

Appendix 2D

Technology in Commercial Banking

Technology is important because well-chosen technological investments have the potential to increase both the FI's net interest margin—or the difference between interest income and interest expense—and other net income. Therefore, technology can directly improve profitability. The following subsections focus on some specific technology-based products found in modern retail and wholesale banking (see also Chapter 17).

WHOLESALE BANKING SERVICES

Probably the most important area on which technology has impacted wholesale or corporate customer services is a bank's ability to provide cash management or working capital services. Cash management service needs have largely resulted from (1) corporate recognition that excess cash balances result in a significant opportunity cost due to lost or forgone interest and (2) corporate need-to-know cash or working capital positions on a real-time basis. More recently, FIs have used their own technological investments to help corporate customers improve the efficiency with which they incorporate technology into their business. Among the services that modern banks provide to improve the efficiency with which corporate clients manage their financial positions are these:

1. *Controlled disbursement accounts.* An account feature that allows almost all payments to be made in a given day to be known in the morning. The bank informs the corporate client of the total funds it needs to meet disbursements, and the client wire-transfers the amount needed. These checking accounts are debited early each day so that corporations can obtain an early insight into their net cash positions.
2. *Account reconciliation.* A checking feature that records which of the firm's checks have been paid by the bank.
3. *Lockbox and electronic services.* A centralized or online collection service for corporate payments to reduce the delay in check clearing, or the **float**. In a typical lockbox arrangement, a local bank sets up a lockbox at the post office for a corporate client located outside the area. Local customers mail payments to the lockbox rather than to the out-of-town corporate headquarters. The bank collects these checks several times per day and deposits them directly into the customer's account. Details of the transaction are wired to the corporate client. With electronic lockboxes, the FI receives online payments for public utilities and similar corporate clients.
4. *Funds concentration.* A service that redirects funds from accounts in a large number of different banks or branches to a few centralized accounts at one bank.
5. *Electronic funds transfer.* Includes overnight payments via CHIPS or Fedwire, automated payment of payrolls or dividends via automated clearinghouses (ACHs), and automated transmission of payment messages by SWIFT, an international electronic message service owned and operated by U.S. and European banks that instructs banks to make specific payments.

float

The interval between the deposit of a check and when funds become available for depositor use—that is, the time it takes a check to clear.

6. *Check deposit services.* Encoding, endorsing, microfilming, and handling customers' checks.
7. *Electronic initiation of letters of credit.* Allows customers in a network to access bank computers to initiate letters of credit.
8. *Treasury management software.* Allows efficient management of multiple currency and security portfolios for trading and investment purposes.
9. *Electronic data interchange.* A specialized application of electronic mail, allowing businesses to transfer and transact invoices, purchase orders, and shipping notices automatically, using banks as clearinghouses.
10. *Electronic billing.* Provides the presentment and collection services for companies that send out substantial volumes of recurring bills. FIs combine the e-mail capability of the Internet to send out bills with their ability to process payments electronically through the interbank payment networks.
11. *Verifying identities.* Using encryption technology a bank certifies the identities of its own account holders and serves as the intermediary through which its business customers can verify the identities of account holders at other FIs.
12. *Assisting small business entries in e-commerce.* Helps smaller firms in setting up the infrastructure—interactive website and payment capabilities—for engaging in e-commerce.
13. *Online customer-facing technologies.* Technologies that allow an FI's business clients to reach their customers more individually and efficiently across online channels, e.g., give business customers the technology to scan checks and deposit images online or the ability to provide online and mobile applications.
14. *Cloud computing.* Technologies that would allow business clients to log into an FI provided web-based service which hosts all software the business client needs, from e-mail to word processing to complex data analysis programs.¹
15. *Facilitating business-to-business e-commerce.* A few of the largest commercial FIs have begun to offer firms the technology for electronic business-to-business commerce. The banks are essentially automating the entire information flow associated with the procurement and distribution of goods and services among businesses.

RETAIL BANKING SERVICES

Retail customers have demanded efficiency and flexibility in their financial transactions. Using only checks or holding cash is often more expensive and time consuming than using retail-oriented electronic payment technology, and increasingly, the Internet. Some of the most important retail payment product innovations include the following:

1. *Automated teller machines (ATMs).* Allow customers 24-hour access to their checking accounts. They can pay bills as well as withdraw cash from these machines. In addition, if the bank's ATMs are part of a bank network (such as CIRRUS, PLUS, or HONOR), retail depositors can gain direct nationwide—and in many cases international—access to their deposit accounts by using the ATMs of other banks in the network to draw on their accounts.

¹ Cloud computing differs from traditional hosting in that it is sold on demand rather than prearranged; it is variable in that the business client uses as little or as much of a service as they need at any given time; and the service is fully managed by the FI, so the business client needs only computer and Internet access to access the cloud.

2. *Point-of-sale (POS) debit cards.* Allow customers who choose not to use cash, checks, or credit cards for purchases to buy merchandise using debit card/point-of-sale (POS) terminals. The merchant avoids the check float and any delay in payment associated with credit card receivables since the bank offering the debit card/POS service immediately and directly transfers funds from the customer's deposit account to the merchant's deposit account at the time of card use. Unlike check or credit card purchases, the use of a debit card results in an immediate transfer of funds from the customer's account to the merchant's account.² Moreover, the customer never runs up a debit to the card issuer as is common with a credit card.
3. *Preauthorized debits/credits.* Includes direct deposit of payroll checks into bank accounts and direct payments of mortgage and utility bills.
4. *Smart cards (stored-value cards).* Allow the customer to store and spend money for various transactions using a card that has a chip storage device, usually in the form of a strip. These have become increasingly popular at universities.
5. *Online banking.* Allows customers to conduct retail banking and investment services offered via the Internet. In some cases this involves building a new online Internet-only bank, such as Security First Network Bank of Atlanta.
6. *Mobile banking.* Allows customers to acquire banking apps through Apple and Android marketplaces and/or by scanning promotional QR codes. Services provided over mobile devices include remote deposit capture and digital wallets in which bank customers can pay for items using smartphone apps.
7. *Tablet banking.* Similar to mobile banking, but allows customers access to bank services through the tablet format.
8. *FI social media sites.* Allows customers to comment, see promotional advertisements, and request services through the FI's social media site, e.g., Facebook.
9. *Integration of online, offline, and mobile channels.* Allows a customer to start a loan application online and later finish the application at a branch without having to start the process over.
10. *Financial planning services.* Allow customers to manage their finances and monitor spending through online, mobile, and tablet services.
11. *Instant "micro mobile loans."* Allows customers to apply for, get approval on, and receive disbursement of a loan via a mobile or tablet device.
12. *Loyalty programs.* Allow customers to receive benefits from retail, entertainment, travel, and vacation services through mobile and tablet devices.

ADVANCED TECHNOLOGY REQUIREMENTS

The services mentioned previously require FIs to continuously update and integrate their technology infrastructure. Some of the specific technological advances FIs must deal with include the following:

1. *Integration of online, mobile, and tablet technologies.* As revenue generators, FIs are welcoming the mobile and tablet channels of attracting and serving customers, while at the same time continuing to support the older technology of

² In the case of bank-supplied credit cards, the merchant normally is compensated very quickly but not instantaneously (usually one or two days) by the credit card issuer. The bank then holds an account receivable against the card user. However, even a short delay can represent an opportunity cost for the merchant.

online banking. However, FIs have not fully integrated technologies used for the various e-banking methods. Advanced technology requires FIs to develop a single technology on which to run all of these e-banking channels. An interconnected set of technologies will make mobile and tablet applications and online development easier for banks to manage and will lower the cost of their operation for FIs.

2. *Provision of integrated, multichannel business information.* To increase efficiency, lower operating costs, and satisfy regulations, FIs need advanced technologies that allow for enhanced methods of gathering and reporting data. Most FIs operate using multiple back-office systems that are not integrated. In fact, customer data across FIs is often managed and serviced by multiple business units with the FI or even by outside data managers. Advanced technology requires the integration of multiple sales channels and customer services into a single business process that allows for the sharing and collaborating of information across all organizational units within the FI. Data integration helps FIs obtain a more accurate picture of their customers, allowing them to break through data “silos” to look at all data on its customers to get a more complete view of consumers’ habits. Advanced technology in banking also provides FI employees with organized and timely access to information they need to effectively and efficiently perform their jobs. While costly, this type of integrated and multi-channel data organization would increase revenues by targeting banking products and services to customers based on an analysis of their individual characteristics, needs, and activities. This process requires technology that provides data mining and analytical capabilities.
3. *Cloud computing.* Just as FIs provide cloud computing for their business customers, FIs use cloud computing to support their own business activities. Rather than run software applications on in-house computers with the staff to support them, they are run on a network of computers that constitute the cloud. Cloud computing systems allow for significant reductions in technology-related employee workloads and operating expenses; the FI needs only a computer that has interface software allowing access to the cloud, which can be as simple as a web browser.
4. *Increase reliance of message centers to replace email communication.* FIs have virtually abandoned e-mail for any customer communication containing sensitive or private information. Replacing e-mail is the message center. These message centers are dedicated web portals set up for secure communication between an FI and its customers. The increased incidence of e-mail phishing scams targeting FI customers made it difficult for FI customers to differentiate between a legitimate e-mail from their FI and a phishing e-mail. Similarly, FI employees became the target of advanced attackers using phishing scams to compromise the FI. To avoid this security issue, FIs employ message center technology to communicate with customers.
5. *Technology used for security issues.* The use of advanced technology brings with it increased potential for and more complex forms of fraud. Thus, FIs have an ever-greater need for technology-based risk management systems. Such technology helps increase the efficiency and effectiveness of security monitoring efforts, using computers, rather than time and labor-intensive manual processes, to detect theft, fraud, and other illegal activities. By electronically capturing and recording data across the FI, an automated technological approach

to security issues can alert an FI to threats more quickly. Such a system can also track a trail of flagged activity to simplify the investigation process and reduce losses. The use of technology to identify security issues can also enable an FI to assess risk more comprehensively, across the entire FI and in an integrated manner. Such a process promotes close operational synergy between the risk and finance functions of the FI.

A specific security issue arises as more FI customers conduct their banking on mobile and tablet devices. Mobile and tablet devices are more prone to security breaches since they are a relatively new technology. Further, mobile and tablet users do not always exercise the security precautions they would with their laptop computers. Thus, the increased use of these devices, particularly at wifi hotspots, has become the growing focus of hackers. FIs face an additional security threat as employees bring their own technology to work. FIs employees who use tablet computers or other mobile devices for work purposes expose the FI to security breaches when they do not use the proper security precautions with the devices.

6. *Data backup and disaster recovery.* The extensive use of advanced technology by FIs creates a need for data backup systems used to save copies of all important data at least daily. By backing up its data, an FI can recover data virtually completely and quickly in the event of a disaster, data deletion, corruption, or fraud. Data backup systems allow an FI to upload as least one copy of files and data to a remote server which is stored and accessed online and is safeguarded from anything that could compromise these files. The backed-up files are generally kept in a secret location far from the FI's branch or business locations. Thus, if a disaster happens in one part of the world, the FI has its data in a location that is unaffected. For large FIs, data backup storage requirements are substantial. Thus, organization of storage space and managing the backup process is a complicated activity.