

Production and Transaction Economies and IS Outsourcing: A Study of the U.S. Banking Industry¹

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outsourcing decision. To empirically test these relationships, information was gathered from senior IT managers in 243 U.S. banks. Financial indices from the archives of the Federal Reserve Bank were a second important source of data.

Results of the study show that IS outsourcing in banks was strongly influenced by production cost advantages offered by vendors. Transaction costs played a role in the outsourcing decision, but they were much smaller than production costs. Finally, financial slack was not found to be a significant explanator, although firm size was a significant control factor. The paper has important implications for research and practice. For researchers, the findings provide evidence that financial criteria can be key factors in outsourcing decisions and compare the relative effects of production and transaction costs. For practitioners, the findings suggest that managerial sourcing strategies need to weigh both costs when hiring systems integrators.

Keywords: IS outsourcing, systems integration, transaction cost theory, production cost economics, financial slack, outsourcing measures

ISRL Categories: EC01, UF, EC0101, EC04, ED01, ED0101, ED03, EL07, EL06

Abstract

This paper studies economic determinants of IS outsourcing. It argues that a focus on comparative economic theories and models can improve our ability to explain outsourcing within the larger context of organizational strategy and environment. Specifically, the research constructs of production cost, transaction cost, and financial slack are examined simultaneously to understand what influences the

Introduction

The strategic importance of information systems (IS) in banking is widely substantiated (OECD 1992; Office of Technology Assessment 1987). Yet, in spite of this, some banks, such as Continental Bank (Huber 1993), have outsourced their entire information services function (American Bankers Association 1990) and the trend to outsource part or all of their information technology (IT) activities seems to be accelerating rather than tapering off (O'Henry 1996). In this regard, the trend in banking is similar to that of many other international enterprises that are increasing

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their rate of IT outsourcing at 9% per annum (Weill and Broadbent 1997).

The evolving literature on IT outsourcing offers a variety of explanations for why outsourcing occurs. Many of these arguments have a basis in economic theories. One of the most commonly cited reasons, for example, is that managers feel that they can gain cost advantages by hiring outsiders to perform certain services and produce certain products (Alpar and Saharia 1995; Loh and Venkatraman 1992a). Transaction cost theory (Grover et al. 1996; Nam et al. 1996), which typically frames outsourcing as a decision about drawing firm boundaries (Mosakowski 1991) or as vertical integration (Harrigan 1985), offers another economic perspective.

This study argues that we can improve our ability to explain outsourcing within the larger context of organizational responses to their strategic environment by focusing on such economic considerations. The findings suggest which factors play into the outsourcing decision and their relative importance in sourcing

choices. A key contribution of the current study is to examine for the first time the direct, concurrent effect of both production and transaction costs on the sourcing decision.

Theory Development and Hypotheses

The theory bases that underlie this study were articulated in an earlier study (Ang and Cummings 1997), which should be consulted for a fuller description of the theories, constructs, and variables used. That study empirically examined production costs as well as transaction costs, but in the context of the moderating influence of these variables on institutional forces. The immediate, simultaneous effects of production and transaction costs on IS outsourcing have been studied neither by Ang and Cummings, which uses the same dataset as the current study, nor by any other published study of which we are aware. The research model is shown in Figure 1.

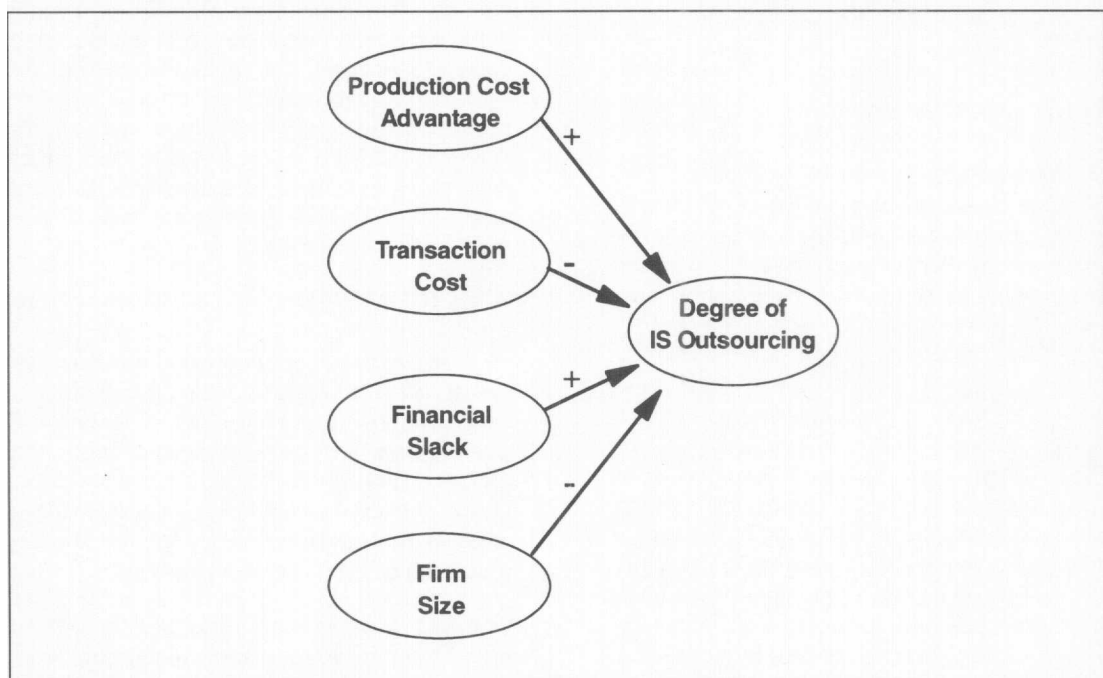


Figure 1. Research Model for Current Study

Production economies

Neoclassical economics regards any business organization as a "production function" motivated by profit-maximization (Williamson 1981). Organizations provide goods and services to markets where they have cost advantages and rely on the marketplace for goods and services in which they have comparative cost disadvantages. Neoclassical economics predicts that firms justify sourcing options based on production economies. In terms of production economies, acquiring products and services is treated as an economic make-or-buy decision—a decision that compares production costs of internal operations versus the price offered in the marketplace (Ford and Farmer 1986). In the context of IS, a firm will choose to outsource or insource based on the comparative costs of internalizing IS versus the price it has to pay vendors for the same IS services (Saarinen and Vepsäläinen 1994). Accordingly:

Hypothesis 1: The higher the comparative production cost advantage offered through IT outsourcing, the greater is the degree of IT outsourcing.

Transaction economies

Transaction cost economics extends the neoclassical economic perspective of the firm by recognizing the significance of transaction costs in any market exchange. Transaction costs refer to the effort, time, and costs incurred in searching, creating, negotiating, monitoring, and enforcing a service contract between buyers and suppliers (Mahoney 1992). Transaction costs can erode comparative advantages in production costs of vendors. When a firm has to incur substantial effort and costs in supervising, coordinating, and monitoring the activities of the vendor, it may decide that external sourcing is too costly. Accordingly, firms may opt for internal sourcing when they perceive transaction diseconomies to override any production cost advantages in market exchanges (Bakos and Brynjolfsson 1993):

Hypothesis 2: The less the transaction costs involved in hiring outsourcers, the greater is the degree of IT outsourcing.

Financial slack

The sourcing conundrum may also be explained by a firm's discretionary use of financial slack. Financial slack refers to financial resources in excess of what is required to maintain the organization. One study defines slack as the difference between total resources and necessary payments (Cyert and March 1963), while another describes it as "a cushion of excess resources available in an organization that will either solve many organization problems or facilitate the pursuit of goals outside the realm of those dictated by optimization principles" (Bourgeois 1981, p. 29).

Whenever a firm possesses excess resources, it tends to invest the resources toward increasing the size of the firm. As has been observed, firms tend to invest slack in promoting firm size through asset capitalization rather than in distributing the excess resources back to shareholders (Jensen 1989). Based on a behavioral view of the firm, the rationale is that, by increasing asset capitalization and, in turn, enlarging the scale and scope of the firm, senior executives in the firm enhance social prominence, public prestige, and political power vis-à-vis other firms in the marketplace (Awh and Primeaux 1985).

In the 1970s and early 1980s, slack resources were sometimes employed to build the internal IT infrastructure. Especially in information-intensive industries such as banks, IT is considered to be "crown jewels." IT symbolizes the *avant garde*, firm growth, advancement, and progress (Sitkin et al. 1992). If investments in IT can promote social prominence and public prestige, managers are induced to invest slack resources on internalizing IS services.

The above reasoning suggests that when organizations possess slack resources, firms may enlarge the scale and scope of their operations by deploying slack resources toward

building up internal IT resources in the form of hardware, software, and IS human resources. Conversely, when slack resources are low, firms are likely to resist internalizing in response to the anxiety provoked by loss of financial resources (Sutton and D'Aunno, 1989). Thus, when slack resources are low, firms can be expected to downsize internal IS services by selling off IT assets and reducing IS personnel expenses:

Hypothesis 3: The less the financial slack, the greater the degree of IT outsourcing.

Study Method

Sample

The study called for a data source that demonstrated variation in dependent and independent variables. Moreover, to rule out possible effects of decision novelty, the source had to have a long history of making sourcing and acquisition decisions in IS. Surveys on the use of IT by the American Bankers Association showed that banks, as information-intensive users, acquire IS services from a variety of places. Banks can opt from services provided inhouse, by parent banks, correspondent banks, service bureaus, cooperative joint ventures, and facilities management (American Bankers Association 1990). These alternative arrangements vary in the degree of internal control banks have over the IS services (as discussed in Ang 1994). Second, because banks vary in size, profitability, IT scale, and scope operations, antecedents such as production and transaction economies, financial slack, and perceived institutional influences are expected to vary across banks. Finally, deciding on alternative sources of IS services is not novel among banks. The preponderance of banking literature (cf. American Bankers Association 1982-1993) describing and prescribing alternative IS sourcing arrangements suggests that wrestling with an appropriate source of IS services has been one of the central themes in managing IS resources in the banking industry.

This study adopts a survey research design as the best method for collecting original data from a population too large to observe directly. At the time of this study, there were more than 13,000 commercial banks in the United States. Commercial banks are members of the American Bankers Association, the premier bank association in the nation. The Association released its members list for the purposes of this research. Sample stratification by size was also used because bank size has been shown to affect organizational boundary decisions such as outsourcing (Pisano 1990).

An analytical sample resulting in a response of at least 200 was sought to ensure sufficient statistical power. To attain a sample of approximately 200 banks, 385 banks were drawn from the population. The banks consisted of 85 very large banks and a random selection of 100 banks in each of the other three size strata: large, medium, and small. This four size strata has been adopted by the American Bankers Association as a way of stratifying their industry.

The sampling approach was to survey random banks from the three strata other than the very large banks, whose population of 85 banks was sufficiently small to represent the entire stratum. Mailing questionnaires to the entire population of the very large banks eliminates the issue of whether the sample represents the population (assuming no response bias). Moreover, since sampling of the other three strata was random by design, there should be no systematic bias in the sample finally selected for mailing. That is, the three subsamples of large, medium, and small banks should be representative.

The sampling strategy does not, however, eliminate the possibility of systematic bias in respondents. This is essentially an external validity issue and to test this in the returned sample, community and medium-sized banks were classified as small banks while large and very large banks were classified as large banks. Based on the sample size of 385 banks, a final number of 243 banks responded, generating an overall response rate of 63.1%. This high response rate was due to the

focused interest in, and the importance of, IS outsourcing among commercial banks. The high response rate was also due to the elaborate data collection process of eliciting the participation of the respondents and following through with each respondent on an individual and personal basis.

A single respondent from each bank completed the questionnaire. The respondent was either the CIO or a high-level ranking person in charge of IS. On the average, the respondents had 12.89 (S.D. = 9.09) years of work experience with the bank, and 19.58 (S.D. = 8.11) in banking.

Procedure

A full description of the instrument development appears in Ang (1993). In brief, a draft instrument was pretested with the CIO at each of the 21 banks within the Minneapolis-St. Paul, Minnesota, metropolitan area to ensure that the instrument was valid (Straub 1989). Based on information provided by the American Bankers Association, each bank in the stratified sample was called to identify the person who held corporate responsibility for IS in the bank. Slightly more than two-thirds of completed questionnaires were returned within three weeks. When the survey was not returned, follow-up phone calls, written

reminders and duplicate survey instruments were sent. Once a case was completed, archival financial information on the banks was retrieved from the Federal Reserve Bank databases.

Survey design

Items in the survey instrument measured the degree of IS outsourcing, production cost advantage, transaction costs, financial slack, and performance (for descriptions of these constructs, see Appendix A). Table 1 presents the relevant characteristics of all measures, including firm size, which was used to test external validity and for purposes of control. To avoid the problem of heteroscedasticity in the dataset (i.e., a disproportionate effect from a skewed distribution), the log transform of firm size was used in all analyses. An abbreviated form of the instructions to respondents and actual items appear in Appendix C.

Archival data

A second important source of data for this study was financial indices extracted from two Federal Reserve Bank financial databases: *Bank Holding Company Performance Reports* and *Uniform Bank Performance Reports*.

Table 1. Characteristics of Measures

Construct	Scales/Measures	# of Items	Type of Variable
Production Cost Advantage	Perceived Production Cost Advantage (COST)	5	Survey scale
Transaction Cost	Perceived Transaction Cost (TRCOST)	3	Survey scale
Financial Slack	Available Slack (AS1)	1	Archival data
	Potential Slack (PS2)	1	Archival data
	Perceived Slack (SLACK)	2	Survey scale
Degree of IT Outsourcing	Operations Perspective (OUT1)	1	Survey scale
	Functional Perspective (OUT2)	8	Survey scale
	Applications Perspective (OUT3)	10	Survey scale
Firm Size	Total assets (SIZE)	1	Archival data

These databases contain financial statistics for individual commercial banks in the United States and comparative financial indices for banks in the same peer or size categories. These financial indices were obtained to measure independently the level of financial slack resources available in banks. Key financial indices used to measure slack in the banking industry were retained earnings, interest paid, and asset capitalization. In the financial services industry, total assets, usually taken as a measure of firm size, was used.

As advocated by other researchers (Bourgeois and Singh 1983), financial slack was measured by the derived financial indicators: (1) available slack and (2) potential slack. Available slack refers to retained earnings or those internal resources that a firm can tap immediately. Potential slack refers to the capacity to generate extra cash from its environment, i.e., possible resources the firm can pull from the environment at a future date. Since the firm does not have the slack on hand, there is a time lag before it can be acquired. Both available slack and potential slack are postulated to affect outsourcing decisions because the cash infusions arising from the sale of IT assets can influence both kinds of slack.

Operationally, available slack was derived by taking the difference between the average three-year level of retained earnings and the three-year average level of retained earnings of peer banks. Potential slack was derived by taking the difference between the average of the past three-year yield of a bank compared to the past three-year yield of banks in the same peer group, where yield refers to interest revenue earned on interest-earning investments. One additional measure of slack—perceived slack—supplemented the archival measures.

Instrument validation

While measures of the independent variables (Appendix C) are perhaps self-explanatory, some explanation of the dependent variables

is called for. As Table 1 and Appendix C show, three perspectives were sought in the data gathered on degree of IT outsourcing. The operations perspective is an omnibus measure of whether the firm is operating *primarily* through insourced or outsourced arrangements. A second perspective, that of the various functions within IS that can be outsourced, allows respondents to gauge the extent of outsourcing across eight different functions such as planning, security, communications, etc. The third perspective is an applications perspective. Based on prior field work, standard banking applications such as demand deposits, installment loans, and bond accounting systems were presented to the respondents and they were asked to assess the extent to which these applications were outsourced. Capturing the essence of the dependent variable was critical to the study and, as it turns out, these measures demonstrated excellent psychometric characteristics.

Multiple-item constructs were subjected to Cronbach's α reliability analysis to assess internal consistency. Scales were all reliable by Nunnally's (1967) heuristics (Table 2).

To validate the instrument, a principal components factor analysis (Varimax rotation) was first performed to assess the construct validity of each scale. Demonstrating both convergent and discriminant validity (Campbell and Fiske 1959), all scales loaded cleanly and at least at the .40 level. In that potential slack did not load with the other slack variables, it was dropped.

Methods bias

In that the extent of IT outsourcing was measured via the same instrument as the independent variables, there is a possibility that common methods biased the results (Campbell and Fiske 1959). Methods bias means that respondent answers may be self-justifying. That is, respondents may be underplaying the difficulties that they found with carrying out the outsourcing transaction or overplaying the comparative cost advantages associated with choosing an outsourcer.

Table 2. Reliabilities

Construct	Scales/Measures	# of Items	Reliability*
IT Outsourcing	Degree of Internal Resource Control	3	.90**
Production Cost	Perceived Cost Advantage	5	.93
Transaction Cost	Perceived Transaction Costs	3	.75
	Perceived Slack	2	.72
Financial Slack	Available Slack	1	—
	Potential Slack	1	—
Size	Log of Firm Size	1	—

* Reliabilities were assessed with Cronbach's α .

** This α value was calculated by comparing the 0-1 coding of the operations perspective to the average of the 10 items on the applications perspective scale.

The study attempted to overcome this bias first by not making it patently obvious to respondents where they fit on the outsourcing continuum. Degree of outsourcing was captured through three extremely different measures, as discussed above. As seen in Appendix C, two of these measures attempt to break the sourcing decision down into components in such a way that the complexities of the decision are represented while still retaining construct unidimensionality.

Second, issues such as comparative production cost advantages were not tied to specific outsourcing decisions, but to the respondent's general evaluation processes. This, again, was an attempt to separate the independent variables from the dependent variables in the minds of the respondents. The tradeoff of this approach is a measurement constraint which is discussed later in the limitations section.

is a small chance of systematic bias in the respondents.

Nevertheless, to assess external validity, the difference between demographics of the respondent group versus the non-respondent group was also examined. For this analysis, community and medium-sized banks were combined in this study as small banks while large and very large banks were combined as large banks. Based on a χ^2 analysis, no significant difference existed between the distribution of participants and the distribution of the original sample based on bank size ($\chi^2 = 3.62$, $df = 1$, $p < .05$). Thus, in terms of bank size, firms participating in the study do not appear to be a systematically biased sample.

Descriptive statistics

Descriptive statistics are useful in giving an initial sense for whether the raw data supports or disconfirms the model. To assess the extent to which banks tend to outsource highly specific assets, for example, the descriptives for the functional perspective measures (Table 3) can be examined. Consistent with transaction cost theory, asset-specific IT activities like strategy and planning are least likely to be outsourced among banks that heavily invest in vendor solutions. Utility functions that are operational in nature, such as capacity management and

Analysis and Results

Test of non-response bias

Given the response rate of over 63%, the external validity of the study can be assessed as "good" (see Babbie 1990, p. 165). A reasonable interpretation of this rate is that there

Table 3. Degree of Outsourcing of IT Functions
(where 1 = completely insourced; 7 = completely outsourced; 4= jointly managed)

Item #	Functional Area	Mean	S.D.
1	Information Systems Strategy	4.45	1.82
2	Information Technology Planning	4.56	1.92
3	Capacity Management	5.74	1.54
4	Production Scheduling	5.04	1.93
5	Human Resources Management	4.88	2.44
6	Security Management	4.49	1.72
7	Network Management	4.64	1.91
8	Personal Computer (PC) Management	2.26	1.81

production scheduling, are most likely to be outsourced.

A more complex picture emerges when the handling of application development and maintenance are examined. Banks that are primarily outsourced hire outsiders to handle about 90% of their applications, including core systems, General Ledger, and ATM processing. Banks that are primarily insourced employ vendors only about 15% of the time.

Test of research model

Partial least squares (PLS) was used to analyze the effects of these various economic variables on the decision to outsource IT. Given missing data, the N for the PLS analysis was 225. The path coefficients and their T-statistics and the explained variances for the model components are shown in Figure 2. Item loadings and their T-statistics are presented in Appendix B. As Figure 2 indicates, the model explains 52% of the variance in degree of IT outsourcing.

The coefficient linking advantage in external production costs to information systems outsourcing in the PLS run was highly significant and in the posited direction. This finding supports Hypothesis 1. Banks tended to outsource IT when they perceived external services-providers could offer comparative advantages in IS production costs.

In the main test of transaction economies, the coefficient linking perceived transaction costs with IS outsourcing was statistically significant and negative. This result supports hypothesis 2. Banks were less likely to outsource IS activities when they perceived transaction costs associated with outsourcing the function to be high.

The findings do not support hypothesis 3. The coefficient linking financial slack with IS outsourcing was statistically insignificant and, moreover, in the wrong direction. Across all sizes of banks, banks did not outsource IS services more when slack was low than when slack was high.

Degree of IT outsourcing measures

In that three different perspectives—operational, functional, and applications—were employed in the study instrument, it was not anticipated that they would necessarily load equally, or even load that well together. An unexpected consequence of the study, however, was that these three measures showed a strong tendency to covary, and they did indeed load together and at high values in the PLS run. The loadings for the items making up the IT outsourcing construct, OUT1 = 0.9668, OUT2 = 0.8842, OUT3 = 0.9596, satisfy the criterion for nomological validity and, as reported above, the Cronbach α of .90 indicates con-

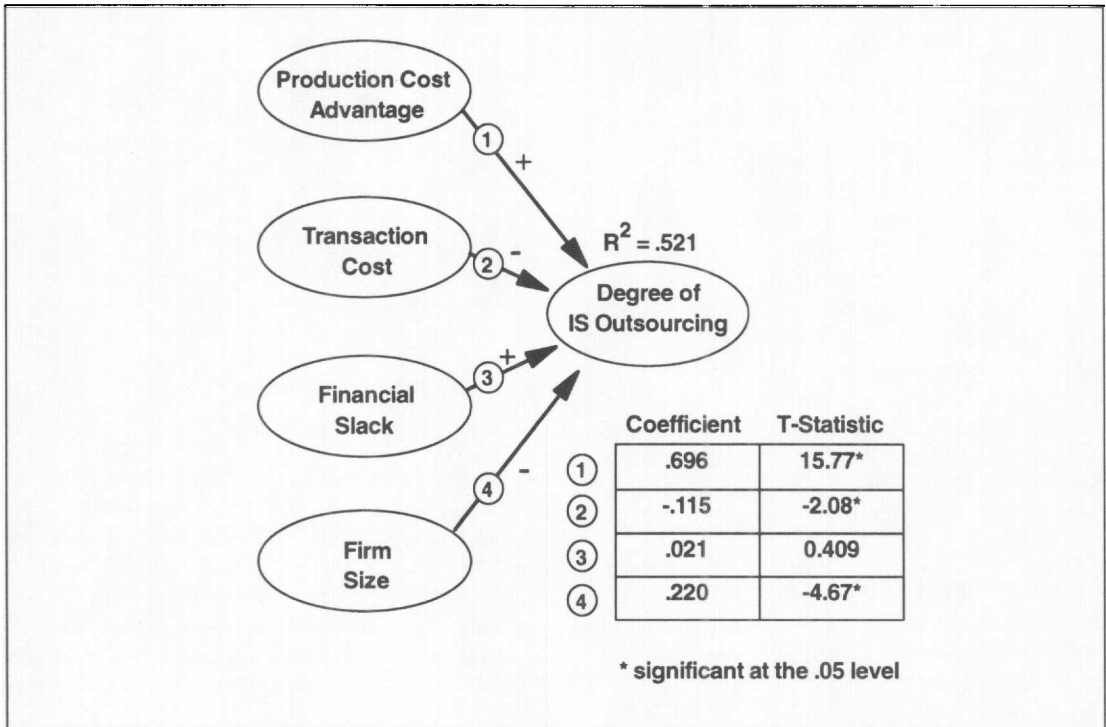


Figure 2. PLS Results

sistency across measures. Researchers who are considering how to measure IT outsourcing should note that these measures demonstrate some strong psychometric properties.

Discussion

Overall, the results offer evidence that economic factors can play an important role in the decision-making processes of bank managers. Production and transaction economies affected IS outsourcing choices; surprisingly, financial slack did not have a bearing on such decisions.

Production economics findings

Based on the data analysis presented earlier, perceived comparative advantages in production costs offered by vendors appear to lead to

a greater degree of IS outsourcing. This result is consistent with findings in a study of the U.S. automobile industry, which strongly supported the effect of production advantage of the supplier on sourcing decisions (Walker and Weber 1987). Production costs were particularly salient, reflecting perhaps that the major corporate rationale for outsourcing is operational cost savings. With an average 15% to 20% savings in operational cost from outsourcing, banks have been able to substantially reduce technology outlays on IT expenditure (Anonymous 1993). For example, First Fidelity Bancorp, which has \$29 billion in assets, reduced operating expenses by as much as \$150 million in 1991, with the bulk of the saving derived from lower labor and equipment costs related to IT. Although this is an argument that reports in popular press tend to inflate potential savings (Lacity and Hirschheim 1993), the present study shows, nevertheless, that perceived comparative cost advantages offered by vendors is a major fac-

tor in banks outsourcing IS services. In that banking is an industry with a long history of outsourcing, the strength of the finding in the present study is worth re-emphasizing.

As predicted, bank managers were apparently cognizant of the need to factor in marketplace "friction" in assessing the returns they would receive from IS outsourcing. Bank managers were apparently not overconfident in the returns they would receive from IS outsourcing and their decisions were tempered somewhat by the extent of transaction costs associated with outsourcing. They were aware, for example, that firms must pay a price to negotiate a good contract and to monitor the ongoing actions of their systems integrators.

Financial slack findings

Based on the results of the data analysis, the sourcing decision is not readily explained by a firm's sensitivity to fluctuations in financial slack. In spite of the fact that different forms of theory-based measurement were utilized, the latent construct was not significant at the .05 level. With a sample size of 225, moreover, statistical power was high (Cohen 1977), which means that it is unlikely that these results are simply a statistical artifact.

As discussed in an earlier study (Lacity and Hirschheim 1993) and in the report written by the General Accounting Office (GAO 1992), IT vendors often offer financial packages whose net present value provide organizations with immediate cash infusions and postpone payments until the end of the contract. Based on such accounts, it has been thought that this type of sourcing arrangement enables banks to maintain capital, defer losses on disposing assets, and show an increase in financial value on the balance sheet. However, these arrangements also mean that bank books are artificially inflated and hence do not reflect the true financial position of the institutions. The evidence in this study indicates that banks, at least, are *not* regarding outsourcing purely as a monetary solution for alleviating anxiety generated from declining retained earnings or

potential slack available from outside the firm. This finding suggests that such short term financial solutions (Behara et al. 1995) are *not* being favored over decisions based on other economic factors.

Firm size findings

The strong relationship between the control variable, bank size, and outsourcing was not surprising. Smaller organizations have more difficulty generating economies of scale in their IT operations that allows them to justify internal operations (Lacity and Hirschheim 1995). No doubt there are other elements to firm size that would also explain why this relationship appears so consistently as a factor associated with outsourcing in the IS literature (Brynjolfsson et al. 1994; Grover et al. 1994). Firm size, for example, clearly has roots in social characteristics related to IT sourcing (Ang and Cummings 1997).

Interpretation of relative coefficient weights

Taking especial note of the coefficients in the model, several interesting relationships need interpretation. First, the coefficient for production cost advantage (.696) is about six times as large as that of transaction costs (-.115). The relative strength of these links suggests that the effect of simple costs on the choice to outsource is far greater than that of transaction costs, even though both were significant. What this implies is that while managers, in general, consider both production and transaction costs in their decision making, production costs are the overwhelmingly dominant factor.

The major issue is whether the production cost advantage factor is weighed more heavily by managers than the transaction cost factor. The sign of the coefficient, i.e., whether the factor is an incentive or an impediment, is not at issue since the data gathered from the respondents represents in itself the importance placed on these factors. Thus, the path coeffi-

cients may be interpreted as suggesting that managers place six times more emphasis on production costs than on transaction costs in their outsourcing decisions.

Indeed, if the responses of managers on production and transaction cost measures are averaged and then compared across firms that were primarily insourcing versus those primarily outsourcing IT, some very revealing statistics emerge. As shown in Table 4, managers who are primarily insourcing IT are more likely to consider the friction of the transaction (mean = 5.30) than are those who have made the decision to outsource heavily. This is in stark contrast to production costs where those who are significantly invested in outsourcing place a large emphasis on comparative production cost analysis (mean = 5.26). What is also revealing is that each group of managers seems to heavily downplay costs that might weigh against their decision: production costs for those insourcing (mean = 2.75) and transaction costs for those outsourcing (mean = 4.38).

These findings are troubling. If Williamson is correct, and there is every reason to believe that he is, managers should be considering transaction costs in every outsourcing decision, not just frequently enough for the overall findings to show significant relationships. Managers who have made the decision to invest heavily in outsourcing should be even more sensitive to the value of transaction cost analysis than those who have not made this decision. That they may not be suggests that managerial decisions are far from the normative ideal represented in theory and in the outsourcing literature.

Study Limitations

Despite the mounting evidence in favor of transaction cost explanations, the *completeness* of these has been questioned (Eisenhardt and Brown 1992). In fact, the fundamental critique of transaction cost analysis is that it focuses solely on efficient organizational boundaries and ignores other factors. Consequently, transaction cost analysis isolates or atomizes organizational economic actions when such actions should be construed more appropriately as socially embedded in ongoing networks of relationships with *internal* and *external* institutional constituents (Ang and Cummings 1997; Granovetter 1992; Hesterly et al. 1990). With an undersocialized conception of economic actions, production and transaction cost analyses then could overemphasize efficiency concerns and ignore other non-efficiency organizational goals such as legitimation, approval, and power. Besides approaching the study of IS outsourcing through other substantive dimensions, researchers should also explore the use of alternative methods.

However appropriate to the research questions being explored in this study, the banking sample clearly limits the generalizability of results. As outsourcing becomes pervasive across industries and develops longer decision-making histories in these firms, future researchers will want to gather samples that extend the external validity to all industries.

Perhaps the most severe limitation of the study is the cross-sectional nature of the study. Degree of outsourcing could influence perceptions of transaction costs as well as the oppo-

Table 4. Production Costs and Transaction Costs Across the Decision to Outsource IT
(where 1 = Strongly Disagree; 7 = Strongly Agree; 4 = Neutral)

	Primarily Insourcing IT	Primarily Outsourcing IT	Total N
Production Costs ...are important	2.75 (N=140)	5.26 (N=85)	225
Transaction Costs ...are important	5.30 (N=133)	4.38 (N=84)	217

site effect. Longitudinal data gathering should be considered to ensure direction of causality in future studies. Moreover, although the key informant was a senior manager, there are always methodological limitations associated with gathering data from a single source.

Conclusion

Supply and demand forces place in perspective the interesting conflict of a reluctant organization striving to maintain its independence from others while knowing that it must assent to interorganizational ties to procure the resources it needs (Lacity, et al., 1995). Outsourcing poses challenges for both user organizations and service providers: in estimating the "true" costs and savings of outsourcing; in managing power dependencies in the exchange; and in balancing the opportunities offered by open boundaries and free-flowing information against the need to protect the organization's unique capabilities. This study is a first attempt to compare the relative effects of production and transaction costs on managerial outsourcing decisions in the IT context. Both production costs and transaction costs can and, it is argued, should have a major impact on decisions to outsource. Managers need to be especially vigilant to see that estimates of both kinds of costs figure into their calculations of ROI.

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Appendix A

Definition and Operationalization of Constructs in the Survey

Degree of information systems outsourcing refers to the degree of reliance on external service-providers for IS functions and banking applications. Informants from each bank indicated the degree to which decisions on major IS management activities were controlled internally, jointly between bank personnel and external service-providers, or externally by service providers. This is consistent with Loh and Venkatraman (1992b) and Quinn and Hilmer (1994) who conceptualize outsourcing as the locus of governance in decision rights or control. There were three perspectives on outsourcing requested: (1) an omnibus operations perspective (1 item), (2) a functional perspective, and (3) an applications perspective. With regard to (2), following the work of Cash et al. (1992) on the nature of the IS function, the major IS management activities used were IS strategy, IT planning, capacity management, production scheduling, IS human resource management, security management, network management, and PC management. With regard to (3), measurement was based on the extent of outsourcing of primary applications in the banking industry, namely: (a) core banking systems, i.e., demand deposit, savings, certificate of deposit; (b) installment loan systems; (c) commercial loan systems; (d) customer information files; (e) general ledger; (f) trust accounting systems; (g) bond accounting systems; (h) ATM processing; (i) credit card processing; (j) payroll processing.

Production cost advantage refers to the degree to which an external service provider is perceived to have advantage in production cost economies over an internal bureaucratic management with respect to IS services. Production cost was operationalized through three components: hardware costs, software costs, and cost of information systems personnel.

Transaction costs refers to the effort, time, and costs incurred in searching, creating, negotiating, monitoring, and enforcing a service contract between buyers and suppliers. Transaction cost was operationalized through perceived measures of contracting and monitoring costs.

Financial slack refers to financial resources an organization possesses in excess of what is required to maintain the organization. It was operationalized by (1) an archival measure of available slack; (2) an archival measure of potential slack; and (3) a perceived measure of the excess budgetary and funding resources available for IT investment.

Firm size refers to the capability of a firm to create and maintain scale economies. It was operationalized by total firm assets, which is the standard way of measuring bank size.

Appendix B

Jackknife Estimates and T-Statistics for Indicators

Sample size: 225						
Loadings:						
	Entire sample estimate	Mean of subsamples	Jackknife estimate	Standard deviation	Standard error	T-Statistic
Production Cost						
PRODCOST1	0.7696	0.7696	0.7747	0.4394	0.0293	26.4445
PRODCOST2	0.8255	0.8255	0.8264	0.3869	0.0258	32.0406
PRODCOST3	0.7777	0.7777	0.7707	0.5337	0.0356	21.6633
PRODCOST4	0.7863	0.7863	0.7920	0.4775	0.0318	24.8763
PRODCOST5	0.8431	0.8431	0.8482	0.3661	0.0244	34.7528
Transaction Cost						
TRCOST1	0.8097	0.8097	0.8203	0.5488	0.0366	22.4213
TRCOST2	0.8419	0.8419	0.8437	0.4670	0.0311	27.1016
TRCOST3	0.7886	0.7885	0.8044	0.6532	0.0435	18.4735
Financial Slack						
AS1	0.5305	0.5300	0.6411	4.2407	0.2827	2.2677
SLACK1	0.8842	0.8842	0.8928	1.4191	0.0946	9.4368
SLACK2	0.4667	0.4665	0.5062	2.9458	0.1964	2.5777
Degree of Outsourcing						
OUT1	0.9668	0.9668	0.9566	0.0551	0.0037	260.5838
OUT2	0.9039	0.9039	0.8945	0.2264	0.0151	59.2568
OUT3	0.9596	0.9596	0.9690	0.0754	0.0050	192.7366

Appendix C

Summary of Measures

Construct	
Degree of Information Systems Outsourcing	<p>Operations Perspective: Please check the box which best describes the PRIMARY way in which your bank's computer data processing facilities are managed and operated. CHECK ONLY ONE BOX ON THIS PAGE. Choices are: [1] You have your own INTERNALLY MANAGED, IN-HOUSE data processing operations; [2] Your BANK HOLDING COMPANY or PARENT BANK provides you with computer services; [3] Other BANKS provide you with computer services; [4] External SERVICE BUREAUS provide you with computer services; [5] You have FACILITIES MANAGEMENT with information technology service providers that are now owned by a bank; [6] You share data processing services with other banks with similar data processing requirements in a JOINT-VENTURE, COOPERATIVE COMPUTER SERVICES arrangement; [7] OTHER arrangement (specify). [Definitions of each of the above accompanied the original instrument.]</p> <p>Functional Perspective: For each of the IS activities listed below, please circle the number corresponding to the DEGREE to which decisions concerning IS management and operational control are made internally by your bank personnel, jointly (cooperatively) by your bank personnel and those of an external service-provider, or externally by those of an external service-provider. External service-providers include information systems consultants, bank holding companies, correspondent banks, service bureaus, facilities managers, and joint venture cooperatives. [Scale ranges from 1 (Exclusively Internal) to 4 (Jointly) to 7 (Exclusively External). Definitions of each function were included in the original instrument.]</p> <ol style="list-style-type: none"> 1. Information systems strategy 2. Information technology planning 3. Capacity management 4. Production scheduling 5. Human resources management 6. Security management 7. Network management 8. Personal computer (PC) management
	<p>Applications Perspective: Each of the following banking applications were classified according to the IT sourcing scale shown above under "Operations Perspective": [a] core banking systems, i.e., demand deposit, savings, certificate of deposit; [b] installment loan systems; [c] commercial loan systems; [d] customer information files; [e] general ledger; [f] trust accounting systems; [g] bond accounting systems; [h] ATM processing; [i] credit card processing; [j] payroll processing.</p>

Appendix C. Continued

Construct	Item Name	Questionnaire items below are on a 7-point Likert scale with 1—strongly disagree; 2—moderately disagree; 3—slightly disagree; 4—neutral; 5—slightly agree; 6—moderately agree; and 7—strongly agree
Production cost advantage	COST1	"We have the scale and volume to justify internal data processing management and operations."
	COST2	"An external data processing service-provider would be able to reduce our <i>hardware costs</i> ."
	COST3	"An external data processing service-provider would be able to reduce our <i>software costs</i> ."
	COST4	"An external data processing service-provider would be able to reduce our <i>information systems personnel costs</i> ," and
	COST5	"It is cheaper to manage our own data processing facilities and services than to rely on external data processing service-providers." ²
Asset specificity (5 items)	ASSET1	"Compared to our peer banks, our IS facilities and services require technical skills that are relatively unique."
	ASSET2	"To process our data, external service-providers would have to make substantial investments in equipment and software tailored to our needs."
	ASSET3	"Our data processing operations are more complex than the data processing operations of peer banks."
	ASSET4	"We use more hardware platforms and multiple systems configurations than most of our peer banks."
	ASSET5	"Our banking software portfolio is more sophisticated and complex than those of peer banks."
Supplier presence (3 items)	SUPP1	"There are a sufficient number of reputable external service-providers who potentially could provide IS facilities and services to our banks."
	SUPP2	"There are a sufficient number of trustworthy external service-providers who potentially could provide IS facilities and services to our banks."
	SUPP3	"If we decide to terminate inhouse IS operations, there are other external service-providers who could provide us with the same level of IS facilities and services."
Transaction cost (3 items)	TRCOST1	"There would be significant problems associated with negotiating a contract or agreement (e.g., agreeing on conditions, prices, etc.) with an external service-provider for our data processing services."
	TRCOST2	"External data processing service-providers would have to be closely and constantly monitored to ensure that they adhere to our contractual terms and conditions."
	TRCOST3	"It would be very difficult to modify our contracts or agreements with external data processing service-providers once a contract is signed."
Perceived financial slack (2 items)	SLACK1	"Compared with our peer banks, our bank has more money that could be invested in data processing services and operations."
	SLACK2	"We are facing tighter data processing budget limitations than we did three years ago."

² Questionnaire items for external production cost advantages and transaction costs were worded slightly differently depending on whether the bank adopted inhouse IS services or outsourced for IS services. For banks that outsourced, the phrase "would be" was changed to present tense in each of the items in order to reflect the situation facing the respondent or the respondents' context.