Deal or No Deal?
Vendor Issues in Two Multi-Organization Pilot Test Projects

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Abstract

This paper compares issues in managing technology vendor relationships in two pilot tests of the FSTC eCheck and a pilot test of the US Treasury's Internet Payment Platform (IPP). We discuss issues related to participation of technology vendors in these projects, and conclude with suggestions for further research on planning and managing emerging technology pilot test projects.

1. Introduction

This paper contributes to the literature of emerging IT assessment projects by examining vendor issues in inter-organizational IT pilot tests. Companies face an ongoing challenge of evaluating and implementing new IT tools and applications (Benamati and Lederer, 2001). While some firms harness the power of emerging technologies, others fail to achieve strategic benefits. Some firms choose to team up to conduct inter-organizational pilot tests of new tools, applications, techniques, or processes. Such projects often include the participation of hardware or software vendors, who want to participate since new technologies have significant ramifications for the products and services they sell, and for the development of de facto or de jure interoperability standards. To date inter-organizational pilot tests of emerging information technologies have been under-studied, and little is known about the motives and tactics of different sized technology vendors in such projects.

From the trade press we do know that very large technology vendors like Microsoft (with 2006 revenues of $44 billion) and IBM (with 2006 revenues of $91.5 billion) have made big investments in R&D, and each company participates in a wide variety of collaborative initiatives aimed at identifying, assessing and exploiting new software and hardware technologies. Companies in the next tier, like Sun Microsystems (2006 revenues of $13 billion) also conduct R&D, but because of resource constraints their efforts must be more focused. Small companies, especially start-ups with very limited capital resources, must choose both technologies and technology evaluation projects with great care. We propose that when technology vendors participate in inter-organizational pilot tests of new information technologies, their motives and tactics vary, depending on whether they are large market leaders, mid-sized companies or small start-ups.

This paper examines vendor issues in two emerging IT assessment initiatives that pilot-tested Internet-based payment technologies: the Financial Services Technology Consortium's eCheck project and the United States Treasury's Internet Payment Platform (IPP) pilot project. Our paper draws on data and opinions gathered in field and telephone interviews with 36 informants, spanning eight years (1996 – 2004). The paper is organized as follows. We review pilot testing strategies revealed in a review of practitioner and academic papers. We next provide overviews of the two pilot tests, in terms of participants, strategic goals, and project management issues. We then focus on the participating technology vendors. We offer our observations of pilot testing issues related to technology vendors, and conclude with suggestions for further research on planning and managing emerging technology pilot test projects.

2. Pilot Testing Approaches

We define an information technology pilot test as a time-bound limited-scope and limited-participation project to examine characteristics of a new technology, application, or IT-intensive process in a particular context. In comparison, a *proof-of-concept* demonstration, which may be conducted before a pilot test, is a simulation of the planned system. A software *beta test* differs from a pilot test in its aim, which is primarily to identify as many software bugs as possible before general release. A software pilot test is a disciplined test of the use of particular software in a particular context. *Feasibility studies, demonstration projects* and *field tests* have much in common with pilot tests.

One or several pilot tests may be conducted to examine technical, operational or economic aspects of an IT application or process. For example, a company may

pilot-test use of RFID tags for tracking inventory in the warehouse or on the manufacturing line. Once *technical* aspects (such as distances and environmental conditions under which tags can be read, comparison of tags or tag readers, or challenges of integrating the RFID data with enterprise systems) are assessed, some companies use pilot tests to look more closely at *operational* issues (such as the impact on processes and employees) or *economic* feasibility (cost/benefit analysis). For example, the Chicago Transit Authority conducted a ten-day pilot test of a Convention Pass fare card in 2006 to learn whether it would pay off.

A pilot test may be short or long in duration. The US Department of Homeland Security conducted a 3-month pilot test of a Customs application, while the US Department of Health and Human Services announced plans for a 12-month pilot test of electronic prescribing standards for Medicare and Medicaid transactions. A pilot test of biometric passports was scheduled to last five years (http://ec.europa.eu.idabc/eu/document/3297/347).

From the literature of innovation management we find a consensus that it is difficult for organizations to "go it alone" when it comes to technological innovation, because of the rapid pace of change, need for investments in complementary processes and technologies, and need for multiple specialized resources which may be globally dispersed (Murtha et al., 2001; Powell, 1998; Van de Ven, 2005). Many inter-organizational alliances have formed to pilot-test new technologies. Some tests are tightly focused and involve just a few partners. For example, in 2006 Google teamed with the US National Archives on a pilot test of a process for digitizing historic films (see www.google.com), and Dallas County partnered with Telecharge, Inc. to pilot test citizens' use of Internet kiosks to pay property taxes, parking tickets and the like. Other pilot tests involve many participants. For example, in 2007 the Chicago Board of Exchange tested a program to convert to penny increments in trading options (see www.cboe.com/penny) and the United States Securities and Exchange Commission sponsored a nine-company pilot test in 2005 and a 17-company pilot test in 2006 to explore the use of XBRL (eXtensible Business Reporting Language; see www.sec.gov/news/press/2006-43.htm).

A pilot test may examine a single technology or application, or compare multiple technologies. For example an American and a Canadian trucking company collaborated to test four "fatigue management" systems for drivers (www.fmcsa.dot.gov).

The systems development and software testing literatures offer surprisingly little guidance on when to use pilot tests to assess emerging technologies and how to manage them. MIS textbooks (such as Martin, et al., 2005) advocate pilot testing a fully debugged operational system in a single location before rolling it out to the rest of a large organization. This is a narrower view of why pilot tests are used than we observed in our practitioner literature review; many pilots examine new technologies early in the life-cycle. Indeed, the two cases presented herein involved pilot-testing early in the life-cycle.

The software testing literature usually mentions pilot tests as a means of conducting end-to-end usability testing after unit and integration testing have been completed (e.g., Craig, et al., 2002; Whitaker, 2006). A perusal of Microsoft's Tech Net resource reveals that within this narrower domain, the rationale for pilot testing is as follows: "you can conduct a pilot test to try out a design with a controlled number of users. This enables you to capture refinements that have not been identified during the design phase, and to highlight any issues that have not previously been seen during the proof of concept phase. In some circumstances, you can use pilot testing to check system performance and resilience under real-user conditions." (Microsoft, 2003; see also Fox, 2006).

Regardless of the specific objectives, a pilot test is a project which can be managed using techniques similar to those employed in other software projects. Microsoft identifies four key steps: 1) select the appropriate users, 2) provide pre-pilot training, 3) deploy the pilot, and 4) review and refine "to ascertain whether the systems met the design requirements. This helps you identify any improvements you need to consider for inclusion in the final design." We would add that all pilot tests benefit from clearly defined goals, participant roles, and milestones. Metrics help gauge the extent to which goals and milestones are achieved. However, when compared with the mature-technology activities under a CIO's direction, emerging technology assessments demand fewer controls, in order to encourage experimentation that can reveal unanticipated opportunities and challenges (Gogan and Rao, 2004). It follows that in an inter-organizational pilot test of very new technologies, each participating organization (as well as the governing body of the collaboration overall) should employ somewhat looser controls than would be used on fully operational, mature systems.

We next provide an overview of the two cases.

3. eCheck and IPP Cases

3.1 Context

Many in the U.S. banking industry – including commercial banks, government entities such as the United States Treasury and the Federal Reserve Banks – see the Internet as having brought both attractive new opportunities and serious threats. A few years after the World Wide Web "opened for business" *The Wall Street Journal* (Tracey, 1998) observed: "With more financial services in the future based on the Internet and all-electronic payment systems, the way will be opening for new competition against the banks …" Since then, some institutions found opportunities to transform processes, structures and brick-and-mortar settings by offering internet payment services or using new technologies to consolidate redundant operations and drive down costs. Some expressed concern that the Internet is a disruptive technology which will hurt those organizations that fail to adjust. Others fear that control over financial transactions and confidential information will fall into the hands of terrorists or organized crime.

Two efforts to assess opportunities and risks of internet technologies, involving the United States Treasury's Financial Management Service, the Federal Reserve, technology vendors and other private-sector participants, are described here: eCheck (two pilot tests) and the Internet Payment Platform (one pilot test). In all three pilot tests, the participating technology vendors expected that their participation would help them either defend or capture a market position. Figure 1 provides an overview of the two initiatives.

Figure 1
Profiles: eCheck and IPP Pilot Tests

	eCheck, 1994-2001	*IPP, 2002-2004*
Strategic Goals	Initial aim: defend against bank and non-bank competitors. Subsequent aim for some: commercialize eCheck technology.	Support President's Management Agenda, reduce costs/ delays in purchasing, move toward fully electronic payments.
Technical Goals	Test digitally signed documents using FSML and PKI, achieve consensus on industry standards.	Learn if a commercial system can support gov't purchasing processes, integrate with legacy systems.
Governance Structure	Consortium of 65 banks, vendors, gov't agencies. Pilot team of 12 organizations (US Treasury, Boston Fed, 2 commercial banks, IBM, Sun, 4 other technology vendors).	Initiated and managed by US Treasury FMS; technical oversight by Boston Federal Reserve and Xign, Inc. 2 vendor participants: Xign and Biometric Associates

We describe the earlier eCheck initiative (two pilot tests) next.

3.2 eCheck Project Overview

eCheck was the first initiative sponsored by the Financial Services Technology Consortium (see www.fstc.org). Formed in 1993, its 65 members at the time of our study included financial institutions, technology firms, and government agencies. Following several years' design and development work (by a team including representatives from 27 companies) and a fall 1995 Proof-of-Concept demonstration, in Fall 1996 the steering committee considered ten proposals for a pilot test of the eCheck system (Gelinas and Gogan, 1997; see Figure 2 below).

Figure 2
Ten eCheck Pilot Proposals Considered in Fall 1996

Business to Business	Computer manufacturer accounts payable Library payments for periodical subscriptions Transactions among doctors, suppliers, insurers Payroll processing service
Business to Consumer	Independent brokerage payments Virtual shopping mall
Non-commercial	US agency payments to suppliers (SELECTED) US federal government inter-agency payments Large company employee travel reimbursement Responsibility accounting system

After much deliberation regarding the benefits and risks of pilot-testing the new payment technology in various contexts, the steering committee chose a project with a relatively narrow scope: a division of the U.S. Department of Defense would use eCheck to make payments to some suppliers. This pilot test was announced in fall 1997 and the first eCheck payment of the test took place in summer 1998. This first pilot test project involved 12 FSTC members, each of whom contributed $500,000 or more to the effort: two commercial banks, the Federal Reserve Banks of Boston and Richmond, US Treasury FMS, US Department of Defense Finance and Accounting Service, and several vendors: IBM, Sun Microsystems, BBN (later, GTE Internetworking), RDM Corporation, IntraNet, and Information Resources Engineering (IRE).

Although planners hoped to recruit up to 50 Defense Department suppliers, just two agreed to participate in this pilot test, which officially ended in March 2000 following the exit from the pilot of Sun Microsystems and the two commercial banks. The eCheck system

architecture was then modified so that payments could be cleared without commercial banks. A second pilot test was designed under this new system architecture, and this test ran until July 2001, when a server failed and it was learned that funding was not available for its replacement (Gogan, Gelinas and Rao, 2004).

A full account of stakeholder perspectives and key turning points in the eCheck initiative from 1994 through 2001, including the two pilot tests, is provided in Gogan, Gelinas, and Rao (2007). Consistent with a theory proposed by Das and Teng (2000), which posits that in strategic alliances competing tensions must be kept in balance, the above-noted study observed tension in three predicted aspects: cooperation versus competition, short-term versus long-term orientation, and flexibility versus rigidity. Like Das and Teng, Gogan et al. found that when tensions were not in balance, the eCheck project experienced instability (as evidenced by, for example, member defections). However, tensions in the eCheck project played out differently than predicted by Das and Teng during the planning, structuring, and operational stages.

We summarize the key findings in the longitudinal eCheck Project study:

1. The project was motivated by banks' broad defensive goal: to defend against possible competitive threats by non-bank entities which were beginning to offer new Internet-based payment mechanisms.

2. Membership in the initiative was broadly representative of financial institutions and technology vendors, with 27 organizations (out of 65 FSTC member organizations) involved with the eCheck system design, and 12 members actively participating in the Phase I pilot test.

3. Among the 12-member Phase I team, tension was evident in issues related to intellectual property, governance, system architecture, recruitment of supplier participants, and timing (including how quickly to proceed and when to end the pilot tests). External events, including competing payment initiatives, Year 2000 software projects, and mergers also put pressure on participants in the first pilot test and led some to pull out while others opted to continue with the second pilot test.

4. An overriding concern that created tension in the two pilot tests was a difference of opinion as to whether the tests should merely explore two technical architectures for payment (among many possibilities which bankers wanted to understand) or to take the first steps toward full-scale commercialization. While some bankers and other participants (especially IBM, the market leader for banking systems) saw the pilot tests as a means to be better prepared against competitors should they become potent, other participants (such as Sun Microsystems, which sought to capture banking business) saw eCheck as a viable commercial opportunity which they were eager to exploit. In 2000 two start-up companies were formed by some eCheck project participants: Clareon (which was spun off from BankBoston, struggled to find its niche, and was re-acquired by BankBoston after declaring bankruptcy) and Xign (which did identify a profitable business-to-business accounts niche and ran independently until their spring 2007 acquisition by JP Morgan Chase).

3.3 Vendor Challenges in the two eCheck Pilots

Six of the twelve participating organizations on the first eCheck pilot-test team were vendors. IBM (with nearly 270,000 employees and $78.5 billion in revenue in 1997, when they played an important role in the eCheck design and implementation work), was definitely the elephant in the room. IBM's role on the project was to develop the server software and provide hardware for the two commercial banks to use during the pilot test. IBM had long been the leader in providing mainframe computers and software to the financial services industry, and in the nineties they were starting to provide microprocessor-based servers. In the past IBM had been able to lock customers in with their de facto standards for operating systems and (sometimes) databases, as well as a host of complementary products and services. Now, along with the move away from mainframe architectures, two industry shifts -- to open-source software such as the Linux operating system and to more inclusive formal standard-setting processes by the IEEE and W3C – posed threats to IBM, and managers there were uncertain how they should respond. IBM quickly lost ground in the early nineties but by 1997 was beginning to consider a more open approach. Subsequently, IBM has made a strong commitment to supporting Linux and other open-source software, and they remain the leader in the $13 billion financial services server market.

IBM has for many years provided equipment and software for check processing systems in a large number of banks. One member of the eCheck team recalled: "For IBM (the eCheck project) was more important from a check processing perspective.… IBM was more interested

in integrating this Internet payment infrastructure with their overall check processing architecture....” Thus, it seems likely that IBM’s presence on the eCheck team was motivated primarily by defensive concerns as they attempted to retain their dominance in the banking IT industry.

IBM was very interested in promoting the Financial Services Markup Language, developed for the eCheck project, as an industry-wide standard. However, this did not play out, as an alternative XML-based approach won out (see Gogan, 2005). While this was surely a disappointment, it evidently was not of great significance for IBM, which was also involved in many other IT assessment projects for financial services and other industries. For example, in an alliance that included Visa, Mastercard, Microsoft, Netscape and other parties IBM worked on the Secure Electronic Transactions protocol for web-based credit-card transactions (subsequently SET received some acceptance in Europe but failed to take hold in the US). So, the eCheck project was not a make-or-break proposition for IBM, but rather an opportunity to stay abreast of potentially significant developments in financial services technologies.

Intellectual property (IP) was a key issue for IBM in the eCheck project. The initial eCheck project ground rules stated that the Financial Services Technology Consortium would retain rights to any IP created during the eCheck project. However, once serious post-prototype design work commenced, IBM pushed for – and won – a change in that policy. Beginning in 1999, code created by a participating company was retained by that company.

The next largest vendor participant, Sun Microsystems, was one tenth the size of IBM, with 21,500 employees $8.5 billion in revenues in 1997. Fueled by the rapid rise of eCommerce on the web, Sun’s revenues continued to grow rapidly in 1998 – 2001, but Sun suffered a significant reversal in the aftermath of the 2001 dot-com bust. Founded in 1982, Sun had achieved early success providing high-end workstations for trading rooms and other financial services applications at influential firms such as JP Morgan. Hurt by rapid price drops for both personal computers and workstations, in 1997 Sun was attempting to get a stronger share of the server market. They took a cue from IBM’s successful lock-in strategy by offering a proprietary version of the Unix operating system for its servers. However, by then other vendors were pushing the open-source Linux O/S, a move which Sun was resisting (Analysts in 2007 agree that pushing a proprietary O/S was a mistake which accounted for much of Sun’s troubles until their approach changed in recent years. In 2006 Sun was a distant third with its 9% market share for the financial services server market, far behind #1 IBM and #2 Hewlett-Packard).

Back when the eCheck team was considering the ten pilot-test proposals, Sun had pushed for a test involving accounts payables to its suppliers. In late 1996/early 1997, with the decision to instead do the US Treasury pilot test, the eCheck steering committee discussed possible roles for different participating companies. Sun was asked to develop the server software to support the Fed’s role (verifying and clearing eChecks for payment). A manager at the Boston Federal Reserve recalled: “Commercial banks aligned with IBM, primarily because IBM was a very, very big provider of the existing payments infrastructure, and both banks already used IBM for their check processing. The Federal Reserve had a big investment in IBM, too, along with Unisys. (But) we decided we would try to take some of the heavy lifting in dealing with a new player in this network … We felt comfortable with Sun, and we felt it would be more heavy lifting for the banks to partner with Sun … (Also) Sun had that aura of newness and innovation.”

This participant further recalled: “ I think (the eCheck project) was more important to Sun from an R&D/ Java / XML perspective. Sun’s stance was, ‘let’s figure out if we can actually play in the payment space. … We’re going to learn a lot here.’ So, from Sun’s perspective, it was learning, while for IBM it was how to build a next generation product.”

An eCheck team member recalled that during the pilot “IBM and Sun were in many respects, at each others’ throats for some business.” He added, however, that he was impressed that the two companies “also demonstrated how to work together with a competitor.”

Sun left the eCheck project before it ended. In July 1999, Sun and Netscape announced the Sun-Netscape Alliance, which (after Netscape was acquired by AOL) was later called the iPlanet Alliance. Its mission, according to the press release at the time: “to provide easy to deploy, comprehensive enterprise and e-commerce solutions to business partners and other companies competing in today's Net Economy. The alliance product portfolio provides customers with the industry's most scalable, integrated infrastructure software and a family of production ready e-commerce applications … including commerce exchange, procurement, selling, and billing.” One participant informed us that the iPlanet Alliance became a dominant claim on Sun’s attention: “Sun … started to back away …When Sun, AOL, and Netscape got together to form I Planet, there was all of a sudden a new focus … and ECheck was just this little R&D activity and it was very,

very difficult to get them to focus on that. They were off to much bigger things." Subsequently, however, in summer 2001 AOL laid off 500 of the 3000 Alliance employees, and the Alliance was officially terminated in 2002, at a time when Sun was beginning to rapidly lose server market share (while IBM was gaining share).

BBN was the next largest technology vendor participant, with 2000 employees (one tenth of Sun and one percent of IBM) and about $234 million in 1996 revenues. In 1997 BBN got about half its revenues from government contracts, down from about 88% in 1994. BBN's specialized role on the eCheck project was to provide expertise on public key infrastructure, particularly certificate authority software and policies. In 1997 BBN was acquired by GTE, which caused some concern among team members. However, GTE did allow the BBN team to continue work on the eCheck project.

The other three vendors on the eCheck project (IntraNet, IRE, RDM) were quite small -- each with less than $3 million in revenues at the time of the case. IntraNet, which was already focused on banking software, provided code that made it possible for the commercial banks to forward eCheck messages from the commercial banks to the Fed, in a usable format. IntraNet was subsequently acquired by Transaction System Architects, and after the eCheck project they became a Premier Partner with IBM. As of 2007 they claim that half of the 50 largest banks in the US, Europe, and Australia use their Money Transfer System.

IRE, with 30 employees, was a provider of smart cards and related software. IRE saw an opportunity in the token-based security of the eCheck design (meaning that the certificates and other software required for secure transactions resided on a card which a user would insert in a card reader). This design choice was actually quite controversial, with many FSTC members arguing that it raised the cost of eCheck significantly as compared with having this software sit on a user's PC. We were unable to determine IRE's fate post-eCheck.

RDM Corp, a young Canadian company that also focused on financial applications, wrote the software for the Treasury's server, as well as the customer interface software. After the eCheck project, some employees from this company formed Xign, Inc. (the payments vendor that provided the Internet Payment Platform system), and RDM took a 20% stake in Xign. As of 2006 RDM had 96 employees and revenues of about $24 million.

We believe that the smallest three vendors (IntraNet, IRE, RDM) were as interested in developing strong relationships with IBM (and to a lesser extent, Sun) as they were in working directly with the banks and Treasury. In the case of IntraNet, we know they did forge a strong partnership with IBM. We believe IRE subsequently was acquired or went bankrupt. RDM continues to play a role in electronic payments, primarily in digital image processing. Examination of their web site (rdmcorp.com) indicates that they sell directly to banks now (no mention of IBM or other vendor partners).

Many participants in the eCheck project, including but not limited to vendors, struggled with issues surrounding the disclosure of proprietary information. This caused some project delays, especially when one bank indicated some reluctance to test eCheck with their customers. Some government agencies participants were reluctant to involve their suppliers because of disclosure concerns. While it was expected that 50 suppliers would participate, in fact only two did.

While the manager at Treasury's eMoney Group viewed the eCheck project as having fallen short of its goals, other participants were happy to note that strong cross-company collaboration on technical issues led to several patented technologies. Indeed, the eCheck design effort did yield sufficiently promising results that at least two commercial ventures were spun off from the effort: Xign (mentioned above) and Clareon, a company formed by some of the BankBoston employees who worked on the eCheck project.

3.4 Internet Payment Platform

As noted above, the Financial Services Technology Consortium initiated the eCheck project and solicited the participation of the US Treasury's Financial Management Service (FMS) for its pilot test. Within FMS, the organizational unit which participated on the eCheck pilot test was the eMoney Group, an internal R&D unit tasked with investigating technologies and applications that offered possibilities for improving FMS operations in hopes of reaching the goal of processing ninety percent of Treasury payments electronically by 2010. At the conclusion of the eCheck Phase II pilot test in July 2001, the head of the eMoney Group indicated that the eCheck project had overreached. He felt the initial scope of the project had been too broad (although the choice to narrow the focus to government agency payments to suppliers was a positive move, in his view). The eCheck pilots had involved too many participants with too many agendas, and the tests took too long with too little in the way of tangible benefits. Still, he reflected, "we learned a great deal…" He was particularly concerned that participants had spent a great deal of time attempting to promote the eCheck system architecture and the Financial Services Markup Language as industry standards. Neither effort

had succeeded, and the eMoney Group head subsequently stated that he wanted future projects under his authority to avoid such ambitious aims: "We now definitely go toward limited, small achievable implementations," he stated. "… We don't bet that a standard will work." (Gogan, 2005).

The Internet Payment Platform pilot test project (Gelinas and Gogan, 2006; Gogan and Gelinas, 2006), which would involve far fewer participants than eCheck, was initiated in 2002 by the FMS eMoney Group in conjunction with the Boston Fed; several individuals on this joint team had previously worked on the eCheck project. The head of the eMoney Group decreed that this new project should be narrower in scope and shorter in duration. In one aspect, the IPP project picked up where the eCheck pilot test had left off, in that the transaction domain would again be payments to government suppliers. However, the IPP project would focus on the end-to-end process of creating a purchase order, issuing it to a supplier and subsequently paying the supplier and accounting for the transaction. As noted above, a commercial company, Xign, had spun off from the eCheck project to develop such a system for use in the for-profit sector. It was believed that with a little modification, the Xign system could be adapted to government payments to suppliers. So, even though the IPP project encompassed the issuance of purchase orders, invoices, and payment authorizations, while the eCheck project had focused just on electronic payments, IPP was viewed as a more manageable, less ambitious initiative.

The eMoney Group head made another decision which he believed would make the IPP project easier to manage than eCheck: commercial banks were not asked to participate in this pilot test. Having demonstrated in the second eCheck pilot test that it was possible to make and clear payments to suppliers without asking a commercial bank to take on any new processing or record-keeping tasks, it was felt unnecessary to involve commercial banks now. Much of the tension in the eCheck project had emanated from conflicting priorities of banks that were competitors, and the team at FMS wanted to avoid that source of conflict. They also stated that since Xign already had a working commercial system, it would not be necessary to involve as many technology vendors as had been the case with the eCheck project. Although they did not state so explicitly, it seems likely that the choice to involve just two vendors may have been motivated by similar concerns as they choice about banks' involvement: to reduce competitive tension. So, besides Xign, just one other vendor participated in the IPP pilot – a small company which provided a biometric authentication system.

The IPP project plan was approved in summer 2002. The planners expected that it would take about six months to recruit three federal agencies to participate in the pilot test, and to develop interfaces between their legacy accounting systems and the Xign software. Xign would help recruit agency suppliers (based on lists provided by the agencies). The pilot test was expected to run for one year: from January to December, 2003. In fact, every step did take longer than expected (not unlike many inter-enterprise software projects). In November, 2002 the US Treasury's Bureau of Engraving and Printing (BEP) committed to participate, and the other two participants – a unit of the US Department of Labor and the small Alaska-based Denali Commission – signed on in summer and fall, 2003. For each participating agency the integration work took longer than expected (although each successive agency came online faster than its predecessor). So, it was necessary to extend the pilot, but only by six months. The IPP pilot test was terminated in June, 2004.

In 2006, a decision was made to move forward with a next generation of the IPP, again using the Xign software (with some modifications in response to issues identified in the first pilot test). This project was promoted not as a limited, highly experimental pilot test, but rather the early stages of a broader roll-out of a modified operational version of the IPP system. It was expected that in late 2007 one agency (BEP) would come online with this new IPP version, and subsequently new agencies would be added at an accelerating pace. So, although as of August 2007 neither BEP nor any other agency has gone online with IPP II, nevertheless the earlier IPP pilot test is seen as having been a success because it led to this decision to move into an operational phase.

Because IPP was a smaller-scale project than eCheck, there was ample opportunity to capture participants' views and generate and sustain their enthusiasm. On the other hand, this project lacked access to commercial banks' and larger technology vendors' extensive technical and project management expertise. Because neither the eCheck nor IPP projects measured processes or outcomes in a disciplined way, it is difficult to adjudge whether IPP or eCheck generated better learning. Each project can be seen as having led to a successor project (eCheck to IPP, and IPP to IPP II).

3. 5 Vendor Challenges in the IPP Pilot Test

As noted above, the IPP project involved a far smaller roster of participants, including just two technology vendors: BAI and Xign. BAI (Biometric Associates, Inc.) provided a smart fingerprint-based authentication smart

card device which was used at several approval steps in the process for authorizing transactions. We did not have an opportunity to interview anyone from this company, and several interviewees indicated that it was an off-the shelf product that worked well and did not pose any significant challenges for the IPP project.

Xign, Inc. (spun off from RDM) developed and hosted the web-based system through which users could submit purchase orders and invoices, and authorize and make payments. The system was developed in response to the recognition that a payment system is embedded in business processes such as purchasing and fulfillment; merely automating the payment itself would not yield enough benefits to justify the investment in new software. This system had gone live with Xign's first six corporate customers in summer 2001. A member of the IPP team noted that this was a major factor in choosing Xign: "Xign was up and running… with real live commercial customers. Treasury wanted a stable system that was already in the market. Xign was the only one that really fit the bill at the time." He added that, in the interests of keeping things simple, Treasury wanted to use commercial off-the-shelf software that would require only the bare minimum of customization. He and others also noted that because managers at Treasury were familiar with Xign because of their earlier connection with the eCheck project, they felt comfortable turning to them for this next pilot test.

A key challenge during the IPP project came with the recognition that the Xign system, which reportedly worked well in supporting Fortune 100 companies' typical commercial transactions (based on experiences with about 10 large clients and more than 5000 suppliers, amounting to more than $10 billion in payment settlements), would need significant modification in order to adequately fit the government procurement context. Government-issued purchase orders often include many pages of contractual stipulations, which Xign's software did not support. Also, the system did not include provision for some of the many authorizations that were required (a digital signature capability was not present at every necessary step in the transaction cycle), nor did the system handle change orders in a way that fit government processes. Agency participants expressed some frustration with these feature gaps, but the contract with Xign for the pilot test had specified that the vendor would not have to make such modifications, given the low price they were charging for the service during testing.

Tension also arose between Treasury and Xign when the decision was made to extend the pilot test. At that point, managers at Xign wanted evidence of a long-term commitment, but managers at Treasury preferred to continue to test the system. Following this extension, when the pilot test reached its end in June 2004, Xign (naturally) wanted to know whether Treasury was ready to commit to a long term contract to use Xign's service. However, instead a decision was made to conduct an evaluation of the pilot test and consider several alternative "next steps" before making any commitments. As noted above, nearly two years passed before a decision was made to contract with Xign for IPP II.

4. Discussion and Conclusions

Whether conducted by one organization or in an alliance, a pilot test can be large-scale and involve many participants, as was true of the eCheck project, or smaller and more focused, as with the IPP project. And, in order to adequately assess technical, economic and operational feasibility, organizations may choose to conduct multiple pilot tests. The case studies of eCheck and the Internet Payment Platform suggest to us that if new technologies are deemed essential to an organization's future viability, managers will be more likely to order multiple pilot tests, as was true of the United States Treasury. If, as in the eCheck initiative the aim is to help set interoperability standards or to achieve a critical mass of users, companies will be more likely to participate in inter-organizational pilot tests, and vendors of all sizes will (if given the chance) sign on to participate in designing and carrying out these tests.

Some of the issues and challenges that we observed are not unique to vendor participation. For example, we observed in the eCheck project that a technology vendor (RDM) used their participation in the first pilot test as an opportunity to investigate new technologies and help build prototypes that subsequently formed the basis for an entrepreneurial venture (Xign). This outcome was not unique to vendor participation, since participating team members from one of two commercial banks also formed an entrepreneurial venture (Clareon). Certainly when vendors participate in emerging technology pilot projects, one possible motivation is that they are considering commercial prospects for the technology.

We observed in the IPP project that the host (the US Treasury's Financial Management Service), chose to involve a much smaller cast of characters than had been involved in the eCheck projects, presumably to reduce competitive tension. Again this issue does not seem to be unique to vendor participation, since in addition to limiting vendor involvement to two companies, they also excluded commercial banks from the IPP pilot test.

Another issue that we observed in some of the participating vendors involved concerns about disclosing

proprietary information. However, again this issue was not confined to vendor participation. The two participating banks in the first eCheck pilot test had lots of disclosure concerns, and pushed for clear "rules of engagement" about this when assessing economic feasibility issues. They clearly did not want to reveal information about the costs of their operations, numbers of customers and other strategically-sensitive data. So, this issue, too, is not unique to vendors.

Tension between competition and cooperation was noted in the earlier paper about the eCheck projects (Gogan, et al., 2007), which revealed that both bankers and technology vendors struggled to strike a balance between these elements. As described herein, technology vendors in both the eCheck and IPP initiatives had competing priorities. IBM was participating in many other inter-organizational pilot tests, but because of their position as the market leader with deep pockets, this didn't seem to have a detrimental effect on their participation in the eCheck project. Sun, on the other hand, found that when they chose to get involved in the AOL/Netscape alliance, resource constraints and other factors caused them to withdraw from the eCheck project. BBN, another mid-sized vendor, faced some issues when it was acquired by GTE Internetworking, although they did continue with the eCheck project. Xign's competing priorities played out in the concerns over features that government agencies sought in their system, which were not necessary in their other commercial settings.

We observed that some participating vendors had issues with intellectual property concerns. IBM, for example, wanted to retain the rights to certain portions of the eCheck system that they designed, and Xign pushed back when Treasury asked them to add features to their system even though the contract for Internet Payment Platform had specified that Xign would not be required to customize their system. This issue does seem to be unique to the participation of vendors in an inter-organizational emerging technology assessment.

Thus, it seems that many issues that would apply in any inter-organizational pilot test also apply in those tests involving technology vendors as participants. In any pilot test it is necessary to determine how many participants to involve, how many pilot tests to run, and the scope and duration of each pilot test. The longer the pilot test, the more the risk that merger-and-acquisition activity will cause defections or changes in roles. Inter-organizational pilot tests that include participants who are competitors (be they vendors or members of the same industry, such as the bankers in the eCheck project, will face issues surrounding disclosure of proprietary information.

These case studies also suggest that in inter-organizational pilot tests involving technology vendors, size matters. From observing IBM, we propose that large vendors, especially market leaders with extensive resources and clout, push hard to protect their intellectual property, while smaller vendors are likely to expend some effort selling themselves to the larger vendors and other pilot-test participants. Large vendors appear more likely to stay the course in a longer project, but mid-sized vendors seem to be caught in a bind: they compete with the market leaders, and thus are not motivated to ally with them yet they want to participate. However, they aren't large enough to participate in many simultaneous pilot tests, and they may have resource constraints that make them especially likely to defect. Small firms are partly motivated to participate because they can get the attention of the larger players and demonstrate their qualities as a potential partner for subsequent alliances.

Pilot tests can be short or long in duration. One issue that arises in a longer pilot test is that the smaller vendors may merge with (or be acquired by) other vendors (or go bankrupt) during that time frame, adding complexity. We saw this phenomenon at work in the eCheck case. We note also that this risk was not confined to vendors – both banks also were subject to M&A activity during the pilot.

Our findings are subject to limitations which should be addressed in future studies. When we first started studying these projects, we were interested in the perspectives of banks, federal agencies, their suppliers, and the US Treasury. We interviewed participants from the US Treasury and commercial banks, but we were not able to interview all six eCheck vendors. For the IPP study, we interviewed managers from Treasury and the Fed, participating agencies, some suppliers, and Xign, but not from BAI. Subsequently we became intrigued by informants' discussions of vendor participation issues, which led to this paper. Had we anticipated this at the outset, we would have included more vendors in our interview schedule. We urge researchers to include a broad swath of key stakeholders in future studies of inter-organizational emerging IT assessments (as will we).

Both projects involved an influential partner, the US Treasury (which participated in the two eCheck pilot tests and hosted the IPP pilot test). Possibly some of the issues and outcomes that we observed were heavily influenced by this one uniquely powerful participant. So, it would be useful to study pilot tests conducted by other networks of participants. We note also that these two projects involved payment technologies, a domain in which security and confidentiality are paramount concerns. Perhaps pilot tests of other, less vulnerable IT applications would not exhibit the same patterns of behavior and outcomes.

Lastly, we note that the opinions of individuals from participating firms do not always reflect their companies' senior managers' opinions. So, some behaviors or outcomes that we have attributed to companies should more fairly be attributed to specific employees of those companies.

Technology vendors can play important roles in emerging IT pilot tests, because they bring important expertise and other resources, and because – especially if new IT interoperability standards or market opportunities might be at stake -- their skin is in the game. Prior research on the management of change suggests that relevant stakeholders should be identified and their issues considered. It is evident that stakeholder analysis would lead many pilot test planners to include vendors in these initiatives. However, as these two cases reveal, vendors also bring a variety of challenges, and these intersect with more basic pilot project challenges, including whether to be broad vs. focused, to involve few vs. many participants, and to conduct one or several pilot tests.

We conclude: pilot tests (singly or in combination) should yield valuable information on four aspects: Does the technology work? What changes are needed in our operations and staffing in order to make effective use of this technology? What new risks does it bring, and what economic benefits are we likely to yield, and how soon can we expect to reap those benefits? Technology vendors can play an important role in inter-organizational pilot tests, by participating in collaborative assessments of the technical, economic and organizational feasibility of emerging IT applications. Although they do bring unique challenges, vendors also bring valuable expertise and perspectives to the inter-organizational pilot test. Their contributions and associated challenges vary depending on their size and market positions, and further research is needed to determine how these aspects play out.

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