CELENT

CASE STUDY

PROJECT FUTURECORE

ZIONS BANCORPORATION'S TRANSFORMATION AND IMPLEMENTATION OF THE TCS BANCS CORE SYSTEM

Stephen Greer
sgreer@celent.com

Dan Latimore
dlatimore@celent.com

February 2018

CORE MIGRATION AT A GLANCE

FINANCIAL INSTITUTION	Zions Bancorporation ("Zions")
INITIATIVE	FutureCore: Zions Core Platform Migration to TCS BaNCS
SYNOPSIS	Zions decided to simplify and modernize its operating and technology infrastructure by transforming its legacy core loan and deposit systems, which had been customized for each of its affiliates, into a single core platform: TCS BaNCS. It's a large and complex implementation by an international vendor in the US, and indicative of the changing attitude in the US toward international solutions. The bank is presently live with consumer lending; the commercial lending phase is scheduled to go live in 2019; and, the final deposits phase thereafter.
TIMELINES	• Nov. 2013 — FutureCore Project Launch. • December 2015 — Zions consolidates seven charters under a single entity. • May 2017 — Zions goes live with consumer lending and common components like the CIF (customer master).
KEY BENEFITS	• Standardized, simplified, and de-risked operational environment. • Leveraged the system's extensive parameterization to meet Zions' specific configurability requirements. • Established a strong foundation for a more agile business alongside robust digital initiatives. • Significantly improved customer service. • Significantly improved data quality/integrity. • Reduce integration efforts and costs due to SOA enablement. • Consolidated a number of ancillary systems and reduced the overall number of vendors needed to support the bank. • Enriched jobs & reassignments for back office staff who were no longer required to support the old system.

CELENT PERSPECTIVE

- **Zions selected an international vendor solution to implement a large transformation project**: The TCS deal at Zions is a significant moment for core banking in the US, signaling a change in the attitude of US institutions toward international providers. The US banking industry has always been relatively insular, with institutions preferring domestic vendors for most of their back end systems. Despite significant ongoing efforts by international players to penetrate the US market, domestic banks have been leery; a couple of well publicized failures, an unavoidable lack of domestic reference accounts, and a general wariness of trying something different have delayed progress. Recently, however, as banks begin to undergo broad digital transformation initiatives, they are considering a much wider array of vendors. Celent commends Zions Bancorporation for successfully implementing the first of three phases of a multi-year core transformation program. We rarely see this depth of partnership between a bank and a vendor, and Zions' willingness to be a trailblazer by using an international firm to implement a modern, modular, and flexible core system speaks to the vision of its leadership.
- **Zions consolidated multiple banks and moved to a comprehensive platform**: Zions is shifting from a group of affiliated but siloed entities with consolidated operations that were

highly customized to a modern core platform, more suited to the company's local community banking strategy. FutureCore is but one aspect of a much larger strategic vision. Modernization involves ancillary systems, processes, and workflows. Organizing this enterprise-wide shift in the operating model and technology architecture is extremely difficult, and Celent was impressed with the scope.

- **This is not just about technology, it's also about culture**: Cultural shifts at one institution, let alone many, can be difficult. Zions is undergoing a major shift in how its operations and technology support its strategic advantage as a collection of local community bank brands. Although there were many enterprise-wide similarities, localization led to disparate standards and workflows. Through an extended migration process and comprehensive change management that included training and the raising of skill levels, Zions has been able to achieve a significant shift in culture as it drives towards a frictionless customer experience.

DETAILED DESCRIPTION

Zions Bancorporation was founded in 1873 and has assets exceeding $65 billion. Its origins date back to the arrival of the Mormons and the settlement of Utah by Brigham Young. Zions Bancorporation is a bank holding company of affiliate banks across 11 western states: Zions First National Bank (Utah), Amegy Bank of Texas, California Bank & Trust, National Bank of Arizona, Nevada Sta Bank, Commerce Bank of Washington, and Vectra Bank Colorado.

Table 1: Zions Bancorporation Snapshot

	ZIONS BANCORPORATION
YEAR FOUNDED	1873
REVENUE	$2.4 billion
ASSETS	$63.2 billion
GEOGRAPHICAL PRESENCE	HQ: Salt Lake City, UT States: 11
EMPLOYEES	10,057
OTHER KEY METRICS	Deposits: $53.2 billion Commercial bank offices: 436 ATMs: 570

Source: Zions Bancorporation 2016 Year in Review

A bank's core is its central nervous system and arguably the most important piece of technology on which the bank rests. Every transaction, regardless of how it is generated, touches the core, which handles reconciliations, reporting, accounting, and more. The process of switching out a core platform has been likened to changing the engine on an aircraft in flight, and for good reason. These transformations can be costly and risky; and, there are relatively few each year in the US.

The size of the US banking market as well as the relative age of the most common core platforms presents a lucrative market opportunity for outsiders. However, to date, the US core market has been dominated by a few large domestic vendors. With significant barriers to entry and few migrations annually, international core vendors have struggled to gain a foothold despite multi-year efforts and strong product offerings. The lack of adoption of modern core platforms (particularly from international vendors) has been a factor in keeping US institutions insulated from many of the technologies now standard in other regions globally (e.g., real time or componentized architectures). As banks begin broad transformation initiatives, however, they are beginning to look to a broader range of platform partners for more meaningful modernization in a market historically impervious to change.

In 2013, Zions Bancorp issued an RFP to eight separate vendors for a new core. It needed to take a fragmented system of six siloed operating environments and migrate to an integrated and modern core solution. The bank wanted something different, a modern core platform, and it quickly short-listed a few international vendors. The bank ultimately decided on TCS BaNCS, making it one of the largest domestic banks to migrate to a US core system from an international vendor.

Internally, the migration to TCS BaNCS was named FutureCore; it involved the migration of lending (consumer and commercial) and deposits platforms, including a common CIF. The Teller functionality was subsequently added to the scope. Core banking migration involves not just the management of a project, but often the management of a program — a collection of projects run in tandem with significant dependencies. FutureCore was one part of a five-part program to transform the bank, consisting of:

- FutureCore: Migration of core lending and deposits systems.
- Chart of Accounts: Significant simplification of the General Ledger and adherence to consistent usage
- Loan Operations Consolidation: Consolidation of 15 loan centers to two
- Data Governance: Support of information management, implementation of an Operational Data Store (ODS), and establishment of a data governance practice.
- Credit Lead: Implementation of a new commercial loan origination platform.

FutureCore began in 2013, consisting of three different phases running until 2021. Phase 1 went live over a long weekend in May 2017, while phase 2 is set to go live in 2019. Phase 3 planning is currently active and the schedule will be finalized following phase 2 implementation. The TCS BaNCS functional and regulatory readiness for phase 2 and 3 has already been delivered by TCS to Zions.

- **Phase 1**: Consumer lending.
- **Phase 2**: Commercial lending and construction lending.
- **Phase 3**: DDAs, time, IRA, exceptions, teller, and relationship pricing.

The Zions Bancorporation implementation of TCS BaNCS is a significant moment for the US core market. Until recently almost all US banks have resisted adopting an international vendor for core processing. The launch of consumer lending from TCS BaNCS is only the first step of a multiphase project, but its success stands as a watershed for entrants into the US. FutureCore moves Zions beyond the limits of a traditional offering, accelerating its strategic objective of significant modernization.

Changing Core Systems

The vast majority of US banks have been in business for more than 25 years, and the technology environments in which they operate are a reflection of their age. The core banking platforms, which form the foundation of these institutions, were rigidly architected for speed and robustness, and evolved within the context of a business model built around products and oriented toward silos. Decades of product creation, channel innovation, and ancillary integration have added immense complexity to these systems, making changes difficult and expensive.

Legacy core systems weren't built for flexibility, but rather than for speed and stability. Although the code on which they run still functions and is just as stable as it was decades ago, some platforms are incompatible with adopting digital and emerging customer-centric technologies. These systems are increasingly becoming liabilities for institutions looking to transform their delivery models and modernize. Specifically:

- **Costs**: Maintaining legacy systems carries a higher cost than running modern core banking systems due to the number of workarounds. Integration work is expensive, because there are many more risks of opening up a system that is built to be left alone.
- **Flexibility**: Large Mainframe-based legacy platforms were built for stability and speed and to process millions of transactions in a batch at the end of the day. They weren't made to be altered. New and changing banking functionality requires ongoing development. It's very

difficult, and will only become more difficult, to develop modern, flexible customer experience on top of legacy cores.

- **Developer talent**: Many of the developers who originally worked on some of these core platforms are at the end of their careers (or lives). New IT pros are attracted to more modern architecture written in languages like Java or C#. Younger developers often have a hard time making sense of the vast interconnectedness of banking systems, many of which are poorly documented. This hampers their ability to deliver projects and injects substantial risk as pulling on one string can unravel another. Switching to a modern core (with real-time accounting and componentized architecture) is seen as job enrichment to the IT talent coming on stream today.
- **Ability to serve a digital customer**: Tech companies are leading the way with what's possible in digital. Customers expect a modern digital experience, and legacy core systems have been challenged to deliver it. Core systems that lack capabilities around real-time, cloud readiness, componentization, and openness today find it more difficult and expensive to keep pace with the competition; and the task will only become more challenging.

Despite these issues, vendors and banks have been extremely adept at prolonging the lives of these underlying systems, leveraging technology like middleware to abstract some of the more modern applications from the underlying messiness. However, the reality is that core modernization for many institutions, given the rapid advances in technology, is unavoidable. Workarounds like middleware and enterprise service buses are one alternative that will buy banks time, but they are not a robust long-term solution.

International Core Vendors in the USA

After two decades of industry consolidation in the US vendor market, today's banking institutions rely on a few major vendors for core and ancillary banking solutions. The big traditional US vendors have been quick to swallow up ancillary solution providers, building product suites for end-to-end functionality. Impeded by perception challenges, regulatory concerns, and some market idiosyncrasies, international vendors have been largely left out of the picture, and the US has remained a relatively insular market.

A side effect of vendor consolidation is that core banking platforms have rarely been retired, and as a result many minor platforms continue to be supported by the major US vendors. Acquisition has played a significant role in leveraging scale and establishing networks for capabilities like payments or shared services. Buying core systems companies was a historically advantageous way to gain market share and allow for the cross-selling of the acquirer's more lucrative products, yet the land grab has left a diverse landscape of old to critically outdated platforms.

Core vendors have moved to integrate these features of legacy cores into new product sets, but existing product suites can still act as a liability. Legacy platforms that aren't chosen to be the go-forward product are naturally put on the backburner, and a core system firm's development efforts may reflect the 80/20 rule, where 80% of the resources are going toward 20% of the products. Banks on some of the secondary systems — some of which have a sizable customer base — are core transformation opportunities.

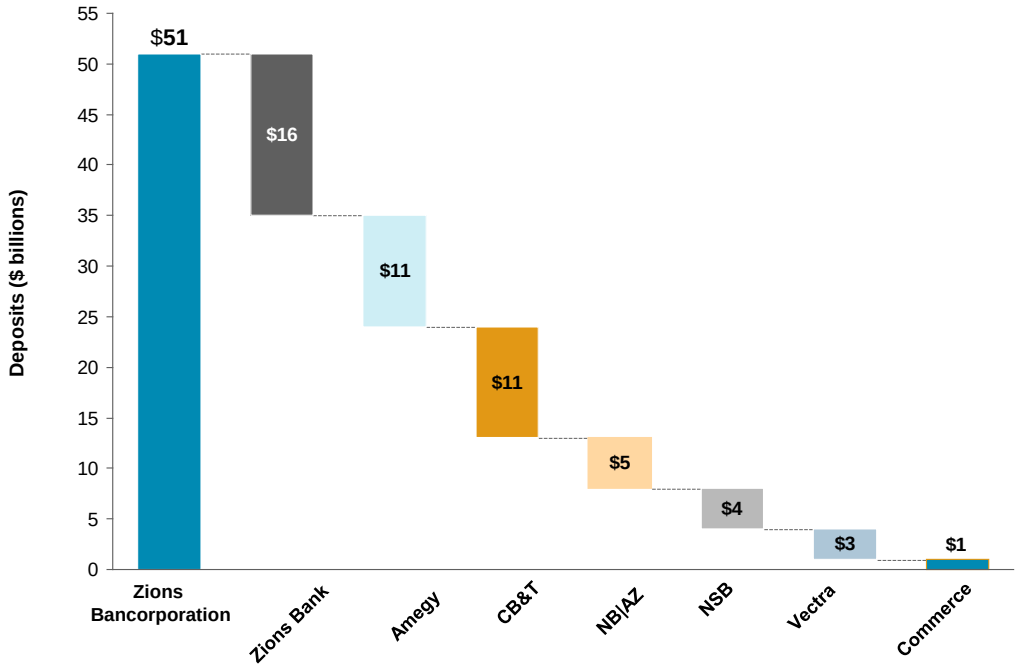
This gap has left an opportunity for international vendors that have identified the US as a fertile market, with a significant number of banks running old products ripe for replacement.

Opportunity for Zions Bancorporation

Like almost all major financial institutions in the United States, Zions Bancorporation (Zions) has been challenged with how to address an aging core. The need to simplify operations and improve the quality of data in the system presented a clear opportunity. Disparate operating environments were making it hard to properly address customer expectations, meet regulatory requirements, and implement enterprise-wide technology initiatives.

Despite its humble beginnings more than a century ago, Zions has grown into a powerful regional institution serving 13 western states. Since 1997, it has purchased 25 different institutions with a total target asset value of $23 billion. Through a series of mergers, Zions Bancorporation was responsible for eight different bank affiliates by 2013.

Figure 1: Zions Bancorp Consisted of Seven Different Legal Entities



Source: SNL Financial, Q2 2017

Each of these affiliate institutions was effectively left to its own devices, customizing operations to the specific locality in which they operated. Deposits and lending platforms were fragmented, often running the same platform across different instances for each institution, requiring multiple batch files to process. Each affiliate was also free to define its own localization. For example, product catalogues might be defined in six different ways. Data was captured and stored with different standards. Loan processing was managed separately by each bank with its own support staff. This strained the ability of the holding company to operate as a cohesive unit, presenting three main challenges.

- **Supporting various systems**: Vendor and technical support was difficult because standards varied. Development, integration work, and data normalization for different initiatives were extremely demanding.
- **Integrating across operating environments**: While the bank largely operated the same set of technology systems, the way they were used differed substantially across the enterprise. At times, this resulted in critical inconsistencies and introduced a substantial amount of expense to standardize.
- **Meeting regulatory reporting requirements**: Data quality issues and siloes affected the bank's ability to fulfill various regulatory requirements like stress testing. Gathering the right data from various siloes to meet reporting requirements was increasingly difficult and complex, costing the bank time and money.

Zions was facing the challenge of running a legacy core environment that was adding increased risk either because the vendor had too few other clients running on the same system, or the

system itself was scheduled to be retired. In Zions' case, the deposits system was being used by only a handful of other banks.

Multiple instances of the same core banking application made time to market for new products a challenge. As such, operational maintenance was more complicated and costly, preventing an effective 360-degree customer view. The bank knew it needed a state-of-the-art core system to make digital a reality.

Zions understood that to continue to grow as an institution and provide its customer base with a truly modern experience, it needed to invest in transforming the way in which it operated. With the investment in FutureCore migration to TCS BaNCS, the bank has begun to realize numerous benefits from modern technology and expects to see more as the next phases of the project go live.

Choosing the TCS BaNCS Core Platform

Identifying the best project partner for core transformation is a lengthy process, especially keeping in mind the challenges and risks involved. Undoubtedly, issues will arise and challenges will be faced, while culture and proficiency also matter. In 2013, the bank launched a lengthy RFP evaluation process to identify the right vendor platform. The complexity of the transformation and the long-term migration program necessitated that they select a firm with strong project management capabilities and strategic vision.

The RFP was issued to eight technology vendors that included both US and International core banking providers. During the evaluation process, multiple workshops were conducted, and Zions quickly narrowed their selection to just three vendors, none of whom was from the US. Zions found the TCS BaNCS platform to be the best fit based on functional richness, flexibility and configurability, TCS' US market commitment, and its technology capabilities. Cultural fit of the two organizations; concerted philosophy around the criticality of relationship management; and TCS' executive commitment to project execution were also considered important aspects of the decision. Ultimately, the bank selected TCS.

The decision to migrate to an international core vendor was a reflection of Zions' commitment to becoming a truly modern and innovative financial institution. TCS and the TCS BaNCS platform were chosen based on a strategic commitment to the US market, a modern core banking platform, TCS' successful implementation track record and a large installed base of leading financial institutions across the globe. TCS' strategic vision also aligned with where the bank was heading, and reference customers provided positive feedback on its implementation capabilities.

TCS BaNCS brought other international best practices and features such as multi-entity capabilities, real-time processing, parameter-driven management, and a cost-effective long-term capability of maintenance and support for multiple years. Zions also appreciated TCS' US presence and its balanced onshore/offshore model.

Table 2: TCS BaNCS at a Glance

TCS HEADQUARTERS	Mumbai, India
ANNUAL REVENUE	$17.6 billion for FY 2016-17 (40% BFSI)
EMPLOYEES	385,809
AVERAGE YEARS OF EXPERIENCE IN CORE	15+ years for domain specialist 15+ years for technology architect 8+ years for designer, business analyst, test leads 5+ years for developer/tester

ORIGINALLY RELEASED YEAR	2007
CURRENT RELEASE	17.0
DEVELOPMENT LANGUAGE/FRAMEWORK(S)	TCS BaNCS business logic is written in 1) COBOL/C++ and Java or 2) Java only
HARDWARE SUPPORTED	The system architecture is agnostic to the underlying operating system and hardware platform. It supports deployment on a wide variety of platforms listed below: IBM AIX with IBM Power HP-UX with HP Itanium Oracle Solaris with Oracle Sparc Windows Server with Intel Linux (Red Hat Linux, Suse Linux) with Intel servers
NUMBER OF CLIENTS	400+
SERVICE BUREAU/IN-HOUSE CLIENTS (PERCENTAGE)	40% / 60%

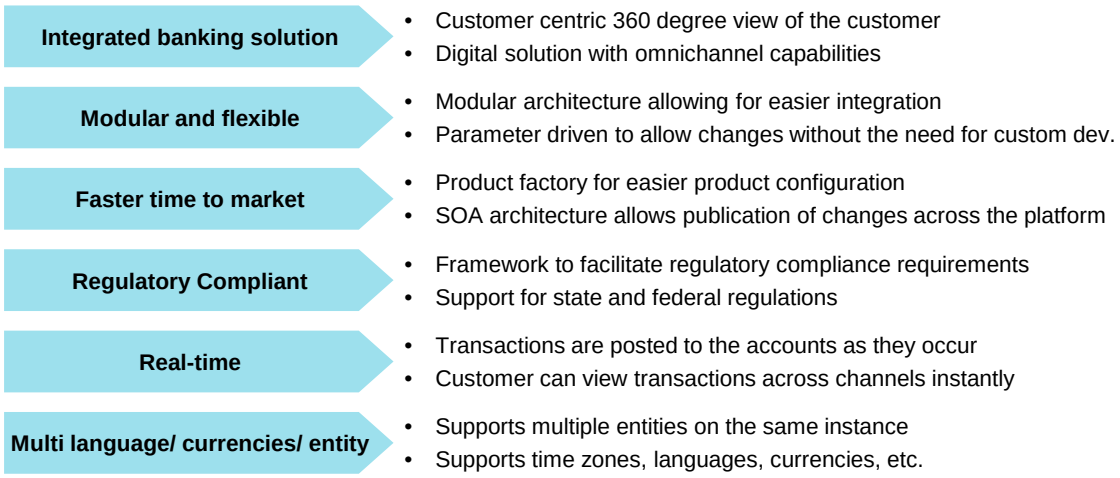
Source: TCS

The TCS BaNCS core platform is built on modern future-proof technology, designed to enable institutions to be both innovative and agile. It is real time-enabled, parameter-driven, componentized, and heavily modular. It's architected to fit within a wide range of technology environments seamlessly and lays the groundwork for both digital and analytics preparedness.

TCS BaNCS is a collection of loosely coupled components, services, and APIs that implement standards like BIAN and IFX. This enables banks implementing TCS BaNCS to deliver superior customer experience through real-time service delivery, agile production of new and relevant products leveraging real-time customer insight, and seamless integration with fintechs where needed. The term TCS is using is "Digital Core."

TCS BaNCS also supports its customer-centric data model to provide a 360-degree view of the customer and other related data. Customers are identified across entities at an enterprise level, and data can be captured locally or globally. This allows the institution to link customer data no matter the entity or role. The models link customer to customer, account, collaterals, limits, and exposures. All the customer data is provisioned centrally in the core for consumption by components or external sources. In the case of shared services, information can be accessed from an externally centralized source. Figure 2 looks at some of the platform's other features.

Figure 2: Key Features of the TCS BaNCS Platform



Source: TCS

For a more detailed overview of the TCS BaNCS core platform, see Appendix 1.

Implementation

Zions' implementation was one of the most complex projects in its history, involving multiple banks coming together under one platform. Any movement away from system architecture designed more than two decades ago to a modern environment will always be complex. The design principles, such as setting parameters, configuring products, operational functions, and much more, were fundamentally different from what the bank had used in the past.

TCS ended up being a valuable partner in the migration, leveraging its implementation framework designed to guide institutions across multi-year technology migration and its "model bank" framework, which proved to be a critical component in rolling out phase 1. The vendor has a large customer base of complex and sizable implementations, letting it leverage data captured and expertise gained from each of them to inform its approach to core migration in new markets and customers.

Delivery Team

The delivery team composed more than 125 people from Zions and TCS, all working full-time on the program for consumer lending. It was supplemented with internal experts from the banks and from TCS, as well as external support from auditing firms. Table 3 gives a high-level view of the activities and their distribution across resources.

Table 3: Resource Split

PHASE	TCS PROJECT RESOURCES	ZIONS PROJECT RESOURCES	ACTIVITIES
SOLUTION ANALYSIS	12%	11%	Requirement Gathering, Gap Analysis , Data Migration Mapping, Interface and Functional Specifications and Solutioning
SOLUTION ALIGNMENT	45%	19%	Technical Specifications, Design Development for Product, Interface, Statements/Notices/Reports and Data Migration

INTEGRATION AND REGRESSION TESTING AND USER ACCEPTANCE TESTING	27%	40%	Test Scenarios, Test Case preparation and Execution. Defect and Resolution Management Business User Validation, Finance, Integration and Compliance Validation
ROLL OUT PLANNING AND DATA MIGRATION	7%	19%	Dress Rehearsals, Migration sequencing, Planning and execution during the “go live” process?
PROGRAM GOVERNANCE AND PMO	9%	11%	Overall Program Planning, Tracking Plans, Action items, Risk and Mitigation plans

Source: TCS and Zions Bancorporation

TCS and Zions split roles and responsibilities between on-site and offshore resources to maximize the effectiveness of the implementation. These entailed:

- Solution Analysis: Primarily on-site
- Solution Alignment: Offshore and onshore
- SIT/ Regression testing: Majority offshore Independent testing teams from the Assurance group of TCS, outsourced to by Zions
- User Acceptance Testing: Primarily on-site
- Rollout /data migration/project governance: Primarily on-site

Challenges of an International Vendor

Implementing TCS BaNCS has successfully pushed the envelope on what the industry has seen in the core banking space. Migrating to an international vendor in the US had, for years, remained largely aspirational. Many of the most successful vendors globally found it difficult to convince local institutions, their global implementations notwithstanding. Generally, US banks had three major concerns:

- Lack of live product localization, including the bank reporting and workflow management required to support US regulatory compliance requirements.
- Lack of existing US clients that can be relied upon for vendor references (domestic banks typically wanted domestic proof points).
- Lack of a US-based services and support infrastructure.

To ensure its successful implementation, the project required a close collaboration between Zions and TCS. For regulatory compliance, the bank contractually agreed that TCS would establish a regulatory oversight practice in the US for the TCS BaNCS core servicing system. The compliance team at Zions worked closely with TCS to perform extensive compliance testing at almost every phase. Rigorous commitment to requirements development and ensuring that experts were involved across the entire lifecycle of the project assured a successful rollout for consumer lending.

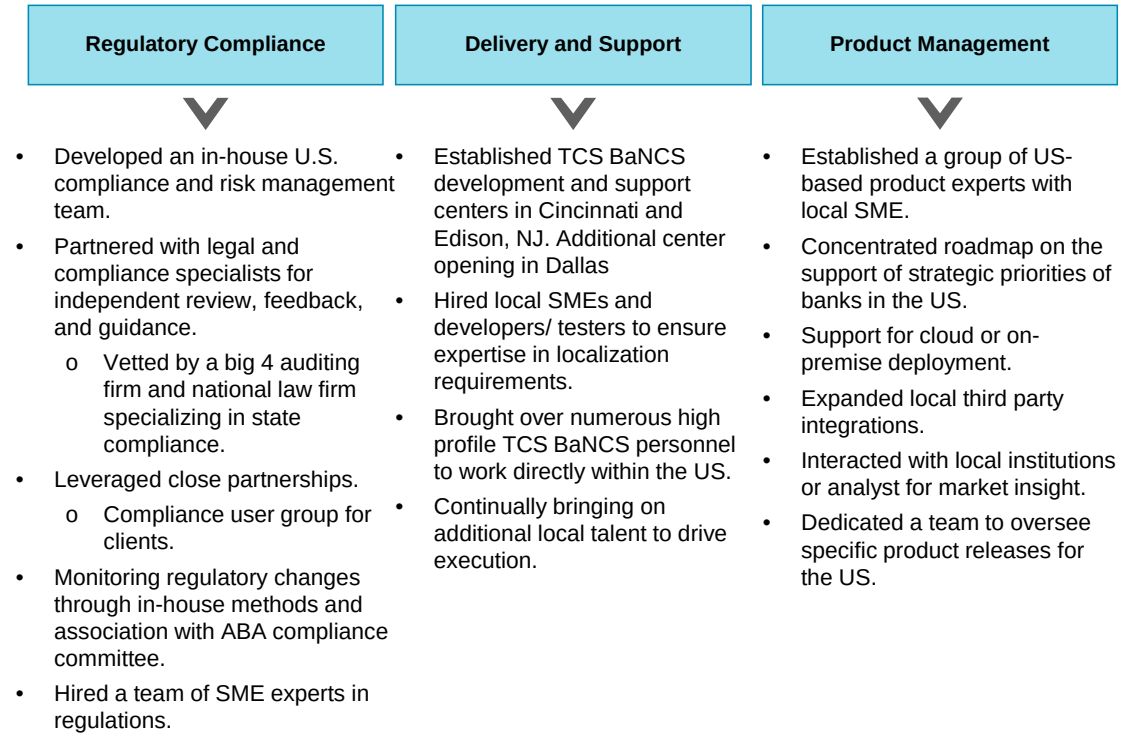
Zions and TCS also brought in one of the Big four auditing firms to reassure that their needs were met. One of the successes required in large transformation is ensuring complete management oversight throughout the program by having monthly program steering committee reviews, and bimonthly executive steering committee reviews covering the following:

- Reviewing progress and status updates.
- Providing strategic direction and acting as the decision-making body of the project.
- Overseeing progress and facilitating global collaboration among stakeholders.

- Ensuring risks and challenges are understood and providing direction for mitigation.
- Controlling change requests.

For TCS, the road to the US meant addressing significant market requirements and a firm commitment to market entry. Figure 3 looks at TCS' approach to the US market, detailing some of the steps taken.

Figure 3: TCS Approach to US Market



Source: TCS

Mapping the data to solution requirements and establishing data quality standards were some of the biggest challenges. The bank also points out the importance of ensuring strong competencies in project management, testing, and integration, skills that are often underestimated.

With projects as large and complex as core transformation, part of overcoming the inevitable onslaught of challenges rests on sheer grit and the determination to make it a success. While it's a long, ongoing process, the bank continues to push through. Executive management engagement, team integration, strong offshore/onshore collaboration with TCS, continuous communication, a well-articulated project plan, and strong governance were critical to being prepared to handle unexpected hurdles.

TCS is developing new models on the cloud across its product suite, creating a SaaS offering in "TCS BaNCS Cloud", built on the best practices established from the successes and learnings from deploying its core banking solution on the cloud across various geographies. TCS has already established this in India, Singapore, and the UK. In the US, there is a clear plan of action to establish a solution for community banks and credit unions as well as for the larger banks on the cloud. This solution covers end-to-end banking capability encompassing support for the entire operations of a bank.

Project Budget

The management team at Zions overseeing the rollout and implementation of the project realize the importance of investing in foundational technology for the future. The bank likes to call it an investment into the “chassis of a car.” Infrastructure spending is critical to the success of the institution and has an impact for many decades to come while it moves away from old legacy products that posed significant technological risk and operational complexity.

The budget for spending on FutureCore and the wider transformation program is still somewhat in flux. Two phases are still being rolled out, with consumer loans and common components including CIF having gone live in May, 2017 as part of the first phase.

The TCS-related spending on the original program scope has remained largely unchanged even though there have been refinements in the plans and adjustment of scope over time due to evolving business needs. While estimates were given at the start of the project, it remains to be seen what the final cost of the implementation will be for Zions. The bank has already started seeing value being derived from the Phase 1 going live, and it is committed to making sure that it sets a good foundation for the future by achieving the milestones pertaining to the remaining two phases.

Generally, the budget consists of implementation services, testing, data management, integration work, product localization, development, licensing, hardware, and software. It also includes the mature capabilities needed in testing, data management, project management, and systems integration.

Project Results

The migration to TCS BaNCS was not just a lift off the existing technology environment, taking old code and turning it into new code, but a shift to a new platform, heralding a complete change in the way the bank operated.

The unification of various operating environments has produced the most tangible benefits so far. The bank has moved away from separate deployment where each legal bank entity implemented its own localization. With TCS BaNCS, Zions has achieved a single platform with deployment across multiple entities and brands. High levels of parameterization and rules allow for changes at an entity level without any customization. Centralized definitions for products and data storage create natural efficiencies while still allowing for variations in the products at an entity level.

While the project is still very new, early feedback from end users has been positive. Users cite the modern interface and the ease of navigating and finding information without memorizing transaction codes as a huge business enabler.

Once the system is fully implemented, Zions expects to see significant improvements in time to market for core product changes, elimination of routines and spreadsheets outside the system, further simplification of operations, reduction in exceptions, and more information immediately available to the customer.

Beyond FutureCore, the bank has been able to take steps to rationalize as a result of the broader transformation objectives. The consolidation of bank charters and operations has enabled further steps toward increasing efficiency, summarized in Figure 4.

- Consolidating and simplifying deposit products from 407 to 70.
- Simplifying the consumer loan approval process, utilizing technology to improve the customer experience (CX). This also reduced the time to receive an application and fund products (e.g., unsecured personal loans) from as long as three days to as little as 15 minutes — 3,000% improvement.

- Combined the parent and subsidiary risk management organizations into a single entity for improved oversight.
- Rationalized financial accounting staff, organizing a single group and reducing staffing requirements, allowing them to redeploy these personnel to higher value areas.
- Bringing together decentralized recruiting groups resulted in a decrease in staffing requirements.
- Merging Business Intelligence Analytics groups serving subsidiary banks reduced staffing needs for that business unit.
- Consolidating loan operations centers from 15 to two.
- Merged various Wealth Management and Trust groups: increased revenue by 16% and reduced expenses by 5% for 2016.
  - Two trust entities into one.
  - Three registered investment advisors into one.
  - Two broker-dealers into one.

Zions has already started to reap the benefits of cultural transformation. Within the Enterprise Technology and Operations division, continuous improvement has become the mantra, with employees identifying ideas and process improvements with a total value to the institution of more than $22.2 million in “hard dollar” savings and revenue improvements and $6.4 million in “soft dollar” savings in 2016. Soft dollar savings include creating organizational capacity for higher value activities. The cultural mindset of innovation cultivated at Zions is flourishing.

Lessons Learned

The advice Zions gives about the project so far is to never underestimate the degree of change required to modernize a bank. The bank is on a multi-year journey to create a new, technologically progressive institution with multiple projects being executed simultaneously, including the replacement of core banking. Without executive commitment to organizational change at all levels, this journey would be extremely painful or even impossible.

There is still significant work to be done, but over the past few years Zions acknowledges that it has substantially improved its ability to manage projects and has achieved organizational readiness needed for change. Key stakeholders are confident in the ability to meet deadlines and deliver. The following are a few of the improvements the bank has seen since the project began.

System Rollout

- Validate functionality as early as possible. Prioritize testing in areas with high business or project risk.
- Simplify the initial release when migrating to the new system. Introduce functionality and enhancements over time.

Project Planning

- Improve business engagement and ownership in the project across all work streams.
- Focus on project planning tools/resources with a focus on bottom-up and top-down planning and decision-making. (Leverage third parties for this.) Rigorous monitoring of project financials will help manage cost inflation and introduce other efficiencies.

Resource Availability

- Ensure consistent skillset and resource assignment rationalization and program restructuring. This will improve execution efficiency and domain expertise, applying lessons learned from previous releases to manage risk and challenges.
- Develop organization capabilities around test automation, data management, and environment management to improve efficiency and manage complexity.

Zions realized just how important technology can be as the driver for meaningful business growth. After years of strong growth in the western United States, the bank realized that the next step was to modernize its technology infrastructure to realize the benefits of a truly differentiating core system. The bank took the “perceived” risk of choosing an international core vendor, and to date, it has certainly paid off.

Historically, most US banks just change their core. Zions is transforming the bank.

APPENDIX 1: TCS BANCS CORE PLATFORM PROFILE

Technology

TCS BaNCS - Recent release information

- 12.0 - Oct 2011
- 13.0 - Oct 2012
- 14.0 - Oct 2013
- 15.0 - Oct 2014
- 16.0 - Oct 2015
- 17.0 – Oct 2017

The next release for TCS BaNCS is planned in Oct'18.

Table 4: Platform Architecture

PROGRAM LANGUAGE UTILIZED	TCS BaNCS business logic is written in 1) COBOL/C++ and Java OR 2) Java only.
PROGRAMMING FRAMEWORKS UTILIZED	TCS BaNCS development is done on the Object Oriented Model Based Development Framework provided by the TCS MasterCraft IDE suite. This is supplemented with additional development toolkits for Channels development.
SUPPORT FOR REAL-TIME PROCESSING	Yes
OUT OF BOX SUPPORT FOR MULTIPLE CURRENCIES (PLEASE LIST)	TCS BaNCS has multicurrency capabilities and supports all ISO standard currencies.
OUT OF BOX SUPPORT FOR MULTIPLE LANGUAGES (PLEASE LIST)	Yes, TCS BaNCS supports all languages based on its inherent design for Multi Byte Character support across tiers. TCS BaNCS is currently operative in production sites with multiple languages (such as English, Main European Languages, Mandarin, Arabic and some India languages included).

Source: TCS

TCS is ITIL certified and holds an Enterprise Wide level 5 CMM certification.

TCS has been a founding member of IFX and has also been tracking BIAN as a standards group since its inception. TCS has been a member of BIAN from 2013 and continues to be active helping drive their Service Definition Standards forward. TCS also leads two working groups in BIAN - Retail Banking and Cards.

TCS BaNCS' system architecture is agnostic to underlying operating systems and hardware platforms. Apart from being cloud-enabled, it supports deployment on a wide variety of platforms such as:

• IBM AIX with IBM Power and Mainframe z/OS

• HP-UX with HP Itanium

• Oracle Solaris with Oracle Sparc

• Windows Server with Intel and

• Linux (Red Hat Linux, Suse Linux) with Intel server

TCS BaNCS customers have the choice of a deployment environment that is best suited to their needs.

Table 5: Integration/ SOA

APPROACH TO SYSTEM INTEGRATION	TCS BaNCS is SOA-enabled and integrates with third party applications using APIs as well as standard middleware.
NAME OF SI PLATFORM	TCS BaNCS Service Integrator component
ESTIMATE PERCENTAGE OF CORE SYSTEM COVERAGE PROVIDED BY SI PLATFORM	100%
AVAILABILITY OF SI TECHNOLOGY LICENSES TO BANK CLIENTS	Yes
AVAILABILITY OF SI TECHNOLOGY LICENSES TO THIRD PARTY VENDORS	Yes
PRICING METHOLOGY OF SI TECHNOLOGY LICENSES	Variable — depending on the number of systems and services to be integrated
THIRD PARTY INTEGRATION INTO CORE PLATFORM	TCS BaNCS is integrated with the following third party providers as standard interfaces: - Enterprise GL (Oracle, SAP, Microsoft) - CRM (CRM Next, Microsoft) In addition, TCS BaNCS is integrated with a number of third party channels, Origination, Trade Finance, and other such components.

Source: TCS

Table 6: Data Information

LOCATION OF STORAGE OF TRANSACTION DATA	Hybrid
TECHNOLOGY/FILE FORMAT(S) SUPPORTED FOR DATA STORAGE	TCS BaNCS uses a centralized relational database as its core database.
DATA STORAGE/INTERCHANGE STANDARDS SUPPORTED	TCS BaNCS supports industry-standard message formats such as ISO 15022, ISO 20022, and a multitude of cross-border and domestic payments clearing formats, including SWIFT through its Service Integrator component.
AVAILABILITY OF TOOLS TO UPLOAD NONTRANSACTIONAL DATA TO CORE SYSTEM	Built-in

Source: TCS

TCS BaNCS uses a centralized relational database as its core database. The application does not utilize any stored procedures, and the database layer does not store any business logic. Supported databases include Oracle, DB2, and SQL Server. While TCS BaNCS transaction data is stored in the database, the application also uses data from other sources through real-time service calls for certain sales and services transactions, as necessary.

The standard data model for data extracts supports custom and third party data warehouses. The data model as defined in the extracts is flexible and is upgraded with standard product releases. The platform has a reference reporting data model and provides data extract programs that can make data available to other reporting systems for consumption, as required.

TCS BaNCS has integrated multiple payment formats like SWIFT FIN, ISO20022, RTGS, and ACH of multiple countries. The product is SWIFT Ready certified for Payments and supports all relevant (MT1xx, MT2xx, MT3xx, MT4xx, and MT 7xxx) SWIFT messages. TCS is also actively involved in the adoption of SWIFT MX ISO 20022 standards.

Standard message formats like ISO8583, 15022, and 20022 are readily available for use in addition to the capability of custom message format definition. Integration to market standard vendors and networks like Reuters, Bloomberg, SWIFT, SEPA, and various in-country settlement systems are preconfigured and available for use. Additional formats can be added and maintained in the service integrator component that allows for a flexible framework for definition of new file and message formats.

Table 7: User Experience

	BRANCH AUTOMATION	TELLER SYSTEM	BACK OFFICE/ OPERATIONS	CALL CENTER
PLATFORM NAME	TCS BaNCS	TCS BaNCS	TCS BaNCS	TCS BaNCS
ORIGINAL RELEASE	2007	2007	2007	2007
ACQUISITION	NA	NA	NA	NA
CURRENT RELEASE	16.0	16.0	16.0	16.0
PROGRAMMING LANGUAGE	Java, HTML 5/ CSS3	Java, HTML 5/ CSS3	Java, HTML 5/ CSS3	Java, HTML 5/ CSS3
PROGRAMMING FRAMEWORKS UTILIZED	Struts2/Spring3, Hibernate, Activiti BPMN 2.0	Struts2/Spring3, Hibernate, Activiti BPMN 2.0	Struts2/Spring3, Hibernate, Activiti BPMN 2.0	Struts2/Spring3, Hibernate, Activiti BPMN 2.0

Source: TCS

TCS BaNCS' user interface for Teller, Branch Sales & Service and Call Center as well as back office operations is a configurable UI, using metadata model driven by Free-marker Templating (FTL) framework. HTML 5/ CSS3 for responsive design, multi-browser, multi-resolution, internationalization (i18n). AJAX-based request responses, Image Sprites and Glificons are used for low bandwidth data transfer, thereby optimizing performance. The Activiti Modeler enables definition of BPMN 2.0 compliant business processes. It also addresses OWASP Top 10 security features (cross-site scripting, encryption of sensitive data, cross-site request forgery (CSRF), Indirect Object Reference.

Table 8: Customization

AVAILABILLITY OF DEVELOPMENT LICENSE	At present, TCS BaNCS is available to clients in the Object Code only model. TCS retains the Intellectual Property Rights attached to the Software and Documentation. Any customization specific to the bank is identified during the solution analysis and design phase. Such a customization layer (outside the core product, enhancement/ extensions to the product) is developed and delivered by TCS as part of the implementation.
PERCENTAGE OF CLIENTS POSSESSING A DEVELOPMENT LICENSE	<5%
AVAILABILITY OF BPM MODELING TOOL LICENSE	Activiti BPM.
PERCENTAGE OF CLIENTS POSSESSING A BPM TOOLS LICENSE	Few clients globally
INTEGRATED DEVELOPMENT ENVIRONMENT	No TCS BaNCS provides tools for customers to configure the solution for: - Product configuration - Service definition and mapping - UI navigation, layout, labels, messages - Reporting

Source: TCS

Table 9: Scalability

TOTAL NUMBER OF TRANSACTIONS PROCESSED DAILY	More than 300 million transactions per day.
NUMBER OF TRANSACTIONS PROCESSED DAILY FOR THE LARGEST CLIENT ON THE SYSTEM	TCS BaNCS processes 75 million transactions per day (50% through non-teller channels) for their largest client. On a peak day like the year-end, TCS BaNCS processes 100 million transactions.
PLEASE LIST ANY SCALABILITY METRICS BASED ON LAB TESTING	A comprehensive benchmarking engagement performed by a third party consulting firm has been conducted in which TCS BaNCS has been benchmarked to process 1 billion accounts. The benchmark data, a 29-terabyte database, was used to conduct this test. Tests were conducted for batch and online transaction processing to simulate actual usage. The test achieved a 17,150 peak TPS with 278 million transactions processed in less than five hours. This benchmark was audited with a Top 4 accounting/consulting firm.
PLEASE LIST ANY SCALABILITY METRICS BASED ON LIVE CUSTOMERS	Peak volumes recorded at a live bank were for 200,000 concurrent users processing 100 million transactions, with about 10,000 TPS at peak volumes.

Source: TCS

Table 10: Deployment Options

AVAILABLE THROUGH A LICENSE OR VIA A HOSTED SERVICE	Yes
HOSTED SERVICE DEPLOYMENT MODEL	Multi-tenant mode
NUMBER OF INSTANCES OF SOFTWARE RUN	100+
MAXIMUM NUMBER OF BANKS RUNNING ON ONE INSTANCE	7
SUPPORT FOR DEPLOYMENT ON VIRTUALIZED HARDWARE (CLOUD SERVICES)	Supported

Source: TCS

TCS offers perpetual, recurring, and term licensing models to its customers. Typically, if the bank is mid-tier or large with a larger presence and multi-country operations, TCS offers a perpetual license. For a Greenfield operation, small banks, or community banks, TCS also offers “Pay As You Grow” or Annuity Based License Models.

TCS BaNCS can be deployed either as one instance/bank or in multi-tenant mode.

TCS partners with third party cloud infrastructure providers to host TCS BaNCS in select markets such as North America and Europe with associated pricing models that are transaction or account-based, among others. TCS is running multiple customers on such an infrastructure in the UK, Singapore, and India. The C-EDGE entity in India provides TCS BaNCS on a TCS-managed private cloud and serves over 10,000 branches of 100+ domestic commercial banks. TCS is developing new models on the cloud across its product suite, creating a SaaS offering in “TCS BaNCS Cloud” built on the best practices established from the successes and learnings of its core banking solution on cloud across various geographies.

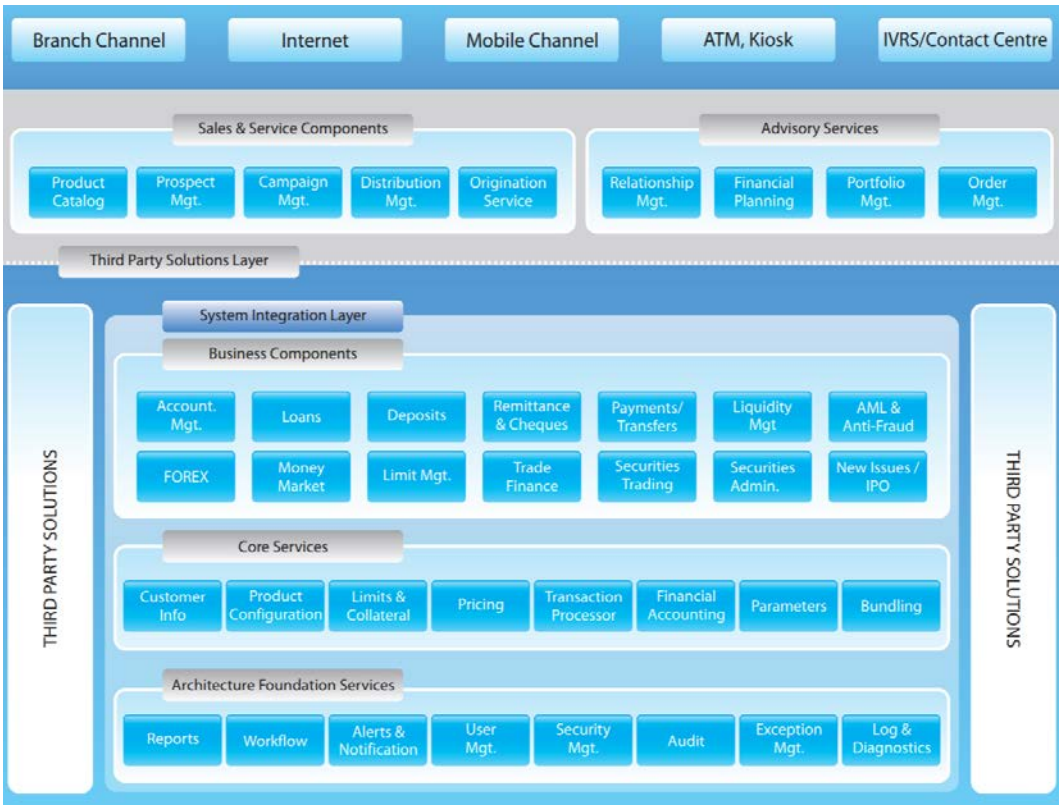
Customer Base

“TCS BaNCS has more than 400 customers across the world, which serve all segments, including small-mid tier banks, non-banks and credit unions, large commercial banks, central banks and financial institutions. TCS BaNCS is implemented at two of the largest banks in the world.

Functionality

Offering for the Banking sector includes: TCS BaNCS Digital, Universal Banking, Core Banking, Payments, Compliance, Treasury, Islamic Banking, Origination, Financial Inclusion, Global Limits & Exposure Management, Trade Finance, and Wealth Management.

Figure 4: TCS BaNCS for Core Banking



Source: TCS

Table 11: User Documentation

FREQUENCY OF RELEASE OF UPDATED DOCUMENTATION	The product documentation is updated with every major and minor release. The application comes with a full schedule of version-controlled documentation that includes: • Management Overviews • User guides • Parameter Configuration • User Reports manuals • Operations documentation • Data Dictionary
ONLINE USER DOCUMENTATION	Yes
SEARCHABLE DOCUMENT (DOCUMENTATION HAS BEEN INDEXED)	Yes
SYSTEM FAQ	Context-Based help is made available on the Branch Channel for users.

Source: TCS

The product teams have a mix of Functional and Technical Resources. The Technical Resources are Graduates and Post Graduates in Engineering, and Functional Resources come with working experience in the Banking domain, ranging from 5 to 25 years. These teams also have diverse skills such as regulations expertise, usability, and visual communication.

Table 12: Product Configuration

PRODUCT CONFIGURATION TOOL?	Yes
BANKING PRODUCTS COVERED	Deposits, Lines of Credit, Commercial Loans, Construction Loans, Syndication and Participation Loans, and Contingent Accounts (Trade Finance Related).
HOW ARE BUSINESS RULES DEFINED?	Product definition is based on parameters and rules allowing for example changes of products, configuration of new product rules, price management, defining channel access rules, and definition of bank as well as “hybrid” products. Charges can be set up once and may be applied across selected products. Different starter kits of products and services are available, for example, for Islamic and conventional banking. Product definitions in these starter kits can be copied to accelerate product management. Relationship-based pricing capabilities are based on factors such as customer type, geography, segment, size, and health of the relationship. A rules engine supports dynamic pricing.
PRODUCT CATALOG FOR ALL PRODUCTS CONFIGURED BY THE BANK	Yes
SINGLE SOURCE OF TRUTH	Yes
SYSTEM COMPLIANT WITH FEDERAL BANKING REGULATIONS OUT OF THE BOX	Yes
SYSTEM COMPLIANT WITH STATE BANKING REGULATIONS (50 STATES) OUT OF THE BOX	Yes
NUMBER OF CANNED REPORTS (PRECONFIGURED) WITHIN THE REPORTING MODULE OUT OF THE BOX	TCS BaNCS comes with a comprehensive set of base reports. These include daily, monthly, end of period reports, and Check Reconciliation reports, General Ledger, Loans, Deposits and General Reports, Day File Processing and Branch Accounting Reports, Remittance Reconciliation Reports, Term Deposit, and Daily Reconciliation Reports. Third party tools may be used to generate the required reports.
REPORTS CUSTOMIZABLE?	Yes

Source: TCS

The Customer Engagement Model at TCS revolves around a host of contact and advisory programs centered on the client.

TCS BaNCS Dialogues embody the myriad channels through which TCS communicates with its customers to discuss and debate product strategy and direction. The goal is to understand customer needs, priorities, and market developments and to then define and articulate product direction through dialogues via TCS BaNCS Product User and Client Working Groups, the finterest Group Customer Community Portal, and TCS BaNCS Operations Connect.

Listed below are the major programs:

1. Customer User Groups and the Annual Customer Forum — provides TCS BaNCS clients with a structured environment to discuss their business challenges and provide constructive advice that shapes the future of TCS BaNCS architecture, innovation, and project implementation strategy. The next global meet will be #11 in October 2018 in Sydney.

2. Finterest Groups — An online portal for the financial community using TCS BaNCS products, facilitating an agile network for knowledge sharing and incubating ideas.

3. Quarterly Customer Newsletters — with approximately two to three customer project summaries and interviews per issue, (90 summaries have been published to date). The last edition #28 was published in October 2017.

4. The Good News Program (GNP) —provide updates to customers on various implementations, news about TCS BaNCS to customers on a regular basis.

5. TCS BaNCS Research Journal — compilation of in-depth research and analytical content from experts in the financial services industry published two times per year. The last issue was #12 in October 2017.

Copyright Notice

Prepared by

Celent, a division of Oliver Wyman, Inc.

For more information, please contact info@celent.com or:

Stephen Greer sgreer@celent.com
Dan Latimore dlatimore@celent.com

AMERICAS

USA

200 Clarendon Street, 12th Floor
Boston, MA 02116

Tel.: +1.617.262.3120
Fax: +1.617.262.3121

USA

1166 Avenue of the Americas
New York, NY 10036

Tel.: +1.212.541.8100
Fax: +1.212.541.8957

USA

Four Embarcadero Center, Suite 1100
San Francisco, CA 94111

Tel.: +1.415.743.7900
Fax: +1.415.743.7950

Brazil

Av. Doutor Chucri Zaidan, 920 —
4º andar
Market Place Tower I
São Paulo SP 04578-903

Tel.: +55.11.5501.1100
Fax: +55.11.5501.1110

Canada

1981 McGill College Avenue
Montréal, Québec H3A 3T5

Tel.: +1.514.499.0461

EUROPE

France

28, avenue Victor Hugo
Paris Cedex 16
75783

Tel.: +33.1.73.04.46.20
Fax: +33.1.45.02.30.01

United Kingdom

55 Baker Street
London W1U 8EW

Tel.: +44.20.7333.8333
Fax: +44.20.7333.8334

Italy

Galleria San Babila 4B
Milan 20122

Tel.: +39.02.305.771
Fax: +39.02.303.040.44

Spain

Paseo de la Castellana 216
Pl. 13
Madrid 28046

Tel.: +34.91.531.79.00
Fax: +34.91.531.79.09

Switzerland

Tessinerplatz 5
Zurich 8027

Tel.: +41.44.5533.333

ASIA

Japan

The Imperial Hotel Tower, 13th Floor
1-1-1 Uchisaiwai-cho
Chiyoda-ku, Tokyo 100-0011

Tel: +81.3.3500.3023
Fax: +81.3.3500.3059

China

Beijing Kerry Centre
South Tower, 15th Floor
1 Guanghua Road
Chaoyang, Beijing 100022

Tel: +86.10.8520.0350
Fax: +86.10.8520.0349

Singapore

8 Marina View #09-07
Asia Square Tower 1
Singapore 018960

Tel.: +65.9168.3998
Fax: +65.6327.5406

South Korea

Youngpoong Building, 22nd Floor
33 Seorin-dong, Jongno-gu
Seoul 110-752

Tel.: +82.10.3019.1417
Fax: +82.2.399.5534