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› ONLINE BANKING SOLUTIONS
*Technology Analysis Abstract**

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TECHNOLOGY ANALYSIS SCOPE & METHODOLOGY

In response to feedback from our membership, we developed this technology analysis product to identify key components of an online banking technology investment decision and effectively compare vendor technology products. The basis of our process comes from the knowledge that investment decisions revolve around the benefit to the end user and enterprise of a technology rather than the feature set alone.

This technology analysis is tailored to reflect the needs of the end user, in this case the retail banking executive, to diagnose the technology attributes particular to a firm, and to effectively identify online banking solutions that align with the firm's needs. To that end, we conducted a series of interviews and surveys with financial services executives, industry experts, and vendors regarding online banking technology. The results of this research formed the basis of our anatomy and informed the five-point rating system on which we scored individual products.

CURRENT MARKET & FUTURE INVESTMENT

Banks are enhancing experience in online channels to meet shifting customer preferences. The online channel is now the preferred mode of account access by more than half of North American customers, having risen by 11% since 2010. Customers most frequently use online banking for simple transactions, preferring in-person or phone interactions for more complex service requests. As customers become increasingly multi-channel, banks are feeling the pressure to provide a seamless experience across channels by creating consistency in the presentation of information, as well as recognizing development efficiency with common code.

Banks are seeking competitive online functionality and flexibility. Customers' preference for opening new accounts and making purchases in personal channels is still nearly three times the preference for digital channels. Operational obstacles that force customers to complete processes in a second or third channel diminish the quality of perceived service. Banks are upgrading or replacing their online banking platforms to accommodate new functionalities and value-added services and gain competitive advantage in the marketplace.

Online banking investment is increasing globally, with emerging markets leading growth. While North America leads in overall dollars spent on online banking platforms, Asia Pacific and Latin America lead the way in steady investment growth, with compound annual growth rates of 9.2% and 7.4%, respectively.

VENDOR LANDSCAPE AND RANKINGS

Retail online banking systems enable retail banking users to perform online banking transactions including account statements, wire transfers, bill pay, personal financial management, and rewards tracking.

This technology analysis profiles and quantitatively evaluates retail online banking systems from CSI, D+H, Digital Insight, Fiserv, FIS, Infosys, Jack Henry, Oracle, Polaris, SAP, and TCS. By combining our qualitative and quantitative data from interviews with industry experts, financial institutions, and technology providers, we identified 21 <u>attributes</u> that define a "best-in-class" online banking system. These attributes are grouped into four <u>categories</u> that highlight a firm's user and enterprise needs. Technology provider rankings are based on our five-point rating scores on each of the 21 "best-in-class" attributes. The top technology providers were designated as best-in-class performers based on their composite scores in each of the technology categories below.

BEST-IN-CLASS TECHNOLOGY CATEGORIES

Technology executives investing in online banking systems should use the Diagnostic Anatomy to select the vendor that best aligns with their firm's needs and business objectives.

- **CUSTOMER EXPERIENCE** includes those attributes that describe the interface, design, and usability of the system for the end user. *Leaders include Oracle's FLEXCUBE and two other products.*

- **DESIGN AND SECURITY** includes those attributes that ensure the system has an optimal architecture and protects the end user and firm from unnecessary risk. *Leaders include Oracle's FLEXCUBE and three other products.*

- **OPERATIONS MANAGEMENT** includes those attributes that pertain to the application's backend functionality and operations. *Leaders include Oracle's FLEXCUBE and two other products.*

- **ENTERPRISE SUPPORT** includes those attributes that impact the technology provider's tactical fit and strategic alignment with the retail bank. *Leaders include Oracle's FLEXCUBE and two other products.*

TECHNOLOGY ANALYSIS OVERVIEW

Mission Statement: Our technology analysis process provides a customer-driven, transparent, and unbiased review designed to drive informed business decisions.

- **Current Market:** Provides a view of industry and customer changes, and best practices for technology investment and implementation.

- **Future Investment:** Identifies emerging technologies and innovations.

- **Vendor Landscape:** Provides an overview of key vendors, product features, and market position.

- **Product Rankings:** Highlights "Best-in-Class" attributes and shows a comparative perspective of leading products.

Technology Analysis Presentation Roadmap

Current Market	Future Investment	Vendor Landscape	Product Ranking
Market Drivers: Assess changes in the industry and customer behavior.	*Spending Forecast:* Benchmark global and regional online banking IT spending.	*List of Players:* Identify key technology firms and their products.	*"Best-in-Class" Products:* See the top products based on our anatomy categories.
	Emerging Technology Landscape: Pinpoint emerging technologies and innovations.	*Diagnostic Anatomy:* Choose your investment priorities with our proprietary framework.	*Ranking Methodology:* Review the key components of an investment decision.
		Feature Audit: Compare the relative feature offerings by vendors.	
		Vendor Profiles: Understand the key differentiators between products.	

ROADMAP FOR THE PRESENTATION

Current Market 〉 Future Investment 〉 Vendor Landscape 〉 Product Rankings

❯ **The online channel is now the most frequently accessed channel on a monthly basis, with transactions online increasing at a compound annual growth rate of 4% between 2010 and 2015.**

ONLINE CHANNEL IS NOW MOST FREQUENTLY ACCESSED CHANNEL

Frequency of Interaction with Banking Channels
Percentage of Respondents, 2013

Online	An ATM	In person	Over the phone	A mobile device application	Through the mail
76%	53%	48%	26%	24%	13%
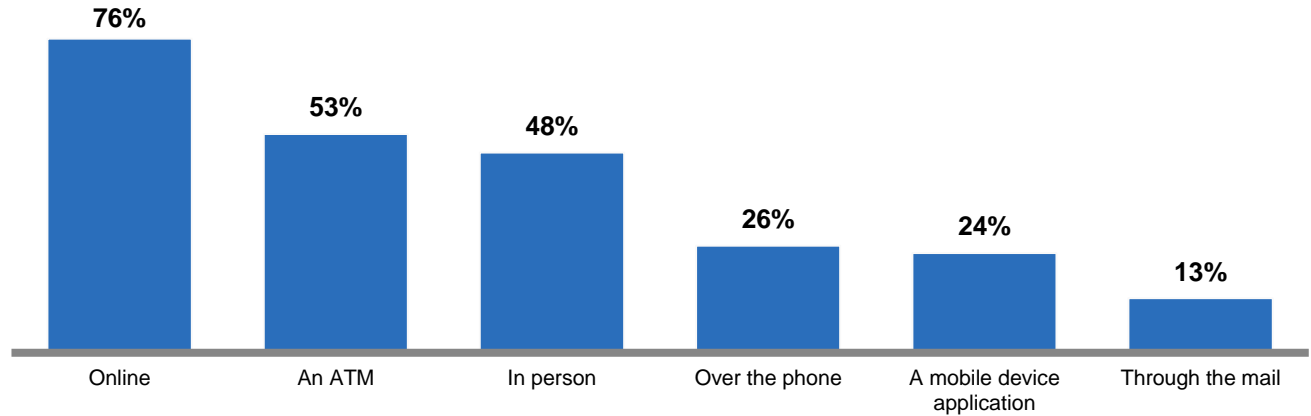
n = 1,077-1,621.
Source: CEB 2013 Customer Experience Survey.

Online Banking Transaction Volumes
Number of Transactions, 2010E-2015P

	2010 (E)	2011 (P)	2012 (P)	2013 (P)	2014 (P)	2015 (P)
Online Transactions	28,524	29,668	30,861	32,098	33,065	34,061
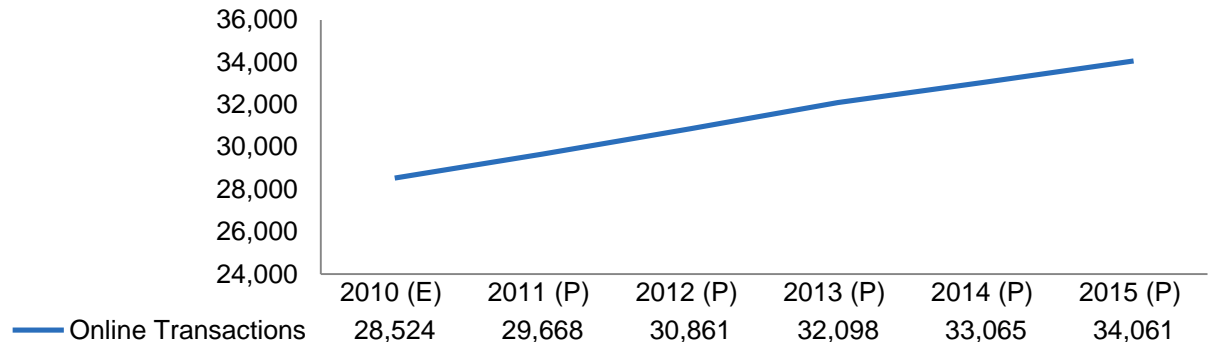
Source: Pew Center for Research, 2012.

› **When looking to replace an online banking system, executives say the primary benefit that the solution should deliver is competitive advantage.**

INVESTING FOR COMPETITIVE VALUE, WITH MODERATE SECURITY RISK

Value of Online Banking Solutions
Percentage of Retail Banking Executives

7% Somewhat low value

4% Very low value

11% Moderate value

56% Very high value

22% Somewhat high value
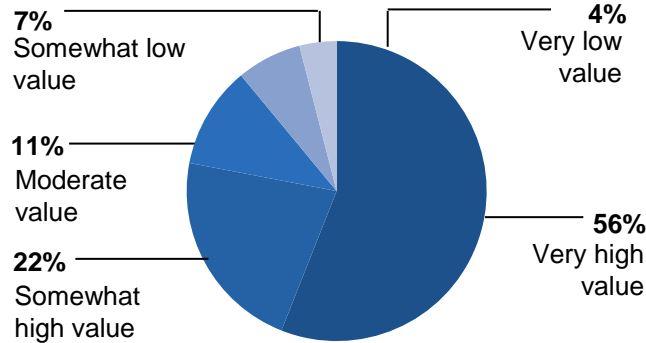
n = 61.
Source: CEB 2013-14 Technology Adoption & Investment Survey.

Key Drivers of Value for Online Banking
Percentage of Retail Banking Executives

Competitive advantage	28%
Enhancement of client value	22%
Process improvement	20%
Functionality	15%
Ongoing costs and maintenance	9%
Financial return on investment	6%
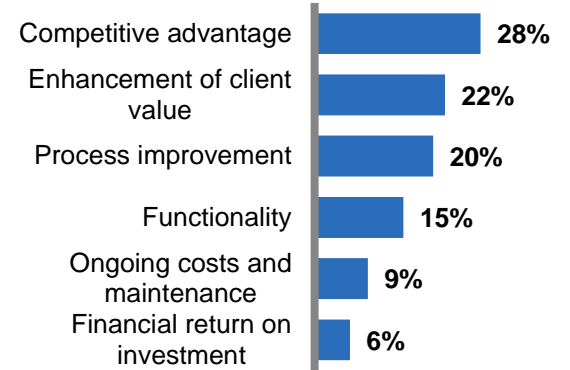
n = 61.
Source: CEB 2013-14 Technology Adoption & Investment Survey.

Risk of Online Banking Solutions
Percentage of Retail Banking Executives

4% Very low risk

10% Very high risk

27% High risk

22% Low risk

37% Moderate risk
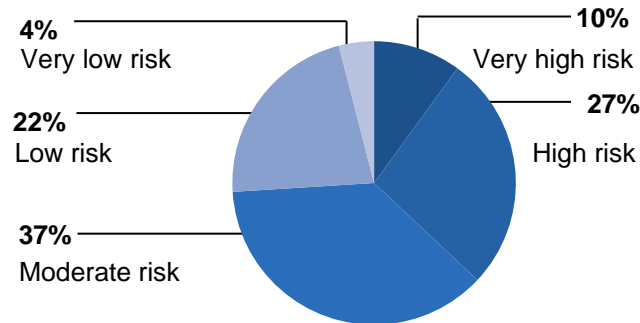
n = 61.
Source: CEB 2013-14 Technology Adoption & Investment Survey.

Key Drivers of Risk for Online Banking
Percentage of Retail Banking Executives

Information security risk	49%
Risk of catastrophic failure	28%
Integration complexity	17%
Dependence on specialized resources	6%
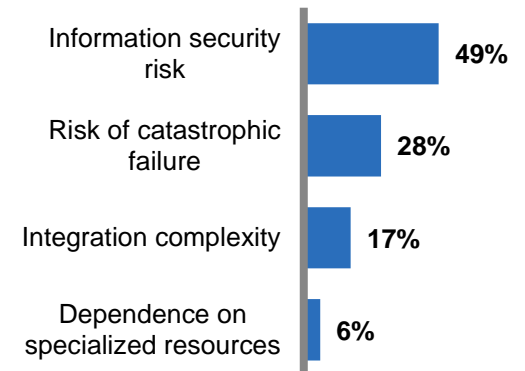
n = 61.
Source: CEB 2013-14 Technology Adoption & Investment Survey.

ROADMAP FOR THE PRESENTATION

Current Market ❯ **Future Investment** ❯ Vendor Landscape ❯ Product Rankings

FORECASTING REGIONAL TECHNOLOGY SPEND
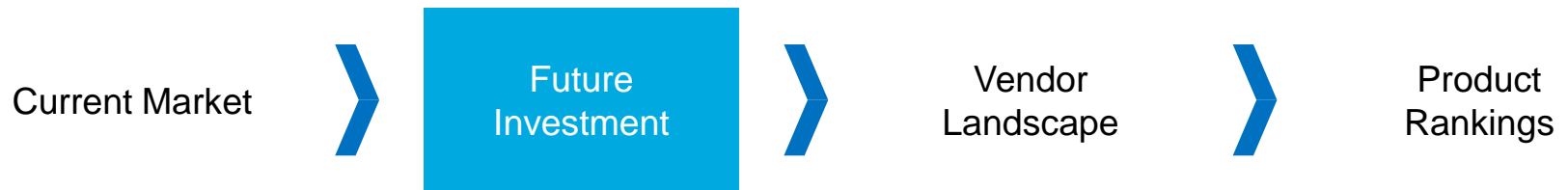
❯ **North America leads the way in overall investment in online banking solutions, however year-over-year growth in the Asia Pacific region is distinguished by a healthy CAGR of 9.2%.**

- Emerging markets are typically more price-sensitive with greater discounts applied, and typically have few users driving the license cost.

Online Banking Solutions Spend by Region
In Millions USD, 2013E-2018P

Region	Definitions
North America	USA and Canada
Europe	Includes Western, Central, and Eastern Europe
Asia Pacific	Includes Australia and New Zealand
Latin America	Includes Mexico and the Caribbean
Middle East and Africa	Includes Turkey and all African and Middle Eastern countries
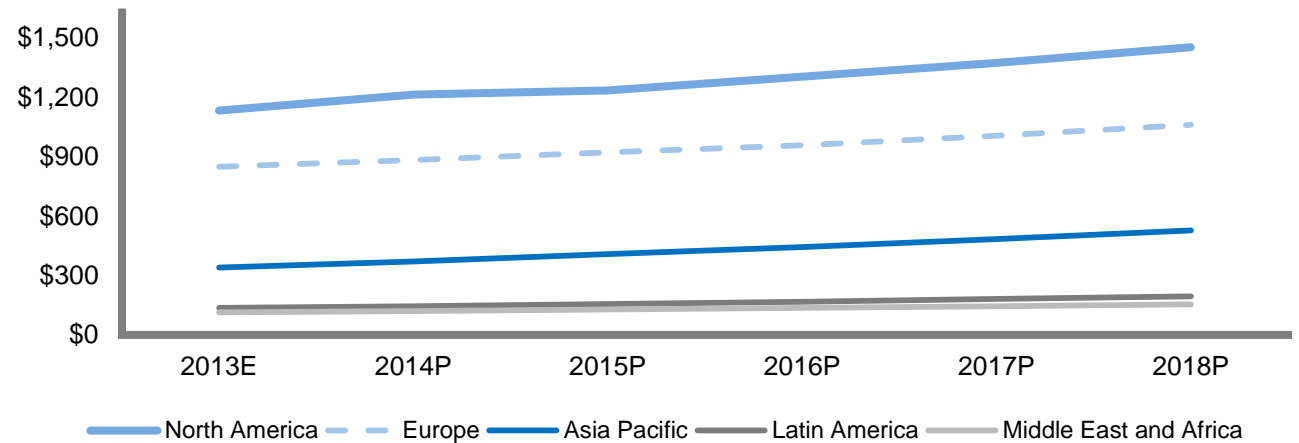
Regional Spend In Millions USD	2013E	2014P	2015P	2016P	2017P	2018P	CAGR
North America	1,135	1,214	1,237	1,306	1,375	1,454	**5.1%**
Europe	851	885	923	959	1,007	1,063	**4.5%**
Asia Pacific	340	371	408	445	485	528	**9.2%**
Latin America	136	146	156	168	182	195	**7.4%**
Middle East and Africa	113	120	129	136	145	154	**6.3%**

Source: CEB analysis.
Note: E indicates estimated values; P indicates predicted values; CAGR: compound annual growth rate.

EMERGING TECHNOLOGY LANDSCAPE

ROI POTENTIAL (High / Low)

TECHNOLOGY STATE — Market-Ready / In Development

Plotted items: Rewards Programs, Business Intelligence Tools, Targeted Marketing, Multi-channel Process Enablement, Relationship Pricing, Cloud Banking, Customer Information Hub, Consolidated Digital Platform, New Product Fulfillment, Responsive Design, Intelligent Authentication, Comprehensive Service History, Wearable Push Notifications

DEFINITIONS

- **ROI Potential:** Measures the relative returns an institution can expect to receive from an investment in the technology.
- **Technology State:** Measures the technology's level of development.
- **Customer Impact:** Measures the level of benefit the technology will have on the customer.

CUSTOMER IMPACT — Minimal, Moderate, Medium, High
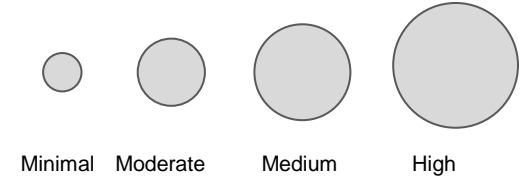
Cross-Sell and Up-Sell Capabilities	Enhanced User Experience	Digital Banking Management
Targeted Marketing	Responsive Design	Business Intelligence Tools
Relationship Pricing	Wearable Push Notifications	Cloud Banking
Rewards Programs	Multi-channel Process Enablement	Customer Information Hub
New Product Fulfillment	Comprehensive Service History	Consolidated Digital Platform
	Intelligent Authentication	

See appendix for Emerging Technology Landscape definitions.

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ROADMAP FOR THE PRESENTATION

Current Market > Future Investment > **Vendor Landscape** > Product Rankings

VENDOR LANDSCAPE AND PRODUCT LAUNCH DATES

CEB — WHAT THE BEST COMPANIES DO

SAP — Retail Online Banking (2003)

CSI — CSI Internet Banking (2011)

DIGITAL INSIGHT (an NCR company) — Digital Insight Online Banking (1995)

TATA — TCS BaNCS (2003)

FIS — Online Banking (2004)

1990   1995   2000   2005   2010

ORACLE — FLEXCUBE Online Banking (mid-1990s)

Infosys — Finacle eBanking (1996)

fiserv. — Retail Online (2000)

POLARIS live your dream — Retail Banking Exchange (2007)

fiserv. — Corillian (1996)

D+H — Cavion Internet Banking (1996)

FIS — Consumer eBanking (2002)

jack henry & ASSOCIATES INC. — NetTeller Internet Banking (1998)

ONLINE BANKING DIAGNOSTIC ANATOMY

CEB — WHAT THE BEST COMPANIES DO

1 Marketing & Fulfillment
Banks can leverage the solution to share all marketing information and the solution allows offer fulfillment and the ability for a customer to dismiss.

2 User Interface
The solution offers a flexible and intuitive user interface that provides a consistent brand experience.

3 User Notification
The solution provides notifications to the user across all channels and allows the user to select preferred channels for specific notifications.

4 Core Banking Functions
The solution allows the user to interact with the full range of retail banking functions such as scheduling transfers and bill pay.

5 Multichannel Support
The solution can support multi-channel processes, pass and receive information to and from the mobile, customer support, ATM, and banking centers.

6 Customer Reporting
The solution allows clients to capture and create reports and tools such as budgeting tools, spending tracking, and savings to manage their finances.

7 Data Security
The solution provides flexible security options, different parameters within each online offering, and secure sign-ins modules on non-SSL pages.

Customer Experience

8 Business Process Support
The solution supports transaction routing to appropriate workflow queues depending on risk of fraud and other customer-specific processes.

9 Consumer Security
The solution supports user-managed and risk-based security as well as multi-factor and out-of-band authentication.

10 Shared Platform
The solution supports a single internal data and services layer and integrates with multi-channel presentation layers.

11 Interface Design
The solution provides a modular code library, a content management system, and various presentation experiences based on browser type.

Design and Security

HOW TO USE THIS ANATOMY

The anatomy is designed to help retail banking executives better assess and prioritize components of their technology investment. As you use this anatomy, please consider your firm's business strategy and current technology maturity.

1. Rate the impact of each attribute to your business and your firm's effectiveness on a 1-5 scale using the grading scale below and tally the results using the scorecard.
2. Map the results on the scorecard to identify areas that are most important, but where your firm is least effective.

Attribute Grading

Current Effectiveness		Potential Impact	
5 = Superior Capability	We or our vendor offer this regularly, systematically, and at the highest standard.	5 = Very High Impact	Our firm considers this attribute mission critical when performed at the highest standard.
4 = Strong Capability	We or our vendor offer this regularly and systematically.	4 = High Impact	Our firm considers this attribute highly important when performed at the highest standard.
3 = Adequate Capability	We or our vendor offer this regularly but in an ad hoc manner.	3 = Moderate Impact	Our firm considers this attribute moderately important when performed at the highest standard.
2 = Marginal Capability	We or our vendor offer this irregularly and in an ad hoc manner.	2 = Low Impact	Our firm considers this attribute somewhat important when performed at the highest standard.
1 = Weak or not at all	We or our vendor do not do this at all.	1 = No Impact	Our firm does not consider this attribute important when performed at the highest standard.

21 Vendor Collaboration
The vendor effectively identifies and aligns online banking implementation to enterprise needs.

20 Pricing Flexibility
The vendor offers multiple pricing options with flexibility for additional ongoing support packages.

19 Vendor Stability
The vendor has an established industry presence and can provide long-term support for institutions.

Enterprise Support

18 Technology Innovation
The vendor has a market-leading product strategy to incorporate emerging technologies and capabilities.

17 Product Maturity
The vendor offers a product with industry-leading technology and a growing market share and client base.

16 Geographic Coverage
The vendor provides multilingual and multicurrency capabilities to support operations in multiple localities.

15 Compliance Strategy
The vendor performs a formal audit on an annual basis and monitors all national and international compliance requirements.

14 System Integration
The solution allows for integration across various information tools and creates a seamless experience with third party vendors.

13 Mgmt. Reporting & Administration
The solution allows the bank full latitude in managing customer and staff permissions and access, customer settings, and activity reporting.

12 Customer Support
The solution offers intra-online banking support for issues related to a site or an account including FAQs, visual cues, and support request forms.

Operations Management

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ONLINE BANKING SOLUTIONS SCORE CARD

> **Retail banking executives should complete this scorecard using the Online Banking diagnostic anatomy tool.**

Categories	Attributes	Current Effectiveness	Potential Impact
Customer Experience	1. Marketing & Fulfillment		
	2. User Interface		
	3. User Notification		
	4. Core Banking Functions		
	5. Multichannel Support		
	6. Customer Reporting		
Design and Security	7. Data Security		
	8. Business Process Support		
	9. Consumer Security		
	10. Shared Platform		
	11. Interface Design		
Operations Management	12. Customer Support		
	13. Mgmt. Reporting & Admin		
	14. System Integration		
	15. Compliance Strategy		
Enterprise Support	16. Geographic Coverage		
	17. Product Maturity		
	18. Technology Innovation		
	19. Vendor Stability		
	20. Pricing Flexibility		
	21. Vendor Collaboration		

![CEB — WHAT THE BEST COMPANIES DO]

ONLINE BANKING SOLUTIONS SCORE CARD

> **Retail banking executives should map their attribute scores from rating their impact and effectiveness on the previous page on this matrix to identify the most important areas of their technology provider selection.**

Potential Impact		1 = Weak	2 = Marginal	3 = Adequate	4 = Strong	5 = Superior
	5 = Very High					
	4 = High					
	3 = Moderate					
	2 = Low					
	1 = No Impact					
		Current Effectiveness				

FEATURE AUDIT DEFINITIONS

Feature or Function	
Banking Function Support	
Online Banking Enrollment	The ability to create and fund an account with the financial institution, or access an established account online for the first time.
Account Information Management	User has the tools to update personal or contact information, as well as manage account access settings.
Multiple Account Summary	Single page that presents summary information for all linked accounts.
Account Details	The ability to see both summary and transaction details for individual accounts.
Searchable Account Details	The ability to find transactions based on factors that may include amount, date, description, payee, or other.
Transaction Reconciliation and Dispute Support	The ability to begin a transaction dispute process from the online session.
Account Statements	Digital copies of account statements are available to view and download in standard format(s).
Account Rewards Management	Integrated views of any rewards information or activity associated to a financial account.
Financial Product Information	The ability to review product information for current and other available financial products.
Privacy Policy Support	Access to relevant privacy information specifically relevant to the online channel.
Card and Check Reorder	The ability to order new payment cards or checks.
Marketing Support	Support for rotating placement of offers and product information based on scheduling or customer targeting.
Security	
Two-Factor Authentication	Employs more than one method of authentication through the sign-in experience.
Out-of-Band Authentication	Two-Factor authentication using an out-of-band device.
Step-up Authentication	The ability to invoke an additional authentication request in the event of a security or increased risk scenario.
Secure Mail	The ability to receive and send email messages through the application.
Secure Chat	The ability to receive and send real-time chat messages through the application.
PCI Compliance	Complies with PCI standard requirements.
Penetration Testing	Proactive security testing of the solution using advanced hacking techniques.
Customer Password Support	The ability for customer to retrieve or reset a lost or forgotten password without requiring a support call.

FEATURE AUDIT DEFINITIONS

Feature or Function	
Transfers and Alerts	
Transfers Between Linked Accounts	The ability to transfer money between two linked accounts (such as a savings to a checking account owned by the same person).
Transfers Between Internal Accounts	The ability to transfer money from an account to an external account (such as a friend's account) at the same financial institution.
Transfers to External Accounts	The ability to transfer money from an account to an external account (such as a friend's account) at a different financial institution.
E-statements	The ability for a customer to see their financial statement summary online.
Alerts Management	The ability for customer to choose which alerts and notifications they want to receive for their portfolio of accounts.
Advanced Alerts Management	The ability for the consumer to set personal preference for channels such as email, mobile, and SMS through the online banking application.
Advanced Security Alerts	The ability for the online banking solution to notify the customer on possible portfolio security issues.
Bill-Pay Alerts	The ability for a customer to set alerts when the solution makes an automatic payment from their bank account.
Marketing Alerts	The ability for the solution to notify a customer based on marketing opportunities.
Risk-based Alerting	The ability to notify a customer when potential risk occurs through the online banking application.
Bill Pay	
Bill Pay	The ability to schedule and send a payment from a checking account to a vendor.
Save Payee	The ability to remember vendors and their routing information.
E-Bills	An electronic version of a vendor payment request sent through the online banking solution.
Payment Summary	The ability for a customer to view their account transaction and payment summary online.
Recurring Payments	The ability to create routine and automatic bill pay transactions to an ad-hoc dollar amount, number of payments, and calendar plan.

FEATURE AUDIT DEFINITIONS

Feature or Function	
Solutions Management	
Usage Reporting Dashboards	Internal reporting for the financial institution that provides a standardized view of online banking channel activity.
Software Development Toolkit (SDK)	Pre-built set of code modules that a bank may use to update and extend the banking application.
Customer Segment-Based Enablement	The ability to provide or not provide specific online banking features to a custom-defined segment of users. (e.g. by region, account mix, total deposits, etc.).
Feature Depreciation Support	Process support for sunsetting features and capabilities within the application.
Regression Testing	Full application testing support for releases that includes testing code installation that has not been altered, but may still be impacted.

Feature Legend	
Standard Native Feature	A feature contained in the base package of the solution. Standard native features are provided solely by the vendor.
Premium Native Feature	A feature that is only available at an additional cost or as an addition to the base package of the solution, and is provided solely by the vendor.
Third-Party Premium Feature	A feature that is only available at an additional cost or as an addition to the base package of the solution, and is provided by a third-party firm or integration partner.
Plan to Offer in 12 Months	A feature that is on the vendor's product roadmap for the next 12 months, to be provided by the vendor, third-party firm, or integration partner.
Plan to Offer in 24 Months	A feature that is on the vendor's product roadmap for the next 24 months, to be provided by the vendor, third-party firm, or integration partner.
Not Offered	A feature that the vendor does not have plans to offer.

FEATURE AUDIT

Banking Function Support	Oracle FLEXCUBE
Online Banking Enrollment	●
Account Information Management	●
Multiple Account Summary	●
Account Details	●
Searchable Account Details	●
Transaction Reconciliation and Dispute Support	●
Account Statements	●
Account Rewards Management	●
Financial Product Information	●
Privacy Policy Support	●
Card and Check Reorder	●
Marketing Support	●
Security	
Two-Factor Authentication	●
Out of Band Authentication	●
Step-up Authentication	● (gray)
Secure Mail	●
Secure Chat	●
PCI Compliance	●
Penetration Testing	●
Customer Password Support	●

Transfers and Alerts	Oracle FLEXCUBE
Transfers Between Linked Accounts	●
Transfers Between Internal Accounts	●
Transfers to External Accounts	●
E-statements	●
Alerts Management	●
Advanced Alerts Management	●
Advanced Security Alerts	●
Bill-Pay Alerts	●
Marketing Alerts	●
Risk-based Alerting	●
Bill Pay	
Bill Pay	●
Save Payee	●
E-Bills	●
Payment Summary	●
Recurring Payments	●
Solutions Management	
Usage Reporting Dashboards	●
Software Development Toolkit (SDK)	●
Customer Segment-Based Enablement	●
Feature Depreciation Support	●
Regression Testing	●

● Offered native   ● Offered Premium or add-on   ○ Plan to offer in 12 months   ○ Plan to offer in 24 months   Not offered
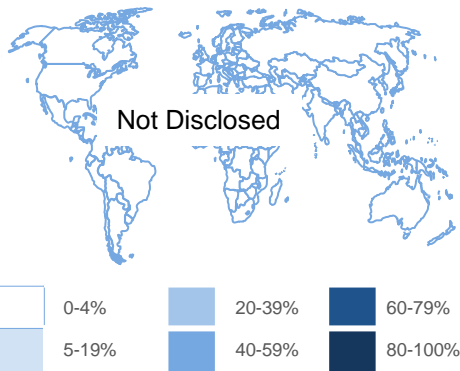
KEY STATISTICS

COMPANY TYPE	Public
YEAR FOUNDED	1977
HEADQUARTERS	Redwood Shore, CA
FT EMPLOYEES	110,000+
FY 2013 REVENUE	$35.68 billion

Distribution of Clients by Asset Size

<$1 Billion	$1-10 Billion	$10-50 Billion	>$50 Billion
	Not Disclosed		

Distribution of Clients by Region

Not Disclosed

	0-4%		20-39%		60-79%
	5-19%		40-59%		80-100%

ORACLE
FLEXCUBE DIRECT BANKING

COMPANY OVERVIEW

Oracle is a provider of business hardware and software systems to more than 380,000 customers, including all of the Fortune 100, and has deployments across a wide variety of industries in more than 145 countries around the globe. In addition to online banking, FLEXCUBE includes offerings for universal banking, private banking, online banking, investor servicing, and open development tools. Oracle acquired Taleo Corporation in April 2012, and Nimbula Inc. in March 2013 to enhance its cloud service offerings.

PRODUCT OVERVIEW

Oracle FLEXCUBE was developed in-house by Oracle and released in the mid 1990s. Version 12.0.3 was released in 2014, offering enhanced customer experience and self-service capabilities, as well as additional functionality across channels. The platform supports multiple touch points and can be implemented in various languages and currencies.

PRODUCT HIGHLIGHTS

- **Tailored branding capabilities:** Bank users can tailor the interface to align with their brand and color schemes. This capability can be extended to co-branded products offered jointly by the bank.

- **Multi-currency support:** Account balances can be viewed in various currencies, and the solution allows cross-border, cross-currency transfers, and payments within the system.

- **Adaptive Strong Authenticator and Adaptive Risk Manager:** These integrated, yet independently deployable components help organizations prevent fraud by leveraging real-time analysis of key data types to prevent fraud before it happens.

CEB TOWERGROUP VIEW

Oracle FLEXCUBE provides a highly integrated and user-friendly platform, with scalable architecture and global support. Oracle puts the design and user interface in the hands of the financial institution, allowing extensive customization options. Oracle FLEXCUBE is a strong choice for global banks, with its multi-currency support that allows for cross-border and cross-currency transfers and payments. Because Oracle's policy does not allow for disclosure of their client distribution, we would encourage any organization contemplating the FLEXCUBE solution to engage with regional reference customers.

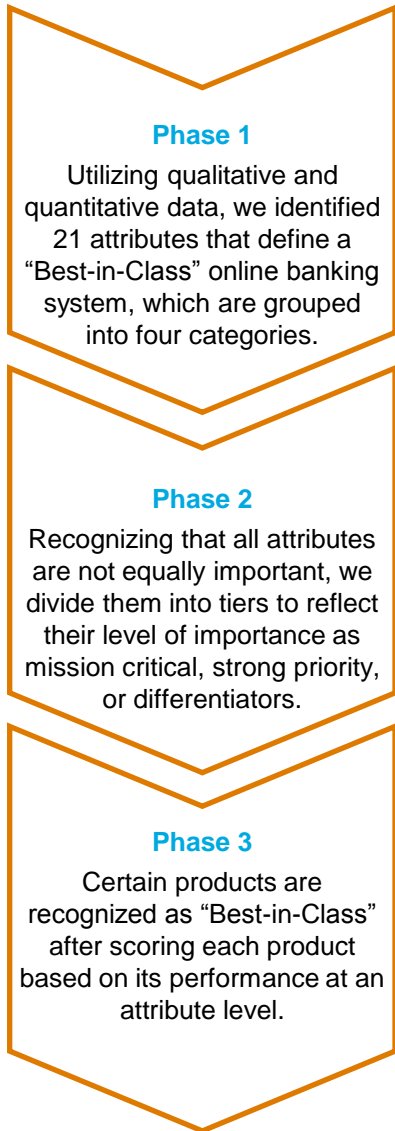# ROADMAP FOR THE PRESENTATION

Current Market ❯ Future Investment ❯ Vendor Landscape ❯ **Product Rankings**

CREATING OUR "BEST-IN-CLASS" PRODUCT RANKINGS

Phase 1

Utilizing qualitative and quantitative data, we identified 21 attributes that define a "Best-in-Class" online banking system, which are grouped into four categories.

Phase 2

Recognizing that all attributes are not equally important, we divide them into tiers to reflect their level of importance as mission critical, strong priority, or differentiators.

Phase 3

Certain products are recognized as "Best-in-Class" after scoring each product based on its performance at an attribute level.

CATEGORIES	Customer Experience	Design and Security	Operations Management	Enterprise Support
	Those attributes that describe the interface, design, and usability of the system for the end user.	Those attributes that ensure the system has an optimal architecture and protects the end user and firm from unnecessary risk	Those attributes that pertain to the application's backend functionality and operations.	Those attributes that impact the technology provider's tactical fit and strategic alignment with the retail bank.

ATTRIBUTES		Customer Experience	Design and Security	Operations Management	Enterprise Support
Mission Critical		▪ Marketing & Fulfillment ▪ Multichannel Support	▪ Business Process Support ▪ Shared Platform	▪ System Integration	▪ Technology Innovation ▪ Vendor Collaboration
Strong Priority		▪ User Notification ▪ Core Banking Functions	▪ Data Security ▪ Consumer Security	▪ Management Reporting & Administration ▪ Compliance Strategy	▪ Product Maturity ▪ Vendor Stability
Product Differentiator		▪ User Interface ▪ Customer Reporting	▪ Interface Design	▪ Customer Support	▪ Geographic Coverage ▪ Pricing Flexibility

"Best-in-Class" Customer Experience	"Best-in-Class" Design and Security	"Best-in-Class" Operations Management	"Best-in-Class" Enterprise Support

Source: CEB analysis

> **Retail banking executives should use the ranking matrix _in combination_ with the Online Banking Diagnostic Anatomy to select the vendor that best aligns with their firm's needs.**

- Vendor rankings are based on our five-point rating system for each of the 21 attributes in our online banking systems anatomy.

PRODUCT RANKING MATRIX

Listed Alphabetically by Provider

Provider	Product	Customer Experience	Design and Security	Operations Management	Enterprise Support
Oracle	FLEXCUBE Direct Banking	4.9	4.8	4.9	5.0
Computer Services, Inc.	CSI Internet Banking	--	--	--	--
D+H	Cavion Internet Banking	--	--	--	--
Digital Insight	Digital Insight Online Banking	--	--	--	--
FIS	Online Banking	--	--	--	--
FIS	Consumer eBanking	--	--	--	--
Fiserv	Retail Online	--	--	--	--
Fiserv	Corillian Online	--	--	--	--
Infosys	Finacle eBanking	--	--	--	--
Jack Henry	NetTeller Internet Banking	--	--	--	--
Polaris	Retail Banking Exchange	--	--	--	--
SAP	Retail Online Banking	--	--	--	--
TCS	TCS BaNCS	--	--	--	--

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■ = Best-in-Class in Anatomy Category

❯ **Oracle received "Best-in-Class" achievements in all four categories: Customer Experience, Design and Security, Operations Management, and Enterprise Support.**
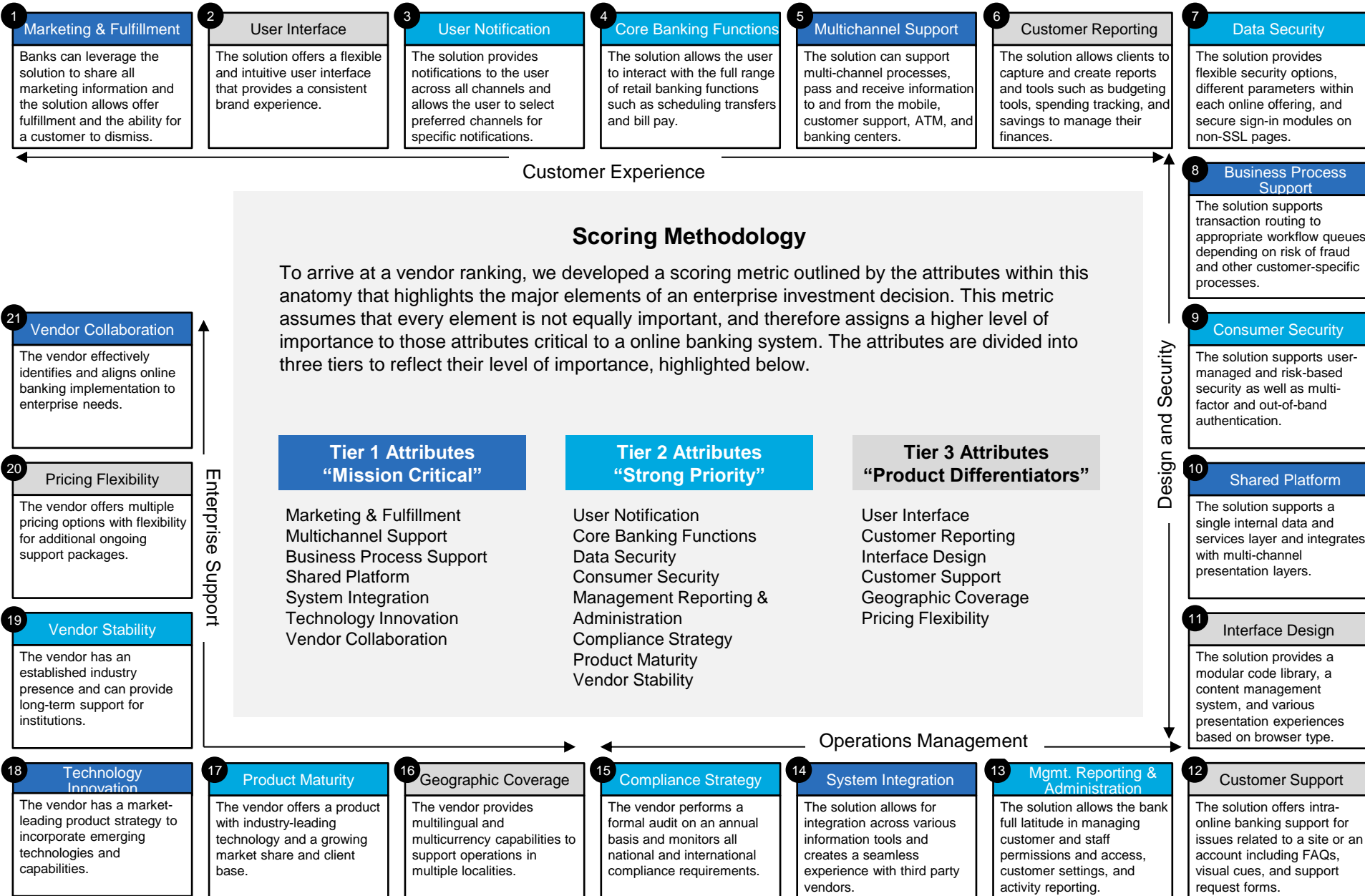
- Customer Experience includes those attributes that describe the interface, design, and usability of the system for the end user.

- Design and Security includes those attributes that ensure the system has an optimal architecture and protects the end user and firm from unnecessary risk.

- Operations Management includes those attributes that pertain to the application's backend functionality and operations.

- Enterprise Support includes those attributes that impact the technology provider's tactical fit and strategic alignment with the retail bank.

Source: CEB analysis

"BEST-IN-CLASS" ACHIEVEMENTS FOR ORACLE

Category	Scoring Analysis
Customer Experience	▪ **User Notifications:** Alerts can be delivered via email, phone (text message), or secure mail through the banking platform. Alerts can be configured at the user, customer, account, and default level. ▪ **Customer Reporting:** Oracle's native PFM gives customers a holistic view of their finances, and allows integration with wealth management via an internet banking dashboard. Additionally, as an out-of-the-box feature, customers can benchmark their financial performance against peers across the bank or defined communities (internal or external to the bank). ▪ **Marketing & Fulfillment:** Offers are pushed to customers on a relationship basis, with tailored propositions based on relationship status. All offers can be fulfilled online, in real-time. All marketing alerts are actionable.
Design and Security	▪ **Business Process Support:** FLEXCUBE's Adaptive Strong Authenticator and Adaptive Risk Manager help organizations prevent fraud by leveraging real-time analysis of key data types to prevent fraud before it happens. ▪ **User Interface:** FLEXCUBE's user interface is uniquely designed with the interactive and personalization needs of the end user in mind, instead of the bank's product lines. ▪ **Customer Security:** FLEXCUBE's Adaptive Strong Authenticator provides multifactor authentication for highly sensitive information, and when coupled with Oracle's Adaptive Access Manager, provides comprehensive security for online banking transactions through adaptive authentication techniques.
Operations Management	▪ **Compliance Strategy:** Oracle offers extensive compliance coverage that is tailored to support localization and internationalization. ▪ **Management Reporting & Administration:** FLEXCUBE offers a robust entitlements management engine that allows banks to tailor reporting and user entitlements to meet their unique needs. ▪ **System Integration:** Oracle FLEXCUBE seamlessly integrates with numerous product processers and backend core systems, LOB legacy systems, or third-party components. The system supports integration with multiple data sources and is both horizontally and vertically scalable.
Enterprise Support	▪ **Geographic Coverage:** Account balances can be viewed in various currencies, and the solution allows cross-border, cross-currency transfers, and payments within the system. ▪ **Technology Innovation:** Oracle's market-leading strategy for incorporating technology innovation includes mobile app integration, P2P payments through social media, highly personalized alerting and push notifications, and an integrated portal for bank-led development and targeted marketing. ▪ **Vendor Collaboration:** Oracle incorporates user feedback and ideas through user groups, customer advisory boards, strategy boards, CIO Advisory Board, and country-specific customer forums.

ONLINE BANKING DIAGNOSTIC ANATOMY

CEB — WHAT THE BEST COMPANIES DO

1 Marketing & Fulfillment
Banks can leverage the solution to share all marketing information and the solution allows offer fulfillment and the ability for a customer to dismiss.

2 User Interface
The solution offers a flexible and intuitive user interface that provides a consistent brand experience.

3 User Notification
The solution provides notifications to the user across all channels and allows the user to select preferred channels for specific notifications.

4 Core Banking Functions
The solution allows the user to interact with the full range of retail banking functions such as scheduling transfers and bill pay.

5 Multichannel Support
The solution can support multi-channel processes, pass and receive information to and from the mobile, customer support, ATM, and banking centers.

6 Customer Reporting
The solution allows clients to capture and create reports and tools such as budgeting tools, spending tracking, and savings to manage their finances.

7 Data Security
The solution provides flexible security options, different parameters within each online offering, and secure sign-in modules on non-SSL pages.

8 Business Process Support
The solution supports transaction routing to appropriate workflow queues depending on risk of fraud and other customer-specific processes.

9 Consumer Security
The solution supports user-managed and risk-based security as well as multi-factor and out-of-band authentication.

10 Shared Platform
The solution supports a single internal data and services layer and integrates with multi-channel presentation layers.

11 Interface Design
The solution provides a modular code library, a content management system, and various presentation experiences based on browser type.

12 Customer Support
The solution offers intra-online banking support for issues related to a site or an account including FAQs, visual cues, and support request forms.

13 Mgmt. Reporting & Administration
The solution allows the bank full latitude in managing customer and staff permissions and access, customer settings, and activity reporting.

14 System Integration
The solution allows for integration across various information tools and creates a seamless experience with third party vendors.

15 Compliance Strategy
The vendor performs a formal audit on an annual basis and monitors all national and international compliance requirements.

16 Geographic Coverage
The vendor provides multilingual and multicurrency capabilities to support operations in multiple localities.

17 Product Maturity
The vendor offers a product with industry-leading technology and a growing market share and client base.

18 Technology Innovation
The vendor has a market-leading product strategy to incorporate emerging technologies and capabilities.

19 Vendor Stability
The vendor has an established industry presence and can provide long-term support for institutions.

20 Pricing Flexibility
The vendor offers multiple pricing options with flexibility for additional ongoing support packages.

21 Vendor Collaboration
The vendor effectively identifies and aligns online banking implementation to enterprise needs.

Customer Experience
Design and Security
Enterprise Support
Operations Management

Scoring Methodology

To arrive at a vendor ranking, we developed a scoring metric outlined by the attributes within this anatomy that highlights the major elements of an enterprise investment decision. This metric assumes that every element is not equally important, and therefore assigns a higher level of importance to those attributes critical to a online banking system. The attributes are divided into three tiers to reflect their level of importance, highlighted below.

Tier 1 Attributes "Mission Critical"
Marketing & Fulfillment
Multichannel Support
Business Process Support
Shared Platform
System Integration
Technology Innovation
Vendor Collaboration

Tier 2 Attributes "Strong Priority"
User Notification
Core Banking Functions
Data Security
Consumer Security
Management Reporting & Administration
Compliance Strategy
Product Maturity
Vendor Stability

Tier 3 Attributes "Product Differentiators"
User Interface
Customer Reporting
Interface Design
Customer Support
Geographic Coverage
Pricing Flexibility

UNDERSTANDING OUR SCORING METHODOLOGY

> **We developed a unique scoring methodology that highlights the key priorities for an executive's investment decision.**

- Every product featured in this report is scored on each of the 21 attributes outlined in the Online Banking Diagnostic Anatomy on a standardized 1-5 scale.

- We calculate the weighted average of a product's attribute scores in each of the four categories of the anatomy to arrive at an overall category score.

Sample Technology Analysis Internal Anatomy Scoring Guide
Illustrative

		Customer Experience	**Operations Management**
Anatomy	**Category**		
	Attribute Title	*Marketing & Fulfillment*	*Mgmt. Reporting & Administration*
	Attribute Definition	*Banks can leverage the solution to share all customer-facing marketing including financial product information, rewards, and other marketing communications.*	*The solution allows the bank to manage administrative and management permissions, customer information and settings, and activity reporting.*
Scoring Metric	**SCORE**		
	5	Banks can leverage the solution to deliver timely and targeted customer-facing marketing for financial products, loyalty programs, and partners, and allows for both real-time offer fulfillment, as well as the ability to dismiss offers.	The solution allows the bank full latitude in managing customer and staff credentials and access within the system. The solution provides a flexible role-based permissions approach. The solution provides a high level of transparency into staff and client behaviors with easy and configurable reporting options to monitor activity.
	4	The solution facilitates targeted, actionable marketing and real-time view of rewards that redirects the user to the website for management.	The solution allows the banks to create configurable role-based permissions for clients and staff. The solution tracks both user and staff activity within the system and provides extensive (but not configurable) monitoring and reporting on these metrics.
	3	The solution facilitates targeted marketing, but alerts are not actionable. Provides a monthly static review, but redirects to website for monthly update on rewards.	The solution allows the bank to create role-based permissions for both clients and staff. The solution is configurable and requires minimal input from the vendor to create permissions. The solution tracks both user and staff activity within the solution, but monitoring and reporting is difficult.
	2	The solution facilitates static marketing, with no targeting. Provides a monthly static report of rewards.	The solution allows the bank limited flexibility to create role-based permissions. The solution tracks staff activity within the platform, but not customer activity. Reporting is difficult and not configurable for monitoring.
	1	The solution does not provide any functions related to the view and maintenance of current customer accounts.	The solution allows the bank to adjust client permissions, but only provides pre-set staff permission configurations. The solution does not track staff and client activity.
	Attribute Score:	**5.0**	**3.0**

Source: CEB analysis

Cross-Sell and Up-Sell Capabilities	Definition
Targeted Marketing	Ability to make intelligent, real-time offers and centrally manage offers across channels.
Relationship Pricing	Ability to leverage the overall customer relationship to determine the cost of services and profitability of the customer to the bank.
Rewards Programs	External merchant rewards programs and offers for customers.
New Product Fulfillment	Ability to fully manage the new product application, terms and approvals, and fulfillment capability in online banking.

Enhanced User Experience	Definition
Responsive Design	User interface presentation capability that accounts for the type of device, application container, and orientation and size of screen.
Wearable Push Notifications	Feature that sends user- and bank-defined alerts to customers through preferred channels. Expected to expand beyond smartphone to Windows desktop and wearable devices.
Multi-channel Process Enablement	Feature allowing end users to begin a transaction or process in one channel, and complete it in a different channel.
Comprehensive Service History	A complete view of customer service requests and summary information available to consumers through the online banking portal.
Intelligent Authentication	Authentication strategy that aligns security measures to consumer information risk on a transactional level in an individually-tailored way.

Digital Banking Management	Definition
Business Intelligence Tools	Customer product mix, usage, and service reporting across the full suite of channels.
Cloud Banking	Software-as-a-service, hosted online banking services.
Customer Information Hub	Ability to source all customer information into an in-memory data store for universal access and silo reduction.
Consolidated Digital Platform	Creating a consolidated platform for digital channels that allows for efficiencies of technology, development, and management.