

**Economic, Systemic, and Environmental Influences
on the Sourcing of Application Services:
A Comparative Study of German and US Companies**

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Abstract

This study examines the question on why firms outsource particular information systems (IS) functions to varying degrees. It is the first to simultaneously examine three theoretical perspectives that represent different rationales for and against IS outsourcing. The first of these perspectives is new to the IS outsourcing literature. It acknowledges the systemic character of the IS function, i.e. that IS performance critically depends on various sub-functions working together effectively. Such systemic influences may be affected through outsourcing particular IS functions. Accordingly, they are considered as determinants that reflect the extent to which systemic influences are better recognized through in-house as opposed to external service provisioning. In order to examine the relative importance of systemic influences in the outsourcing decision they are contrasted against two more established ones; the one holds that the outsourcing decision is based on a cost comparison including production and transaction costs (efficiency); the other recognizes the fact that outsourcing decisions are often influenced by environmental forces as reflected by the opinion of influential stakeholders and the level of control (i.e. power) that an organization has over the decision. Additionally, this study is the first to formulate hypotheses *ex ante* on the moderating influence of cross-cultural differences on IS outsourcing determination. A questionnaire survey was conducted including 180 companies in the United States and Germany. The results revealed that efficiency considerations and the opinions of external stakeholders were significant determinants of IS outsourcing in both countries, though production costs were more strongly considered than transaction costs. As hypothesized, no statistically significant differences between countries could be detected regarding the impact of these three factors. In contrast, the consideration of two types of systemic influences varied significantly between countries confirming our hypotheses that systemic influences are cross-culturally sensitive. In addition, the impact of outsourcing control was statistically significant between countries confirming cross-cultural influences. The results reveal a number of theoretical and practical implications.

Keywords

Outsourcing determinants, cross-cultural, group comparison, software development and maintenance, PLS, multigroup structural equation modeling, system theory, transaction cost economics, resource-based theory, individualism, collectivism

1. Introduction

While in the early 1990's information systems outsourcing was a relatively new phenomenon dominated by large-scale outsourcing deals in the United States, it is now a globally recognized and accepted organizational option for managing the IS function of the firm. The global reach of IS outsourcing is indicated by a more balanced distribution of IS outsourcing expenditures across countries (TPI, 2005). And yet, outsourcing is no panacea for the management of IS services for all organizations. This is reflected by a considerable level of variation among organizations regarding the extent to which IS functions are outsourced. Most organizations prefer a selective outsourcing approach where only particular IS functions and certain portions of IS functions are handed over to external service providers (Apte et al., 1997, Lacity et al., 1995).

The observed variation in outsourcing behavior has motivated research to examine the determinants of the IS outsourcing decision. The determinants explain why some organizations prefer to outsource a higher percentage of their overall IS function to external service providers than other organizations. These determinants represent different streams of theorizing, such as economic, strategic, or institutional (Dibbern et al., 2004). In spite of these multiple perspectives, however, there are hardly any quantitative studies that considered multiple streams of reasoning within the same study. Accordingly, there is little knowledge about the relative importance of particular perspectives for the IS outsourcing decision.

Close examination of previously established IS outsourcing determinants (Dibbern et al., 2004), it is also interesting to note that the majority of factors are not IS-specific. Factors, such as strategic importance, production costs or transaction costs can be equally applied to explain the sourcing of other business functions, such as marketing or human resources. One unique feature of IS that has occasionally been mentioned in IS outsourcing research is its cross-

functional character (Dibbern et al., 2004). On the one hand, the IS function serves a number of other business functions and hence is an integral part of many business processes. On the other hand, the IS function is itself divided into various sub-functions that are often organized independently, i.e. as separate units, but still need to be integrated to form a coherent whole. IS performance usually depends on all IS sub-functions working together effectively. These systemic impacts that exist both between IS sub-functions as well as between IS and other business functions are largely affected by the organizational arrangement of these functions. Accordingly, such systemic influences may need to be considered when evaluating how IS effectiveness is influenced through outsourcing.

Finally, it is striking that the majority of studies on the determinants of IS outsourcing have been done in the Anglo-American countries of the United States and Great Britain. This raises the question of the generalizability of theoretical assertions and empirical findings across countries. The results of a limited number of studies that explored IS outsourcing determinants across countries revealed a number of national differences that suggest that national culture may be influential on the IS outsourcing decision (Apte et al., 1997, Barthélemy and Geyer, 2001, Tiwana and Bush, 2007). This is in line with cross-cultural research that has questioned the universality of management and organizational behavior theories (Cheng et al., 2001, England, 1983, Hofstede, 1983a, 1993, 1994, Triandis, 1982). For example, Triandis (1982, p. 139) stated:

“Culture is the human-made part of the environment (...). Its significance for organizational behavior is that it operates at such a deep level that people are not aware of its influences. It results in unexplained patterns of thought that seem so natural that most theorists of social behavior fail to take them into account. As a result, many aspects of organizational theories produced in one culture may be inadequate in other cultures.”

Based on the preceding discussion, the objective of this study is threefold. First, it seeks to consider multiple rationales for or against IS outsourcing, each representing different theoretical perspectives, simultaneously for exploring their *relative importance*. Second, it seeks to introduce systemic influences as a fairly new *idiosyncratic IS-related dimension* that acknowledges the highly integrated character of the IS function both inherently (i.e. across its sub-functions) and externally (i.e. with other business functions). Finally, this study seeks to consider the effect of *national culture* on the IS outsourcing decision. It is the first contribution that builds a priori hypotheses about the moderating impact of cultural dimensions on the impact of the previously deduced theoretically grounded determinants of the IS outsourcing decision.

Overall, this study contributes to previous research that sought to develop comprehensive frameworks on the determinants of IS outsourcing. It also extends previous theory contributions by combining the resource-based theory with systems theory. Moreover, by integrating cross-cultural dimensions into the theoretical frame, the generalizability of mid-range theory on IS outsourcing across nations is increased (Preston et al., 2006).

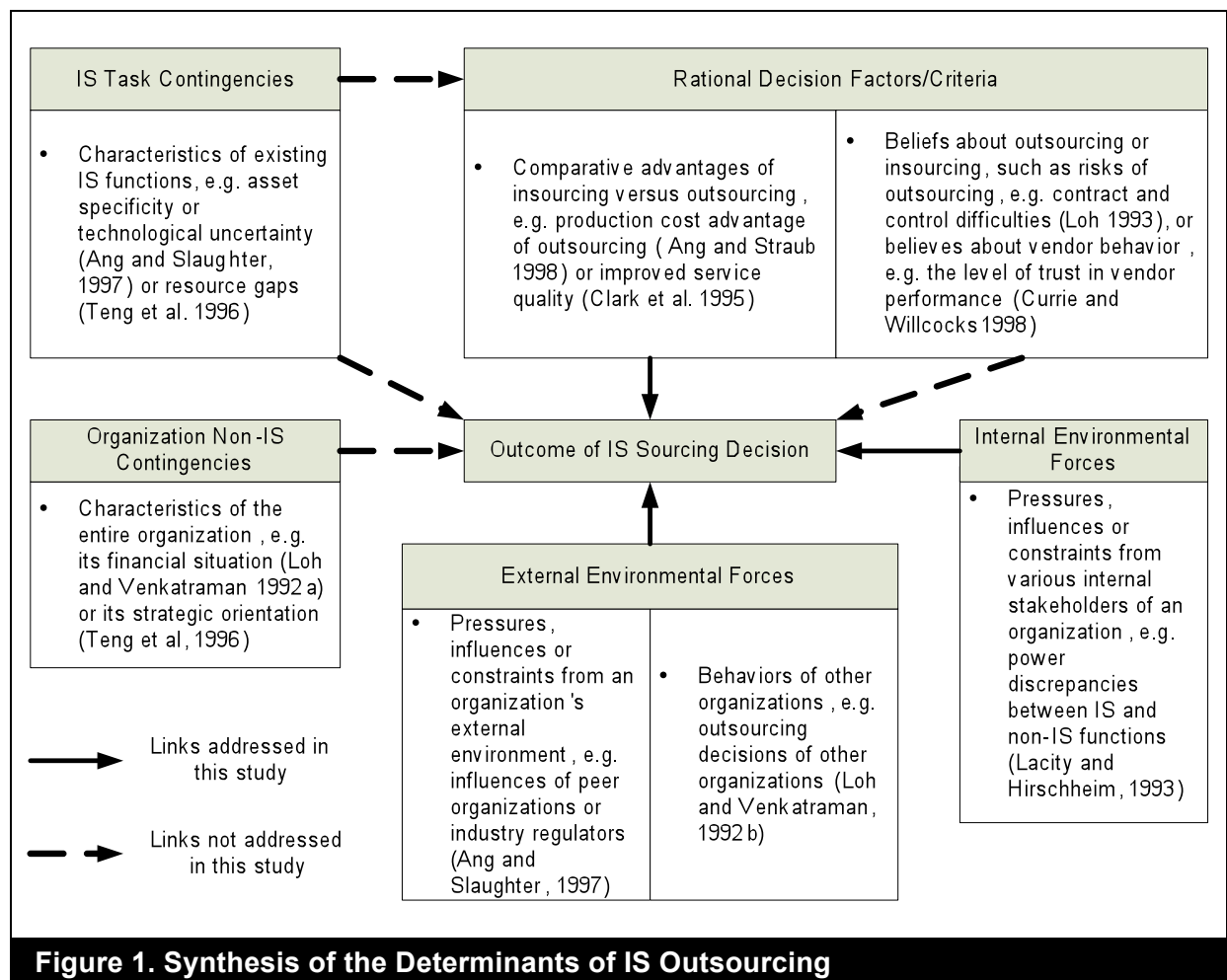
The remainder of this paper is organized as follows. The next section provides a literature review on the determinants of IS outsourcing. Based on this assessment, a theoretical framework on the determinants of IS outsourcing is developed including hypotheses on the moderating impact of cross-cultural differences. Then, the method for model testing is introduced and the results of a survey including companies from the United States and Germany are presented. Finally, the limitations and implications of the study are discussed and final conclusions are drawn.

2. Literature Review

Determinants of IS Outsourcing

The study of the determinants of IS outsourcing has already reached a relatively high level of maturity, as indicated by the use of multiple theoretical lenses and research approaches, including different empirical and non-empirical methods (Dibbern et al., 2004). When closely examining the nature of all of the determinants, five main spheres can be distinguished (See Figure 1).

The first category is *rational decision criteria*. It reflects the actual criteria that decision makers in organizations are meant to apply when evaluating alternative sourcing options and making the final decision. The most often cited argument is that outsourcing is the result of a cost comparison of in-house governance versus outsourcing including both production costs and transaction costs (Ang and Straub 1998; Barthélemy 2001). Surprisingly, there are few quantitative empirical studies that explicitly looked at factors besides costs in a comparative manner. To date, it is qualitative research that has suggested that some organizations enter into outsourcing for various strategic reasons (DiRomualdo and Gurbaxani 1998; McLellan et al. 1995), to improve service quality (Clark et al. 1995), or to gain access to better IS resources (Cross 1995). In particular, conceptual studies have also pointed to various types of risks associated with outsourcing, such as the loss of organizational learning (Earl 1996), or the loss of cross-functional skills (Quinn and Hilmer 1994).



The second major stream of determinants consists of various types of *IS related contingencies*. The theoretical idea is that by analyzing the attributes of an organization's current IS functions, conclusions can be drawn about the appropriateness of IS outsourcing. For example, based on a combination of resource-based and resource-dependence theory, it has been argued that organizations that perceive a gap between the actual and desired base of IS resources will more likely outsource particular IS functions (Teng et al., 1995). Most prominent among these contingency views is transaction cost economics (TCE). It is argued that outsourcing a particular IS function is less likely due to efficiency disadvantages if it is characterized by certain contingencies, such as a high level of asset specificity or technological uncertainty (Ang and Cummings 1997; Nam et al. 1996). Notably, the rationales on which these impacts are

based equal the rational decision criteria that were introduced earlier. Accordingly, there should be a direct logical link between both categories, as depicted in Figure 1 (e.g., higher asset specificity leads to transaction cost disadvantages and hence the degree of outsourcing should be low).

Another group of *contingencies* is that of *firm* characteristics, such as a firm's financial situation or strategic orientation (Loh and Venkatraman 1992a; Smith et al. 1998; Teng et al. 1995). The impact of these non-IS factors has received only mixed support in empirical studies. More consistent results were found for the influence of various forces of the internal and external environment of an organization.¹ *External forces* comprise the influence of peer organizations or the outsourcing behavior of other organizations (Ang and Cummings 1997; Hu et al. 1997; Loh and Venkatraman 1992b). *Internal forces* may include issues such as politics and power asymmetries within organizations (Arnett and Jones 1994; Goodstein et al. 1996; Lacity and Hirschheim 1993; Palvia 1995).

Finally, in analyzing previous research on IS outsourcing, it is worthwhile to examine the *unit of analysis* of these studies more closely (Dibbern et al., 2004). Early research has mostly abstracted from individual IS functions and treated IS as a homogeneous function. However, quite soon it became apparent that outsourcing is predominately performed selectively, i.e. that organizations choose to outsource some IS functions wholly or partially, while keeping others in-house (Lacity et al., 1996). The recognition of selective outsourcing has lead to the trend of concentrating on particular IS functions or even transactions or projects as the unit of analysis. This selective view, however, bears the danger of ignoring potential interactions among different IS functions and loosing the overall picture of the entire IS function. For example, Lacity et al. (1995) observed that if the development of a software application that required

data from many other applications was outsourced, the vendor's lack of understanding of the respective interfaces led to substantial project delays and budget overruns. To date, hardly any research has investigated such systemic influences within and across IS functions. Hence, little knowledge exists about the extent to which they are recognized in the IS outsourcing decision. In cases where systems' interconnectedness was conceptually recognized as an important factor, no information was provided about their empirical relevance (Willcocks and Fitzgerald 1993). This reinforces recent calls for explicitly analyzing systemic impacts in boundary choices (Jacobides and Billinger 2006).

In addition, there is minimal research that has examined different types of determinants within the same empirical study. Thus, there is little knowledge about the relative importance of IS outsourcing decision factors. Notable exceptions are Ang and Slaughter (1997) that studied how the influence of peer banks and bank regulators on IS outsourcing is moderated by different types of task-related contingencies. In a similar vein, Teng et al. (1996) examined the moderating influence of an organization's strategic orientation on the impact of resource contingencies. Moreover, the rival influence of multiple contingencies stemming from different theories, such as transaction cost economics and the resource-based view has been examined (Poppo and Zenger, 1998, Tiwana and Bush, 2007). However, since the direct effect of these contingencies on the IS outsourcing decision can often not be clearly attributed to one particular rationale, e.g. efficiency or effectiveness (or transaction cost economic versus resource-based reasoning (Carter and Hodgson, 2006)), there is still little knowledge about the relative importance of particular types of rationality on the outsourcing decision.

Finally, while there are a few studies that explored IS outsourcing determinants (Apte et al., 1997, Tiwana and Bush, 2007), or IS outsourcing behavior (Barthélemy and Geyer, 2001,

¹ For the differentiation between internal and external environment, see e.g. Paulson Gjerde et al.

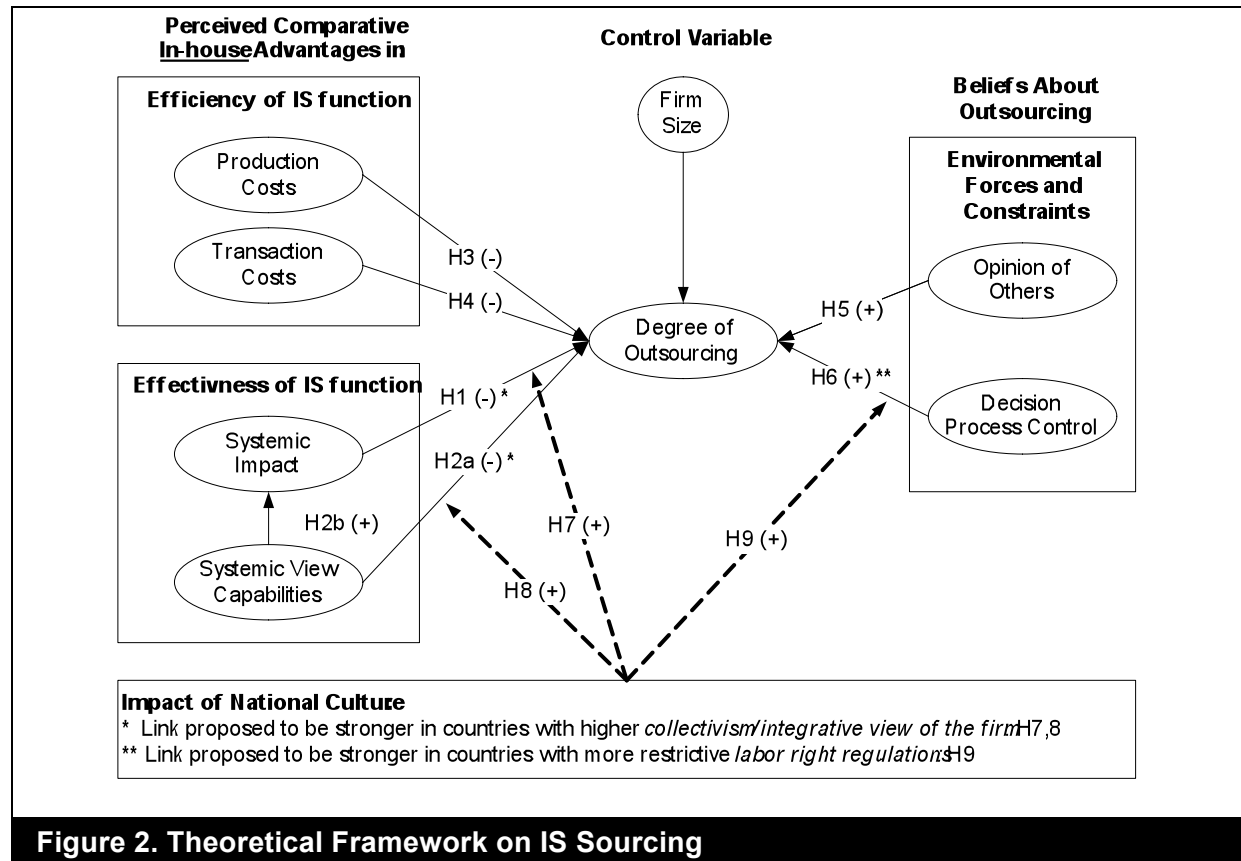
Barthélemy and Geyer, 2005) across countries, little attempt has been made to theoretically explain the observed country differences. In particular, there is a lack of integration of country-specific factors (e.g. cross-cultural dimensions) into the theoretical frame in order to extend the generalizability of mid-range theories on IS outsourcing determination.

Based on the preceding discussion, this study seeks to contribute to the existing literature by considering systemic influences as separate decision criteria in the IS sourcing decision. We aim to test their impact alongside well-established influences, such as the rationale of cost efficiency and the influential role of external and internal forces. Moreover, the moderating influence of cross-cultural differences on determinants of IS outsourcing will be considered. Non-IS contingencies are not further examined due to their relatively low empirical support in previous studies. Moreover, IS task-related contingencies are not included since they are logically related to particular rational decision criteria and their explicit recognition would go beyond the scope of this paper.

3. Theoretical Framework

Based on the previous literature review, we will develop hypotheses on the impact of selected determinants of IS outsourcing, as well as on the impact of selected cross-cultural dimensions. We base the deduction of hypotheses on outsourcing determinants on three sets of theoretical perspectives: (1) resourced-based theory along with notions of systems theory, (2) transaction cost economics and (3) the theory of planned behavior (adapted to the organizational context) along with notions of institutional theory. A graphical representation of the resulting theoretical framework is presented in Figure 2. Essentially, the model suggests that an IS function is outsourced to a lower extent if decision makers see advantages of in-house provision in efficiency (production and transaction costs) and if effectiveness, as exemplified by systemic

impacts and systemic view capabilities of IS personnel, is seen to be negatively affected through outsourcing. Moreover, organizations tend to outsource more of a particular IS function if the opinion of referential others about outsourcing is positive and if the organization has a high as opposed to low level control over the process of outsourcing. The discussion below elaborates upon each set of factors and explains why certain linkages are expected to be *moderated* by cross-cultural dimensions.



Effectiveness through Systemic Influences

According to the resource-based view, organizations generally differ in their base of resources (Barney, 1991, Penrose, 1959, Wernerfelt, 1984) and capabilities, i.e. the “(...) capacity to deploy *Resources*, usually in combination, using organizational processes, to effect a desired end” (Amit and Schoemaker, 1993, p. 35 - italics original). Thus, as far as client and vendor have different resources and capabilities, their ability to achieve IS effectiveness likely differs

as well. IS effectiveness is a multidimensional construct that can be viewed from different angles. DeLone and McLean (1992) have distinguished between system quality, information quality, user satisfaction, use, individual impact, and organizational impact (later adapted to include service quality, DeLone and McLean, 2003). These different categories are proposed to be hierarchically composed such that high level organizational impacts (strategic or operative) are dependent on base level impacts such as system and information quality. Previous research on IS outsourcing has largely focused on the implications of the IS sourcing decision on high level strategic impacts (DiRomualdo and Gurbaxani, 1998, McLellan et al., 1995) or on service and support quality (Hirschheim and Lacity, 2000, Reponen, 1993, Teng et al., 1995). Base level implications, such as implications for system quality have been rarely considered (e.g. information quality, Teng et al., 1995).

This study explicitly addresses base level implications of IS outsourcing by recognizing how the systemic impact is influenced by the outsourcing of a particular IS function. *Systemic impact reflects the extent to which the IS sub-functions and sub-components are synergistically integrated to leverage overall IS performance.* It recognizes the fact that IS effectiveness is achieved through the joint effect of all IS sub-functions working together rather than by just increasing the performance of each function separately. Such sub-functions may include applications development and applications maintenance; systems and data center operations; design and maintenance of networks and telecommunication centers; user support and training; as well as overall planning and management (Grover et al., 1994). It is often hard to separate the effectiveness of one particular IS component, such as the application software (i.e., the software development and maintenance function) from that of the overall IS (i.e., the overall IS function) (cf. Hamilton and Chervany, 1981, Pitt et al., 1995). What matters is the effect of the combined effort of all IS components and services working together. For example, the application software per se is often of little use if it is not based on a reliable and secure operating environment, or if it is not dynamically connected to other source or target

applications via powerful networks in order to establish meaningful identification, gathering, processing, and transfer of information.

This view is consistent with the premise of systems theory, which emphasizes the difference between the whole and its parts (Bertalanffy, 1979, Luhmann, 1994, Rapoport, 1988). Lacity and Willcocks (1995), in referring to related work from Milgrom and Roberts (1995, 1990) on complementary activities in manufacturing, argue that similar phenomena do exist in the field of information systems.

“An example of complementary transactions in the information systems field is building an information network in conjunction with implementing new application software. As standalone transactions, the network and software add little value ... it is the combined benefits of building both that add value” (p. 240).

According to Thompson (1967), the type of interdependency that exists between organizational sub-functions dictates the appropriate organizational structure. For example, if two functions are characterized by reciprocal interdependence, it may be beneficial to organize these functions under one common umbrella in order to enable close interaction and integration of these sub-functions. Thus, there is a close link between the relational attributes of organizational functions and their organization. Organizational sub-functions may also be viewed as modules that need to be integrated under a common architecture (Schilling, 2002). Thus, for an organization it is not only sufficient to build up specific capabilities for performing particular IS functions, but also for achieving systemic impacts. This requires capabilities in architectural design and system integration as well as the ability to achieve synergistic effects from different IS functions working together. When it comes to outsourcing parts of an organization's IS function, the question is raised whether such systemic impacts can still effectively be accounted for (Jacobides and Billinger, 2006). For example, when it comes to the outsourcing of application software services, the external vendor needs to have a certain level

of understanding of the various interfaces that exist between the application software for which he is responsible and other applications as well as other IS functions (e.g., data center operations or telecommunications networks). Accordingly, systemic impacts should reasonably be accounted for in the IS outsourcing decision. The question is raised, whether systemic impacts can be appropriately addressed if a particular IS function is performed by an external vendor rather than in-house. This is reflected by the following hypothesis.

H1: The more the systemic impact of the IS function is threatened through outsourcing a particular IS function to an external vendor as opposed to keeping it in-house, the less this function is being outsourced.

Besides considering systemic influences at the functional level, they may also be taken into account at the individual level. As such, *systemic view capability refers to the capacity of organizational members of having an integrated view of the organization, i.e., taking into account how work in one area fits in and affects all other work throughout the organization.*²

Notably, this systemic view capability goes beyond the boundaries of an organization's IS functions. In a recent claim for a stronger recognition of systems thinking in the IS discipline, Alter (2004) argued that IS development would benefit from methods and procedures that systematically acknowledge the organizational context and the social environment in which systems are embedded, i.e. the work systems. In a similar vein, shared knowledge between the IT-domain and the user domain has been shown to be critical for IS effectiveness (Ray et al., 2005). These assertions characterize IS as open systems that are typified by constant interchanges with their environment and accordingly a constant state of flux (Bertalanffy, 1979). Indeed, an IS may be viewed as a subsystem of another broader system (Mora et al., 2003). Thus, in line with the resource-based view, IS professionals that acknowledge how their work

² This definition is based on the concept of systems thinking ability which has been referred to as the "(...) the ability to see the world as a complex system, in which we understand that you can't just do one thing, and that everything is connected to everything else" (Sterman, 2000, p. 4), or as "(...) being able to see the whole or context of a situation and its interconnections to its environment" (Wolstenholme, 2003, p. 20) – cited by Alter (2004, p. 758).

relates to other work throughout the organization – beyond the boundaries of IS – may be seen as valuable resources. If systemic view capabilities are not accounted for, the alignment of IS functions with overall organizational objectives may be threatened (Bacon and Fitzgerald, 2001). Accordingly, it is crucial for the IS outsourcing decision, whether such systemic view capabilities are better available in-house or through outsourcing. If in-house personnel for a particular IS function is seen to be advantageous in its system view capabilities, then outsourcing becomes less likely. Moreover, the systemic impact of IS may be better taken care of in-house if in-house personnel has better systemic view capabilities than vendor personnel. This is reflected by the following two hypotheses:

H2a: The higher the systemic view capabilities of in-house as opposed to personnel of an external vendor in performing an IS function, the less this function will be outsourced.

H2b: The higher the comparative advantage of in-house personnel as opposed to that of an external vendor in its systemic view capability, the higher the comparative in-house advantage in achieving a systemic impact.

Efficiency Factors

According to TCE, the make or buy decision should be guided by economic criteria (Williamson, 1981). It is argued that the governance choice depends on both production and transaction cost differences between the firm and the market. The external vendor is supposed to be advantageous in realizing economies of scale and scope due to its ability to provide the same type of service for a larger pool of customers than client organizations could realize in-house (Ang and Straub, 1998). In particular, the vendor's ability to economize on past experiences from multiple customer accounts may explain lower production costs (Levina and Ross, 2003). There is evidence, however, that contrary to Williamson's (1981, 1985) original assertions, the external vendor may not generally be superior in production costs. Indeed, there are cases where clients have consciously decided against outsourcing due to vendors charging substantially higher prices versus their in-house costs, reflecting the vendor's cost

plus profit margin (Dibbern et al., 2003, Hirschheim and Lacity, 2000). Accordingly, the decision of whether it is more production cost efficient to keep an IS function in-house or to outsource it to an external vendor should be made on a case by case basis leading to the following hypothesis:

H 3: The higher the comparative production cost advantage of the in-house as opposed to outsourced provision of an IS function, the less it will be outsourced.

Like production costs, transaction costs also should not be neglected (Ang and Straub, 1998, Barthélemy, 2001, Lacity and Hirschheim, 1993b). *Transaction costs are all costs in terms of time, effort, and money spent that arise when delegating tasks of an IS function to one or more agents.* They refer to costs for activities such as “ ... planning, adapting, and monitoring task completion under alternative governance structures” (Williamson, 1981, p. 552f.). These transaction costs can occur both in-house and when outsourcing to an external vendor. Hence, it is the difference between in-house and outsourcing transaction costs that determines the sourcing choice (Williamson, 1981). This leads to the following hypothesis:

H 4: The higher the comparative transaction cost advantage of the in-house as opposed to outsourced provision of an IS function, the less it will be outsourced.

Environmental Influences and Constraints

So far, it has been assumed that the sourcing decision represents a rational decision based on efficiency and effectiveness criteria. This view has been partially contradicted by other studies showing that an organization's sourcing decision can be influenced by other factors, such as various internal and external environmental forces (see Literature Review).

Similar influences have been largely substantiated at the level of individual decision making. According to the Theory of Planned Behavior (TPB) (Ajzen, 1985, 1991), an individual's decision to perform or not perform a behavior is influenced by the perceived *subjective norm*, i.e. the perceived social pressure of referential others. Another factor that goes beyond a

motivationally oriented evaluative appraisal of alternative behaviors (i.e. attitude towards a behavior) is *perceived behavioral control* which reflects a person's ease or difficulty of performing a behavior. The concepts from the TPB can be meaningfully applied to the organizational context (Cordano and Frieze Hanson, 2000). They acknowledge the fact that external and internal forces can support or constrain the outsourcing decision independent of an organization's rational comparison of alternative sourcing options.

Since the TPB has been designed for explaining individual rather than organizational behavior, both concepts need to be slightly adapted to fit the organizational context. One important difference of the organizational context is that decisions, such as IS outsourcing, are usually not solely made by single individuals but rather by groups, e.g. consortia. Moreover, decision makers in organizations have to consider the objectives of the organization for which they work, such as profit motives, which may override their personal preferences to a certain extent. Most generally, both dimensions are therefore defined as follows: *Subjective norm is referred to as the opinion of others, reflecting the extent to which persons or groups whose opinion is important for an organization think that the organization (and not an individual decision maker) should outsource an IS function rather than keeping it in-house.* This notion is consistent with the argument that an organization's "enacted" environment actively shapes organizational behavior (Pfeffer and Salancik, 1978, p. 63). Consultants, managers from peer organizations, or various types of public media could present actively perceived influences from external stakeholders (Ang and Cummings, 1997, Lacity and Hirschheim, 1993a, Loh and Venkatraman, 1992). Behavioral Control is referred to as *control over the outsourcing decision process reflecting the extent to which an organization has unlimited power of direction over all necessary activities associated with outsourcing an IS function to an external service provider.* For example, the outsourcing decision was found to be influenced by politics (i.e., the exercise of power by various stakeholder groups) (Lacity and Hirschheim, 1993b, Lacity et al., 1994, Lacity and Willcocks, 1997, Palvia, 1995). Moreover legislative regulations could constrain

decision flexibility (Barthélemy and Geyer, 2005). One would expect that the less the implementation of an outsourcing decision is constrained by various forces, the easier it is for an organization to outsource application services. Together, these influences of an organization's social and institutional environment lead to the following two hypotheses:

H5: The more positive the opinion of influential others towards an organization's outsourcing of an IS function, the more it will be outsourced.

H6: The lower the perceived control over the process of outsourcing an IS function, the less it will be outsourced.

Finally, in accordance with previous studies on IS sourcing, firm size is added as a control variable (Ang and Straub, 1998, Sobol and Apte, 1995).

Proposed Cross-Cultural Differences

The preceding network of hypotheses (see Figure 1) may be viewed as a mid-range theory that seeks to explain variations in the extent to which organizations outsource application services. While we believe it is reasonably robust in its coverage, it should be clear that the objective is not to definitively establish the model per se. Rather, it is to present a plausible model for the second goal of this study, that being whether the relationships among constructs are influenced by cross-cultural influences. This recognizes the fact that culturally programmed, deeply grounded behavioral beliefs, values, and predispositions of key decision leaders within firms (Hofstede, 1993) as well as related culture-specific artifacts (e.g., legislation and educational systems) can have a significant effect on firm level decisions (Dickson and Weaver, 1997, Hofstede, 1993, Triandis, 1982).

Cross-cultural research has identified numerous cross-cultural dimensions. An overview and categorization is provided by Lytle et al. (1995). Based on this overview, we identified four dimensions in a deductive way that are related to the constructs and relationships of our

previously developed framework on IS outsourcing determination (See Table 1). Only those dimensions that clearly relate to an organizational context were considered.

Table 1. Selected Cross-Cultural Dimensions			
Category (Lytle et al. 1995)	Cultural Dimension	Study	Related to following construct of theoretical framework
Relationship between societal members	Individualism versus collectivism	(1980, Hofstede, 1983b, 1991)	<ul style="list-style-type: none"> • Comparative systemic impact advantage • Comparative systemic view capability advantage
	Analytical versus integrative view of the firm	Trompenaars and Hampden-Turner (1994)	<ul style="list-style-type: none"> • Comparative systemic impact advantage • Comparative systemic view capability advantage
Motivational orientation	Individualistic versus communitarian (Self- orientation vs. collectivity-orientation)	Trompenaars and Hampden-Turner (1994)	<ul style="list-style-type: none"> • Comparative systemic impact advantage • Comparative systemic view capability advantage
Patterns of institutions and social systems	Bargaining power of unions, works councils	Argyres and Liebeskind (1999)	<ul style="list-style-type: none"> • Decision process control

The first of these cultural dimensions is *individualism-collectivism*. According to Hofstede (1980), it reflects the degree to which individuals are integrated into groups. A related dimension is that of individualism versus communitarianism which is defined similarly (Hampden-Turner and Trompenaars, 1993, p. 51). This dimension is based on the “self-orientation versus collectivity-orientation” concept from Parson and Shils (1951). Today, *individualism-collectivism* is by far the most extensively studied cultural dimension in the field of cross-cultural research. Numerous definitions and operationalizations of individualism-collectivism have been developed and applied in cross-cultural research. In separating the forest from the trees, so to speak, Hui and Triandis (1986) have identified seven different categories of collectivism. Two of them are (1) the people’s concern about how their decisions could affect others in their collectivity; and (2) the belief in the correspondence of one’s own outcomes, both positive and negative, with the outcome of others. These two aspects of collectivism show a striking correspondence with two of the constructs of our theoretical model on IS sourcing, namely the comparative in-house advantages in systemic view capability as

well as in systemic impact. Another cultural dimension that is closely related to these two systemic variables is the *analytical versus integrative view* dimension (Hampden-Turner and Trompenaars, 1993, Trompenaars and Hamden-Turner, 1994), which reflects the extent to which a firm is perceived as a collection of tasks, functions, people, and machines (analytical view) rather than as a group of related persons working together (integrative view).

It may be argued that in cultures that are more collectivist and that have more of an integrative view of the corporation, organizational decision makers are more sensitive to systemic influences. This is based on the notion that in cultures that have a strong focus on group performance and that strongly consider the interdependency between tasks, functions, and people, decision makers may generally value systemic impacts and systemic view capability of individuals higher than strongly individualist cultures, where the focus is on individual performance and on treating tasks, functions, and people independently of each other. Thus, in more collectivist nations decision makers may more strongly consider differences in achieving systemic influences between in-house and outsourced provision of IS services than more individualist countries. Moreover, decision makers in more collectivist nations may be more inclined to consider whether in-house personnel or the staff of external vendors shows better systemic view capabilities in doing their work. This is reflected by the following hypotheses:

H7: The relationship between comparative in-house advantages in systemic impact and the degree of outsourcing is stronger in more collectivist and less individualist nations.

H8: The relationship between comparative advantages in systemic view capabilities of in-house professionals and the degree of outsourcing is stronger in more collectivist and less individualist nations.

The third construct whose effect is proposed to be culturally sensitive is decision process control. The impact of this determinant may be particularly high in institutional environments where the IS outsourcing decision is strongly regulated. In particular, labor right regulations

may have a considerable impact on the IS outsourcing decision. As noted by Lytle et al. (1995) patterns of institutions and social systems may be seen as culturally induced artifacts that reflect overall cultural values and norms of a society. As such, significant variation can be observed between nations in the extent to which labor markets are regulated. For example, Argyres and Liebeskind (1999, p. 59) stated that countries such as Germany and France accord greater bargaining power to labor unions and work councils than other countries (See also Kieser, 1990, Richardi, 1990). In particular codetermination provides employees the right to participate in organizational decisions that impact their personal disposition or the disposition of the group that they belong to (Chmielewicz, 1990). In countries with such strong labor regulations, organizations need to find ways to cope with them when making IS outsourcing decisions. This need to react to labor market regulations (because they exist) makes decision makers more likely to consider them in the IS outsourcing decision. Some organizations may be able to cope with regulations easily. Hence, their perceptions of control over the outsourcing decision would be reflected by higher levels of IS outsourcing. Others may feel that regulations strongly limit their control over the process of outsourcing and hence would outsource less. In nations with little regulations, the perception of control over the process of outsourcing may vary among organizations as well. However, for them the need to react to institutional constraints is not as severe. Accordingly, decision process control plays a much less important role for them in the IS outsourcing decision. This is reflected by the following hypothesis:

H9: The impact between perceived control over the process outsourcing and the degree of IS outsourcing is stronger in countries with more restrictive labor regulations.

In summary, there are three relationships that are proposed to be culturally sensitive. Significant differences in the strength of these three relationships are expected between countries that are known to differ in the respective cross-cultural dimensions. The other relationships (efficiency, opinion of others) are expected not to significantly differ between nations.

4. Method

Data

Choice of Countries. Data for this study was gathered via a mailed questionnaire survey. In order to account for national differences the questionnaire was administered to organizations in two countries. On the one hand, these countries should be similar in their industry structure, economic power, and the maturity of IS within corporations (OECD, 2002). On the other hand, both countries should differ in the cross-cultural dimensions of the theoretical framework. Two countries that meet these requirements are Germany and the United States. The differences in cultural dimensions between both countries are shown in Table 2.

The questionnaire was developed both in English and German language. To ensure fit between both versions, the initial English version was translated into German and then back-translated by a native American, who works as an English lecturer in Germany (Douglas and Craig, 1999). No significant differences could be detected which increased the confidence in the fit between the English and the German version.

Choice of Respondents. The questionnaires were administered to the highest ranking IS executives of organizations in the United States and Germany. Chief IS executives were deemed as the most appropriate informants, since they are most familiar with an organization's IS sourcing choices and its wider implications for the entire organization. The selection of this group as key informants is consistent with prior studies on IS outsourcing (cf. Ang and Straub, 1998, Apte et al., 1997, Aubert et al., 1996, Barthélemy and Geyer, 2001, Poppo and Zenger, 1998, Teng et al., 1995). The questionnaire was pre-tested in two rounds of face-to-face meetings with an experienced CIO in Germany. His comments were considered in the development of the questionnaire in order to ensure that all questionnaire items were understandable and could be answered by the intended group of respondents.

Table 2. Instances of Cultural Dimensions in Germany versus United States

Cultural Dimension	Study	Germany	United States
Individualistic versus communitarian (Self-orientation vs. collectivity-orientation)	Trompenaars and Hampden-Turner (1994)	Medium individualism	Relatively high individualism
Individualism versus collectivism	Hofstede (1980, 1983b, 1991)	Medium individualism (rank 15 from 50; index 67)	Highest individualism of all countries (rank 1 from 50; index 91)
Analytical versus integrative view of the firm	Trompenaars and Hampden-Turner (1994)	Toward integrative view	Toward analytical view
Bargaining power of unions, works councils	Argyres and Liebeskind (1999)	<p>Relatively high</p> <ul style="list-style-type: none"> • § 613 BGB regulates the transfer of organizational units to legally independent organizations ("Betriebsübergang") (Koffka, 1997, p. 124ff.) • Works constitution act guarantees the right of employee participation and codetermination in social, economic, and personal matters (Richardi, 1990, p. 1282) 	Medium

Choice of Industries. In order to avoid potential industry influences, only two industries were considered that play a significant role in both countries: the finance and the machinery industry (Germany: 406 Finance, 552 Machinery; United States: 676 Finance, 591 Machinery).

Choice of IS functions. In order to account for the practice of selective IS outsourcing, the focus was set on two particular IS functions: applications development and applications maintenance. Respondents were asked to answer each question of the questionnaire for both the development and for the maintenance of software applications (Poppo and Zenger, 1998). The choice of two IS functions also allowed us to control for differences between IS functions.

Response Rate. Overall, 180 usable questionnaires were returned from a total sample of 2130 companies (Germany: 77 Finance, 62 Machinery; United States: 17 Finance, 24 Machinery). This equals an overall response rate of 8.4% (3.4% in the United States and 15.1% in Germany).³ Since the survey included questions about both the development and the maintenance of software applications, the sample for the country comparison includes 278 decisions on the sourcing of software applications in Germany and 82 cases in the United States. Based on recent simulation studies analyzing the 75 versus 150 scenario (Chin, 2003), our sample size provides a power either near or above the recommended 0.80 level.

Measures

Each of the constructs from our model was measured with a block of indicators (questionnaire items). Whenever possible, existing measures from prior empirical studies were adopted. An overview of the constructs and measurement items is provided in Table 3. In the case of systemic impact and systemic view capability, items were developed based on the construct definition. The specific facets in the definition (e.g., Chin et al., 2008) were determined to develop the corresponding terms in the items. The items were presented to four noted IS outsourcing researchers in order to ensure content and face validity as well as readability. As noted earlier, the items were pre-tested in two rounds of face-to-face meetings with an experienced CIO and the comparative fit of translations from English to German and back provided further assurance. Discriminant, convergent, and nomological validity are then subsequently assessed using the survey data.

³ This relatively low response rate may partly be attributed to the cross-national survey procedure. Based on her literature review, Harzing (2000) concludes: "Cross-national mail surveys aiming at industrial population generate very low response rates. If questionnaires are not either preceded or followed by telephone contact, response rates typically vary between 6% and 16%." Although the U.S. survey packages were sent off from the U.S., and follow-up phone calls conducted in both countries, differences in the response rates between Germany and the U.S. could not be prevented. Indeed, the response rates differ significantly. It should be noted, however, that for the U.S. similar results were obtained in a more recent IS outsourcing mail survey by Poppo and Zenger (1998). They achieved a response rate of 5% (152 from 3000) in the United States. We were also unable to detect any significant non-response bias using the extrapolation procedure of Armstrong and Overton (1977).

Most of the items were measured on a (positive-to-negative) five-point Likert scale ranging from “strongly agree” to “strongly disagree”, with “neither agree nor disagree” as a mid-point. For measures of the *degree of outsourcing*, respondents were asked to provide percentages ranging from 0% to 100%. For the construct *opinion of others*, the semantic differential approach to measurement was adopted (Osgood et al., 1957) where each response is located on an evaluative bipolar (negative-to-positive) dimension, using a seven-point scale. All blocks of indicators were formulated in the reflective mode (Chin, 1998a, p. 1x, Chin and Newsted, 1999, p. 310, Fornell, 1989, p. 161). The unit of analysis was the respective application service. *Applications development* was introduced as the definition, design, and implementation of customized software as well as the analysis, selection, and tailoring of standardized software packages (e.g. SAP R/3), while *applications maintenance* was referred to as all corrective, adaptive, and perfective (i.e., optimizing) modifications of application software that do not include any functional enhancements (Bansler and Havn, 1994, Swanson and Beath, 1989).

Table 3. Questionnaire Measures		
Construct	Source	Sample Item
Degree of Outsourcing	Based on Teng, et al. (1995) and Dibbern and Heinzl (2001)	For each of the two IS functions, please estimate the average percentage currently allocated to external service providers in terms of 1. . . . the function's total budget (from 0 to 100%) 2. . . . total person working days. 3. . . . total number of people that participate in doing the work.
Comparative in-house systemic impact advantage	Newly formed based on general systems theory (Bertalanffy, 1979)	If this IS function is not performed in-house but externally, 1. . . . the integration of this IS function into the overall IS function of our organization is weakened. 2. . . . the synergetic effects to other IS functions will be threatened. 3. . . . the overall performance of our entire IS function will be greatly affected.
Comparative in-house advantage in systemic view capability	Newly formed based on concepts of systems thinking (Stermann, 2000, Wolstenholme, 2003)	In doing the actual work required for each of the IS functions, our own employees tend much more than personnel of external service providers to 1. . . . have a systems view of the organization. 2. . . . have an organization wide perspective of how work in different areas effect one another. 3. . . . consider the task interdependencies in our organization. 4. . . . have an integrated view of the organization.

Comparative in-house production cost advantage	Based on Ang and Straub (1998)	In doing the actual work required for each of the IS functions 1. . . . our internal staff works more cost efficient than an external service provider. 2. . . . we can realize higher economies of scale internally than an external service provider.
Comparative in-house transaction cost advantage	Based on Ang and Straub (1998)	When delegating i.e. transferring tasks of the particular IS function 1. . . . the costs incurred in negotiating, managing and coordinating are lower within the firm than in case of contracting with an external service provider 2. . . . less transaction costs are incurred for internal employees than when using an external service provider.
Outsourcing decision process control	Based on Ajzen (1991), Ajzen and Fishbein (1980), Cordano and Hanzen Frieze (2000)	When it comes to outsourcing this IS function to an external service provider 1. . . . our organization can act unrestrictedly. 2. . . . there are no impediments to our organization.
Opinion of Influential Others	Based on Ajzen (1991), Ajzen and Fishbein (1980)	Persons or groups whose opinion is important to our organization think that outsourcing this particular IS function is 1. . . .bad—good (-3 to +3). 2. . . . negative—positive. 3. . . . harmful—beneficial. 4. . . . foolish—wise. 5. . . . illogical—logical. 6. . . . worthless—valuable.
Firm size	Based on Ang and Straub (1998)	Please estimate your organization's overall number of employees.

Group Comparison Procedure

The model testing was done with PLS (PLS Graph 3.0, Version 1130). PLS was favored over covariance-based SEM for several reasons. First, the sample size of the United States data set is lower than 200 (the recommended minimum size for covariance-based SEM), whereas PLS can produce consistent results with sample sizes as low as 17 (Majchrak et al., 2005). Second, the data points of this study do not follow a multivariate normal distribution⁴ which is assumed for covariance-based SEM, but not for PLS (Chin, 1998b). Third, in this study, the observations are not truly independent from each other, since the same respondent answered each question for both the development and maintenance. PLS does not assume independence of cases nor that any two cases have equivalent residual distributions (Chin, 1998b, p. 315).

While these are points that clearly suggest using PLS in this study, there is one limitation. To date, multi-group comparisons of PLS models, in which differences in path estimates for sampled populations were examined, have been relatively “naïve”. Often, researchers simply examine and discuss the differences in the path estimates for two or more data sets. When assessing the significance of the differences, a procedure based on the t-test using the pooled standard errors obtained via a resampling procedure such as bootstrapping from each sample is made (e.g. Keil et al., 2000). Yet, this procedure is valid only under the assumption of normal population or similar sample size.

Recently, Chin (2003) proposed an alternative distribution free approach of applying a random permutation procedure to overcome these limitations. Chin noted that randomization or

⁴ Mardia's (1970) coefficient of multivariate kurtosis for Germany was 122.61, c.r. = 30.14 and for the U.S was 74.50, c.r. = 9.95; $\frac{1}{N} \sum_{i=1}^N \left[(x_i - \bar{x})' \hat{S}^{-1} (x_i - \bar{x}) \right]^2 - \frac{p(p+2)(N-1)}{N+1}$.

permutation tests among statisticians are the preferred tests of significance for non-normal data. Moreover, random permutation procedures should not be viewed as alternatives to parametric statistical tests currently used. Rather, they should be considered as preferred for data that do not conform to normal distributional assumptions. The availability of fast computers has made permutation tests increasingly feasible, even for large data sets. Since such methods require no particular assumptions concerning statistical distributions, permutation tests are increasingly applied even in the context of traditional statistical tests (e.g. correlation, *t*-tests, ANOVAS, etc.). Detailed discussion of permutation tests can be found in Edgington (1987, p. 1) and Good (2000, p. 25). In general, a permutation test based on randomization, as Edgington (1987, p. 5) notes, “is valid for any kind of sample, regardless of how the sample is selected.” This is an extremely important property because the use of nonrandom samples is common in surveys as well as experimental studies and would otherwise invalidate the use of parametric statistical tables (e.g., *t* or *F* tables). Essentially, the random sampling assumption underlying these significance tables states that all possible samples of *n* cases within a specified population have the same probability of being drawn which is not always tenable.

5. Results of Data Analysis

Descriptive Findings

Table 4 offers insights into the company characteristics of our sample. The data reveals that senior IS executives in the United States have a shorter tenure (10.5 years) than in Germany (15.9 years). Corporate size and the size of the IS function are significantly larger in the United States compared to Germany.

Table 4. Company Characteristics		
	Germany	United States

		Mean	Std.	Mean	Std.
CIO Company Membership (in Years)		15.9	11.5	10.5	8.4
Number of Employees in	Entire Organization	2658	5619	4476	9622
	Entire IS Function	88	160	239	796
	Applications Development	28	59	137	635
	Applications Maintenance	27	55	49	161

The larger size of the IS function in the United States can partially be attributed to a lower degree of IS outsourcing in applications development and maintenance. Table 5 shows that the German organizations of our sample spent about twice as much money on outsourcing their IS development and maintenance functions.

Table 5. Outsourcing Behavior				
Variable	Germany		United States	
	Mean	Std.	Mean	Std.
Current budget spent on outsourcing (in %)	40.1%	34.2	17.7%	27.3
Expected change in outsourcing expenditure in 1 year (in %)	3.6%	19.3	3.6%	16.4
Percentage of former in-house employees transferred to external vendor in case of outsourcing (in %)	6.8%	18.9	6.9%	22.4
Capital share in external vendor (in %)	10.8%	25.4	10.9%	25.1
No. of Contracts in Last 5 Years	10.1	19.2	11.1	19.0
No. of Decisions Against Outsourcing in Last 5 Years	5.1	8.4	2.1	2.7

Other sourcing peculiarities such as equity arrangements, where a certain amount of capital is exchanged between vendor and client, average number of employees transferred to external vendor in case of outsourcing and contracting experiences (no. of contracts signed within last five years) were quite similar between the German and United States sample. Only decisions against outsourcing were more often made in Germany in the last five years.

Finally, Table 6 shows the summed averages and standard deviations (Std.) of the constructs of the theoretical model. In line with the lower level of outsourcing in the United States, the United States shows a higher level of perceived in-house advantages in production costs and

transaction costs as well as in systemic impact and systemic view capabilities. Moreover, control over the outsourcing decision is perceived as lower and the opinion of others is negative on average in the United States as opposed to positive in Germany. The question is raised, however, whether these factors have indeed a significant influence on the sourcing choice in both countries and whether those linkages that were proposed to be culturally sensitive do indeed show significant differences between Germany and the United States

Table 6. Summed Averages and Standard Deviations for Theoretical Constructs					
Construct	Scale	Germany		United States	
		Mean	Std.	Mean	Std.
Degree of Outsourcing	(0-100%)	38.74	34.29	16.61	24.69
Comparative In-house Systemic Impact Advantage	(+2 to -2)	-0.08	1.12	0.56	1.14
Comparative In-house Systemic View Advantage	(+2 to -2)	0.92	0.88	1.33	0.77
Comparative In-house Production Cost Advantage	(+2 to -2)	0.67	1.09	1.02	1.11
Comparative In-house Transaction Cost Advantage	(+2 to -2)	0.77	1.00	0.98	0.91
Outsourcing Process Control	(+2 to -2)	-0.11	1.02	-0.22	1.19
Opinion of Others towards Outsourcing	(+3 to -3)	0.40	1.24	-0.41	1.42

Results of PLS Estimation

We will now examine the results of the model testing for both Germany and the United States beginning with the test of (1) the measurement model followed by (2) the structural model in both countries, and finally (3) the test of differences in the structural paths between both countries.

Measurement Model. In order to check whether the indicators of each construct measure what they are supposed to measure, tests for convergent and discriminant validity were performed in both the German and United States sample. Before doing any multi-group comparisons, it is important to examine whether the measures perform adequately in both data samples.

In terms of convergent validity (Bagozzi and Phillips, 1982, p. 468), both indicator reliability and construct reliability were assessed (Peter, 1981, p. 65). *Indicator reliability* was examined by

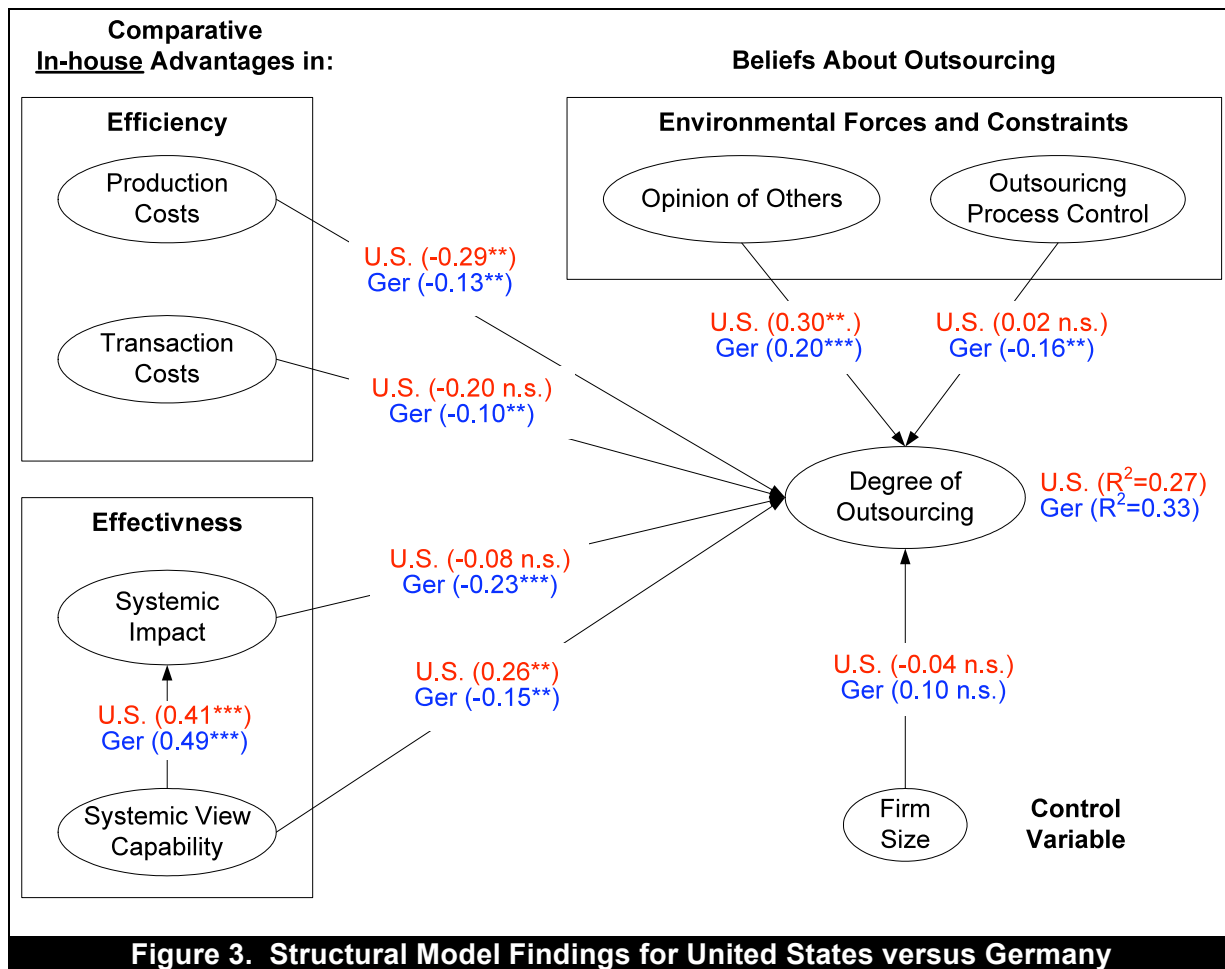
looking at the construct loadings. All loadings are significant at the 0.01 level and above the recommended 0.7 parameter value (Significance tests were conducted using the bootstrap routine with 500 resamples (Chin, 1998b)). *Construct reliability and validity* was tested using two indices: (1) the *composite reliability* (CR) and (2) the *average variance extracted* (AVE). All the estimated indices were above the threshold (Bagozzi and Yi, 1988) of 0.6 for CR and 0.5 for AVE (see Table 7).

Table 7. Indicator and Construct Reliability							
Construct	Item	Germany			United States		
		Loading	CR	AVE	Loading	CR	AVE
Degree of Outsourcing	Out1	0.96	0.97	0.93	0.95	0.97	0.91
	Out2	0.96			0.98		
	Out3	0.96			0.94		
Systemic Impact Advantage	Impact1	0.89	0.91	0.78	0.92	0.94	0.85
	Impact2	0.89			0.90		
	Impact3	0.86			0.94		
Systemic View Advantage	EmplOri1	0.77	0.91	0.71	0.77	0.91	0.73
	EmplOri2	0.87			0.84		
	EmplOri3	0.83			0.91		
	EmplOri4	0.89			0.89		
Production Cost Advantage	Pc1	0.81	0.86	0.67	0.86	0.83	0.62
	Pc3	0.82			0.85		
	Pc4	0.82			0.62		
Transaction Cost Advantage	Tc1	0.90	0.85	0.74	0.70	0.83	0.71
	Tc4	0.82			0.97		
External Influence	Other1	0.92	0.97	0.82	0.93	0.98	0.87
	Other2	0.93			0.92		
	Other3	0.92			0.93		
	Other4	0.89			0.97		
	Other5	0.88			0.96		
	Other6	0.89			0.90		
Outsourcing Process Control	CoPro2	0.90	0.93	0.87	0.86	0.93	0.87
	CoPro1	0.97			0.99		

Finally, the discriminant validity of the construct items was assessed by looking at the cross-loadings. They are obtained by correlating the component scores of each latent variable with both their respective block of indicators and all other items that are included in the model (Chin,

1998b, p. 321). In Table 8 and 9 (see Appendix), the cross loadings for both Germany and the United States are presented. The loadings on their respective constructs are shadowed. Moving across the rows reveals that each item loads higher on its respective construct than on any other construct. Going down a column also shows that a particular construct loads highest with its own item. Taken together, this implies discriminant validity for both samples.

Structural Model. Having gained confidence that the measures are appropriate for the German and United States sample, the next step is to test the explanatory power of the entire model on IS sourcing as well as the predictive power of the independent variables in both countries. The explanatory power is examined by looking at the *squared multiple correlations* (R^2) of the main dependent variable, the degree of IS outsourcing. It can be concluded from Figure 3 that 33% of the variation in the degree of outsourcing ($R^2 = 0.33$) are explained by the independent variables in Germany, whereas 27% can be explained in the United States sample ($R^2 = 0.27$). The hypotheses are tested by examining the magnitude of the standardized parameter estimates between constructs together with the corresponding t-values that indicate the level of significance (t-values were obtained through the bootstrap routine, (Chin, 1998b, p. 320)). An overview of the results can be obtained from Table 10. Moreover, Figure 3 shows a graphical representation of the findings for the United States and Germany, respectively.



The findings show solid support for the “Efficiency and Effectiveness hypotheses” in Germany. All of the path coefficients show the expected negative sign and are significant at the 0.05 (**) or 0.01 (***) level. Notably, perceived comparative in-house advantages in the *systemic impact* have the strongest impact (H3: -0.23, $t = 3.67$). The impact of “Environmental Influences and Constraints” is less consistent. While solid support can be found for the *opinion of others* on the degree of outsourcing (H5: 0.20, $t = 3.93$), the link between *outsourcing process control* and degree of outsourcing is negative instead of positive as predicted in the model. Moreover, *firm size* has no impact.

In the United States, more deviations from the hypotheses were found. Comparative advantages of in-house professionals in the *systemic view* are positively related to the degree

of outsourcing and not negatively, as predicted. Moreover, in contrast to Germany, no evidence can be found for the significant impact of comparative *transaction cost advantages* and *systemic impact advantages*, as well as for *outsourcing process control*. Firm size has no impact, either.

Significance of Group Differences. The main question is, however, whether the observed differences between Germany and the United States are significant and whether those differences are in line with the proposed cultural differences (Hypotheses 7-9). This can be deduced from the right column of Table 10. It shows the level of probability (P) with which the hypotheses that the differences in the parameter estimates for both countries equal zero (i.e., the Null-hypothesis) is *true*. This probability (scaled from 0 to 100) should be limited to a critical distance of 1% ($P \leq 1$), 5% ($P \leq 5$), or 10% ($P \leq 10$) (Mohr, 1991).

As hypothesized, only the three culturally sensitive paths (H7-9) were found to have statistically significant differences between Germany and the United States. Five of the eight structural paths that were assumed to be equivalent for both countries were found to be non-significantly different. The probability of exactly matching the eight hypotheses is one in 256 (i.e., 0.39 percent). The results for the path coefficient from *systemic impact advantage* to degree of outsourcing (H1) in the structural model for Germany is significantly stronger ($P=2.5$, $p \leq 0.05$) than the corresponding path in the structural model for the United States, supporting H7 at the 0.05 level of significance. Likewise, the link between *process control* and degree of outsourcing is significantly stronger ($P=7.9$, $p \leq 0.1$) in Germany than in the United States. While this supports H9, it should be considered that the directional link is the opposite to H9 in Germany. Finally, H8 is also supported partially. It was proposed that a negative link between *systemic view advantage* and degree of outsourcing exists and that it will be stronger in Germany than in the United States. However, the results show that not the strength, but the *direction* of that link

is significantly different between Germany and the United States ($P=0.3$, $p \leq 0.01$). It is negative in Germany (as predicted), while positive in the United States.

Table 10: PLS Results for Structural Model and Group Comparison

			Germany (n = 278)	United States (n = 82)	Country Difference
Hypothesis			Path <i>t-value</i>	Path <i>t-value</i>	Δ Path <i>P-value</i>
In-house systemic impact advantage	H1 (-) → Degree of outsourcing		-0.23 *** 3.67	0.08 0.54	-0.31 ** 2.5 H7
In-house systemic view advantage	H2a (-) → Degree of outsourcing		-0.15 ** 1.98	0.26 ** 2.11	-0.40 *** 0.3 H8
In-house systemic view advantage	H2b (+) → In-house systemic impact advantage		0.49 *** 11.38	0.41 *** 3.86	0.08 17.1
In-house production cost advantage	H3 (-) → Degree of outsourcing		-0.13 ** 1.86	-0.29 ** 2.05	0.17 13.0
In-house transaction cost advantage	H4 (-) → Degree of outsourcing		-0.10 ** 1.66	-0.20 1.23	0.10 25.2
Opinion of others	H5 (+) → Degree of outsourcing		0.20 *** 3.93	0.30 ** 2.31	-0.10 20.9
Process Control	H6 (+) → Degree of outsourcing		-0.16 ** 2.22	0.02 0.21	-0.18 * 7.9 H9
Firm size	→ Degree of outsourcing		-0.04 1.08	0.10 0.65	-0.14 12.0

The same analysis of country differences between Germany and the United States was performed for each function (development and maintenance) separately (See Table 11). The results are similar to those of the aggregated data sets. Analogous to the aggregated data sets, the strongest differences can be seen in H2a between both countries, which is statistically significant for both functions. Moreover, the path of H1 differs at the 0.05 level in maintenance and about at the 0.1 level in development. H6 was only found to differ significantly in applications development. Moreover, it is notable that the “opinion of others” has a significantly stronger influence in the United States with regard to the outsourcing of applications development. Finally, in the United States, production cost savings are more important for applications maintenance than in Germany, where systemic influences play the most important role. Overall, when comparing the United States and Germany at the functional level, it is striking how consistent the findings are with regard to the different impact of systemic influences between both countries.

Table 11: Group Comparison for each Function								
Hypotheses	Maintenance				Development			
	GER	United States	Country Diff.	p-value	GER	United States	Country Diff.	p-value
	Path	Path	Δ Path		Path	Path	Δ Path	
H1 (-)	-0.24***	0.15	-0.39	4.57** (H7)	-0.23***	0.03	-0.26	11.62* (H7)
H2a(-)	-0.24***	0.28*	-0.52	0.25*** (H8)	-0.15**	0.33 **	-0.47	5.26* (H8)
H2b (+)	0.44***	0.36**	0.07	26.27	0.49 ***	0.46 ***	0.03	17.99
H3 (-)	-0.07	-0.36*	0.28	10.23*	-0.13**	-0.24	0.12	38.53
H4 (-)	-0.11	-0.24	0.13	27.97	-0.10*	-0.18	0.09	44.44
H5 (+)	0.14*	0.11	0.03	43.81	0.20 ***	0.56 ***	-0.36	2.30**
H6 (+)	-0.17*	-0.05	-0.12	30.43	-0.16***	0.09	-0.25	10.37* (H9)
Firm size	-0.07*	0.12	-0.19	15.19	-0.04	0.02	-0.05	46.74

Results from Control for Industry and IS functional differences

We also tested the model for each industry and each IS function separately and examined whether the results for the structural paths differed significantly. When comparing the IS functions (n=180 for each) only one path turned out to be slightly different ($p \leq 0.1$). This was the path between opinion of others and degree of outsourcing (H5), which was 0.28 for development and 0.16 for maintenance. When comparing industries it appeared that systemic influences were in the expected direction (negative) for both samples, but only significant for the Finance industry. These differences between industries were weakly significant ($p < 0.10$). Moreover, process control had a negative impact on outsourcing in the Finance industry, while being insignificant for the Machinery industry (the difference was significant at the 0.05 level). Overall, these controls show that the differences between paths are considerably stronger between the countries than between IS functions and industries.

6. Discussion and Implications

In the following, the results of the model testing will be discussed and interpreted. In line with our research objectives we are particularly interested in the relative importance of IS outsourcing determinants, the role of systemic influences as new determinants to the IS

outsourcing literature and the cross-cultural differences. Since the differences between countries turned out to be very strong for some relationships, we separate the discussion of results into the common findings across countries and country-level differences.

Commonalities. In both the German and the United States samples, differences in *production costs* between in-house provision and outsourcing have a significant impact on the sourcing of application services. This substantiates the findings from previous empirical studies (Ang and Straub, 1998, Apte et al., 1997, Clark et al., 1995, Lacity and Willcocks, 1998, McLellan et al., 1995). Notably, the descriptive results have shown that, on average, production costs are perceived lower in-house which is in contrast to Williamson's (1981) assertion that economies of scale and scope could generally be better achieved through the market. This study also supports findings from previous empirical studies that production costs are more influential on the sourcing choice than transaction costs (Ang and Straub, 1998). One reason for the different level of importance of the two types of costs within decision making could be that it is much harder for organizations to estimate transaction costs. They often appear as hidden or extra costs in later stages of the actual service delivery e.g. in the form of increased control and coordination effort (Barthélemy, 2001, Dibbern et al., 2008). In both Germany and the United States production costs play a more important role than transaction costs.

It is instructive to note, however, that the opinion of others plays at least an equally important role as production costs in the United States or even a more important role for the IS outsourcing decision in Germany. This could be explained by the fact that IS outsourcing is often associated with a certain level of uncertainty, e.g. about the true cost of outsourcing, and hence organizations often actively seek the advice of external stakeholders, such as from consultants or from peer organizations. The negative side of these external impacts, however, may not be overlooked. There is the danger that organizations unknowingly conform to external opinions. From a theoretical point of view it is notable that this study confirms that selected dimensions from an individual level theory, namely the theory of planned behavior, can help to

explain firm behavior, when adapted to the organizational context (see also Cordano and Frieze Hanson, 2000).

Country Differences. Notably, all three determinants that were hypothesized to be culturally sensitive indeed showed significant differences in the structural paths between Germany and the United States (H7-9). When looking at the two systemic factors the differences showed up particularly strong. First of all, while perceived in-house advantages in the *systemic impact* of an IS function were found to impede the extent to which application services are outsourced in Germany, the relationship was found to be irrelevant in the United States. This country difference is consistent with the perspective that in countries which are characterized by a very high level of individualism and a more analytical view of the firm, the focus is more on evaluating the quality and the performance of particular IS functions rather than the integrated performance of all functions working together. Accordingly, the systemic consequences of the outsourcing of particular IS functions, such as applications development or maintenance, are not explicitly factored into the sourcing choice. By contrast, in Germany which is more collectivist in nature and more characterized by an integrative view of the organization, the implications of outsourcing a particular IS function for overall systems performance are explicitly recognized.

The results further show, however, that this does not mean that systemic influences are generally ignored in highly individualistic countries. They are recognized in form of individual capabilities. And yet, the way in which systemic view capabilities are factored into the sourcing decision appears to strongly differ between highly and less individualistic countries. Germany, with a more integrative view and collectivist culture is less likely (more negative path) to outsource an IS function if IS managers perceive a systemic view advantage exists for their company employees relative to outsourced professionals. In contrast, in the United States, application services are outsourced although in-house personnel are seen as superior in

systemic thinking. Obviously, the moderating impact of culture in terms of individualism versus collectivism and analytical versus integrative perspectives is so strong that the direction of the relationship is converted from negative to positive in the United States. In explaining this discrepancy, it should be noted that systemic view capabilities may not be seen as a required trait for all IS professionals. Indeed, too much systemic thinking may also have negative consequences because it prevents IS personnel from staying focused on their particular task, e.g. concentrating on just one particular software component or module rather than thinking in terms of the entire system. One may further argue that systemic thinking may be the task of specialized groups. Examples are systems analysts that need to have a good understanding of both the technology domain and the application domain or systems architects that need to understand the interfaces between all IS sub-components working together. The preference for providing this quality by a small unit of specialized systems analysts and architects may be particularly high in individualistic nations like the United States. In these cultures, clear roles and responsibilities are preferred based on the belief that tasks can unrestrictedly be broken down and delegated to specialized work forces. The personnel of external vendors may not be required to have strong systemic view capabilities if the tasks are clearly specified by the client that keeps the responsibility for the alignment of business and IT objectives. The specification may be carried out by a small group of remaining in-house systems analysts and architects that serves as a bridge between the various IS functions but also between the technology domain and the business domain. The analytical culture of United States businesses based on the division of labor would ensure that the *systemic view* is accounted for by a specific group of employees – namely management – within the firm (Hofstede, 1993). Therefore, this is not a required trait for the majority of IS professionals. In other words, individualist cultures do consider the systemic capability necessary to ensure IS systems fit integrative into the firm, but not as a general quality of IS personnel. Indeed, the majority of IS professionals may be required to stay focused and perform their particular functions as specified. This explains why the majority of an IS function may be outsourced in the United States although systemic

capabilities are seen superior in-house – and, vice versa, application services are kept in-house, although no systemic view advantages are seen in-house, because such capabilities are not seen as required trait for all IS personnel.

Another relationship that was found to be culturally sensitive is the link between outsourcing *process control* and degree of outsourcing. It was proposed that a higher level of perceived control over the outsourcing process would be positively related with the degree of outsourcing and that this link would be stronger in Germany than in the United States. Interestingly, there was a significant difference in the impact of that link between Germany and the United States. But, unexpectedly, this link was slightly positive but non-significant in the United States, while being negative in Germany. In other words, German organizations show a higher level of outsourcing though IS executives do not believe that their organization has full control over all necessary activities associated with outsourcing. One explanation for this reversed link could be that in cultures where the influence of the internal works council and other labor regularity forces is particularly high, organizations may see outsourcing as a viable option to increase organizational flexibility. That is, managers may choose outsourcing in response to low internal flexibility in hiring and dismissing IS professionals when needed, e.g. due to variations in workload. Such inflexibility is particularly high in countries with a high level of regulatory labor forces. While outsourcing decisions may be hard to fight through in highly labor regulated countries, decision flexibility is increased once outsourcing is accomplished because IS professionals are then engaged on a contractual basis independent of internal work councils. This then puts a critical light on legislation in countries such as Germany, which enforces organizations to choose organizational arrangements that may not be optimal solutions from an economic or strategic point of view if the labor market were less regulated, as is the case of the United States.

From a *statistical perspective*, the differences that we found between the two countries with the structural paths shifting from one direction to the other or to a non-significant level are typical of interaction effects. Traditional hypothesized effects, by definition, are assumed to change due to the moderator variable. Labeled as a disordinal interaction (Jaccard et al., 1990, pp. 75-78), whether the paths for both countries are in the same direction, opposite, or non-significant is mainly contingent on the impact strength of the moderator. Given a specific starting point for one country, the stronger the cultural differences, the greater the likelihood that the path for the other country would move towards either a non-significant path or opposite sign, as was found in our study (Baron and Kenny, 1986).

Managerial Implications

Overall, it can be stated that the question regarding the sourcing of application software services is a multidimensional managerial problem which is significantly influenced by cultural contingencies. Multinational client organizations, which prepare for outsourcing decisions as well as internationally oriented IS vendors, should carefully look at IS sourcing from three perspectives integrated in our model: (1) efficiency, (2) effectiveness, and (3) environmental influences and constraints.

Comparative production cost and transaction cost advantages, as well as the opinion of influential individuals are largely culturally insensitive, and remain key determinants for the outsourcing decision. However, systemic aspects as well as the client's ability to fully control the outsourcing process as a constraint should be factored into the outsourcing decision when extending outsourcing strategies globally. Since the systemic view capability of IS professionals has a direct impact on the outsourcing decision, attributes of the corporate and IS workforce in each country organization which will be involved in the outsourcing contract should be carefully analyzed. In countries which are more integrative and collectivistic rather than analytical and individualistic, e.g. in Germany, Switzerland, or France, systemic view

capabilities are generally seen as valuable. Accordingly, vendors need to ensure that their work forces cooperate closely with client organizations and quickly develop a good understanding of the client's "work system". Sending inexperienced personnel to the client with little domain knowledge and hence low capacity for systemic view capabilities may be particularly counterproductive. In other words, the vendor has to anticipate the client's expectations and demonstrate strong systemic view capabilities early on when approaching customers. By contrast, when attracting United States clients the focus may be more on signaling strong management capabilities that would ensure good relationships with the client's management team so that systemic requirements of the client are appropriately accounted for. It is important to note, however, that this should not be seen as a normative recommendation for all IS sourcing decisions, since the question remains to be open how exactly systemic influences should be addressed by organizations in an optimal way. It appears, however, that United States and German organizations are setting different priorities and this should be taken into account both by vendors and clients when transferring sourcing approaches and strategies across national boundaries.

Moreover, internationally oriented clients and vendors should take environmental differences between countries into consideration. In country environments that face a high level of unionization and codetermination, this aspect has to be taken into account explicitly. Since the legal environment cannot be changed easily like individual perceptions, specific bargaining capabilities have to be built up in order to cope with such legal constraints. The significant growth of IS outsourcing in spite of more restrictive legal surroundings in Germany shows that organizations are innovative in overcoming legal barriers. Third party advice may be recommended in order to adequately address such specific legal issues.

Study Limitations

Although the findings of this study emerged from a well grounded statistical analysis, it is not necessarily a complete causal analysis. Rather, it is a snapshot of the sourcing behavior of United States and German companies which takes cultural patterns into consideration. Since other cultural realms have not been addressed in this research, the generalizability of the results has to be treated with some caution. It should also be noted that the United States was one of the first movers in IS outsourcing and that generally more experiences of United States firms with outsourcing may have had an impact on our model testing results. Moreover, this research focused on just two particular industries, manufacturing and financial services, and on just two IS functions, applications development and applications maintenance. Furthermore, despite all counter-efforts which have been described in the method section of this paper, the response rate in the United States sample may still be a factor. In particular the relatively low average degree of outsourcing of application services in the United States sample may not be representative for a larger population.

It also has to be taken into consideration that the differences in cultural profiles were determined inductively from archival data. Accordingly, confirmation of the proposed cultural differences in the structural paths of the IS sourcing model "... does not rule out the possibility that the inductive characterization of the cultural groups may be invalid" (Janssens et al., 1995). While the team of authors is made up by representatives of both cultures, Germany and the United States, the development of the framework and the interpretation of the results may still be affected by the respective cultural perceptions and values. These limitations call for further cross-cultural research in IS outsourcing and for studies that explicitly consider cultural dimensions in their research.

Future Research

One promising avenue for such an endeavor is to incorporate more variables at the individual IS professional level into mid-range theories on IS sourcing (Ang and Slaughter, 2001). These individual level variables could be deduced from cross-cultural research and explicitly deployed as moderators or mediators. The incorporation of such variables would increase the generalizability of mid-range theories of IS sourcing. Furthermore, multiple case studies may complement our survey approach in a useful way. Those case studies may focus on multinational or global outsourcing deals. In multinational outsourcing deals, one could analyze how the expectations associated with outsourcing and the management of the relationship differ between the countries involved in the global deal – in particular when a single vendor is chosen that seeks to apply the same relationship management techniques worldwide. Alternatively, the client location or organization could be held constant and the vendor location could be varied. This would be particularly interesting in light of the fast emerging practice of IS offshoring. For example, the question may be raised whether systemic view capabilities differ between vendors from different countries and whether the client is factoring such differences into its sourcing decision. The study by Kumar et al. (1990) on differences in IS design values may be informative for incorporating other IS specific culturally sensitive dimensions (see also Leidner and Kayworth, 2006). From our perspective, it has been very useful that the authors of this paper stem from the two cultural domains analyzed. Such a cross-cultural composition of researchers is recommendable for future cross-cultural research in order to capture the richness and diversity of the cultural phenomena involved (Pauleen et al., 2006). As suggested, there are plenty of research opportunities ahead which should be addressed by future research.

7. Conclusion

Based on our study, we can draw a number of conclusions. First, the comparison of three different theoretical perspectives of IS outsourcing determination has shown that efficiency is

not the dominant factor. While production costs play a significant role across countries, external influences, such as the opinion of referential others, are at least as important. In addition, effectiveness as exemplified by the systemic impact of IS and the systemic view capability of IS personnel was found to be a key factor. These systemic influences, however, were found to be highly culture related. In more collectivist nations, such as Germany, where organizational members tend to have more of an integrative view of the corporation, decision makers consider how overall system performance is affected through the outsourcing of particular IS sub-functions, such as systems development or maintenance. By contrast, in highly individualistic countries, such as the United States, the focus may be more on the effectiveness of particular IS functions, e.g. the reliability and quality of a software application, rather than its fit with other functions and systems throughout the corporation. And yet, systemic influences are not ignored in strongly individualistic countries. They are accounted for at the individual level in form of systemic thinking capability that is in the hand of a group of specialists, such as systems analysts or architects that take care of systemic influences. Contrastingly, systemic thinking is seen as a generally valued capability of system developers and maintenance personnel in more collectivist nations, such as Germany. Thus, there is a stark contrast in the way systemic influences are considered in the outsourcing decision between organizations in more and less individualistic (i.e., collectivistic) nations. From a theoretical point of view, the effect of systemic influences on IS outsourcing behavior supports the resource-based view, holding that client and vendor firms may have different capabilities in effectively providing IS services. The recognition of systemic influences is one important part in achieving IS effectiveness. It provides a starting point for elaborating on IS-specific determinants in explaining heterogeneous IS outsourcing among organizations. Both systems theory and the theory of modularity may provide fruitful lenses to further examine the conditions under which systemic influences are better recognized in-house compared through outsourcing (and vice versa). The integration of the contingency theory perspective could be useful in this realm. Accordingly, this research calls for searching for idiosyncratic IS factors in IS outsourcing research. Further, the influence

of cross-cultural differences on mid-range theories of IS outsourcing should be studied more intensively in order increase generalizability. Information systems are a combination of technology, business functions and people. Any systematic differences in the behavior of people should be accounted for in theories about the organization of IS work as well as in IS design research.

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Appendix

Table 8: PLS Cross-loadings for German Sample

	PC	TC	firm size	Out	Sys_Imp	Control	Sys_View	Ext_Infl
Pc1	0.85	0.57	0.05	0.34	0.40	0.16	0.44	0.25
Pc3	0.88	0.44	0.10	0.38	0.49	0.12	0.42	0.33
Tc1	0.53	0.90	0.12	0.36	0.33	0.14	0.33	0.30
Tc4	0.45	0.82	0.03	0.27	0.40	0.06	0.39	0.29
No_All	0.09	0.07	1.00	0.01	0.03	0.01	0.13	0.00
Out1	0.40	0.36	0.03	0.96	0.41	0.05	0.35	0.36
Out2	0.41	0.37	0.01	0.96	0.43	0.04	0.38	0.32
Out3	0.38	0.36	0.02	0.96	0.41	0.04	0.37	0.38
Impact1	0.51	0.41	0.03	0.38	0.89	0.24	0.46	0.21
Impact2	0.46	0.36	0.03	0.41	0.89	0.14	0.44	0.28
Impact3	0.40	0.34	0.02	0.35	0.86	0.16	0.41	0.22
CoPro1	0.16	0.11	0.03	0.05	0.18	0.97	0.17	0.05
CoPro2	0.14	0.12	0.07	0.03	0.21	0.90	0.17	0.05
EmplOri1	0.34	0.36	0.08	0.23	0.40	0.15	0.77	0.18
EmplOri2	0.47	0.39	0.17	0.38	0.41	0.08	0.87	0.31
EmplOri3	0.41	0.31	0.03	0.33	0.39	0.22	0.83	0.17
EmplOri4	0.44	0.34	0.14	0.33	0.46	0.15	0.89	0.19
Other1	0.37	0.37	0.03	0.34	0.28	0.07	0.25	0.92
Other2	0.35	0.35	0.03	0.33	0.27	0.07	0.27	0.93
Other3	0.33	0.31	0.01	0.34	0.27	0.03	0.22	0.92
Other4	0.26	0.28	0.03	0.33	0.22	0.09	0.22	0.89
Other5	0.23	0.25	0.03	0.31	0.22	0.06	0.18	0.88
Other6	0.27	0.32	0.04	0.34	0.21	0.02	0.22	0.89

Table 9: PLS Cross-loadings for United States Sample

	PC	TC	firm size	Out	Sys_imp	Control	Sys_View	Ext_Infl
Pc1	0.92	0.39	0.02	0.36	0.53	0.01	0.17	0.30
Pc3	0.89	0.47	0.02	0.31	0.59	0.02	0.36	0.33
Tc1	0.31	0.70	0.02	0.11	0.31	0.15	0.34	0.25
Tc4	0.46	0.97	0.02	0.30	0.36	0.07	0.35	0.20
No_All	0.02	0.02	1.00	0.16	0.10	0.04	0.06	0.17
Out1	0.28	0.19	0.25	0.95	0.08	0.00	0.06	0.29
Out2	0.36	0.33	0.11	0.98	0.19	0.02	0.01	0.32
Out3	0.41	0.27	0.11	0.94	0.25	0.04	0.01	0.37
Impact1	0.62	0.40	0.16	0.22	0.92	0.17	0.37	0.34
Impact2	0.50	0.31	0.00	0.16	0.90	0.11	0.30	0.44
Impact3	0.56	0.35	0.09	0.14	0.94	0.07	0.44	0.40
CoPro1	0.01	0.10	0.04	0.02	0.13	1.00	0.10	0.01
CoPro2	0.11	0.10	0.03	0.00	0.09	0.86	0.04	0.03
EmplOri1	0.19	0.28	0.12	0.09	0.34	0.19	0.77	0.28
EmplOri2	0.34	0.44	0.05	0.03	0.31	0.01	0.84	0.28
EmplOri3	0.25	0.38	0.12	0.11	0.40	0.04	0.91	0.35
EmplOri4	0.19	0.23	0.08	0.08	0.35	0.12	0.89	0.28
Other1	0.32	0.25	0.17	0.28	0.39	0.05	0.28	0.93
Other2	0.35	0.21	0.23	0.28	0.37	0.07	0.24	0.92
Other3	0.31	0.12	0.14	0.24	0.42	0.05	0.31	0.93
Other4	0.36	0.27	0.15	0.36	0.42	0.05	0.34	0.97
Other5	0.34	0.26	0.17	0.34	0.39	0.02	0.41	0.96
Other6	0.26	0.21	0.08	0.37	0.37	0.10	0.36	0.90

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