The Challenge for the New Bank CIO
How to Achieve Customer-Centricity by Making Better Use of Six Emerging Technologies
Executive Summary

The financial crisis and changing marketplace have created massive disruption in the financial services industry, particularly for banks. To address these challenges, consumer banks must become more customer-centric. This in turn requires new foundational capabilities: capabilities that will help banks distinguish themselves as part of a customer-oriented industry. These include a seamless cross-channel portal with improved customer experience, better access to (and use of) customer insights, custom products and services, and better back-end business processes.

Information technology (IT) functions will be increasingly called on to play a key role in developing these strategic capabilities. The IT function will be the gateway to six new enabling technologies. Each offers opportunities for giving customers convenience, control, recognition, and transparency. The technologies are mobility (the use of mobile devices), high-end analytics, big data management, next-generation data processing, cloud computing, and service-oriented architecture.

To make use of these key enablers, organizations will need to refine their operating models, governance, data and application management, and technology architecture. An IT road map can integrate these technology enablers into your company’s ongoing, planned initiatives.
Banks must reassess their strategies ...

- The financial crisis and changing marketplace have created massive disruption
  - Limited growth opportunities and regulatory constraints are now familiar
  - The customer base has eroded, as traditional banks increasingly compete with nonfinancial services organizations: PayPal, Mint, Prosper, etc.
  - Most banking products (other than wealth and payment) have reduced operating profits
  - Revenues have steadily decreased in an extremely competitive market

- To address these challenges, consumer banks must become more customer-centric

- This in turn requires new foundational capabilities:
  - A seamless, cross-channel portal (with improved customer experience and interface)
  - Better access to (and use of) insights about consumer needs and preferences
  - Better platforms for custom products and services
  - A holistic view of the customer
  - A back-end platform for managing the product and service portfolio
  - Efficient back-end business processes and infrastructure management
... and IT plays a key role in developing the requisite capabilities

- The IT function should provide comprehensive, strategically oriented technology enablers:
  - Mobility to enable “always-on” connection to clients, customers, and employees
  - High-end structured analytics to provide full-population, real-time, deep customer insights
  - Management of “big data” to process large, unstructured data from social media and other sources
  - Next-generation data management systems for agile processing of multi-format data and to integrate unstructured and structured data
  - Cloud computing for infrastructure, data, analytics, and applications
  - Service-oriented architecture to enable data and functional service reusability

- To make use of these key enablers, organizations will refine their operating models, governance, data and application management, and technology architecture

- An IT road map can integrate technology enablers into your company’s ongoing, planned initiatives
Disruption: The shrinking of bank profit pools, 2009–2014

Source: Federal Reserve; FDIC; Nilson Report; Mortgage Bankers Association; Financial Services FactBook 2010; analyst reports; industry newsletters; news articles; annual reports; Booz & Company analysis

Bank Revenue (US$ billion)

Margin (%) Operating Profit Margin

Revenue Growth (CAGR) Profit Growth (CAGR)

2004–2009 4.8% 2004–2009 3.8%
2009–2014F 1.2% 2009–2014F -1.1%

1 Excludes insurance (life, property and casualty, etc.) and capital markets
2 Excludes loan loss provisions, nonrecurring gains or losses, and income taxes
3 Excludes commercial real estate
4 Includes home equity lines of credit, auto loans, student financing, and other consumer lending products; excludes mortgage and credit cards
5 Includes originations, holdings, and servicing of multifamily, commercial, and farm mortgages; excludes securitization
6 Includes originations, holdings, and servicing of 1- to 4-unit residential mortgages; excludes securitization
7 Includes interchange fees from credit and debit card transactions, in addition to fees from cash management, online payment processing, global trade, and wire transfers
Banks seek to grow through customer-centric strategies

**Easier access to and use of accounts, products, and services**
- Freedom to move between fully functional, technology-enhanced mobile channels
- 24/7 ability to conduct transactions and access information

**Ability to control the end-to-end experience**
- Convenient access to make informed trade-offs
- Hassle-free flexibility, so customers can rethink their choices during (and after) the purchase decision
- Multiple levels of assistance online and in person

**A more pronounced personalized banking experience**
- Products and services tailored to fit customers’ particular financial and personal needs
- Personalized experiences based on customer segments

**Transparency**
- In-depth understanding of value proposition and the “fine print”
  - Features and prices of offerings explicitly compared to market
  - Clear communication of fee structures, terms, restrictions, and deadlines

**Key Business Drivers**
- Improved market share
  - Mobile and other new channels
  - Broader reach
  - Use of social media
- Segmentation
  - More “human touch” for premier customers
  - Lower-cost channels for selected customers
- Increased share of wallet
  - Personalized products and services
  - Seamless interaction and assistance across channels
- Improved delivery
  - Increased speed-to-market
  - Reduced cost of solutions

Source: Booz & Company analysis
To make this approach work, banks need new IT capabilities

<table>
<thead>
<tr>
<th>Front Office</th>
<th>Middle Office</th>
<th>Back Office</th>
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</table>
| ▪ **A seamless, cross-channel portal**  
  – Rich, elegant interface; personalized for client preferences  
  – Integrates sales, service, origination, and third-party products and services  
  – Better customer experience and user interface  
 | ▪ **Better access to customer insights**  
  – Portal and other means to gather data on customer behavior, product/channel usage, and risk  
  – Real-time analytics to predict “next best offer” for the customer  
  – Optimized lead distribution  | ▪ **A back-end platform for managing the product and service portfolio**  
  – The ability to quickly define products on the platform and provide inputs to transactional systems  
  – Clean product master providing inputs to front-end, middle, and back-end systems  |
| ▪ **Better access to customer insights**  
  – Portal and other means to gather data on customer behavior, product/channel usage, and risk  
  – Real-time analytics to predict “next best offer” for the customer  
  – Optimized lead distribution  | ▪ **Better platforms for custom products and services**  
  – Easy configuration of products and services based on customer responses to the front-end portal  
  – Underwriting and custom pricing, making use of deep customer insights  
 | ▪ **Efficient business processes and infrastructure management**  
  – Reusable services, improved speed-to-market, reduced costs for delivering services  
  – Ability to easily scale up or scale down infrastructure capacity  
  – Ability to manage large volumes of customer and transaction data  |

Source: Booz & Company
Six emerging technological enablers can help develop these IT capabilities

1. Mobility
2. High-End Analytics
3. Big Data Management
4. Next-Generation Data Processing
5. Cloud Computing
6. Service-Oriented Architecture

Source: Booz & Company
Each plays a role in helping IT build out the bank’s overall strategic capabilities

### Consumer Banking

**Front Office**
- Seamless, cross-channel portal
- Better access to customer insights

**Middle Office**
- Better platforms for custom products and services
- A holistic view of the customer

**Back Office**
- A back-end platform for managing the product and service portfolio
- Efficient business processes and infrastructure management

### Key Capability Enablers

1. **Mobility**
   - Use of mobile devices
   - “Anytime, anywhere” connectivity

2. **High-End Analytics**
   - Full population analytics
   - Real-time consumer insights
   - Analytics embedded into business processes (risk management, marketing, sales)

3. **Big Data Management**
   - Data derived from customer banking
   - Data derived from external sources (such as social media)
   - Integration of relational and unstructured data from multiple sources and formats
   - Changes in data architecture and governance

4. **Next-Generation Data Processing**
   - Specialized database management systems (columnar) to manage data from disparate sources
   - Data-driven business intelligence
   - Agile data processing

### Supporting Enablers

5. **Cloud Computing**
   - On-demand, standardized infrastructure, platform, processes, and services
   - External on-demand services (such as analytic computing)

6. **Service-Oriented Architecture**
   - Service-based technology architecture
   - Reusable, plug-and-play services

Source: Booz & Company
Early adopters of these six enablers are demonstrating their potential for FS

<table>
<thead>
<tr>
<th>Technology Enablers</th>
<th>Critical Breakthrough</th>
<th>Success Story</th>
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<tbody>
<tr>
<td><strong>1. Mobility</strong></td>
<td>▪ Widespread acceptance of touch-sensitive mobile devices (smartphones, tablets) ▪ Increased adoption of new technologies (near field communication, speech/facial recognition) enabling mobile commerce</td>
<td>▪ PNC has developed a “virtual wallet,” with features (mobile banking, calendars, savings plan) designed for Gen Y customers</td>
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<tr>
<td><strong>2. High-End Analytics</strong></td>
<td>▪ Fast, agile data-processing capability that can process full population data without database manipulations ▪ New integration mechanisms (such as Web services) and interfaces to deliver real-time analytics</td>
<td>▪ Foursquare provides real-time, social graph–based offers on mobile devices or on website, based on full population data analysis</td>
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<tr>
<td><strong>3. Big Data Management</strong></td>
<td>▪ Ability to manage increased volume, velocity, and variety of data from social media, digital, and other channels using distributed parallel processing</td>
<td>▪ Hadoop MapReduce is being used for “sentiment” analysis by trading institutions. The platform measures sentiment about specific stocks by following trends on social media channels</td>
</tr>
<tr>
<td><strong>4. Next-Generation Data Processing</strong></td>
<td>▪ Commercialization of new database management systems (for example, columnar data) ▪ Technologies to connect structured, relational data with unstructured data</td>
<td>▪ Analytic application in Morgan Stanley combines more than 10,000 dimensions of structured and unstructured data from five ERP applications to provide unified customer data view to sales force</td>
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<td><strong>5. Cloud Computing</strong></td>
<td>▪ Increased adoption of SaaS-based applications, including analytics, from different vendors (such as Salesforce.com) ▪ Ability to provision application development platforms over cloud, in addition to infrastructure</td>
<td>▪ Visa is using cloud computing to access fraud data models (from Google) that use 36 terabytes of data—this cuts down model building time from one month to 13 minutes</td>
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<tr>
<td><strong>6. Service-Oriented Architecture</strong></td>
<td>▪ Maturity of integration technologies (enterprise bus, service management appliance like IBM DataPower) to facilitate SOA implementations</td>
<td>▪ SOA services at Credit Suisse have resulted in cost reduction and service quality improvement—Credit Suisse began implementing SOA in 2007</td>
</tr>
</tbody>
</table>

Source: Booz & Company
Smartphones are increasingly positioned as e-commerce platforms

Projected Mobile Commerce Growth

Note: E-commerce includes mobile media and content, retail, travel, coupon/deals, and services.
Source: Forrester Research Mobile Commerce Forecast: 2011 to 2016 (U.S.)
Analytics are key drivers for decision-making processes in banks

Source: Booz & Company research
The data available to banks has dramatically increased

### Structured Data
- CRM
- Financials
- Logistics
- Data marts
- Inventory
- Sales records
- HR records
- Web profiles

### Complex Data
- Documents
- Web feeds
- System logs
- Online forums
- SharePoint
- Sensor data
- Data archives
- Images/video

### Technical Implications of Big Data
- High-speed processing to manage the large volume of data
- Structured and unstructured data in combination
- Highly scalable platforms on commodity computers or cloud infrastructure
- Multiple tools to manage data processing based on open source technologies
- Tools that access big data through familiar query language like SQL
- Graphic design layers to minimize coding

**Note:** For example, Yahoo’s big data implementation consists of 100,000 CPUs and 40,000 commodity computers.

Source: Cloudera; Booz & Company
Few banks have the requisite database management systems in place

Surveys of CIOs: “What are your plans for specialized database engines (OLAP, columnar databases, warehouse appliances) this year?”

Technical Implications of Next-Gen DBMS

- There is increased recognition that row-oriented relational database management systems can’t meet the new demands
- New technologies and computation capabilities can support different data architectures
- Specialized databases are being adopted:
  - To manage high-volume, unstructured, and diverse data structures and attributes
  - To improve speed-to-market insights by eliminating the need for physical modeling and multidimensional cubes
- At present, four specialized databases are leading the field:
  - Columnar RDBMS
  - In-memory databases
  - Inverted databases
  - Associative index databases

Source: Enterprise and SMB Software Survey, North America and Europe, Q4 2009; Forrsights Software Survey, Q4 2010
Cloud computing can reduce costs and improve speed-to-market

- Cloud services are growing much faster than internally hosted IT—in 2012, 25% of net new IT spend growth will come from cloud services
- Multiple vendors provide infrastructure as a service, used by the financial services industry to augment in-house infrastructure
- SaaS (on-demand software) has evolved as a generally accepted deployment model for CRM/HRM apps in financial services
  - SaaS subscriptions account for 39% of total apps revenue in HRM
  - SaaS expected to grow at 15% CAGR through 2014
- SaaS expanding to financial and ERP systems as customization, upgrade, data security, and maintenance limitations are being addressed
- Platform as a service (PaaS) enables partner ecosystems
  - Reduces coding effort, with model-based configuration and BPM
  - Enables apps to be built more rapidly than with proprietary tools
  - Improves SaaS adoption by providing additional extensibility

Worldwide IT Spending ($US billion)

<table>
<thead>
<tr>
<th>Year</th>
<th>IT Cloud Service</th>
<th>On-Premise IT</th>
<th>Total</th>
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<tbody>
<tr>
<td>2010</td>
<td>431</td>
<td>26</td>
<td>457</td>
</tr>
<tr>
<td>2011</td>
<td>27</td>
<td>20</td>
<td>47</td>
</tr>
<tr>
<td>2012</td>
<td>35</td>
<td>26</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>493</td>
<td></td>
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</table>

Source: Booz & Company
Banks are adopting SOA, but without an enterprise strategy for it

SOA’s Potential Value

- In financial services, SOA penetration is high (close to 80%), but most firms don’t have an enterprise-level strategy

- Organizations need to place SOA inside a broader architectural context that enables key IT capabilities:
  - In-house or cloud-sourced data services for complex analytics and customer insights
  - External and internal services to improve the customer value proposition
  - Customer-facing business processes using services like compliance and security validation

Annual survey of CIOs: “What are your plans to pursue SOA?”

Note: Numbers may not add up to 100% because of rounding.
Source: Enterprise and SMB Software Survey, North America and Europe, Q4 2008 and Q4 2009, and Foresights Software Survey, Q4 2010
Each bank should define its own distinctive mix of IT-enabled capabilities ...

<table>
<thead>
<tr>
<th>Enablers</th>
<th>Architecture</th>
<th>Technology</th>
<th>Data &amp; Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>Separation of user interface from back end as enterprise applications are accessed by multiple customer devices</td>
<td>Migration to Web-centric tools that reduce dependency on specific devices and platforms</td>
<td>To provide a full range of functions on mobile channels, build infrastructure to support apps, and use cloud-sourced services</td>
</tr>
<tr>
<td>High-End Analytics</td>
<td>Infrastructure strategy to enable full population analytics</td>
<td>Database and infrastructure to support in-memory processing</td>
<td>A data strategy to support high-end analytics and insights based on recurring customer events</td>
</tr>
<tr>
<td>Big Data Management</td>
<td>Enterprise data warehouse and analytic data structure enhancement to accommodate unstructured data from multiple external providers</td>
<td>Platforms (Apache, LexisNexis), tools (Hadoop, MapReduce), and delivery strategies (in-house vs. cloud) for big data management</td>
<td>Access to critical data sources (such as social media) needed for customer and process insights</td>
</tr>
<tr>
<td>Next-Generation Data Processing</td>
<td>Data, query, and analysis architecture to support new database constructs</td>
<td>Integrated data architecture to manage relational data with new data structures (columnar or inverted DBMS)</td>
<td>Deployment of data warehouses and downstream applications to bring together traditional RDBMS with new columnar or inverted data</td>
</tr>
<tr>
<td>Cloud Computing</td>
<td>Cloud strategy (private, public, hybrid) aligned with business needs</td>
<td>Cloud services that support mobile payments and complex analytics</td>
<td>Cloud-sourcing SaaS apps for CRM, HRM, and ERP capabilities</td>
</tr>
<tr>
<td>Service-Oriented Architecture</td>
<td>Refinement of the SOA implementation approach to weave in mobility, high-end analytics, big data management, and next-generation data processing</td>
<td>Cloud-based platforms to enhance app development capabilities</td>
<td>Data sensitivity classifications to design clouds with appropriate security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refinement of the enterprise technology strategy to ensure support for service-based interoperability</td>
<td>Common services to be provided to front-, middle-, and back-office applications by aligning SOA strategy with enterprise business model</td>
</tr>
</tbody>
</table>

Source: Booz & Company
... and adjust IT budgeting, operating model, and governance accordingly

<table>
<thead>
<tr>
<th>Enablers</th>
<th>IT Budgeting</th>
<th>Operating Model</th>
<th>Governance</th>
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</thead>
</table>
| Mobility | ▪ Budget allocation to support new technology platforms (mobile, unstructured data analytics) and devices needed to develop new capabilities | ▪ New sourcing models to facilitate new IT capability development  
  - “Pay-as-you-use” models for cloud-sourcing  
  - Risk- and reward-sharing models with partners providing mobility and analytics/data-processing capabilities | ▪ Corporate policy revisions, keeping in mind adoption of new mobility devices |
| High-End Analytics | ▪ Budget balancing across mobility platforms (to ensure that all customers have access) | ▪ PMO framework and “horizontal management” processes to achieve synergies between operational initiatives and initiatives related to new technology | ▪ Data security (customer consent, encryption, entitlements) to meet compliance and customer service needs |
| Big Data Management | ▪ Optimal spend to support multiple analytic and data-processing application implementation (no single app or technology can support the needs of any major customer-facing enterprise) | ▪ Shared services and governance structures to manage development of emerging platforms (this is critical for mobile, analytics, and big data management) | ▪ Information governance refinement for big data: compliance monitoring plan and security policies related to unstructured data |
| Next-Generation Data Processing | ▪ “Proof-of-concept” fund to test new tools and technologies before developing rollout plans | ▪ “On-ramp/off-ramp” investment strategy to develop mobility, analytics, and other capabilities from the ground up and refine investments based on value realization | ▪ Clear governance structure for cloud computing and SOA  
  - Rules and structure to determine what can be cloud-sourced  
  - Standards to develop interoperable services  
  - Decision rights for individuals in the IT organization |
| Cloud Computing | ▪ Operational budget allocation for cloud-sourcing infrastructure and platforms | ▪ Optimal resource mix (including IT outsourcing and offshoring) to procure critical skill sets and knowledge needed to support emerging technologies | ▪ Clear policies and control rights for information dissemination and download into external channels (for example, insights pushed onto mobility platforms outside the organization’s firewalls) |
| Service-Oriented Architecture | | ▪ Defined development approaches and infrastructure standards to reduce incoherent proliferation across the enterprise for the emerging enabling technologies | |
CIOs should augment existing initiatives with new technology enablers

**Enterprise Initiative**

- **Customer/Employee Portal**
  - Explore mobile channels to roll out a portal for customers and employees
  - Use SOA to define services to be offered by the portals
  - Make cloud-based third-party products and services available on the portals

- **Consolidated Customer Views**
  - Capture customer data using mobile channels
  - Deploy next-generation DBMS to store and manage unstructured data

- **New CRM Platform**
  - Explore hosting of CRM platform in the cloud
  - Integrate operational analytics with CRM modules to aid sales interaction
  - Provide full range of functionalities on mobile devices for field users

- **Analytics & Insights**
  - Use new analytic tools to process a high volume of data to deliver customer insights
  - Define context-aware insights to mobile channels

- **Enterprise Data Platform & Warehouse**
  - Use appliances like Teradata and Netezza to manage big data
  - Explore hosting of the data platform in the cloud

- **Third-Party Contract Management**
  - Refine third-party contracts for cloud-based infrastructure, platform, data, and applications

**Some Illustrative Scenarios**

- Explore mobile channels to roll out a portal for customers and employees
- Use SOA to define services to be offered by the portals
- Make cloud-based third-party products and services available on the portals
- Capture customer data using mobile channels
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- Explore hosting of CRM platform in the cloud
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Source: Booz & Company
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