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Chang-tseh Hsieh  
*University of Southern Mississippi*

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## **Check 21: The New Technological Drive Towards Paperless Banking**

**Chang-tsch Hsieh**

University of Southern Mississippi

118 College Drive, #5178

Hattiesburg, MS 39406

### **ABSTRACT**

*Over the last decade, banks have spent a great deal of resources on technology improvements. With decreasing interest rate spreads, banks are being forced to look for new ways to increase profits. Recently, new legislation was passed that will allow banks to become more efficient in check truncation through technology. The new legislation is commonly referred to as Check 21. If used properly, Check 21 will increase employee efficiency and reduce other operational costs such as courier services. This paper examines the short history of Check 21 and discusses how technology affects banks profitability. Key areas where banks can become more efficient with the help of the new technology will also be determined. The paper will give ROI, NPV, and IRR estimates for what the new technology investments will provide. There is also a checklist for managers that will help determine the best technology for their banks.*

### **INTRODUCTION**

Check 21 is a new law recently passed by the United States Congress (House of Representatives, 2003). This law gives a printed check image the same legal standing as an original paper check. This will allow banks to simply swap images of checks electronically. The law was passed due to the effect September 11, 2001 had on the banking industry. In the aftermath of 9/11, planes were grounded all over the nation; therefore, checks could not be sent to their bank of origin. This effectively cost many individuals and businesses millions of dollars. Holds were put on deposits made because the funds were uncollectible for an extra two to three days (Anderson, 2004; Kelly, 2004; Kendler, 2004; Thomas, 2004).

For years prior to passing Check 21 law, the U.S. Congress had been researching possible ways for banks to swap checks electronically. Check 21 has the potential to save banks millions of dollars per year by doing away with sorting and transportation costs, as well as reducing the risks associated with returned checks. The consensus in the banking industry is that most, if not all, U.S. banks will have to acquire the technology to exchange images in the near future. The costs associated with this new technology will definitely be a barrier for many of the smaller banks and may open the door for many new mergers to take place in the banking industry. Articles have suggested that the DTA (Distributed Traffic Agent) developed by VECTORsgi may be the best technology solution for many banks (Anderson, 2004; Bielski, 2005; Hollingsworth, 2004, Kendler, 2004).

This new law took effect in October of 2004. However, after one and half-year, there is still much to learn about the technology options available. Furthermore, there will definitely be security issues that must be resolved before the image transferring begins.

Due to the changing times in the banking industry, this topic warrants immediate investigation. Not long ago, "image processing" to many banks simply referred to check safe keeping, microfilm replacement, or one or more point solutions delivering incremental benefit to a portion of the overall process. Increasingly, financial institutions are embracing benefits of re-engineering their check operations in response to the radically changing payments landscape. At the present, there appears to be diverse response to the current challenge.

All financial institutions acknowledge the need to address the impact of Check 21 on their current operating models and the impact shrinking margins are having on their core services (Boardman, 2006; Pezdirtz, 2003). The majority of banks recognize the benefit of identifying and deploying end-to-end image solutions and capturing the full savings potential of image exchange (Bielski, 2005; Bills, 2004; Denver, 2006; LaRue, 2003). Many banks are beginning to create detailed business cases and ROI estimates to support these initiatives. A growing number are

preparing to deploy image-based re-engineering of their current operating models and are beginning to pilot various image exchange solutions (Bearingpoint.com, 2004).

The rest of the paper is organized as follows. Although, most studies regarding Check 21 were done by the practitioners, a rather thorough review of the related articles will be presented first. A simple return on investment (ROI) model is then used to illustrate how the technologies induced by Check 21 might help banking industry. Some management implications will then be presented. A short summary of major findings and a brief of directions for future studies then conclude this report.

### **Literature Review**

The key component of the Check 21 law is the real-time check clearing requirement, which states that a document re-created from an image of an original check is legally exchangeable as a draft as long as the re-created document contains all front and back side information of the original check. This change allows banks to exchange transaction information without the use of paper checks (Pasquerrell, 2006).

The new technology required to meet Check 21 requirements will most definitely be a barrier for smaller banks. According to much of the literature, the financial services industry is already the nation's largest consumer of Information Technology, exceeding even the government (Expert Choice, Inc. 1996). Banks spend nearly 20% of their non-interest expense on Information Technology. IT spending is second only to labor costs, proving banking is a very IT intensive industry (Caplow, 2001; Denver, 2006; Kendler, 2004; Thomas, 2004; Voelker, 2003).

Since the law was put into implementation, a large number of articles have been published to address issues ranging from the pros and cons of these new requirements to more strategic-oriented studies of the potential impacts of new laws on bank operations. Almost all of these studies were done by practitioners for practitioners. And because of the practitioners-orientation, most of the studies researched did not mention the role investment in IT systems has on the banks' profitability. However, IT investment has been shown to have an important role in lowering the total costs of a firm and differentiating its products. This competitive advantage should lead to increased net profit (Gupta, 1998; Kessner, 1989; LaRue, 2003; Santomero, 2004; Wade, 2003).

A number of articles gave contrasting views as to where the greatest cost benefit will be seen with Check 21. Several believe that the benefit will be in reduced transportation costs. The majority argue that the benefit will be in reduced back room staffing. *Bearingpoint.com's* "White Paper on Enhancing your Check 21 Business Case" empirically proves that the reduced back room staffing will account for nearly 65% of the total savings in the first year (Bearingpoint.com, 2004).

The major concern about the future of Check 21 is security. Numerous reports have indicated that new check clearance system could open a wide door for fraud (Blakeley, 2005; Blodgett, 2004; Carey, 2004; Rice, 2005; Wade, 2004). But, for most banks, with the help of the state-of-the-art fraud control technologies, the benefits will still outweigh the risks associated with this new system. This is the focus of this study and needs to be carefully elaborated.

### **RESEARCH METHODOLOGY**

To illustrate how a typical bank could gain from Check 21 initiative, a hypothetical model, and used to conduct a simple empirical testing as explained below.

#### *Software*

Excel spreadsheet software was used to perform all empirical calculations. This software was chosen because of its user friendliness and ease of transferring charts and graphs to Microsoft Word.

#### *Empirical Models*

Due to the limited empirical data available we used the ROI model found in *Bearingpoint.com's* "White Paper" to determine the Return on this technological investment (Bearingpoint.com, 2004). The ROI is based on a pre-Check 21-operating model leveraging our exhaustive validation of all Check 21 costs and benefits. Project capital outlays

are weighed against annual benefits to arrive at a payback period and internal rate of return (IRR). The NPV is calculated using an 8% discount rate. The ROI is calculated with costs and savings happening simultaneously on January 1, 2004. However, in a real world situation, the costs may occur in a short period of time, but the benefits would occur gradually over the entire year.

### Decision Models

With limited research existing regarding our topic, Heuristics was used to determine the strategies for banks to choose. Although this is settling for a solution that is “something less than the best,” for this case it is the best. The ROI model described above is a kind of simulation. We are making general estimates on all of the data going into the model. Therefore, the numbers generated are far from exact. The purpose of the model is not to show exact numbers, but to give a generalized idea of the cost benefits to be expected. Individual banks should use our ROI model along with internal numbers to determine how the changes will economically effect their organization.

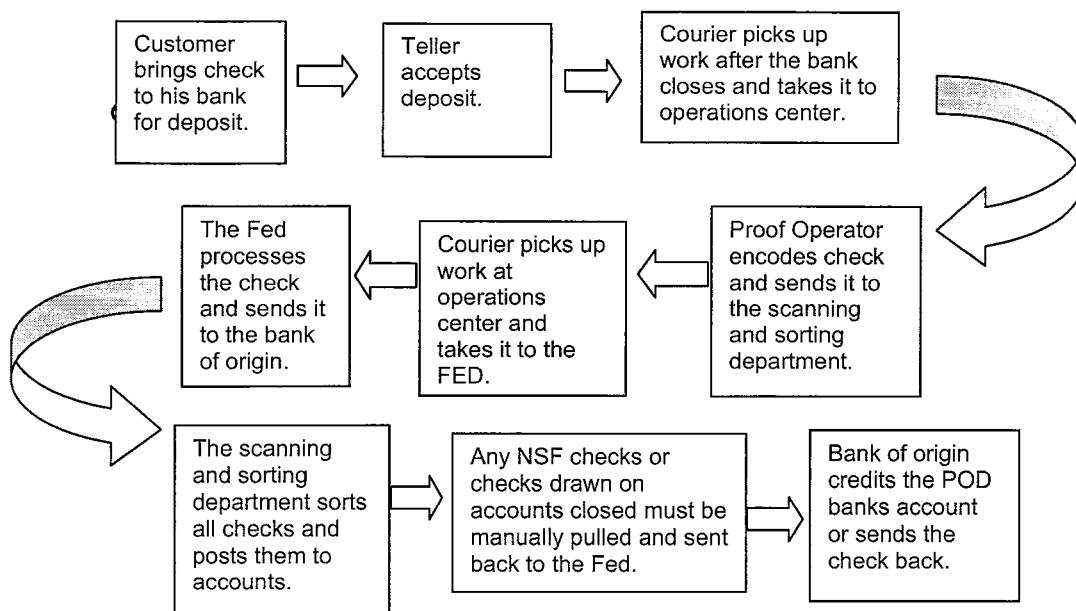
## RESULTS & SUMMARY

Table 1 below shows the results of how the new technology could affect a U.S. Tier 1 Bank (a bank with \$50 Billion or more in assets) over a 5-year period. The figures in this table were taken directly from *bearingpoint.com*'s “White Paper” because of limited empirical research on this topic. *Appendix 1* gives a description of how all of the figures were derived and discusses all of the assumptions the researchers considered.

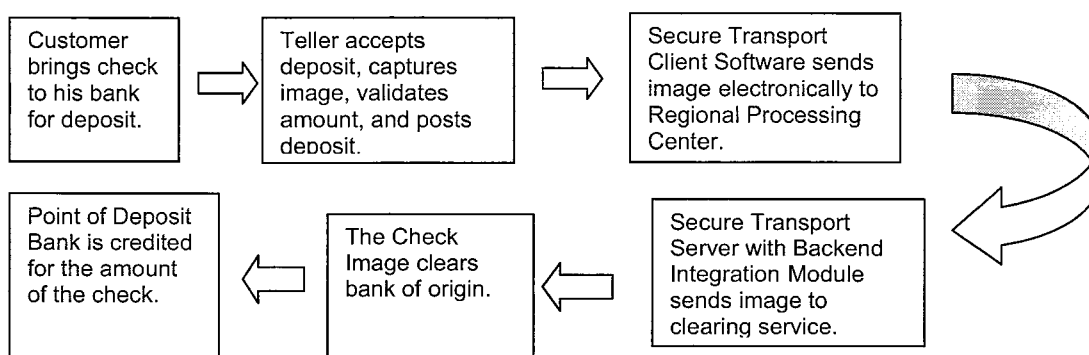
<b>ROI</b>	
Discount Rate	8%
<b>Project Capital Outlays</b>	
Software, Implementation, & Other Bank Costs	\$36,000,000
Hardware Requirements	\$28,201,000
Tax Loss on Undepreciated Capital	\$0
Less Savings Value on Redundant Equipment	\$0
Initial Investment	\$64,201,000
<b>Return on Investment</b>	
Initial Investment	\$64,201,000
Year 1	\$45,609,515
Year 2	\$49,243,024
Year 3	\$49,933,932
Year 4	\$51,365,423
Year 5	\$53,372,270
Payback Period (Months)	17
NPV of Project Investment	\$133,966,544
Project IRR (After 5 Years)	70%

**Table 1: Potential impact of new technology on a US Tier 1 Bank**

As shown in *Table 1*, the new Check 21 software could have as much as a 70% IRR after 5 years, with a Payback Period of only 17 months. For these numbers to hold true, the banks should make certain not to overspend in areas, such as server upgrades, or under spend in areas, such as teller scanner upgrades. To better understand how these upgrades will increase efficiency and therefore increase profitability, please note *Chart A*, which represents the current path of a check, before Check 21.

**Chart A.**

A survey done by the American Bankers Association suggests that each deposit or cashing of a check costs the bank \$1.07. If estimates are correct, the average cost of cashing a check with Check 21 will be only slightly higher than that of an ATM transaction, which costs \$0.27. *Chart B* illustrates the new path of a check, after Check 21.

**Chart B.**

As shown in *Chart B*, the cycle of the check has become almost completely electronic. This will allow banks to eliminate tens to hundreds of employees from back offices, depending on the size of the bank. A bank may have to

add additional tellers to compensate for the extra time it may take to scan the check. However, Check 21 will allow the tellers' work to be checked immediately while the customer is still present.

## MANAGEMENT IMPLICATIONS

### *Manage Risk*

Risks associated with Check 21 will come from far and wide, from risk we already know about to those we have failed to anticipate. All banks must be aware of the new challenges Check 21 presents for detecting fraud (ABA teleconference). Without the actual checks, alterations may be difficult to detect. Furthermore, it will be possible for substitute checks to be fraudulently altered at any point in the check clearing process. Another concern for banks that allow customers to access images of checks online is that hackers may obtain check images and use them to create altered substitute checks (Bills, 2005a; Blakeley, 2005; Blodgett, 2004; Rice, 2005).

Managers should invest in products and services that are available to counteract possible threats including, automated signature verification, check stock verification, and positive pay solutions (ABA teleconference). Bisys Document Solutions offers *ISVerify™*, which is an advanced automatic signature and check stock verification application offering results comparable to those of the most highly trained and accurate human signature verifier. Rejected signatures are forwarded for visual verification with attached analytical information, including the reason for rejection and signature samples. This automation enables financial institutions to increase the number of checks reviewed for potential signature fraud.

Positive Pay is a powerful preventative tool. It intended for use by commercial customers to prepare and transmit to the financial institution a file listing of all checks written or issued each day. Included are the account number(s) the checks are drawn on, the serial numbers of all individual checks and their corresponding amounts, and the issue date. The financial institution then stores this information and conducts a daily match of all data it has received compared to the items presented for payment against the customer's account(s). Checks that do not match the stored information are returned to the customer for a pay/no pay decision.

Reverse Positive Pay is a similar capability that can be offered, and calls for the financial institution to issue information to the customer about checks that have been presented for payment. The customer then compares the bank's list with its own accounting records, again making pay/no pay decisions as appropriate within a pre-specified time frame. Account Reconciliation Processing (ARP) services provide the commercial customer an automated, simple means of balancing and accounting for the activity of deposits, paid checks, outstanding checks, etc. Using ARP, the customer can also receive information on items that are presented for payment but not within a range specified in advance. ARP information may be provided via paper, electronic transmission, or disk.

### *Decision Making*

In the banking industry since the early 1970's, technology introductions have made a huge impact on profits. Studies on the effects of ATMs on profitability provide evidence of cost savings and better services for customers. It has been shown that investing in ATMs increases the value of deposit accounts (Shawkey, 1995), and so could be the investment in Check 21 technologies (Caplow, 2003; Hicks, 2004; Pribus, 2003; Williams, 2004). Deposit accounts are cheaper in terms of cost of funds than other sources, hence reducing overall cost of funds. Throughout the history of banking, anytime new technology has been able to replace employees, the banks have seen a direct impact on profitability. Therefore, investment in Information Technology should be considered a means of increasing bank profitability. Other factors believed to affect bank profitability include, but not limit to, the follows (Gupta, 1998; Kendler, 2004; Pribus, 2003):

Market Size  
Growth in Market Size  
Cost of Funds  
Loan Risk  
Capital Risk  
Productivity  
Capitalization  
Portfolio Composition

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As managers begin planning for life after the implementation of Check 21, they should adopt an overall image strategy with appropriate tactical solutions. The banks need to fully realize all the efficiencies and cost savings inherent in check truncation. Managers will be able to streamline bank processes from the back office to points of customer contact. They must also choose carefully when it comes to their image exchange solutions.

For managers, the decision is to choose the type of software that is right for their organization, not whether or not to upgrade for electronic image transferring. Although there is not a clear-cut formula for success, the following checklist outlines the functions of image exchange software:

- Create and send image exchange files to another bank or an image exchange network.
- Receive image files from another bank, or retrieve them from an image exchange network.
- Perform image validation and quality assurance.
- Process returned items.
- Verify images maintained at a third party archive.
- Maintain an environment secure enough to protect the confidential nature of the file data being transferred.
- Use recoverability tools to handle contingency scenarios.

The cost of the new software may become a barrier for the small town banks to compete with the larger multi-state banks. Mergers and takeovers are likely to take place. Some analysts argue that although the merger and acquisition strategy may be prevalent at first, it is only a short-term solution.

Banking is essential to a modern economy. Banks are not. If some other entity performs the functions of banking faster, smarter, or cheaper, it will replace banks.” This statement brings a lot of truth. The new act will allow banks to operate more efficiently and open the door for big banks to get bigger. However, with the deregulation that has occurred in that past decade, banks are no longer just competing against other banks. In today’s marketplace, banks are competing against Credit Unions, Insurance Companies, and many other institutions for both deposits and loans. This requires banks to operate at the most efficient level possible to remain competitive. If the managers take full advantage of Check 21 and the new software available, banks will have a competitive advantage over the other industries.

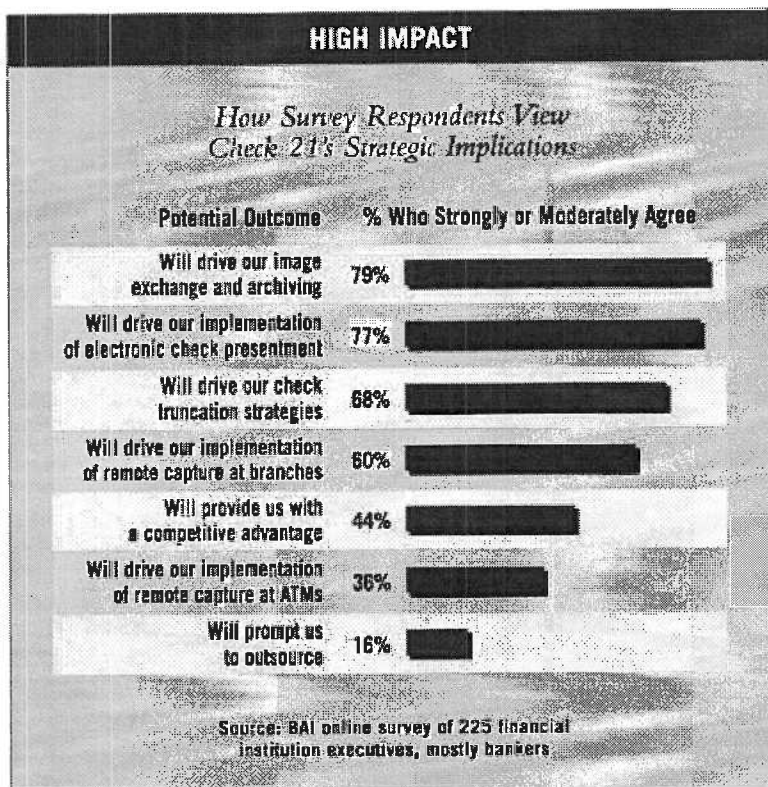
Managers should also consider the spin-off technological advances that will occur due to Check 21. *Bank One* is already experimenting with ATMs that accept checks that are not in envelopes for deposit. The ATM will display an image of the check on the screen and the customer will be able to see the check being credited to their account. After the transaction is complete, the customer will get a digital image of the check along with a receipt. *Bank One* is hoping that the ATM one-day check truncating will become the new wave (LaRue, 2003; Shawkey, 1995).

Although seldom discussed, there is the possibility of large retail stores joining in on check truncation. Some technology producers are designing imaging software that would allow retailers such as Wal-Mart and Target to accept a check for payment, image it, and post the debit to the customers account from the check out register.

### *Technology*

The Distributed Traffic Agent (DTA), developed by VECTORsgi, is the most promising technology in the market at this time. With DTA, image files are exchanged by banks directly, while summary information moves through Small Value Payments Co, a third party clearinghouse, allowing for settlement or settlement reporting (Pezdirtz, 2003). The DTA developed by VECTORsgi does more than just send and receive files through the image exchange network. While automating all aspects of image exchange, it also functions as a network for communications, authentication, file tracking and audit control for participating banks. The greatest benefit of this program is the relatively small capital investment it takes. “The consensus in the banking industry is that most, if not all U.S. banks

will have to acquire the ability to exchange images in the near future, if they wish to remain competitive" (Pezdirtz, 2003).



### MANAGEMENT INTERPRETATIONS

Smaller asset-sized institutions will be more affected by Check 21 than most large institutions due to existing technology and customer base. Most large institutions have been integrating new banking technology for the last decade. These banks were already imaging statements and checks and storing the data. Most large banks have debit cards, originate and receive ACH transactions, as well as, host transactional internet banking sites. Thus, check 21 does not require a significant amount of change regarding operations, equipment, or storage capacity. Most changes for these institutions will be policy formation for recredit procedures and procedures for properly coding return checks. Customers of these banks will most likely not see any change. At most, they may eventually see their checks clear faster and they will receive substitute checks as returned checks. Large banks stand to benefit greatly from the cost reduction that Check 21 will enable (Bachelder, 2004; Caplow, 2003; Denver, 2006).

On the other hand, those who will see and feel the change are small institutions and their customers. There are actually banks that still do not have debit cards, do not originate ACH transactions, and who return original checks with statements. Check 21 represents a need for a large investment in technology and equipment in return for cost reduction. Even if banks do not create substitute checks they must receive substitute checks and print or cause to be printed at customer request and for customer statements. The printed images should be legible and high quality clear images. Secondly, customers of small banks are typically not accustomed to technology or change. These customers typically do not own a computer, fear imaged statements, and have an acute need to see and touch their own cancelled checks. These customers are, as expected, rebuking the substitute check movement with great force. Therefore, a large effort must be put into place by management to educate customers about Check 21 and the legality of substitute checks. In addition, it will be imperative for small banks to create high quality, legible substitute checks to foster customer confidence in them (Bielski, 2005; Bills, 2005b).



However difficult or costly bank management simply must embrace the technology requirements that Check 21 has bestowed upon the industry. Even for those institutions lagging behind and have continued to live in the 1980s era of transaction processing, now is the time. Time and time again, different banks have implemented imaged statements, customers have demanded original checks, and eventually those customers grew to love the easy to store, less bulky, imaged statements. Who knows what will happen when customers get back a mix of original checks and substitute check in their statements.

An investment of \$100,000 in processing equipment could feasible pay for itself over a three-year period through cost reduction. In addition, image capture capability gives the institution added value beyond Check 21 compliance. Research time is reduced when image-enabled products are used to view captured images via internet-based applications. Multiple users can access the same information without handling the item, which reduces the risk that items are lost or damaged.

Insider fraud risk is reduced due to the powerful item query capability associated with imaged documents. For example, a query can be built to search for a certain dollar amount. The output yields all transactions for that dollar amount. Then, the user can select a particular date to review or review all the transactions in the query. The transaction screen links to images of the debit and credit tickets that make up the particular transaction. Immediately, the user can determine exactly which accounts were affected by the transaction and which employee initialed the transaction request. Customer service is enhanced through image technology by providing users with faster access to information relating to complicated account research requests.

## CONCLUSIONS

The major findings of this study indicate that the potential for creating a more efficient banking system in the United States by implementing Straight-Through Check Processing with Check 21 is inevitable. Banks must analyze their current operations regarding check truncation to determine the amount of money they can save by implementing the STCP programs. Because there is a lack of relevant information currently available, new research needs to be done on the potential ROI and IRR of investment in this new technology (Bills, 2004; Hollingsworth, 2004; Kelly, 2004; Voelker, 2003).

Check 21 has the potential to completely revolutionize check truncation. The small town banks that do not have the financial capability to purchase the new software and hardware will no longer be able to compete in the banking industry. These smaller banks may find themselves being actively pursued by the larger banks. There is room for a great deal of research regarding the number of banks that merge or are bought out as a result of big technological changes in the banking industry. The information could prove useful to the banks that are not considering upgrading their systems for Check 21. This knowledge would also be useful for when the next big technological change comes along affects their industry (Boardman, 2006; Voelker, 2003; Wade, 2003).

It will also be important to track the change in the number of overdrafts after Check 21, when there is no longer float to help "cover" checks until customer's funds are available. If Check 21 reduces the number of overdrafts, this will affect a banks income negatively, because a great deal of non-interest income is derived from overdraft fees.

Technology can truly affect profitability in this new millennium. Whether banks are prepared or not, Check 21 will be an integral part of the future of all banks. Check 21 was an inadvertent technology requirement for banks and other financial institutions. There is no doubt that the financial industry will bear the cost burden for the government's action in strengthening the reliability of the payment system. However, now is not a time for prudent managers to lag behind in image capture technology. The technology offers benefits to the institution far beyond Check 21. In addition, most industry experts believe that more requirements will follow regarding image transfer quality. Check 21 in 2004 is only the beginning of banking technology changes.

Further research is needed in fraud prevention. It is imperative for the industry to stay abreast of and eliminate criminal activity regarding image transfer and substitute checks in order to maintain customer confidence in the process.

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APPENDIX:  
IMAGEBANK SCENARIO ASSUMPTIONS SUMMARY

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**INSTITUTION & FINANCIAL**

The size of the financial institution modeled is as follows:

- \$160 billion in assets.
- 2,000 branches.
- 10,000 teller stations (five stations per branch).
- 12 capture sites.
- 3.9 billion prime pass annual volume consisting of daily volumes of 5.9 million POD, 5.9 million pre-encoded and 3.7 million in-clearing work.
- 3 percent of total POD volume received through ATMs (assumes 8 percent discount rate, 30 percent corporate tax rate and 5 percent variable growth rate).

Initial bank investment costs include:

- Consulting costs for systems integration and/or consulting firm.
- Hardware and software acquisition.
- Business process rework in both branches and centers.
- Effort for internal hardware project implementation (acquisition, implementation management, testing, system software installations).
- Effort for internal software project implementation (acquisition, implementation management, testing, systems integration development, configuration, support training).

- Overall change program management.
- Sales tax and shipping charges estimated at 10 percent of total hardware and software costs.

Annual depreciation benefits assumed using an accelerated depreciation (MACRS) schedule of five years on asset purchases (hardware and software).

**PROCESSING**

Tellers currently balance transactions with five or less items at the branch. Future-state tellers will image and balance transactions with 10 or less items. All remaining transactions will be imaged at the back counter. Central clearing will enter any missing data and balance the transactions using the captured images. Back-counter work is processed only in half of the branches.

Cash tickets, general ledger (GL) entries and other internal ticket items are processed as electronic entries in the future state. Deposit tickets are not truncated at branches but are still sent to central clearing.

Future-state ATM deposits will also be imaged at the back counter and sent to central clearing.

Current-state central processing employs the use of a CPCS check processing system and a two-pass system for reject repair. Where available, standard processing rates used in the model were provided by financial industry data experts (Global Concepts, BAI Check Benchmarking Study).

**Source: (Bearingpoint.com, 2003)**

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