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What drives netsourcing decisions? An empirical analysis

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Abstract

Netsourcing, a rather innovative form of web-enabled value creation, describes outsourcing of selected software applications to external service providers via the Internet. It promises flexibility and cost advantages over operating software applications in-house. However, it also raises the question which software applications corporate users should netsource and which they should keep in-house. To answer these questions, we develop a research framework with seven independent variables derived from the literature on full information technology outsourcing. On data collected in a 2004 survey among the 500 largest German companies, we apply a logistic regression analysis. As a result, we find significant statistical support for strategic management variables and no support for transaction cost economics variables as being relevant to the netsourcing decision. We conclude the paper with some lessons learned and suggestions for further research.
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Introduction

Offering selected web-enabled software applications and application modules to corporate users has recently gained attention in the business press as reports on Salesforce.com, USinternetworking, and other service providers and market volume estimates of up to 21 billion USD for 2007 suggest. Web services add a new chapter to the field of web-enabled software. They present the glue that allows for very diverse web-enabled software applications and application modules to be integrated and to interoperate (Ferris & Farrell, 2003; Williams, 2003). Putting emphasis on integration and interoperability, web services give corporate customers the opportunity to selectively source single applications and even application modules from diverse providers. Not being dependent on a single provider owing to a commutability of software applications permits corporate customers to regard software application sourcing more transaction-oriented as suggested by utility computing, which – among other elements – describes software applications as ‘available as needed and billed according to usage, much like water and electricity today’ (Ross & Westerman, 2004, p. 6). For potential customers, the question remains whether and when to take advantage of such modularized offerings, in contrast to outsourcing almost their complete information technology (IT) infrastructure or – in the other extreme – to keeping all IT in-house.

Web-enabled software applications and application modules are composed of a web interface as service environment, the Internet as channel for service delivery, and the service product, for example, the management of customer data (Rust *et al.*, 1996; Hong *et al.*, 2002; Rust & Kannan, 2003). From a user's perspective, such web-enabled software applications allow for outsourcing selected corporate software assets to external service providers. As the Internet is the underlying infrastructure for selective outsourcing of software applications, such a sourcing option is specified as *netsourcing* (e.g. Kern, 2002). Kern *et al.* (2002, p. 1) define netsourcing 'the practice of renting or 'paying as you use' access to centrally managed business applications, made available to multiple users from a shared facility over the Internet or other networks via browser-enabled devices'. Following this definition, netsourcing can be regarded an umbrella over a range of business models including Application Service Provision (Kern *et al.*, 2002). ASP offerings differ from web services and other business models such as Internet Service Providers, Operations Service Providers, Solution Service Providers also subsumed under the term netsourcing, as they only provide single, complete and standardized applications.

Lacity & Hirschheim (1993, 1994), and Lacity *et al.* (1996) regard transferring IT activities to external service providers as an outsourcing decision with different degrees and they differentiate between full and selective IT outsourcing. *Full IT outsourcing* describes the transfer of a substantial part of IT-related activities to one single or a consortium of external providers. In contrast, *selective IT outsourcing* portrays the transfer of single activities such as development or maintenance, single processes (i.e. Supply Chain Management, Customer Relationship Management), or single software applications to an external service provider. *Netsourcing* is even more limited specifying selective outsourcing of software applications and application modules via the Internet. Thereby, netsourcing represents a fragmented outsourcing configuration with applications potentially outsourced to many providers. One could expect a preference for such arrangements in Western rather than in oriental companies (see also Quinn & Hilmer, 1994). Concerning the time span, netsourcing settings, in spite of their 'pay as you use' characteristic (Kern *et al.*, 2002), do not need be limited to spot trades. Even long-lasting engagements of external service providers and corporate users are conceivable.

IT outsourcing developments described above have evolved in three historic waves. Compared to full outsourcing arrangements during the first wave, netsourcing arrangements describe the third and current wave. The first IT outsourcing wave began in the 1960s. A technology focus, typical of this wave, was caused by the dominance of strongly centralized mainframe systems. The second IT outsourcing wave, starting in the 1980s, was marked by a business focus. It was driven by the evolution of intra-organizational, distributed client–server systems. The advent of the Internet and its capability as delivery channel provide improved connectivity and thereby open the door for the third IT outsourcing wave, the netsourcing wave. Starting in the late 1990s, the netsourcing wave characterizes an industry-specific utilization of browser-based remote computing models for outsourcing of selected applications via the Internet (Currie & Seltsikas, 2001; Ferris & Farrell, 2003).

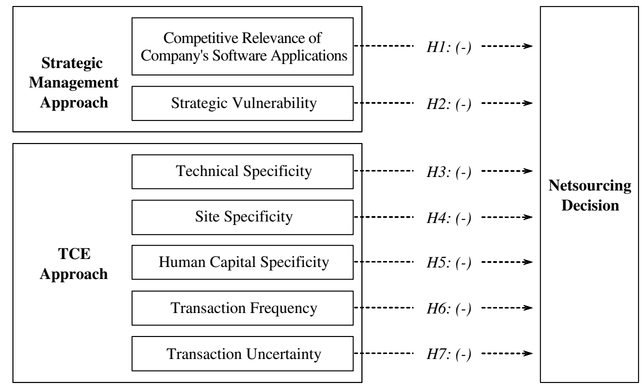

Figure 1 Research framework.

As of its increasing practical relevance, we focus on netsourcing and expand insights from previous research. Netsourcing allows for a better differentiation among software applications with regard to their outsourcing eligibility and thereby casts new light on the meaning of traditional full IT outsourcing factors for an analysis of web-enabled business value.

Research framework

To investigate whether and to what degree the same factors that drive full IT outsourcing are equally relevant for netsourcing decisions, we develop a research framework (see Figure 1) on the basis of two theoretical approaches selected from the literature on full IT outsourcing. We select strategic management approaches to account for arguments of rational decision-making on the organizational level and transaction cost economics (TCE) to focus on transactions of sourcing relationships.[1]

In developing the research framework, we derive the variables from the literature on full IT outsourcing and focus on investigating whether and to what degree the same factors play a role in netsourcing. As we require the variables to be measurable on the application level, we exclude variables such as synergies and strategic flexibility from our investigation of netsourcing drivers.

[1]Thus, we disregard theoretical approaches that investigate outsourcing decisions with regard to the relationship of individuals and organizations (e.g. Loh & Venkatraman, 1992; Lacity & Hirschheim, 1993; Nam *et al.*, 1996). We also discount relationship-oriented theories of rational decision-making such as agency theory which have been applied to analyze outsourcing relationships considering cooperative inter-organizational approaches (e.g. Henderson, 1990; Kern, 1997) or focusing on moral hazard (e.g. Cheon *et al.*, 1995; Hancox & Hackney, 2000).

Depending on their value, the variables weigh for and against netsourcing. It is conceptually negligible whether the variable stands for a risk inhibiting or for a benefit supporting netsourcing.

As *dependent variable*, we choose a company's *netsourcing decision*, that is, we analyze whether or not a company netsources, but not which exact applications it considers for netsourcing.

Independent variables

The research framework comprises seven independent variables which are derived from the *strategic management* literature (e.g. Miles & Snow, 1978; Quinn, 1980; Porter, 1985) and the *TCE* literature (e.g. Coase, 1937; Williamson, 1975; Williamson, 1979; Williamson, 1981) and have in the past been used for studying full IT outsourcing decisions (e.g. Lacity & Hirschheim, 1993; Grover *et al.*, 1994; Lacity & Willcocks, 1995; Slaughter & Ang, 1996; Kern, 1997; Ang & Straub, 1998; Lacity & Willcocks, 1998; Smith *et al.*, 1998; Hancox & Hackney, 2000; Currie & Seltsikas, 2001; Lacity & Willcocks, 2001; Kern, 2002; Vital & Benoit, 2002; Dibbern *et al.*, 2004). Table 1 outlines the variables and the main sources.

In the research on full IT outsourcing, the strategic management approach delimits firms eligible of outsourcing from those not eligible according to the strategic relevance of their IT. Netsourcing factors derived from strategic management acknowledge the variety of the corporate software portfolio, reaching from commoditized application packages to specifically developed and individualized applications. TCE introduce the cost of market usage by differentiating corporate IT and its outsourcing eligibility according to several transaction variables. Regarding netsourcing, factors derived from TCE recognize the short-term transaction-oriented perspective of netsourcing offerings.

In the following, we briefly introduce each of the seven independent variables:

Competitive relevance of company's software applications: Competitive edge is reached by creating and exploiting unique sources of value. Within the value chain, sources of unique value could be identified in capabilities, which are impossible for competitors to imitate at reasonable cost. Thus, competitive relevance of company's software applications is critical to netsourcing decisions as disregard could commoditize competitive edge and finally lead to decreased value in IT (e.g. Apte & Mason, 1995; Cronk & Sharp, 1995; Nelson *et al.*, 1996; Hancox & Hackney, 2000).

Strategic vulnerability: Critical capabilities such as specialized or strategically important skills expose a company to strategic vulnerability. Netsourcing such capabilities causes risks insofar, as the company is endangered of losing critical skills (Quinn & Hilmer, 1994), which are needed across several functional areas (Vital & Benoit, 2002). Also, a company runs the risk to suffer a netsourcing-induced shift of control to the external service provider (Jurison, 1995; Loh & Venkatraman, 1995).

Technical specificity relates to the customization level of corporate software applications (Stuckey & White, 1993). Traditionally, a major cost reduction effect in IT outsourcing arrangements has originated in economies of scale due to mass production efficiency (Lacity & Hirschheim, 1994; Lacity *et al.*, 1996; Ang & Cummings, 1997; Harrington, 2000; Schmerken, 2000; Desai *et al.*, 2003). However, economies of scale diminish with considerable customization or even individualization. The netsourcing cost advantages promised therefore vanish as software is increasingly tailored to an industry or even a single customer.

Site specificity refers to the location dependency of an IT asset (Stuckey & White, 1993). Technical infrastructure requirements, such as specific servers only being available within a company's boundaries, illustrate such a dependency. Also, potential threats such as indiscretion or leaking information are conceptualized under site specificity. Neglecting existing site specificity increases costs and thereby compensates the netsourcing cost advantages.

Table 1 Independent variables and corresponding literature sources

Approach	*Variable*	*Literature sources*
Strategic management	Competitive relevance of company's software applications	Apte & Mason (1995), Cronk & Sharp (1995), Feeny & Willcocks, (1998), Teng *et al.* (1995), Nelson *et al.* (1996), Fowler & Jeffs (1998), Hancox & Hackney (1999) and Hancox & Hackney (2000)
	Strategic vulnerability	Quinn & Hilmer (1994), Jurison (1995), Loh & Venkatraman (1995) and Vital & Benoit (2002)
TCE	Technical specificity	Stuckey & White (1993), Ang & Cummings (1997), Hancox & Hackney (1999) and Hancox & Hackney (2000)
	Site specificity	Stuckey & White (1993)
	Human capital specificity	Loh (1994), Cheon *et al.* (1995), Aubert *et al.* (1996) and Nam *et al.* (1996)
	Transaction frequency	Aubert *et al.* (1996), Earl (1996), Nam *et al.* (1996) and Poppo & Zenger (1998)
	Transaction uncertainty	Cheon *et al.* (1995), Aubert *et al.* (1996), Earl (1996), Poppo & Zenger (1998) and Benoit *et al.* (2004)

Human capital specificity portrays the dependency on a company's own specially trained personnel (Cheon *et al*., 1995; Aubert *et al*., 1996), which could weigh for or against netsourcing. External personnel on the one hand could be better qualified than internal developers (e.g. Quinn & Hilmer, 1994). On the other hand, they may lack specific know-how about business processes and technical infrastructure of the sourcing company or cause insufficient dedication, timeliness and, finally, performance.

Transaction frequency refers to the number of recurring acquisitions of the same asset (Aubert *et al*., 1996). Any acquisition involves vendor search, screening, and subsequently negotiating activities. Frequent acquisitions bind resources to the activities described above. In addition, even one-time acquisitions of software packages may imply recurring activities regarding upgrades and maintenance. Therefore, transaction frequency depends on the frequency of changes in software application requirements in order to determine the amount of searching, screening, and negotiating. Frequent changes imply additional costs and therefore hamper cost savings from netsourcing.

Transaction uncertainty is traditionally determined by performance measurement complexity (Poppo & Zenger, 1998). Indirect measurement of outsourced applications and the intensity of control activities boost the costs associated with netsourcing, hence making it less attractive (Earl, 1991; Cheon *et al*., 1995; Benoit *et al*., 2004). Figure 1 depicts our research framework.

Research hypotheses

Concerning the seven independent variables derived from the literature, we introduce one research hypothesis per variable:

H1: *The higher the competitive relevance of a company's software applications, the less a company netsources software applications.*

H2: *The more a company's software applications are subject to strategic vulnerability, the less a company netsources software applications.*

H3: *The more technical specificity is inherent in a company's software applications, the less a company netsources software applications.*

H4: *The more a company's software applications inherit a high degree of site specificity, the less a company netsources software applications.*

H5: *The more a company's software applications inherit a high degree of human capital specificity, the less a company netsources software applications.*

H6: *The more transaction frequency is inherent in a company's software applications, the less a company netsources software applications.*

H7: *The more transactions uncertainty is inherent in a company's software applications, the less a company netsources software applications.*

Research approach

Data collection

We collected the data with a 2004 survey among the 500 largest German companies based on total sales representing all sectors and industries (F.A.Z. Institut fuer Management-, Markt- und Medieninformationen, 2002). To this list, we applied a systematic sampling (Cochran, 1977) to draw the participants: One of the first three companies in the alphabetical list of 500 companies is drawn by lot. Further candidates are drawn from the list with an interval of three, thus picking one-third of listed companies. Then the procedure is repeated for the remaining list, selecting one of the first two by lot and consequently drawing further candidates with an interval of two, at the end resulting in a sample of 333 out of 500 companies.

Of those 333, we eliminated 41 to avoid redundancies owing to IT aggregation with the respective parent company also included in the sample. Another 54 companies could not be contacted because either the Chief Information Officers (CIOs) had changed and contacts efforts were not forwarded or because companies had outsourced their entire IT department and therefore did not have a department to be contacted. So we reduced the original 333 companies by 41 due to redundancies and by another 54 due to lack of contact possibility. This left us with a sample of 238 companies.

Of the 238 companies contacted, 88 CIOs or IT directors filled out the questionnaire completely, yielding a response rate of 36.97%. A *t*-test for equality of means was conducted among respondents and a group of non-respondents comparing both groups on the basis of total sales and number of employees in order to assure the absence of a significant non-respondent bias (Hansen & Hurwitz, 1946; Teng *et al*., 1995). Table 2 shows that the test yielded no significant difference between respondents and non-respondents ($SIG_t > 0.05$).

With 88 filled-out questionnaires received, we count 54 cases in the set of companies that netsource and 34 cases in the smaller set of companies that do not netsource (see Table 3). The 34 cases in the smaller set are not in line with a rule of thumb, described by Green (1991) and Tabachnick & Fidell (1996), which requires for a logistic regression 50 plus eight times the number of independent variables, that is 106 cases in our research ($50 + 8 \times 7$ independent variables). However, referring to Tabachnick & Fidell (1996) or Steyerberg *et al*. (1999), for exploratory research, four to five times the number of independent variables is sufficient to conduct logistic regressions. Transferred to our research this means a minimum of 28–35 cases, which we do satisfy.

Table 2 Two-parameter comparison of respondents and non-respondents

Parameter	Respondents (N=81) Mean	Non-respondents (N=38) Mean	t-value	Sig.
Total sales (in Mill. €)	8,047.086	7,360.026	−0.218	0.828
No. of employees	18,273.640	17,249.210	−0.111	0.912

Table 3 Survey entries for dependent variable (*N*=88)

	No. of entries	
	Yes	No
Netsourcing	54	34

In the survey, we ask the respondents to assess their company's software application portfolio with regard to each of our seven independent variables, each defined in the questionnaire, on a scale ranging from '1' to '5', where '1' stands for 'very few' and '5' stands for 'all/none', both implying no netsourcing.

Data analysis

We considered using regression analysis and structural equation modeling (SEM) to analyze our data. Regression analysis was chosen over SEM owing to several reasons: SEM is not suited for non-linear relations in the data. Also, multicollinearity among variables is only accounted for in regression modeling. Especially, covariance-based SEM rather targets confirmatory research, which does not fit with our explorative research design (Gefen *et al.*, 2000). In line with this, regression models can at an explorative stage be conducted with fewer cases compared to SEM methods such as LISREL, requiring a minimum of 100 to 150 cases (Gefen *et al.*, 2000). Finally, the risk of over-fitting the model in SEM may have emerged in the explorative research stage, as the potential model fits the data but may not be suitable for hypothesis testing (Cliff, 1983).

Hence, we apply a logistic regression analysis to determine the directional influence of each independent variable on the dependent variable. We choose a binary logistic regression analysis as the dependent variable is binary. A '0' for the dependent variable states that the company is netsourcing software applications; a '1' states that the company is not netsourcing.

Overall, a significant Wald Statistic for the regression coefficient *B* as determinant of model entry ($SIG_{Wald}<0.05$), an exponential form of the regression coefficient Exp(*B*) larger than one (Exp(*B*)>1) as indication of directional influence, a sufficient Nagelkerke (1991) Pseudo-R^2 ($R^2_N>0.2$) as Goodness-of-Fit indicator and a positive discriminating power are required to support each of the seven hypotheses. For a more detailed description of the data analysis, see Figure 2.

Step 1: Wald Statistics
- Calculates the ratio of the squared regression coefficient B to the asymptotic variance of B.
- Variables with an insignificant Wald statistic, i.e., SIG_{Wald} > 0.05, are eliminated from the logistic regression model.

Step 2: Regression Coefficient Exp(B)
- Represents the odds ratio and determines the direction and strength of the independent variable's effect on the dependent variable.
- Values of Exp (B) > 1 in our configuration mean a negative influence of the independent variable on the dependent variable, whereas values of Exp(B) < 1 stand for a positive influence.
- The exact value of Exp (B) is the multiplier for the odds of the dependent variable.

Step 3: Nagelkerke R_N^2
- Assesses the strength of association of the binary logistic regression analogue to the Goodness-of-Fit in linear regression (Nagelkerke 1991).
- Measures as a validity indicator how much of the variance of the dependent variable can be explained by the independent variables.
- The Nagelkerke Pseudo-R^2 is normalized in the interval [0;1], where a higher value indicates a growing quality of the regression function.

Step 4: Discriminating Power
- Compares model performance to a random guess. The rate of correct predictions by the regression model and the rate for a random guess are calculated and compared (Hosmer & Lemeshow, 2000).
- A large positive difference between the discriminating power of the model and a random guess value for the predictions attests the independent variables a better predictive power than a random guess of the dependent variable.

Figure 2 Data analysis steps in the binary logistic regression.

Results and findings

Survey entries

Tables 3 and 4 depict the survey entries by the 88 participating companies.

Logistic regression analysis

In a first step, only variables with a significant Wald Statistic are included in the regression model (see Table 5).

With respect to *competitive relevance of company's software applications* and *strategic vulnerability*, the significance of the Wald Statistic ($SIG_{Wald}<0.05$) and regression coefficients Exp(*B*)>1 confirm hypotheses H1 and H2 and thereby attest the influence of both variables on the netsourcing decision. Therefore, both variables are included in the logistic regression model. An Exp(*B*)>1 for *competitive relevance of company's software applications* and for *strategic vulnerability* attests a decreasing probability of netsourcing with increasing values for the two independent variables (see Table 6).

Of the TCE variables, only *transaction uncertainty*, is included in the logistic regression model with Exp(*B*) >1 and a sufficient significance level ($SIG_{Wald}=0.008<0.05$) for the Wald Statistic (see Table 6). The other four independent TCE-based variables, *human capital speci-*

ficity, *site specificity*, *technical specificity*, and *transaction frequency*, are *not* included in the binary logistic regression model as the significance of their Wald Statistic does not confirm ($SIG_{Wald} > 0.05$) hypotheses H3, H4, H5, and H6 (see Table 5).

The Nagelkerke Pseudo-R^2 has a value of 0.225 for the strategic management variables indicating an acceptable quality of the regression function. A Nagelkerke Pseudo-R^2 value of 0.114 for the single TCE-based variable *transaction uncertainty*, however, attests a low quality of the regression function. Owing to the insufficient quality of the model, *transaction uncertainty* is not further supported as a significant factor to netsourcing.

Table 4 Survey entries for independent variables (*N* = 88)

Independent variable	*No. of entries*				
	Very few	*Few*	*Some*	*Many*	*All/none*
Strategic management approach					
Competitive relevance of company's software applications	14	29	15	20	10
Strategic vulnerability	8	29	18	22	11
TCE approach					
Technical specificity	19	25	18	13	13
Site specificity	5	11	20	36	16
Human capital specificity	11	13	23	29	12
Transaction frequency	3	22	26	30	7
Transaction uncertainty	6	28	27	20	7

Table 5 Variables entered in logistic regression analysis

	df	*Sig.*	*Included*
Competitive relevance of company's software applications	1	0.042	Yes
Strategic vulnerability	1	0.045	Yes
Transaction uncertainty	1	0.008	Yes
Human capital specificity	1	0.167	No
Site specificity	1	0.366	No
Technical specificity	1	0.568	No
Transaction frequency	1	0.314	No

df = degrees of freedom; Sig = Wald significance level.

The discriminating power of the binary logistic regression model is confirmed by a model prediction rate of 69.3% for the strategic management variables and 64.8% for the variables derived from TCE. Those figures are to be compared to 52.6% for a random guess. Figure 3 summarizes the results of the logistic regression analysis.

Major findings

Our research confirms the importance of factors derived from strategic management for netsourcing decisions. However, different from the literature on full IT outsourcing, it questions the importance of TCE-based factors in the netsourcing context.

The strategic management variables, *competitive relevance of company's software applications* and *strategic vulnerability*, find empirical support in the logistic regression model as significant variables to netsourcing software applications.

Concerning the variables derived from TCE, we do not find any support for the directional influence of the variables on netsourcing. *Technical specificity*, *site specificity*, and *transaction frequency* do not substantiate an influence on the *netsourcing decision*. In other words, results do not indicate restraining effects due to customization of software applications. In the same way, existing dependency on the location of an application server is not indicated to keep companies from netsourcing. Neither are activities related to repurchases

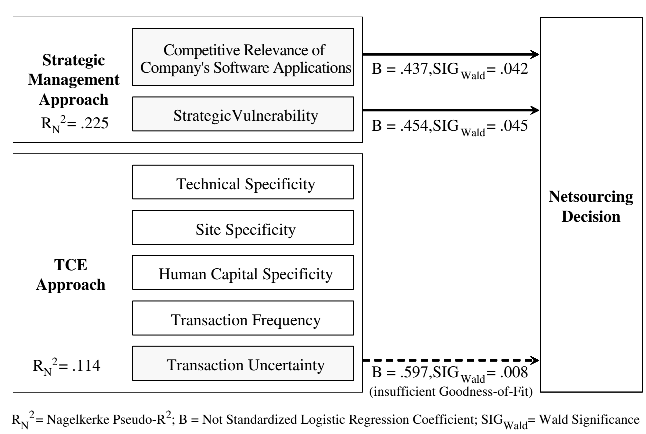

Figure 3 Binary logistic regression results (*N* = 88).

Table 6 Variables included in logistic regression model

	B	*SE*	*Wald*	*df*	*Sig.*	*Exp(B)*
Competitive relevance of company's software applications	0.437	0.215	4.140	1	0.042	1.548
Strategic vulnerability	0.454	0.227	4.015	1	0.045	1.575
Transaction uncertainty	0.597	0.226	7.006	1	0.008	1.817

B = Regression coefficient; SE = standard error; Wald = Wald statistic; df = degrees of freedom; Sig = Wald significance level; Exp(*B*) = exponential form of *B*.

and adaptations indications for denial of netsourcing software applications.

Human capital specificity lacks significant influence on the *netsourcing decision*. The fact that both variables are, however, statistically correlated ($R=0.212$; $SIG_{Pearson}=0.048$) is in line with an effect that Lacity & Hirschheim (1994) describe concerning full IT outsourcing. They ascribe this effect to politically motivated behavior resulting from the fear of an outsourcing-induced power shift. *Transaction uncertainty* theoretically associated with performance measurement problems does not show a significant directional influence on the *netsourcing decision*.

Overall, our research confirms that the more software applications are competitively relevant to a company, the less likely the company is to netsource. Similarly, the more software applications expose a company to strategic vulnerability, the less the company netsources.

These results confirm the findings from the full IT outsourcing literature regarding strategic management variables (Quinn & Hilmer, 1994; Teng *et al.*, 1995). In contrast, variables from TCE are not in line with full IT outsourcing experiences (e.g. Aubert *et al.*, 1996; Nam *et al.*, 1996; Ang & Cummings, 1997; Poppo & Zenger, 1998).

Lessons learned

Generally speaking, strategic management considerations play an equally important role in netsourcing decisions as it is well known from full IT outsourcing. Therefore, we have learned the following:

- Identifying software applications that are competitively relevant in a company's software portfolio allows for better selecting the software applications to be netsourced and for better assessing the potential for creation of web-enabled business value due to netsourcing gains. This insight triggers not only a request for internally ranking software applications in one's application portfolio according to its competitive relevance. It also encourages the benchmarking of highly ranked software applications against competitors. External service providers may want to educate users and assist them with industry data and specialists' expertise in benchmarking projects.
- To reduce negative influence of the important factor *strategic vulnerability*, corporate users and external service providers should foster an effective service management that consists of cooperative control instances and appropriate communication structures. Thus, the loss of hierarchical control and of critical skills could be limited. Service management standards as the Information Technology Infrastructure Library (ITIL), which supports a change from functional and component-based orientation towards a business process-oriented structure of IT, could promote the development of cross-functional skills by including capability-oriented management and communication structures.
- A transaction cost-related calculus appears to be less important to netsourcing decisions. While running applications remotely, company-specific application customization, or difficulties with governing of external personnel may still cause transaction cost, the transaction costs do not exceed cost savings from netsourcing, for example, economies of scale, as promised by service providers. Similarly, even frequent changes in the software portfolio and performance measurement complexities seem not to cause transaction costs that would outweigh other cost savings.

Inspite of the newly gained insights, especially with regard to TCE factors, several questions remain and new ones emerged from this research.

Conclusion and further research

Based on a literature review on full IT outsourcing, we analyze whether the same factors that drive full IT outsourcing also influence netsourcing. Supported by data from a survey of the largest 500 German companies, both strategic management factors, competitive relevance of company's software application and strategic vulnerability are found to play a role in netsourcing decisions. In contrast, none of the five TCE factors introduced in this study is found to be relevant.

Obviously, complementary studies are necessary to further investigate the benefits and the drawbacks of netsourcing from a CIO perspective and to better understand the differences between factors driving full IT outsourcing decisions and those relevant for netsourcing.

We particularly suggest an additional qualitative investigation into the role of the TCE-based variables in netsourcing decisions. Maybe the surprisingly low impact of the TCE variables on netsourcing decisions could be explained by their definition and operationalization which so far were largely drawn from full IT outsourcing research. In-depth interviews and perhaps even an adaptation of variable definitions could shed another light on the applicability of TCE arguments in web-enabled transactions such as netsourcing. Also, transaction costs could be analyzed both on an application level and on an aggregate level, thus paying tribute to the number of netsourced applications and provider relationships.

In addition, further research may want to differentiate applications in the survey design in order to specifically relate results to certain applications. Also, we propose to expand the current analysis to include additional factors from the social and organizational literature (e.g. Henderson, 1990, Hancox & Hackney, 1999; Hancox & Hackney, 2000; Kern & Willcocks, 2001) in the research design.

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