting functions and variables from functional sub-routines, then either bypassing or replacing them based on their functionality. For example, identifying capabilities which are payment-scheme agnostic (such as high value Real Time Gross Settlement - RTGS, Automated Clearing House batch processing- ACH) should be the primary target areas. This requires a combination of LLM solutions tailored to the legacy nature of COBOL code. The combination could include code analysis, documentation generation (using Business Process Modeling (BPM) notation) for rules extraction, and identification of security and code vulnerabilities. This approach helps prevent functionality breakdown when certain payment functions are turned off or bypassed while keeping the rest of the functionality intact.

All these activities are part of reverse engineering and are expected to result in a projected 50% savings in total Full Time Employee (FTE) effort.

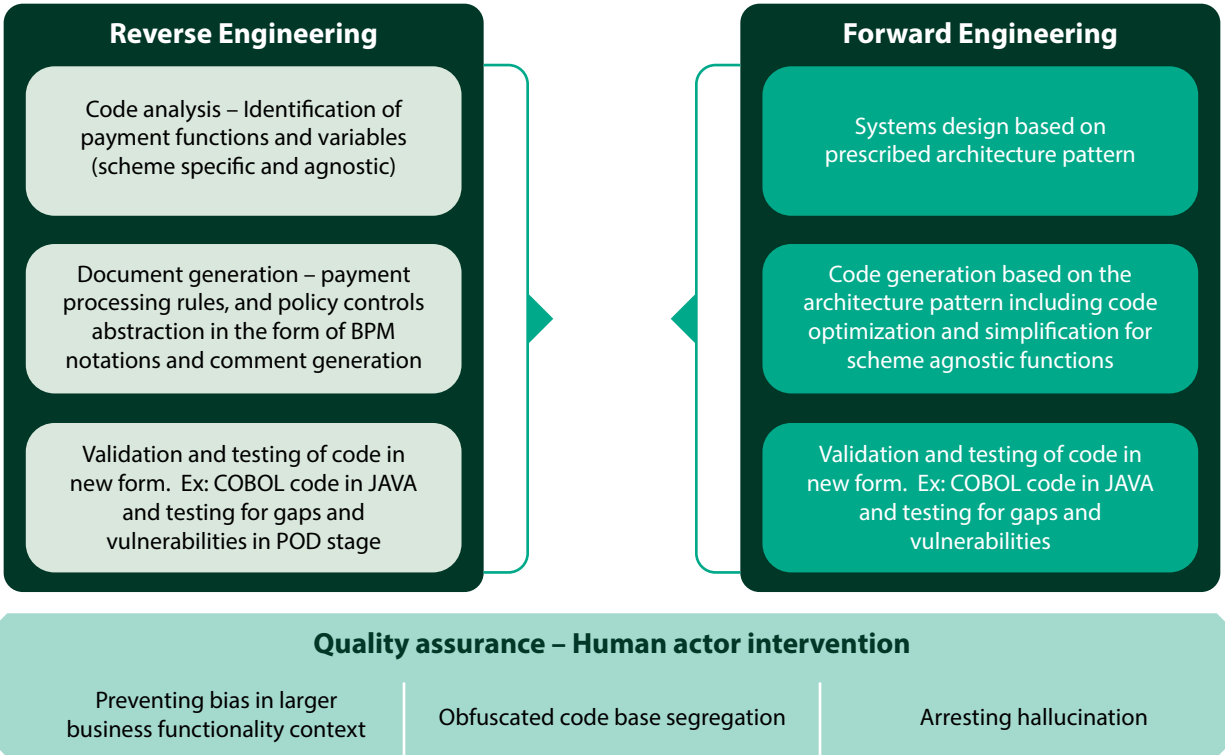
Next is the forward engineering that can further enhance solution modernization by leveraging code generators and system architecture pattern generators, followed by a specific sequence of testing and validation services. This can be accomplished by utilizing LLM, many of which are quite mature and can assist in this process.

A word of caution here: Due to the interspersed nature of COBOL code with system of record functions, and occasionally lending and disbursement functions, extracting payment functions and Isolation of rules for payments processing still requires a human Quality assurance (QA) check. This is called context assessment bias as it ends up missing smaller nuances which a human developer could catch. Hence, at this stage, it is the combined strength of code analysis, documentation generation, and vulnerability assessment, along with human intervention, that ensures the solution is effective.

Identifying the scheme-agnostic capabilities and listing them for forward engineering should help the designer clearly segregate the capabilities for build and buy. It will not be prudent to build or re-engineer everything in new design or architecture patterns like microservices. In fact, some functionalities are easily achieved in the COTS (Commercial Off-The-Shelf) products out-of-the-box. On a case-by-case basis, bringing in a fine balance between build and buy will not only optimize time and cost, but will also lay the foundation for a futuristic payment platform for the bank. This approach literally means monetization of payments data. All the costs associated with modernization efforts with this approach can be outweighed by the business benefits it can bring. Whether it be ROI, the ability to launch new products and services, a steady reduction in RTB spends, or increasing the opportunity for discretionary spend, this will lead the bank to a higher orbit.

*Kodak as a photographic film maker was not able to foresee the oncoming digital technology onslaught and are now out of business completely

Infosys Legacy Modernization Framework for Payment Systems



There is also the question of data coming out of the mainframe, and it should have a proper destination. Most of the data in the mainframe would have been hosted in IMS or DB2 database systems. These systems are potentially governed by the logic and rules of core banking and payment systems combined. Based on our global experiences, Infosys has found that they are often mixed up in banks. Data migration in such scenarios must be carefully planned. Rules coded with data dependency should be analyzed more carefully. The functions and variable attributes should ideally provide the direction where a system of record can be placed.

Perhaps, it may guide the decision to purchase a COTS product. A simple database as a destination location would not be sufficient; It could go into at least a couple of destinations considering the nature of the data. Some data could also be moved into the payment engine for local data persistence. This is also referred to as a 'golden copy' by some COTS product vendors. It includes some customer data, but it is not the system of record. A system of record should ideally be a next generation core banking platform, and that should be the direction to achieve 100% of the modernization agenda. It can also accommodate the position accounts (treasury accounts for foreign currencies) holding the information associated with NOSTRO/VOSTRO relationships.



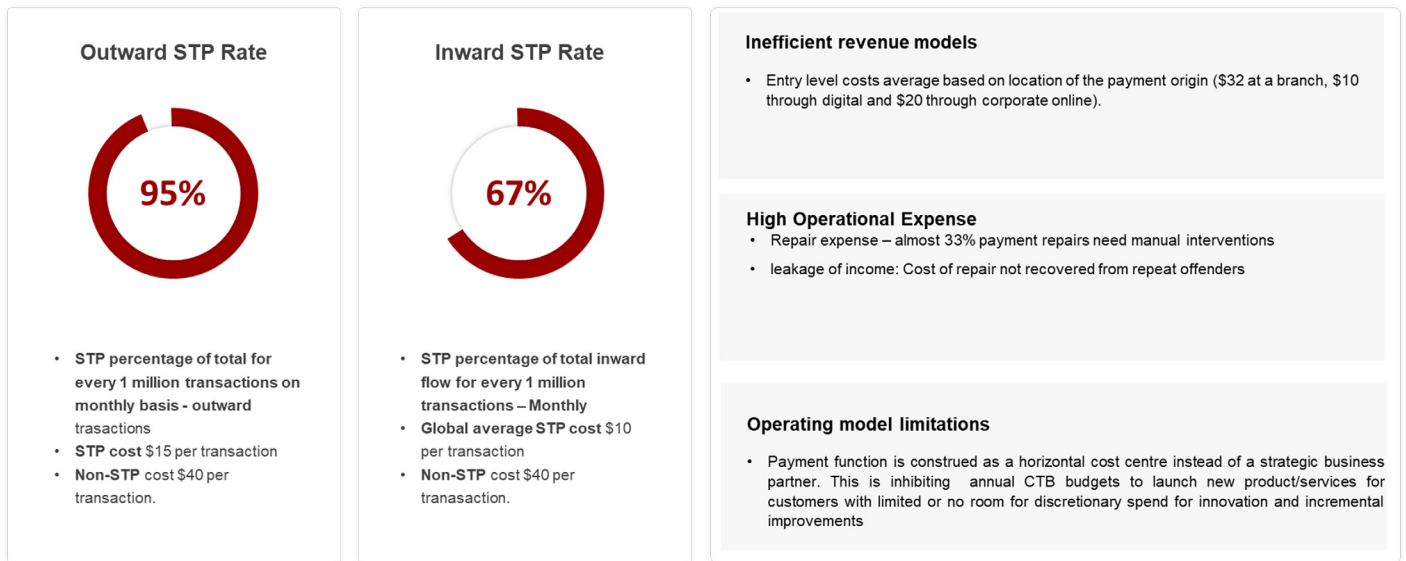
Operations Modernization for Cost and Process Efficiencies Leveraging AI

Irrespective of foundational infrastructure modernization, operations are another important area where AI can make a difference. There are opportunities in banks to provide minimally invasive and targeted AI interventions that bring efficiencies in an accelerated manner. Here, the critical success factor would be reference data, as it will be used to train the machine learning algorithms to improve operational efficiencies. By combining analytical AI/ML algorithms, conversational AI, and workflow capabilities for the next best course of action, efficiencies can be significantly improved, and human intervention is reduced. An additional outcome of this effort would be the provision of payments data as a service which will further enhance

the operating model and open the door for payment data monetization.

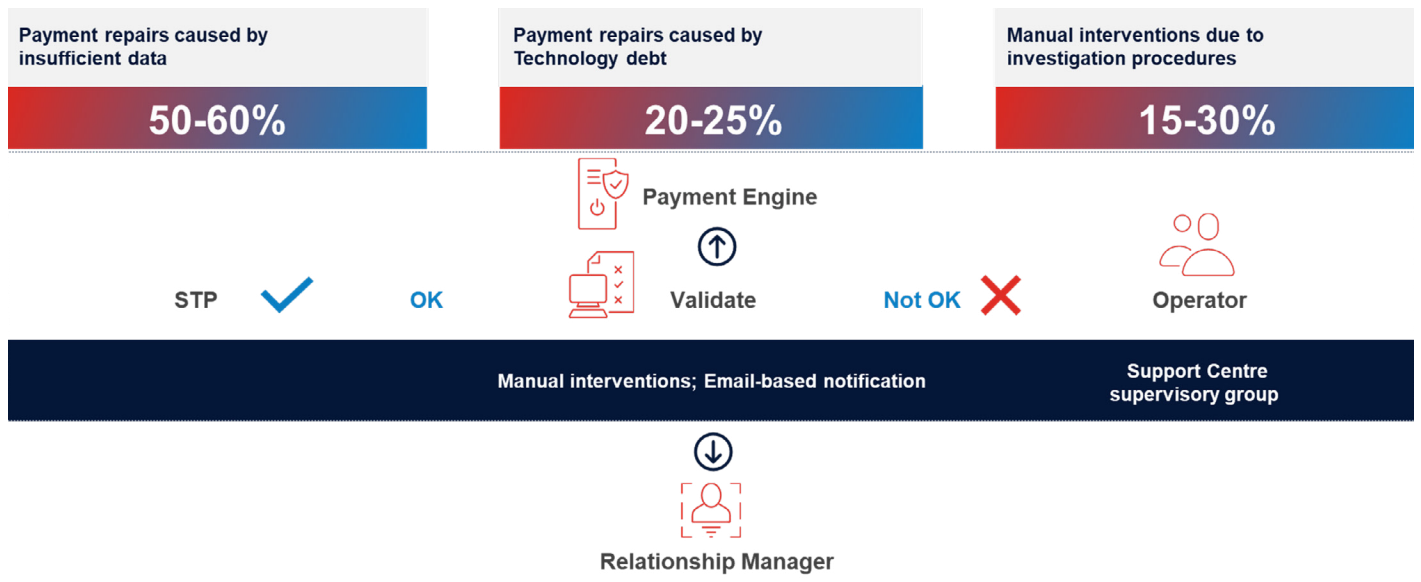
Historically, payment messages have been the root cause of operational inefficiency. The information received in these messages was often insufficient, inaccurate or irrelevant leading to payment transactions ending up in repair or investigation queue.

Globally, an average of 33% of payments are in repair or investigation queues. This percentage is higher for inbound payments and lower for outbound payments in most banks, as inbound payment messages are expected to adhere to all policy standards.



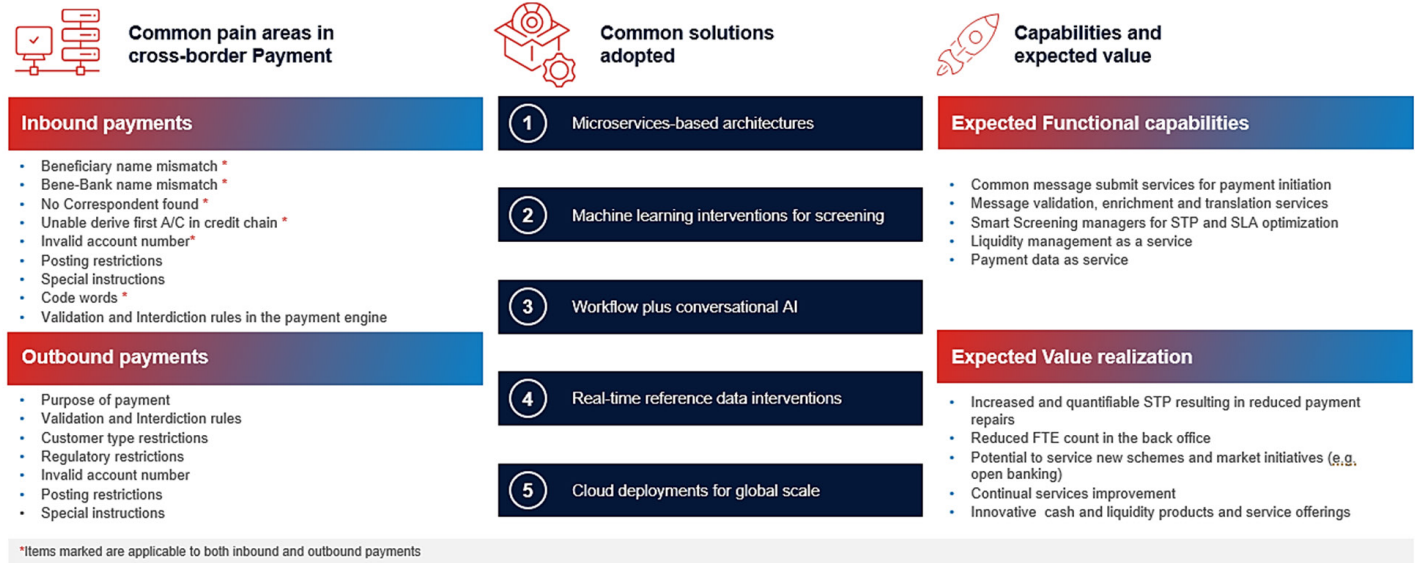
Evidences from the banks with significant legacy infrastructure and presence in North America, Europe and ANZ from FY21-22 assessment

To reduce the number of payments needing repair, it is crucial to capture the payment message early in the value chain, validate it and enrich it. Analytical AI can be especially helpful in this process. At Infosys, we have utilized analytical AI solutions to decrease payment repairs by up to 45% in the payment value chains of some of our global clients.



*Based on Infosys study in Nov 2020 during the engagement

Some of the typical operational problems where payment repairs and investigation-related issues are solved using targeted interventions include:



It is necessary to conduct root-cause analysis to identify the exact type of targeted intervention that needs to be implemented.

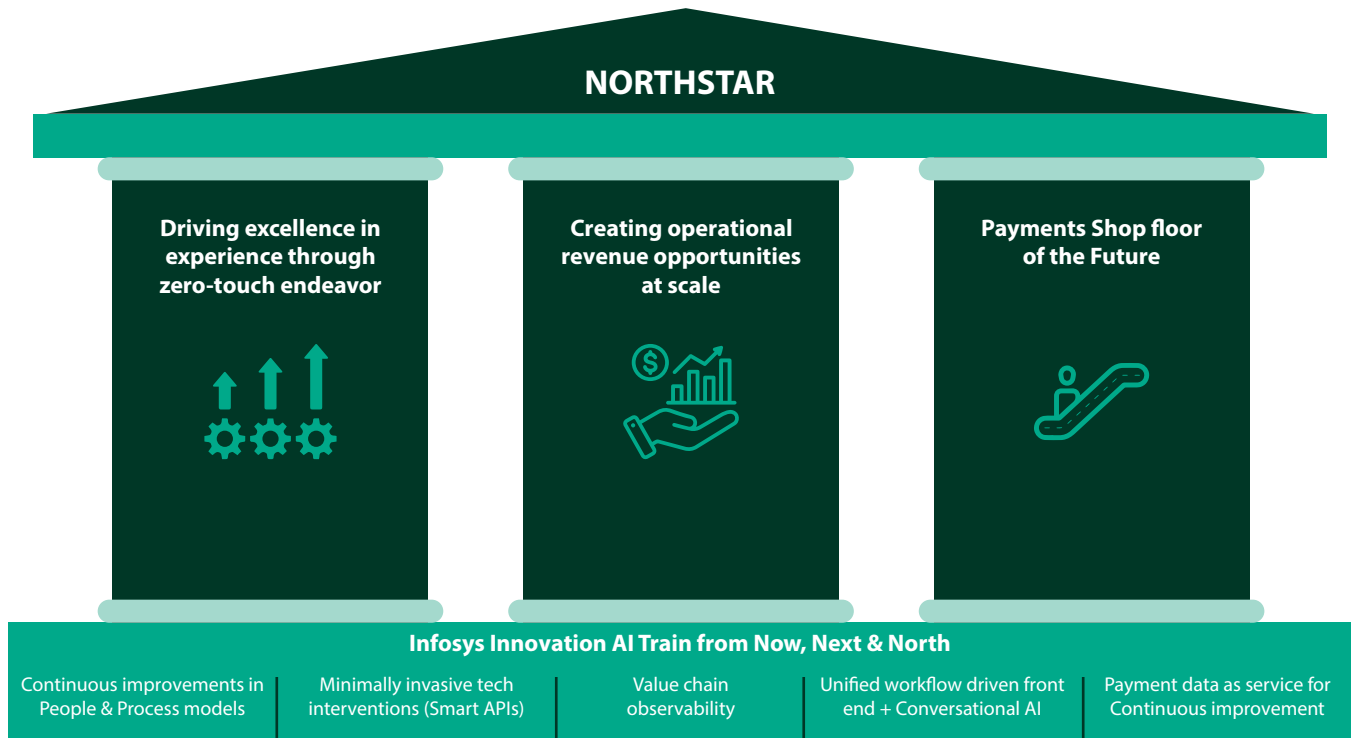
In the next step, candidates for AI/ML interventions need to be qualified to bring operational efficiencies. This qualification process involves validating the outcome and efficacy of the model that will be deployed. Moreover, it is necessary to ensure that the model undergoes iterative fine tuning if needed.

For example, beneficiary name and bank mismatch errors can be addressed through a combination of machine learning algorithms. This has been tested and could improve the STP levels to 95%. The next level of interventions would be workflow driven, conversational AI solutions to make informed decisions, avoid fee loss, and eliminate the human effort wasted on attending to payment repairs.

For all these interventions, real time reference data is critical, and envisioning a suitable data model ensures the success of AI interventions.

The question of payment repairs and investigations in banks is inevitable, irrespective of message formats, standards, and alternate settlement methods to corresponding banking networks. In the current operating model, it is ironic that most of the OBO payments fall into repair queues, while intermediaries end up taking ownership. This will not only increase the cost of payment for the end customer, but also erode revenue efficiency for banks. In this context, the capability to continuously observe the feed and apply ML interventions would be highly valuable. We have implemented payment data as a service to maximize the success of AI interventions.

Infosys has perfected a framework that is powered by targeted AI/ML solutions to bring in operational efficiency in high value, domestic and international payments. Our framework can bring:



Uplifted Customer Experiences in Payments, Leveraging AI Interventions

Next, we get into customer experience. The primary utility of AI in banks is “protecting the customer trust.” After all, banks are the first parking place for a common man’s hard-earned money. The primary set of expectations would be:

1. Securing customer interactions seamlessly from onboarding through account opening, transaction process and account closure
2. Utilize the rigor of precision AI to minimize fraud and prevent losses
3. Streamlining shopfloor processes through intelligent automation

Payments are a key component of a customer service transaction process, with a primary focus on the status and finality of payments. It is crucial that payments are delivered successfully without any reduction in the originally committed value, including exchange rates. This is why regulators worldwide are placing increasing emphasis on this aspect to ensure that customers receive what was promised at the time of payment initiation. The ACCC standard in Australia (along with similar compliance requirements globally) requires that the value of the payment at the time of initiation remains unchanged when received by the payee. Unfortunately, this is not always the case, leading to a loss of customer trust and eventual attrition. AI can solve this issue through intelligent liquidity optimization and forecasting solutions.

Furthermore, there are areas of intervention where AI can improve the customer experience. Some use cases where compelling solutions exist include:

1. Shaping the customer persona through intelligent observability.
2. SMART routing for predictability of value delivered, cost, and time efficiency.
3. Intelligent geo-tagging of payments for AML.
4. Proactively preventing payment fraud through targeted and contextual anomalies detection interventions.
5. Intelligent feedback loops to understand the dynamic behaviors of customers.

AI driven persona shaping is primarily used in consumer payments. Some data providing activities that contribute to the success of this algorithm include:

- Number of transactions approved in the last 24 hours.
- Value of transactions approved/authorized in the last 90 days.
- Number of unpaid transactions.
- Inactivity or the number of days without a transaction.
- Geo-tagging the transactions that occurred at non-standard locations/touchpoints.
- Risk-based adaptive authentication.

Other customer-friendly solutions include Dynamic SMART routing for predictability of value delivered, cost, and time efficiency. Consider selecting the fastest route to your destination while balancing tolls, traffic blockades, and dynamic rerouting. With the customer's consent, a similar prompt at the time of payment initiation can assist the customer in choosing the best option for themselves. Supplementary use cases include inflight orchestration and multi-acquirer routing.

In customer experience dimension, fraud solutions have the highest utility of AI. The frauds of today require solutions that can adapt in real time and at scale. Generative AI, with its ability for continuous learning, offers the unprecedented advantage of rapidly refining and adapting its understanding of patterns to more accurately distinguish between legitimate and fraudulent payments.

Data is equally critical for analytical AI-based solutions and rule-based engines. Compiling and labeling data for training purposes is a painstaking process. In this context, GenAI can help create synthetic data to fill the gap for analytical AI solutions without compromising customer privacy. However, this technology is still in its early stages. Most entities are currently validating their proof of concepts.

The latest issue in payment fraud is enumeration attacks. Fraudsters track digital footprints to capture key security data, allowing them to impersonate someone and steal their money. Securely tracking payment activity with consent helps strengthen the training data and minimize fraud and scam attacks. This not only decreases false positives significantly, but also shapes the customer persona.

Where analytical AI falls short, generative AI steps in to help proactively reduce fraud noise. Some of the use cases in the advanced state of development include:

- Proactive pattern detection.
- Models that can adapt to customer behavior dynamics.
- Deeper analysis solutions such as detecting multi-account frauds or identifying the root of AML chain by leveraging geo-tagging data.
- Synthetic identity fraud detection.

Bias stemming from flawed algorithms and inaccurate data continues to be a significant issue for generative AI. When training data is biased, it can magnify existing inaccuracies, resulting in discriminatory results. These biased outcomes go beyond ethical concerns and can pose substantial risks for businesses. Financial institutions may encounter higher operational expenses as they work to address these unjust false positives, as well as legal liabilities arising from discriminatory practices.

As can be seen, AI is a double-edged sword. What matters is data accuracy and preparation for it.



The ignored segment of the payment value chain modernization – is the system of record.

Payment data, when broadly classified includes:

1. Customer information
2. Account information
3. Transactional data

All these data segments must be kept accurate and available in real time for payment processes to succeed. This results a Straight Through Processing (STP) rate of at least 95%, minimal to no false positives in fraud detection, and valuable insights that banks can offer customers regarding money movement. However, this aspect of architecture is overlooked in many banks. Implementing AI without first cleaning up and establishing the underlying data systems could be risky. Therefore, this becomes a crucial prerequisite for AI-driven payment modernization.

Real-time liquidity is another area of AI intervention in the realm of system of record. In most banks, systems of record operate on batch processing infrastructure. This significantly limits the ability to provide real time transaction banking, cash, and liquidity products. While payment infrastructure may be highly available, if the system of record is in batch processing mode, any modernization efforts are incomplete. Therefore, simply modernizing payment infrastructure is not enough to ensure success. Upgrading the system of record is essential to ensuring accuracy and real time access, while fully leveraging the benefits of AI.

Conclusion:

Based on the current state of AI solutions maturity, it is pragmatic to utilize them to enhance and support modernization programs. Whether it is utilizing LLMs for knowledge extraction from legacy systems, implementing minimally invasive interventions for operational efficiencies, or improving customer experiences, there is a need for compelling data-driven evidence obtained from proof of concept and proof of design activities. Infosys has developed frameworks to support this with compelling experiences. We have assisted banks in expediting payments modernization journeys and enhancing productivity while reducing risks significantly. Our consulting frameworks and technical accelerators offer a balanced approach to maximize the benefits of your modernization journey.

Implementing AI solutions in the actual payments processing journey should be done selectively following the construct of the crawl, walk, and run approach.

It is evident that payment data monetization has been a key focus in designing modernization solutions. In most AI powered modernization programs, we have seen a positive ROI in less than 4 years, while also helping banks achieve enterprise level savings in RTB/CTB spend of over 45%.

Author:



Sridhar Bhagawan

Senior Principal, Payment's practice lead,
Infosys Consulting

Practice Leaders:



Rajesh Menon

Managing Partner,
Financial Services,
Infosys Consulting



Manishi Varma

Partner, Banking Centre
of Excellence,
Infosys Consulting



Anil R Deo

Associate Partner,
Banking Center of Excellence,
Infosys Consulting

Contributing payment practitioners from Banking Center of Excellence – Payment Practice:

Abhisek Bhowmik,
Principal - Business Consulting
Abhisek_Bhowmik@infosys.com

Divye Kapoor,
Principal - Business Consulting
divye.kapoor@infosys.com

Anwasha Chatterjee,
Principal - Business Consulting
anwasha.c01@infosys.com

Shriram Parthasarathy,
Principal - Business Consulting
Shriram_P@infosys.com

Kumar Krishnamoorthy,
Senior Consultant - Business Consulting
kumar.k11@infosys.com

Paranthap Chakrabarti
parantap.c@infosys.com

For more information, contact askus@infosys.com



© 2024 Infosys Limited, Bengaluru, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.