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## Systemic Determinants of the Information Systems Outsourcing Decision: A Comparative Study of German and United States Firms

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### Abstract

*The practice of information systems (IS) outsourcing is widely established among organizations. Nonetheless, evidence suggests that organizations differ considerably in the extent to which they deploy IS outsourcing. This variation has motivated research into the determinants of the IS outsourcing decision. Most of this research is based on the assumption that a decision on the outsourcing of a particular IS function is made independently of other IS functions. This modular view ignores the systemic nature of the IS function, which posits that IS effectiveness depends on how the various IS functions work together effectively. This study proposes that systemic influences are important criteria in evaluating the outsourcing option. It further proposes that the recognition of systemic influences in outsourcing decisions is culturally sensitive. Specifically, we provide evidence that systemic effects are factored into the IS outsourcing decision differently in more individualist cultures than in collectivist ones. Our results of a survey of United States and German firms indicate that perceived in-house advantages in the systemic impact of an IS function are, indeed, a significant determinant of IS outsourcing in a moderately individualist country (i.e., Germany), whereas insignificant in a strongly individualist country (i.e., the United States). The country differences are even stronger with regard to perceived in-house advantages in the systemic view of IS professionals. In fact, the direction of this impact is reversed in the United States sample. Other IS outsourcing determinants that were included as controls, such as cost efficiency, did not show significant country differences.*

**Keywords:** *Outsourcing Determinants, Cross-Cultural, Group Comparison, PLS, Multi-Group Structural Equation Modeling, System Theory, Transaction Cost Economics, Resource-Based Theory, Institutional Theory, Power Theory, Individualism-Collectivism.*

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### 1. Introduction

In the early 1990s, information systems (IS) outsourcing was a relatively new phenomenon, dominated by large-scale outsourcing deals in the United States. Today, it is a widely recognized organizational option for managing the IS function of a firm. IS outsourcing is present globally, a fact indicated by the increasingly balanced distribution of IS outsourcing expenditure across countries (TPI, 2005). Nonetheless, evidence suggests that outsourcing should not be considered a panacea for the management of IS services in all organizations. There is still considerable variety among organizations in the extent to which IS functions are outsourced. Most organizations prefer a selective outsourcing approach, in which only particular IS functions and certain portions of IS functions are handed over to external service providers (Apte et al., 1997; Lacity, Willcocks, & Feeny, 1995).

This variation in outsourcing behavior from company to company has prompted researchers to examine the determinants by which companies decide to deploy IS outsourcing. These determinants explain why some organizations prefer to outsource higher portions of their IS functions to external service providers than other organizations. The different theoretical streams that have been applied to explain the logic behind this decision making, including economic, strategic, and institutional theories, are reflected in these determinants (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004). Despite these multiple perspectives, literature reviews of previously established IS outsourcing determinants reveal the prevalence of economic theories in explaining the outsourcing decision of a company; the main criterion used to evaluate the appropriateness of outsourcing is cost efficiency (Dibbern et al., 2004; Lacity, Khan, Yan, & Willcocks, 2010). However, internal and external IS services can differ not only in efficiency, but also in the effectiveness they offer to the company (Clark, Zmud, & McCray, 1995; DiRomualdo & Gurbaxani, 1998; Hirschheim & Lacity, 2000). A unique aspect of IS effectiveness that has rarely been considered in IS outsourcing research is the systemic nature of the IS function (Davis & Olson, 1985). When studying IS effectiveness, it is often difficult to study particular IS resources or IS functions in isolation. It is often the combined effect of various IS activities and functions working together – the systemic influence – that creates value for an organization (Ariav & Ginzberg, 1985). However, it is still far from clear how this systemic influence is factored into the decision to outsource particular IS functions to an external vendor. Accordingly, the first objective of this study is to establish a theoretical foundation for the consideration of the systemic influence of IS in the IS outsourcing decision.

The second objective of this study is to examine the impact of cross-cultural differences on the IS outsourcing decision. This second goal is motivated by two considerations. First, conceptual research has proposed a theoretical linkage between the cultural norms and values of individuals and their preferences for handling different facets of knowledge, such as systemic rather than independent knowledge (Bhagat, Kedia, Harveston, & Triandis, 2002). Specifically, it has been proposed that collectivists emphasize systemic knowledge when it comes to processing, interpreting, and making sense of a body of knowledge, whereas individualists focus on independent knowledge. Since IS outsourcing decision making represents a knowledge-intensive task, systemic influences are likely to be considered differently by companies in more collectivist as opposed to individualist countries. Second, this study contributes to understanding the perplexing findings of a number of cross-national studies on IS outsourcing that have found its determinants to vary across countries (Apte et al., 1997; Barthélemy & Geyer, 2001; Tiwana & Bush, 2007). Thus far, little attempt has been made to explain these differences. However, finding theory-based explanations for such cross-cultural differences is important, as it helps to achieve a higher level of generality for theories in the IS context, in particular, (Preston, Karahanna, & Rowe, 2006) as well as in the context of managerial decision making and organizational behavior, in general (Cheng, Sculli, & Chan, 2001; England, 1983; Hofstede, 1983a, 1993, 1994; Triandis, 1982).

In the next section, we begin by providing an overview of IS outsourcing determinants and explaining our focus on systemic determinants and their interaction with culture. We then develop our research model and empirically test it through a survey of German and United States companies. Finally, we discuss the findings and final implications and outline our conclusions.

## 2. Literature Review and Theoretical Framework

### 2.1. Major Domains of IS Outsourcing Determinants

The study of the determinants of IS outsourcing has already reached a relatively high level of maturity. These determinants may be separated into two groups, those reflecting motivations for or against outsourcing and those reflecting the IS outsourcing context (Dibbern et al., 2004; Lacity et al., 2010). The motivational factors can be separated into those stemming from the decision maker's own judgment (i.e., different types of rationales, such as efficiency and effectiveness criteria) and those stemming from the environment, referred to as environmental forces and constraints (see upper box in Figure 1). While most quantitative studies have focused on cost efficiency as a major decision criterion, qualitative and conceptual studies have emphasized effectiveness criteria, such as reaching strategic objectives (DiRomualdo & Gurbaxani, 1998; McLellan, Marcolin, & Beamish, 1995), accessing superior resources (Cross, 1995), or improving service quality (Clark et al., 1995).

The environmental forces and constraints reflect the fact that, beyond evaluating, weighting, and aggregating decision criteria based on the decision maker's own judgments, decision makers are usually influenced by their environment, both within their organization and externally (Paulson Gjerde, Slotnick, & Sobel, 2002). Environmental forces and constraints refer to pressures from external stakeholders to conform to institutional regulations (Ang & Cummings, 1997) or to behaviors of peer organizations or opinion leaders (Loh & Venkatraman, 1992). Internal environmental forces can come from various internal stakeholder groups, such as business departments or work councils, which may exercise power in order to influence the outsourcing decision (Lacity & Hirschheim, 1993).

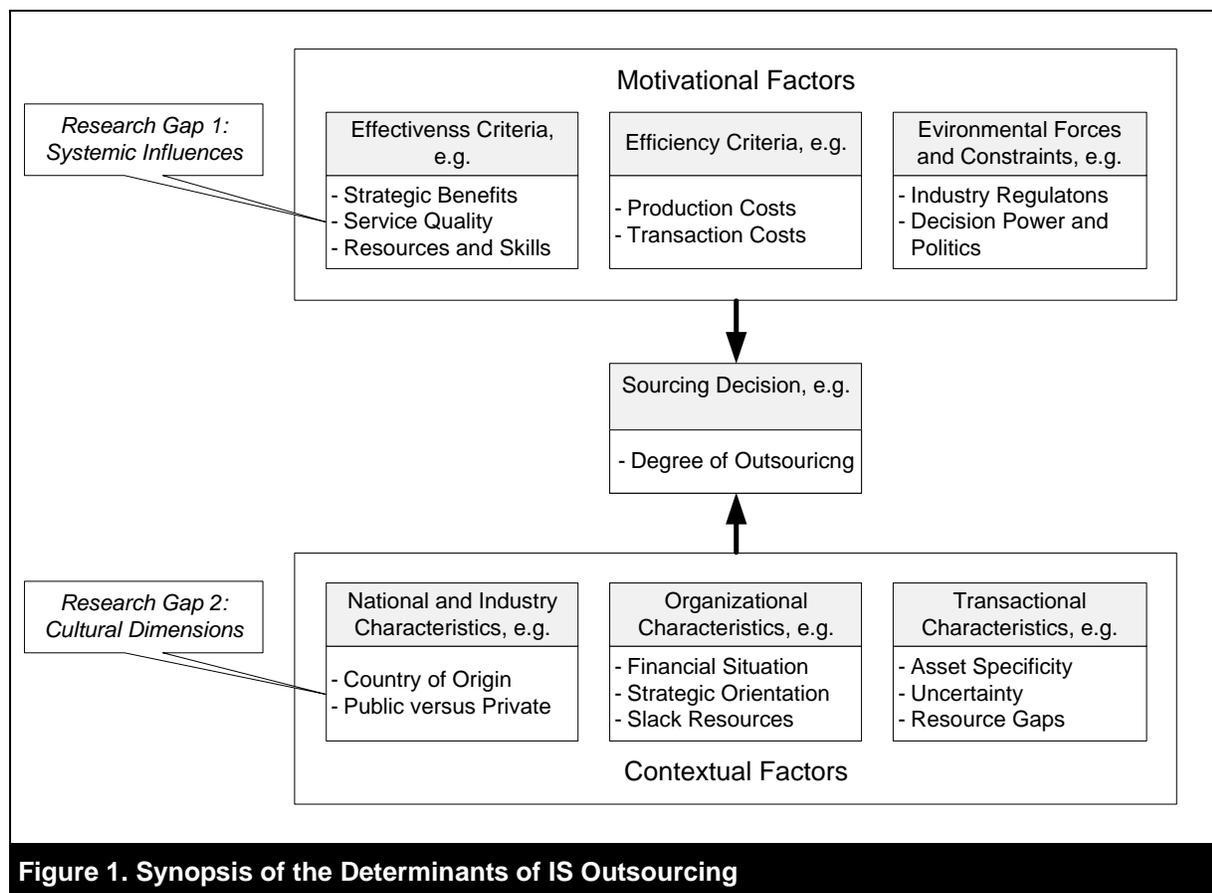


Figure 1. Synopsis of the Determinants of IS Outsourcing

The contextual factors capture the particular situation in which an IS outsourcing decision occurs, which may be characterized at different levels, such as the particular IS function that is the object of the IS outsourcing decision, the organization that makes the decision, and the country of origin in which the IS outsourcing decision is being made (see lower box in Figure 1). The basic idea of the contextual approach is that conclusions can be drawn about the appropriateness of IS outsourcing by analyzing these situational factors. For example, it was found that IS functions are more likely to be outsourced if they are characterized by a gap between the actual and desired base of IS resources (Teng, Cheon, & Grover, 1995) or if they are characterized by a low level of asset specificity or technological uncertainty (Ang & Cummings, 1997; Nam, Rajagopalan, Rao, & Chaudhury, 1996).

It is important to note, however, that contextual and motivational factors are not independent of each other. Various types of mediation and moderation effects have been suggested between the different types of determinants. As an example of moderation effects, the pressure to conform to peer organizations and industry regulations (environmental forces and constraints) was found to be moderated by contextual factors, such as the asset specificity of an IS function (transactional characteristic) (Ang & Cummings, 1997). As an example of mediation effects on IS outsourcing, the effect of asset specificity (transactional characteristic) was found to be mediated by beliefs about transactions costs (efficiency criteria) (Ang & Straub, 2002).

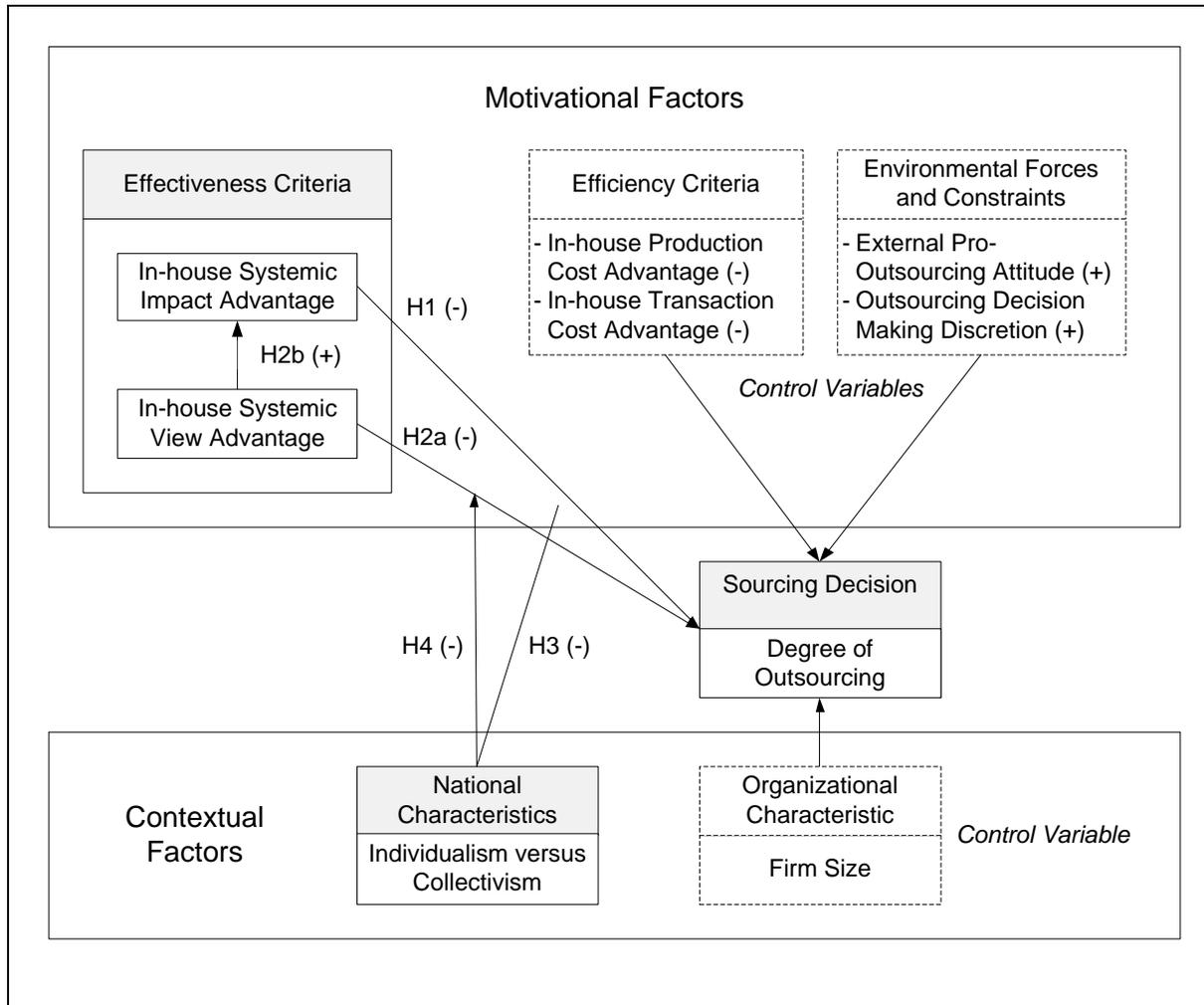
## 2.2. Gaps in the Literature Motivating this Study

While previous research has already led to considerable understanding and theoretical grounding of the IS outsourcing decision, two important gaps need to be highlighted. The first gap lies in the completeness of motivational factors, specifically in the area of effectiveness criteria. It is worth noting that, in light of the increasing practice of selective outsourcing, most studies have focused on evaluating the effectiveness of alternative sourcing options with regard to particular IS functions (Dibbern et al., 2004). However, the effectiveness of a particular IS function often cannot be evaluated without considering its interdependencies and interactions with other IS functions, which may be sourced differently. Ignoring such functional dependencies in the IS outsourcing decision can lead to severe problems. For example, Lacity et al. (1995) observe that, if the development of a software application requiring data from many other applications were outsourced, the vendor's lack of understanding of the interfaces involved tended to lead to substantial project delays and budget overruns. To date, almost no research has been conducted on these systemic influences within and across IS functions. Hence, very little data on the extent to which systemic influences are recognized in the IS outsourcing decision is available. Even in studies where the systems' interconnectedness has been conceptually recognized as an important decision factor, little theoretical grounding and no information that verifies its empirical relevance has been provided (Willcocks & Fitzgerald, 1993). This reinforces recent calls for an explicit analysis of systemic impacts on boundary choices (Jacobides & Billinger, 2006).

The second research gap pertains to the set of contextual factors currently considered in IS outsourcing decision research. While a multitude of IS functional/transactional and organizational characteristics has been considered so far, there is almost no knowledge regarding the impact of specific country and industry characteristics on the IS outsourcing decision. This lack of research is particularly troubling in light of a number of cross-national studies on IS outsourcing determinants. These studies show that some IS outsourcing decision factors seem to significantly vary between countries (Apte et al., 1997; Barthélemy & Geyer, 2001; Barthélemy & Geyer, 2005; Tiwana & Bush, 2007). These country differences suggest a moderating impact of country-specific characteristics on IS outsourcing determinants (Apte et al., 1997; Barthélemy & Geyer, 2001; Barthélemy & Geyer, 2005; Tiwana & Bush, 2007). However, no attempt has been made so far to explain the impact of these country-specific characteristics, for instance, in the form of cultural differences.

### 3. Research Model and Hypotheses

This study seeks to address the two research gaps identified in the areas of systemic interdependencies and cultural influences in explaining the IS outsourcing decision. The research model proposed posits that the consideration of systemic aspects in the IS outsourcing decision is highly sensitive to cultural differences (see Figure 2).



**Figure 2. Theoretical Framework on IS Sourcing**

Essentially, the model suggests that an IS function is less likely to be outsourced if decision makers regard in-house processes as superior in systemic effectiveness. Systemic effectiveness is split into the systemic impact of an IS function and the perspective of IS professionals on systemic issues. Both effects are proposed to be moderated by national culture. They are hypothesized to be smaller in cultures with a comparatively high individualism versus collectivism rating. In addition to the relationships hypothesized, the effects of two efficiency criteria (i.e., perceived in-house production cost advantages and perceived in-house transaction cost advantages), two types of environmental forces and constraints (i.e., the external pro-outsourcing attitude and an organization's outsourcing decision making discretion), and firm size are included as controls. Table 1 summarizes the definitions of the key constructs of the theoretical framework. We discuss the theoretical foundation for each hypothesis below.

**Table 1. Definition of Constructs**

Construct	Definition
Degree of outsourcing	The extent to which the tasks and activities necessary for the provision of an IS function are carried out by external service providers.
Comparative in-house systemic impact advantage	The extent to which an IS function's synergistic integration with other IS functions and components to leverage overall IS performance is greater in-house than if done by an external service provider.
Comparative in-house advantage in systemic view propensity	The extent to which in-house personnel tend to have more of an integrative view of the organization (i.e., tend to take into account how work in their area fits in and affects all other work in the organization) than the staff of an external vendor.
Comparative in-house production cost advantage	The extent to which fewer resources are required in-house than when using an external service provider to perform the actual work for an IS function.
Comparative in-house transaction cost advantage	The extent to which the costs that arise when delegating the tasks of an IS function, such as costs for planning, adapting, and monitoring task completion, to a task owner are lower in-house than they are when using an external service provider.
Pro-outsourcing attitude of others	The extent to which individuals or groups whose opinion is important to an organization think that the organization should outsource an IS function rather than keeping it in-house.
Outsourcing decision making discretion	The extent to which an organization has latitude of action when it comes to outsourcing an IS function to an external service provider.

### 3.1. Perceived In-House Advantage in Systemic Effectiveness

There has been significant interest in the effectiveness of IS ever since the early 1980s, when the strategic importance of IS began to be recognized (Ives & Learmonth, 1984; McFarlan, 1985). The effectiveness of IS can be described hierarchically. High-level organizational impacts, such as generating a competitive advantage through IS or increasing business process performance, are dependent on base-level impacts such as system and information quality (DeLone & McLean, 1992).

When speaking of IS effectiveness, we often refer to an organization's IS in its entirety, including the whole portfolio of information technology (IT) applications (Hamilton & Chervany, 1981). This holistic treatment of IS recognizes its systemic nature. It is usually the combined effect of various interdependent system components or IT applications that creates value, rather than the performance of specific components or applications in isolation. For example, a particular software application may be of little use if it is not deployed in a reliable and secure operating environment, or if it is not dynamically connected to other source or target applications via powerful networks that can establish meaningful identification, gathering, processing, and transfer of information (Davis & Olson, 1985).

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

*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).*

The outcomes produced by different IS functions can also be viewed as modules that need to be integrated under a common architecture (Schilling, 2002). Each module then needs to be constructed with careful consideration of interfaces with other modules in order to ensure overall system effectiveness. In any examination of the provision of particular IS components or functions, it is, therefore, essential that

their interdependence with surrounding components or functions is being considered (Ariav & Ginzberg, 1985). We define this systemic impact of an IS function as the extent to which its synergistic integration with other IS functions and components influences overall IS performance.

When it comes to outsourcing a particular IS function, it is often unclear whether such systemic impacts can be effectively accounted for (Jacobides & Billinger, 2006). IS outsourcing typically creates additional organizational boundaries, such as geographic distance or increased knowledge gaps between system users and system providers (Dibbern, Winkler, & Heinzl, 2008). Knowledge gaps may arise due to external vendor staff lacking an understanding of the various dependencies within client business processes and the existing information systems landscape. These boundaries may hinder the frictionless interconnection of requirements and code, of systems software, middleware and applications software, or of various modules of application software that is necessary to achieve high levels of system performance. For example, an external vendor may lack an understanding of the various interfaces that exist between the application software for which it is responsible and other source and target applications. A vendor may also be unfamiliar with the business processes that the application software is intended to support (Lacity et al., 1995). Accordingly, the software application provided by the vendor may not fit into the overall IS architecture, which, in turn, may constrain overall IS performance. However, generalizing the systemic disadvantages of vendors is likely to involve inaccuracies.

According to the resource-based view (Wade & Hulland, 2004; Wernerfelt, 1984), IS vendors vary in terms of their resource base, which will influence whether they are capable of coping with systemic effects. Based on past experience in achieving synergies between various IS tasks, a vendor may actually provide particularly strong systemic capabilities (Levina & Ross, 2003; Tanriverdi, Konana, & Ge, 2007). In addition, the type of interdependence between the outsourced IS function and other functions could vary from case to case (Thompson, 1967) and could require different types of integrative capabilities. Accordingly, the relative advantage of keeping an IS function in-house due to systemic considerations may differ substantially among cases. In fact, decision makers may see no in-house advantage at all and rather trust an external vendor to cope with the systemic impacts of an IS function. This is reflected in the following hypothesis:

**H1:** *The greater (lower) the perceived systemic impact advantage of an IS function being performed in-house, the less (more) likely it is that the IS function will be outsourced.*

However, accounting for the systemic impact of an IS function also requires that the actual people who perform the IS work consider how their particular job relates to the system as a whole. This systemic view propensity is defined as the extent to which IS professionals have an integrative view of their organization; that is, how much they take into account how the work that they perform in their particular area fits in and affects all other work throughout the organization<sup>1</sup>.

Notably, this systemic view propensity may extend beyond the boundaries of an organization's IS function. It may include an understanding of the entire system that a particular IS function is embedded in, including other IS functions, business functions, and all users (Alter, 2004). IS professionals that take into account how their particular work affects other work throughout the organization are likely to better consider and align the requirements of IS stakeholders with the organization's overall objective and, hence, to contribute more effectively to overall system performance (Bacon & Fitzgerald, 2001). Thus, as the resource-based view makes clear (Wade and Hulland, 2004), the systemic view propensity of IS professionals should be seen as a valuable resource. This raises the question of how such resources can best be obtained.

There are a number of reasons why the systemic view propensity of in-house and outsourced IS professionals could differ significantly. First, in-house personnel may have different motivations and

<sup>1</sup> This definition is based on the concept of systems thinking ability, which has been referred to as "(...) 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).

commitments as well as different degrees of freedom in considering the system-wide effects of their daily work than outsourced personnel who face, for instance, narrowly defined work specifications (Ang & Slaughter, 2001). Second, IS professionals must display a certain level of absorptive capacity if they are supposed to think systematically. That is, in order to realize how their work affects other functional areas in the organization, a certain level of prior knowledge and experience with those specific areas is needed (Dibbern et al., 2008). For example, in order for an IS professional to empathize with users and anticipate their needs, a certain level of shared knowledge between the IT domain and the user domain is required (Ray, Muhanna, & Barney, 2005). Accordingly, it appears crucial for IS outsourcing decision makers to consider whether retaining functions in-house or outsourcing them cultivates higher systemic view propensity:

**H2a:** *The greater (lower) the perceived advantage in systemic view propensity of in-house personnel performing an IS function, the lower (higher) is the likelihood that this IS function will be outsourced.*

Finally, in as far as IS professionals are part of IS functions, the overall evaluation of the systemic view propensity of in-house versus outsourced IS professionals should influence the evaluation at the level of the IS function, leading to the following hypothesis:

**H2b:** *The greater the advantage in systemic view propensity of in-house personnel performing an IS function, the greater the systemic impact advantage of that IS function being performed in-house.*

### 3.2. Moderating Impact of Individualism-Collectivism

National culture can manifest itself in various forms (Kroeber & Kluckhohn, 1963). On the one hand, it refers to culturally programmed, deeply grounded behavioral beliefs, values, and predispositions that are collectively shared by members of a social group, such as a nation (Hofstede, 1980). On the other hand, culture may be embodied in the visible products and expressions created by the members of a social group, such as national regulations and institutional systems (Kroeber & Kluckhohn, 1963). From the broad spectrum of cultural dimensions that have been clarified in the previous literature (Lytle, Brett, Barsness, Tinsley, & Janssens, 1995), three cultural dimensions show a strong conceptual relation to the two systemic determinants of the IS outsourcing decision introduced above (see Table 2).

**Table 2. Selected Cross-Cultural Dimensions**

Category (Lytle et al. 1995)	Cultural Dimension	Study	Related to following IS outsourcing determinant(s)
Relationship between societal members	Individualism versus collectivism	Hofstede (1980)	Systemic impact advantage Advantage in systemic view propensity
	Analytical versus integrative view of the firm	Trompenaars and Hampden-Turner (1994)	Systemic impact advantage Advantage in systemic view propensity
Motivational orientation	Individualistic versus communitarian (self-orientation vs. collectivity-orientation)	Trompenaars and Hampden-Turner (1994)	Systemic impact advantage Advantage in systemic view propensity

The first cultural dimension is individualism versus collectivism (Hui & Triandis, 1986). According to Hofstede (1980), this dimension reflects the degree to which individuals are integrated into groups. The second is individualism versus communitarianism (Hampden-Turner & Trompenaars, 1993, p. 51). This dimension is based on the “self-orientation versus collectivity-orientation” concept that was first defined by Parson and Shils (1951). It reflects the extent to which managers believe that quality of life, organizational performance, and faults relate to individuals rather than groups. The third is the analytical versus integrative view dimension (Hampden-Turner & Trompenaars, 1993; Trompenaars

& Hamden-Turner, 1994), which reflects the extent to which managers perceive the firm as a collection of individual tasks, functions, people, and machines (analytical view) rather than as a group of related persons working together (integrative view). These three dimensions have a common focus on the contrast between a holistic perspective, where an individual entity is seen as part of a whole, and an individualistic perspective, where individual entities are seen in isolation. In general, we will simply speak of individualism versus collectivism, keeping in mind that the notions of analytical versus integrative as well as individualistic versus communitarian are subsumed under this concept.

Out of these two perspectives, it is the holistic concept of collectivism that is closely related to the extent to which an organization considers the systemic nature of IS in its IS outsourcing decisions. This view is in line with conceptual research on cross-cultural variations in cross-border knowledge transfer (Bhagat et al., 2002). Bhagat et al. (2002) argue that an individual's propensity to process, interpret, and make sense of a particular type of knowledge critically depends on the cultural norms and values that this individual holds. Specifically, they propose that the propensity to handle systemic knowledge rather than independent knowledge is directly related to the cultural dimension of individualism versus collectivism. While people from collectivist cultures place emphasis on systemic knowledge when performing knowledge-intensive tasks, individualists tend to focus on independent knowledge. Thus, as far as IS outsourcing decision making represents a knowledge-intensive task that requires the decision maker to consider different facets of knowledge, her/his disposition toward considering systemic IS aspects will probably be culturally influenced. Decision makers are more likely to consider both the systemic impact of an IS function and the systemic view propensity of IS professionals in their evaluation of alternative sourcing options, if their own values and norms are constructed according to a holistic perspective. In contrast, if individualistic thinking dominates, the focus may be on evaluating particular IS functions in isolation and focusing on the more immediate competencies that individuals bring to the table in performing that particular IS function. Accordingly, we propose the following moderating impacts of culture:

**H3:** *The (negative) relationship between comparative in-house advantages in systemic impact and the degree of outsourcing is weaker in more individualistic cultures.*

**H4:** *The (negative) relationship between comparative in-house advantages in systemic view propensity and the degree of outsourcing is weaker in more individualistic cultures.*

### 3.3. Control Variables

In addition to the two systemic IS outsourcing determinants, we include a number of other determinants as control variables. These controls reflect established streams of reasoning in the IS outsourcing literature.

#### 3.3.1. Efficiency Criteria

The first of these reflects the efficiency perspective that is most prominently represented by transaction cost economics (Williamson, 1981). According to Williamson (1981), the governance choice depends on both production and transaction cost differences between the firm and the market. External vendors are supposed to have an advantage over in-house providers in terms of realizing economies of scale and scope. This is because external vendors can potentially provide the same type of service for a larger pool of customers than client organizations could realize in-house (Ang & Straub, 1998). In particular, the vendor's ability to economize on the basis of past experience with multiple customer accounts may explain the lower production costs associated with outsourcing (Levina & Ross, 2003). However, there is evidence that, contrary to Williamson's (1981, 1985) original assertions, external vendors may not generally offer lower production costs. Indeed, there are cases where clients have consciously decided against outsourcing due to vendors charging substantially higher prices compared to in-house costs (Hirschheim & Lacity, 2000). For example, the vendor may have incurred substantial set-up costs in adopting knowledge unique to the client and recoups these by incorporating them into the price premium (Dibbern et al., 2008). Accordingly, firms are expected to outsource an IS function to a lesser extent if in-house production costs are perceived to be lower than that of outsourcing. Beyond production costs, however, the provision of IS services

also incurs transaction costs (Ang & Straub, 1998; Barthélemy, 2001; Lacity & Hirschheim, 1993). Transaction costs refer to the time, effort, and money spent when tasks of an IS function are delegated to one or more agents. For instance, they cover activities such as "...planning, adapting, and monitoring task completion under alternative governance structures" (Williamson, 1981, p. 552-553). These transaction costs can occur both in-house and when outsourcing to an external vendor. Hence, firms should again outsource a smaller fraction of an IS function if transaction costs are perceived to be lower in-house (Williamson, 1981).

### **3.3.2. Environmental Influences and Constraints**

As studies on strategic decision making have made clear (Eisenhardt & Zbaracki, 1992), decisions (such as which IS sourcing option to choose) that occur infrequently and with the involvement of top management are often influenced by various external forces and constraints. The first of these influences that we consider exemplifies institutional theory, which argues that organizations passively conform to their environment (DiMaggio & Powell, 1983). The other influence exemplifies power and politics theory, which holds that organizations are constructed through various coalitions, each of which has different interests, and that the relative power of these various interest groups and their ability to exercise power through politics determine organizational decision making (Pfeffer, 1981).

Influences from the institutional environment may stem from various sources, such as peer organizations (Ang & Cummings, 1997), consultants (Lacity & Willcocks, 1997), or the public press (Loh & Venkatraman, 1992). Such external opinions may be either actively sought to reduce inherent uncertainties surrounding an IS outsourcing decision or may implicitly influence key decision makers by shaping their general attitude toward outsourcing. Thus, the more positive the attitude of influential others toward the outsourcing of an organization's IS function, the more likely it is that the IS function will be outsourced.

While institutional theory acknowledges that various stakeholders may influence the IS outsourcing decision, the general assumption that an organization can act freely in its outsourcing decision has not been challenged. The validity of assuming this managerial choice approach has been called into question by proponents of the power and politics theory (Pfeffer, 1981; Pfeffer and Salancik, 1974). In reality, there may be numerous other coalitions, such as other departments, dissatisfied employees, unions, and internal work councils, that may see their interests weakened if IS functions are outsourced. These groups may, therefore, have incentives to take action against such decisions. In the face of such opposition to the outsourcing of an IS function, an organization's outsourcing decision-making discretion, its latitude of action in outsourcing an IS function, becomes severely limited (in line with the concept of managerial discretion, see Hambrick & Finkelstein, 1987). High levels of outsourcing decision-making discretion in a company would then reflect a high level of power to enforce an outsourcing decision (Carpenter & Golden, 1997). Accordingly, greater discretion means fewer impediments to outsourcing and a higher likelihood that an IS function is, indeed, outsourced (Lacity & Hirschheim, 1993).

In summary, there are two relationships (H1, H2a) that are proposed to be culturally sensitive. We expect to find significant differences in the strength of these two relationships between countries that are known to differ in their individualism-collectivism rating (H3 and H4). The inclusion of control variables will allow us to examine whether there are other determinants that are culturally sensitive. Currently, however, there is no conclusive theoretical evidence that these other determinants are culturally influenced.

## **4. Method**

### **4.1. Data**

#### **4.1.1. 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. For the purpose of the study, we deemed it essential that these countries be similar in terms of their industry structure,

economic power, and the typical level of IS maturity within corporations (OECD, 2002), but different in the cross-cultural dimensions delineated in the theoretical framework. Two countries that met these requirements were Germany and the United States. The differences in cultural dimensions between the two countries are shown in Table 3.

**Table 3. Instances of Cultural Dimensions in Germany versus United States**

Cultural Dimension	Study	Germany	United States
Individualistic versus communitarian (Self-orientation versus collectivity-orientation)	Trompenaars and Hampden-Turner (1994)	Medium individualistic	Relatively high individualistic
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

The questionnaire was designed in both English and German. To ensure a fit between the versions, the initial English version was translated into German and then reverse-translated by a native speaker who works as an English lecturer in Germany (Douglas & Craig, 1999). No significant differences could be detected; this increased the confidence in the fit between the English and the German version of the questionnaire.

#### **4.1.2. Choice of Respondents**

We administered the questionnaires to the highest-ranking IS executives of organizations in the United States and Germany. We deemed Chief IS executives as the most appropriate informants, since they were presumed to be most familiar with an organization's IS sourcing choices and the wider implications of this choice for the entire organization. The selection of this group as key informants is consistent with prior studies on IS outsourcing (cf. Ang & Straub, 1998; Apte et al., 1997; Aubert, Patry, & Rivard, 1996; Barthélemy & Geyer, 2001; Poppo & Zenger, 1998; Teng et al., 1995). The questionnaire items were presented to and validated by four noted IS outsourcing researchers and then 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.

#### **4.1.3. Choice of Industries**

In order to avoid potential industry influences, we considered only two industries that play a significant role in both countries: finance and machinery (in total, we surveyed 2,130 companies; these were broken down as follows: Germany: 406 finance, 552 machinery; United States: 676 finance, 591 machinery).

#### **4.1.4. Choice of IS functions**

We focused on two particular IS functions: applications development and applications maintenance. Respondents were asked to answer each question on the questionnaire for both the development and the maintenance of software applications (see also Poppo and Zenger, 1998). The choice of two IS functions also allowed us to account for differences between these functions in our proposed determinants.

#### **4.1.5. Response Rate**

Overall, 180 usable questionnaires were returned from our total sample of 2,130 companies (Germany: 77 finance, 62 machinery; United States: 17 finance, 24 machinery). This gave an overall

response rate of 8.4 percent (15.1 percent in Germany and 3.4 percent in the United States)<sup>2</sup>. Since the survey included questions about both the development and the maintenance of software applications, the sample for the country comparison included 278 decisions on the sourcing of software application services in Germany and 82 such cases in the United States. According to recent simulation studies analyzing the relative reliability of the 75 versus 150 scenario (Chin, 2003), our sample size is reliable to a degree either near or above the recommended level of 0.80.

As an additional check, we conducted a Monte Carlo simulation focusing on the two hypothesized culturally sensitive paths, and our results corroborated those of Chin (2003). As Muthen and Muthen (2002) noted, "The sample size needed for a study depends on many factors, including the size of the model, distribution of the variables, amount of missing data, reliability of the variables, and strength of the relations among the variables". Following the same approach as Chin (2003), we generated 2,000 sample data sets that mimic the exact sample size differences between Germany and the United States as in our study and with the same measurement reliabilities and path estimates for the two countries. Then, we ran 1,000 multigroup comparisons (to be discussed later) where both sample data sets went through the same 1,000 permutation runs, resulting in 2 million computational runs. The results yielded statistical power (i.e., percentage assessed as significant) of 73.6 and 89.3 for Hypotheses 1 and 2a, respectively. These results are consistent with the cross-national effect size differences of 0.31 and 0.40 and have statistical power to match the significance level presented in Table 9.

## 4.2. Measures

Each of the constructs from our model was measured with a block of indicators (questionnaire items). Wherever possible, we adopted existing measures from prior empirical studies. We provide an overview of the constructs and measurement items in Table 4. The items for systemic impact and systemic view propensity were developed from the construct definitions (see Table 1). We identified specific facets in the definition (e.g., Chin, Schwarz, & Johnson, 2008) to develop the corresponding terms in the items. In order to ensure content and face validity as well as readability, we pre-tested the items, and the comparative fit of translations from English to German and back provided further assurance (see section 4.1). Discriminant and convergent validity were subsequently assessed (see section 5.2).

We measured most of the items 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. To measure the degree of outsourcing, respondents were asked to provide estimated percentages. To measure the construct external pro-outsourcing attitude, we adopted the semantic differential approach (Osgood, Suci, & Tannenmann, 1957), in which 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. ix; Chin & Newsted, 1999, p. 310; Fornell, 1989, p. 161).

Application services were used as units of analysis. Applications development was defined and introduced to the respondents as the definition, design, and implementation of customized software and the analysis, selection, and tailoring of standardized software packages (e.g., SAP R/3). Applications maintenance was defined as all corrective, adaptive, and perfective (i.e., optimizing) modifications of application software that do not include any functional enhancements (Bansler & Havn, 1994; Swanson & Beath, 1989).

<sup>2</sup> 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 United States survey packages were sent off from the United States and follow-up phone calls were conducted in both countries, differences in the response rates between Germany and the United States could not be prevented. Indeed, the response rates differ significantly. It should be noted, however, that for the United States similar results were obtained in a more recent IS outsourcing mail survey by Poppo and Zenger (1998). They achieved a response rate of 5 percent (152 from 3,000) in the United States. We were also unable to detect any significant non-response bias using the extrapolation procedure of Armstrong and Overton (1977).

**Table 4. Questionnaire Measures**

Construct	Source	Sample Item
Degree of Outsourcing	Based on Teng et al. (1995) and Dibbern and Heinzl (2009)	For each of the two IS functions, please estimate the average percentage currently allocated to external service providers in terms of: <ol style="list-style-type: none"> <li>1. The function's total budget (from 0 to 100%)</li> <li>2. Total person working days</li> <li>3. Total number of people that participate in doing the work.</li> </ol>
Comparative in-house systemic impact advantage	Newly formed based on general systems theory (von Bertalanffy, 1979)	If this IS function is not performed in-house but externally: <ol style="list-style-type: none"> <li>1. The integration of this IS function into the overall IS function of our organization is weakened</li> <li>2. The synergetic effects to other IS functions will be threatened</li> <li>3. The overall performance of our entire IS function will be greatly affected.</li> </ol>
Comparative in-house advantage in systemic view capability	Newly formed based on concepts of systems thinking (Serman, 2000; Wolstenholme, 2003)	In doing the actual work required for each of the IS functions, our own employees, much more than personnel of external service providers, tend to: <ol style="list-style-type: none"> <li>1. Have a systems view of the organization</li> <li>2. Have an organization-wide perspective of how work in different areas affect one another</li> <li>3. Consider the task interdependencies in our organization</li> <li>4. Have an integrated view of the organization.</li> </ol>
Comparative in-house production cost advantage	Based on Ang and Straub (1998)	In doing the actual work required for each of the IS functions: <ol style="list-style-type: none"> <li>1. Our internal staff works more cost efficient than an external service provider</li> <li>2. We can realize higher economies of scale internally than an external service provider.</li> </ol>
Comparative in-house transaction cost advantage	Based on Ang and Straub (1998)	Transaction costs are all costs—other than the actual production costs—that arise when delegating tasks of an IS function to a task carrier. When delegating (i.e., transferring) tasks of the particular IS function: <ol style="list-style-type: none"> <li>1. The costs incurred in negotiating, managing, and coordinating are lower within the firm than in case of contracting with an external service provider</li> <li>2. Less transaction costs are incurred for internal employees than when using an external service provider.</li> </ol>
Outsourcing decision making discretion	Based on Osgood et al. (1957) and Cordano and Frieze (2000)	When it comes to outsourcing this IS function to an external service provider: <ol style="list-style-type: none"> <li>1. Our organization can act unrestrictedly</li> <li>2. There are no impediments to our organization.</li> </ol>
Pro-outsourcing attitude of others	Based on Ajzen and Fishbein (1980)	Persons or groups whose opinion is important to our organization think that outsourcing this particular IS function is: <ol style="list-style-type: none"> <li>1. bad–good (-3 to +3)</li> <li>2. negative–positive</li> <li>3. harmful–beneficial</li> <li>4. foolish–wise</li> <li>5. illogical–logical</li> <li>6. worthless–valuable.</li> </ol>
Firm size	Based on Ang and Straub (1998)	Please estimate your organization's overall number of employees.

### 4.3. Group Comparison Procedure

We tested the model using PLS software (PLS Graph 3.0, Version 1130). We chose PLS over the covariance-based structural equation modeling (SEM) software for several reasons. First, the data points of this study do not follow a multivariate normal distribution<sup>3</sup>. Covariance-based SEM assumes a multivariate normal distribution, but not PLS (Chin, 1998b). Second, the observations in this study are not truly independent of each other, since the same respondent answered each question for both the development and maintenance of software. PLS does not assume independence of cases, nor that any two cases have equivalent residual distributions (Chin, 1998b, p. 315). Third, the United States data set was comprised of fewer than 200 respondents, the recommended minimum size for covariance-based SEM. PLS, on the other hand, can produce consistent results with sample sizes as low as 17.

While these advantages make the suitability of PLS in this study very clear, there is one limitation. To date, most of the multi-group comparisons of PLS models in which differences in path estimations 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, researchers usually conduct a procedure based on the t-test using the pooled standard errors obtained via a resampling procedure such as bootstrapping from each sample (e.g., Keil et al., 2000). However, this procedure is valid only under the assumption of normal distribution or similar sample size.

Recently, Chin (2003) proposed an alternative, distribution-free approach in which a random permutation procedure was applied to overcome these limitations. Chin noted that randomization or permutation tests among statisticians are the preferred tests of significance for non-normal data. Random permutation procedures should not be viewed as alternatives to the parametric statistical tests that are currently used. Rather, they should be considered as preferable for data that does 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.). A 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, is, as Edgington (1987, p. 5) notes, "valid for any kind of sample, regardless of how the sample is selected". This is an extremely important characteristic of a permutation test based on randomization, because the potential use of nonrandom samples in surveys and experimental studies would 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; this is not always tenable.

## 5. Data Analysis Results

### 5.1. Descriptive Findings

Table 5 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 both larger in the United States than they are in Germany.

<sup>3</sup> 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;

$$\frac{1}{N} \sum_{i=1}^N [(x_i - \bar{x})' \hat{S}^{-1} (x_i - \bar{x})]^2 - \frac{p(p+2)(N-1)}{N+1}.$$

**Table 5. 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 companies in the United States can partially be attributed to a lower degree of IS outsourcing in applications development and maintenance. Table 6 shows that the German organizations in our sample spent about twice as much money as the U.S. organizations spent on outsourcing their IS development and maintenance functions. Other sourcing peculiarities, such as equity arrangements (where a certain amount of capital is exchanged between vendor and client), the average number of employees transferred to external vendor(s) in case of outsourcing, and contracting experiences (numbers of contracts signed within last five years) were quite similar between the German and United States sample. Decisions against outsourcing were made more frequently in Germany.

**Table 6. 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
Number of contracts in the last 5 years	10.1	19.2	11.1	19.0
Number of decisions against outsourcing in the last 5 years	5.1	8.4	2.1	2.7

Finally, Table 7 shows the summed averages and standard deviations (Std.) of the constructs of the theoretical model. The United States shows higher levels of perceived in-house advantages in both production and transaction costs and in systemic impact and systemic view capabilities than Germany does. This is reflected in the lower level of outsourcing in the United States.

**Table 7. 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
External pro-outsourcing attitude	(+3 to -3)	0.40	1.24	-0.41	1.42
Outsourcing decision making discretion	(+2 to -2)	-0.11	1.02	-0.22	1.19

On average, in the United States, the level of discretion over the outsourcing decision is lower, and the attitude of others toward outsourcing is more negative than in Germany. This prompts the question whether these factors exert a significant influence on the sourcing choice in both countries and whether the linkages we hypothesized as culturally sensitive are significantly different between Germany and the United States.

## 5.2. Results of Model Testing

We now examine the results of the 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.

### 5.2.1. Measurement Model

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

We assessed both indicator reliability and construct reliability (Peter, 1981, p. 65) in terms of convergent validity (Bagozzi & Phillips, 1982, p. 468). We examined indicator reliability by looking at the construct loadings. All loadings are significant to a level of 0.01 and (except for Pc4, U.S.) fall above the recommended 0.7 parameter value (significance tests were conducted using the bootstrap routine with 500 resamples (Chin, 1998b)). We tested construct reliability and validity using two indices: (1) composite reliability (CR) and (2) average variance extracted (AVE). All the estimated indices were found to be above the threshold (Bagozzi & Yi, 1988) of 0.6 for CR and 0.5 for AVE (see Table 8).

**Table 8. 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 Pro-outsourcing Attitude	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 Decision Making Discretion	CoPro2	0.90	0.93	0.87	0.86	0.93	0.87
	CoPro1	0.97			0.99		

Examining the cross-loadings provides a further check on the discriminant validity of the construct items. 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). We present the cross loadings for Germany and the United States in Tables A-1 and A-2, respectively (see Appendix). The loadings on their constructs are shadowed. Tracing the data from one side of the rows to another reveals that each item loads higher on its own construct than on any other construct. Comparing the data from the top of a column to the bottom also shows that a particular construct loads highest with its own items. Taken together, this data implies discriminant validity for both samples.

Finally, in order to check for common method variance due to the self-reported responses of CIOs, we conducted Harman's one-factor test for both the United States and the German data set (Podsakoff & Organ, 1986). For this purpose, we used a confirmatory factor analysis (using AMOS 17.0), where the seven latent variables of the model were loaded on one factor. The results showed poor model fit; this suggests that common method variance is not responsible for the relationship observed among the variables.

### 5.2.2. Structural Model

Having gained confidence that the measures are appropriate for the German and United States samples, the next stage involved testing both the explanatory power of the entire model on IS sourcing and the predictive power of the independent variables in both countries. We used the squared multiple correlations ( $R^2$ ) of the main dependent variable, which represents overall predictiveness of IS outsourcing, to assess the explanatory power. It can be concluded from Figure 3 that 33 percent of the variation in the degree of outsourcing ( $R^2 = 0.33$ ) can be explained by the independent variables in Germany, while 27 percent can be explained in the United States sample ( $R^2 = 0.27$ ).

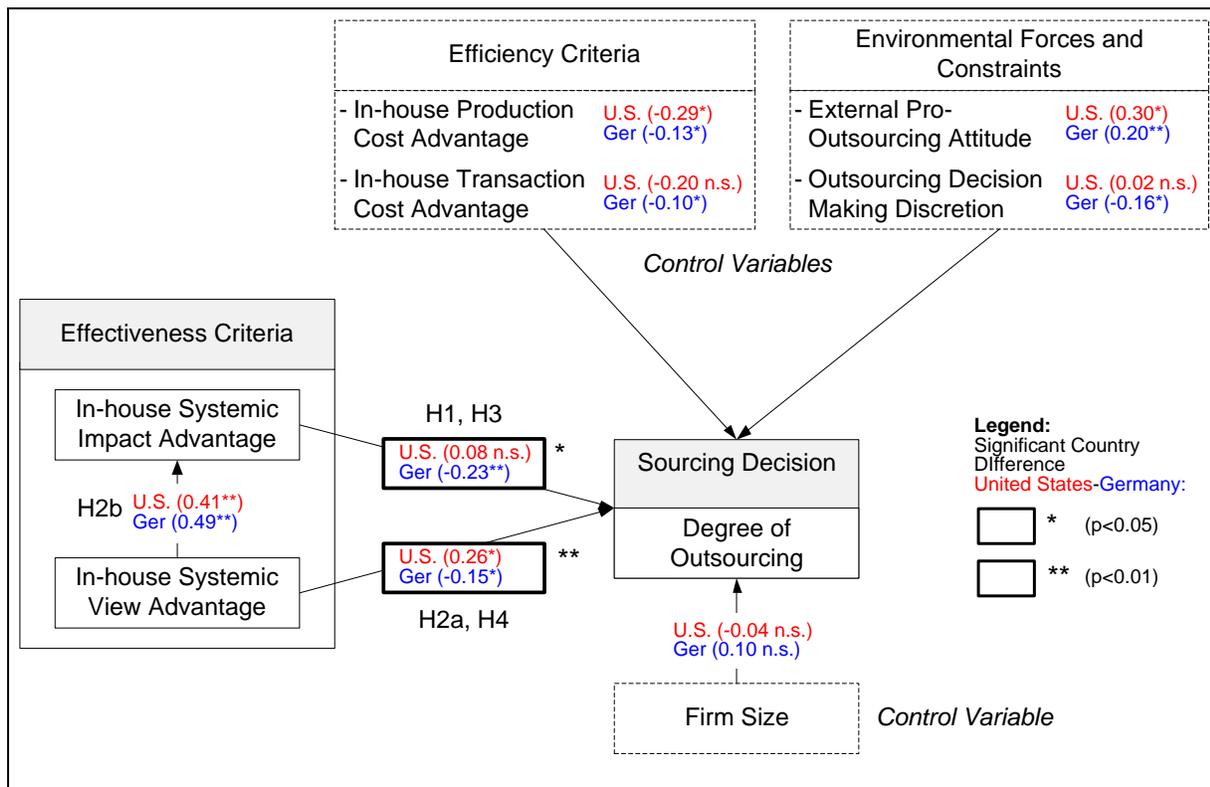


Figure 3. Structural Model Findings for United States versus Germany (Note: \*Significant at 0.05; \*\*Significant at 0.01)

We tested the structural paths by examining the magnitude of the standardized parameter estimates between constructs together with the corresponding t-values that indicated the level of significance (t-values were obtained through the bootstrap routine (Chin, 1998b, p. 320)). We give an overview of the results in Table 9. Figure 3 is a graphic representation of the findings for the United States and Germany.

In the German sample, the findings provide significant evidential backing for the effectiveness hypotheses H1, H2a, and H2b. The path coefficients show the expected signs (negative for H1 and H2a, while positive for H2b) and are significant to a level of 0.05 (\*) or 0.01 (\*\*). Out of the five control variables, all of them except for firm size turned out to be significant determinants. The link between outsourcing decision-making discretion and the degree of outsourcing was found to be negative for Germany; this is in contrast with our expectation of a positive association.

More deviations from the hypotheses were found in the United States data than the German data. We could find no significant impact of perceived in-house advantages in systemic impact; thus, H1 was rejected. Moreover, the comparative in-house advantages in systemic view propensity of IS professionals were found to be positively related to the degree of outsourcing. This is in contrast to H2a. Also, in contrast to Germany, no evidence can be found for the significant impact of comparative transaction cost advantages, outsourcing decision-making discretion, and firm size on the degree of outsourcing.

### 5.2.3. Significance of Group Differences

The data regarding significant differences between Germany and the United States and whether those differences confirm the proposed cultural differences (Hypotheses 3-4) can be found in the right-hand column of Table 9. It shows the level of probability (P) with which the Null-hypothesis (the difference in the parameter estimates for both countries equals zero) is true. Thus, cultural differences are significant if this probability (scaled from 0 to 100) is limited to a critical distance of 1 percent ( $P < 1$ )\*\* or 5 percent ( $P < 5$ )\* (Mohr, 1991).

**Table 9. PLS Results for Structural Model and Group Comparison**

			Germany (n = 278)	United States (n = 82)	Country Difference
Structural Paths			Path t-value	Path t-value	Δ Path P-value
In-house Systematic impact advantage	H1 (-) →	Degree of outsourcing	-0.23 ** 3.67	0.08 0.54	-0.31 * 2.5 H3
In-house Systematic view advantage	H2a (-) →	Degree of outsourcing	-0.15 * 1.98	0.26 * 2.11	-0.40 ** 0.3 H4
In-house Systematic view advantage	H2b (+) →	In-house Systematic impact advantage	0.49 ** 11.38	0.41 ** 3.86	0.08 17.1
In-house Production cost advantage	(-) →	Degree of outsourcing	-0.13 * 1.86	-0.29 * 2.05	0.17 13.0
In-house Transaction Cost advantage	(-) →	Degree of outsourcing	-0.10 * 1.66	-0.20 1.23	0.10 25.2
External pro-outsourcing attitude	(+) →	Degree of outsourcing	0.20 ** 3.93	0.30 * 2.31	-0.10 20.9
Outsourcing decision making discretion	(+) →	Degree of outsourcing	-0.16 * 2.22	0.02 0.21	-0.18 7.9
Firm size	→	Degree of outsourcing	-0.04 1.08	0.10 0.65	-0.14 12.0

As hypothesized, only the two culturally sensitive paths (H1 and H2a) were found to show statistically significant differences between Germany and the United States. We found the difference in the structural path from systemic impact advantage to degree of outsourcing (H1) to be significant at the 0.05 level ( $P = 2.5$ ), supporting H3. The data also show that the difference in the structural path between Germany and the United States in the relationship between systemic view advantage and degree of outsourcing (H2a) significantly differs at the 0.01 level ( $P = 0.3$ ). However, the results show that it is not the strength, but the direction of that link that differs significantly between Germany and the United States. The link is found to be negative in Germany, as predicted, but positive in the United States.

### 5.3. Control for Industry and IS Function Differences

#### 5.3.1. Country Differences for Two Distinct IS Functions

We performed the same analysis of country differences between Germany and the United States separately for both IS functions, development and maintenance (see Table 10). The results are similar to those of the aggregated data sets, particularly regarding the two systemic variables. Analogous to the aggregated data sets, the strongest differences can be seen in the data pertaining to H2a between the countries; these differences are statistically significant for both functions. The path of H1 differs at the 0.05 level in maintenance, but only at around the 0.1 level in development. It is also noteworthy that the external pro-outsourcing attitude has a significantly stronger influence in the United States with regard to the outsourcing of applications development. Overall, however, it is striking how consistent the findings for the particular IS functions are with the aggregated data set regarding the cultural sensitivity of the two systemic determinants.

**Table 10. Group Comparison for Each Function**

Hypotheses	Maintenance				Development			
	Germany	United States	Country Diff.	p-value	Germany	United States	Country Diff.	p-value
	Path	Path	$\Delta$ Path		Path	Path	$\Delta$ Path	
H1 (-)	-0.24 ***	0.15	-0.39	4.57 * (H3)	-0.23 ***	0.03	-0.26	11.62 (H3)
H2a(-)	-0.24 ***	0.28 *	-0.52	0.25 ** (H4)	-0.15 **	0.33 **	-0.47	5.26 (*) (H4)
H2b (+)	0.44 ***	0.36 **	0.07	26.27	0.49 ***	0.46 ***	0.03	17.99
TC	-0.07	-0.36 *	0.28	10.23	-0.13 **	-0.24	0.12	38.53
PC	-0.11	-0.24	0.13	27.97	-0.10 *	-0.18	0.09	44.44
External	0.14 *	0.11	0.03	43.81	0.20 ***	0.56 ***	-0.36	2.30 *
Discretion	-0.17 *	-0.05	-0.12	30.43	-0.16 ***	0.09	-0.25	10.37
Firm size	-0.07 *	0.12	-0.19	15.19	-0.04	0.02	-0.05	46.74

#### 5.3.2. Function and Industry Differences

Comparing the two IS functions (development and maintenance) for the combined data set of the United States and German firms ( $n = 180$  for each) did not reveal any significant differences ( $p < 0.05$ ) in the structural paths. When comparing industries, we found only the effect of decision-making discretion to differ significantly at the 0.05 level. It appeared to have a negative impact on outsourcing in the finance industry, but was insignificant for the machinery industry. The evidence suggests that systemic influences were found in the expected direction (negative) for both samples, but only to a significant extent for the finance industry. These differences between industries were weakly significant ( $p < 0.1$ ).

Overall, these controls show that the differences between paths are considerably stronger between countries than between IS functions or industries. This further strengthens our ex ante theorizing on the cultural sensitivity of the systemic determinants of IS outsourcing.

## 6. Discussion

We discuss and interpret the results of the model testing in the following sections. The discussion is divided into the findings of culturally sensitive and culturally insensitive IS outsourcing determinants. We conclude with the study's limitations.

### 6.1. Cultural Sensitivity of Systemic IS Outsourcing Determinants

Notably, both of the systemic determinants that were hypothesized to be culturally sensitive did, indeed, show significant differences in the structural paths between Germany and the United States (H3 and H4).

First, it is worth noting that the absolute path values of the two systemic determinants turned out to be quite high in comparison to the path values of our control variables, which reflect more established IS outsourcing theories. For the German companies, the path value for systemic impact (H1) shows the highest estimate among all determinants. For the United States firms, the path value for systemic view propensity is almost as high as for in-house production cost advantages and external influences. This shows that our newly introduced systemic influence perspective adds to the general understanding of IS outsourcing decision making.

Second, we found the differences between countries to be significant ( $p < 0.05$ ) only for systemic influences. We found that the perceived in-house advantage in the systemic impact of an IS function impedes the extent to which this function is outsourced in Germany, whereas we found the relationship to be negligibly small (path=0.08) and not significant in the United States. This country difference is consistent with the perspective that organizations are less inclined to consider system-wide effects in their evaluation of alternative sourcing options for particular IS functions in countries that are characterized by a very high level of individualism and a more analytical view of the firm. In contrast, in Germany, which is more collectivist in nature and where companies tend to hold an integrative view of the organization, the implications of outsourcing a particular IS function on overall system performance are explicitly recognized. Thus, the moderating impact of individualism-collectivism appears in the findings as hypothesized (H3).

However, the results also suggest that we should not assume that systemic influences are ignored in highly individualistic countries. In the United States, these systemic influences are recognized at the level of the IS workforce, albeit in a completely different way than in Germany. While in Germany, it was confirmed that application services are outsourced to a lower extent if in-house personnel are regarded as having a better systemic view propensity, the opposite trend was found in the United States; application services are outsourced to a higher level, in particular if in-house personnel are seen as superior in their systemic view propensity. Thus, in contrast to the prediction (H4), a higher level of individualism was not found to lower the extent to which the systemic view propensity of IS professionals is factored into the IS outsourcing decision. Instead, individualism seems to modify the way in which systemic view propensity is considered.

Our hypothesis on the impact of systemic view propensity was based on the assumption that such ability and behavior is generally valued highly for all IS professionals in collectivist countries but lower in more individualistic cultures. This assumption, however, may not hold true for strongly individualistic societies such as the United States. Here, systemic thinking may be seen as a required trait for some, but not all, IS professionals. Consistent with the more analytical view of the firm, the responsibility for taking care of systemic effects of an IS function may be in the hands of a specialized task force that constitutes a minority of that function. At this point, it is interesting to note that systemic view propensity was generally seen to correlate strongly with favoring in-house workforces in the United States sample, even in cases where the majority of an IS function was outsourced to an external vendor. This finding can be inferred from the data presented in Table 11, where the responses of CIOs on systemic view propensity are averaged and then compared. We conducted this comparison between firms that kept their application service primarily in-house and those that primarily outsourced the function (for a similar analysis see Ang and Straub, 1998, p. 545). As shown in Table 11, in contrast to Germany, the average level of perceived in-house advantage in systemic

view propensity is similarly high in those United States firms that substantially outsource (1.27) and in those who outsource only a minority of their IS functions (1.34).

**Table 11. In-house Advantage in Systemic View Propensity Across the Decision to Outsource**

	Country	Primarily in-house (<50%)	Primarily outsourced (>=50%)	Difference	Total N
In-house advantage in systemic view propensity	United States	1.34 (N=67)	1.27 (N=14)	0.07	81
	Germany	1.10 (N=167)	0.65 (N=111)	0.45	278
	Country Difference	0.24	0.62		

Notes: -2 = Strongly Disagree; 2 = Strongly Agree; 0 = Neutral

From a theoretical perspective, the finding that United States firms that primarily outsource still perceive in-house personnel as having an advantage in their systemic view propensity appears initially perplexing. This contradicts the knowledge-based view argument that firms keep the know-how and capabilities of what they do in-house, while outsourcing the required resources of what they do not do (Brusoni, Prencipe, & Pavitt, 2001). Thus, if a firm outsources the majority of its software development work to an external vendor, the personnel of the external vendor are expected to hold superior knowledge about all the activities required to perform the outsourced function. This would entail the systemic capabilities required to ensure integrative fit of the outsourced function with the client's organization.

More recently, however, the opposing view has been taken. It has been argued that firms may actually keep or build up broad systemic knowledge in-house in order to coordinate the work being outsourced (Brusoni et al., 2001). Such organizational arrangements are described as loosely coupled (Orton & Weick, 1990), which means that the client organization and the work being outsourced represent distinctive (i.e., modular) entities that still need to be integrated. This integration of the outsourced function requires a profound understanding of the interfaces and interdependencies between the function being outsourced and the rest of the organization. This understanding is reflected in the concept of systemic view propensity. In fact, in-house systemic view propensity may be seen as a precondition for outsourcing the majority of an IS function in order to ensure "...integration among organizational units to actively manage the relevant technological and organizational interfaces" (Brusoni et al., 2001, p. 609-10). Thus, the majority of an IS function may be outsourced to a separate organizational entity, but superior systemic view competency is retained in-house to ensure systemic integration with the rest of the organization. Higher levels of outsourcing would imply keeping a strong systemic view propensity in-house.

While this seems to be a plausible explanation of the positive link between in-house systemic view advantage and the degree of outsourcing in the United States data, it should be kept in mind that this study did not control for the level of modularity of an IS function being outsourced. This is one of the prerequisites for differentiating alternative coupling arrangements. Yet, our findings suggest that cultural values and norms, such as individualism versus collectivism, contribute to explaining whether organizations prefer to delegate the task of systemic integration to a small group of responsible individuals (individualist view) rather than the collective body of all workforces that together perform an IS function (collectivist view).

From a methodological perspective, the differences that we found between the two countries (i.e. where the structural paths of each country shifted from one direction to the other or to an insignificant level) are typical of interaction effects. By definition, traditional hypothesized effects are assumed to change according to the moderator variable. Indeed, whether the paths for both countries are in the same direction, the opposite direction, or are non-significant is mainly contingent on the strength of the impact of the moderator. This is defined as a disordinal interaction (Jaccard, Turrissi, & Wan, 1990, pp. 75-78). Given a specific starting point for one country, the stronger the cultural differences

between the two countries being examined, the greater the likelihood that the path for the second country moves toward either a non-significant path or opposite sign, as was the case in our study (Baron & Kenny, 1986).

## 6.2. Culturally Insensitive Control Variables

Beyond the cultural differences observed, it is also worth noting that our other IS outsourcing determinants that we controlled for were rather culturally insensitive.

In both the German and the United States sample, differences in production costs between in-house provision and outsourcing were found to have a significant impact on the sourcing of application services. This substantiates the findings of previous empirical studies (Ang & Straub, 1998; Apte et al., 1997; Clark et al., 1995; Lacity & Willcocks, 1998; McLellan et al., 1995). Notably, the descriptive results have shown that, on average, production costs tend to be regarded as lower in-house, which is in contrast to Williamson's (1981) assertion that economies of scale and scope should generally be better achieved through the market (albeit to a lesser extent with increasing asset specificity).

When comparing the strength of the path values, this study also supports evidence from previous empirical studies that production costs are more influential on the sourcing choice than transaction costs (see Ang & Straub, 1998). One reason for the different level of importance of the two types of costs could be that it is much harder for organizations to estimate transaction costs. They often appear as hidden or extra costs in the later stages of the actual service delivery, such as costs of increased control and coordination effort (Barthélemy, 2001; Dibbern et al., 2008).

It is also intriguing that the path values for the impact of influential external stakeholders toward outsourcing turned out to be quite strong in both countries. This could be explained by the fact that IS outsourcing is often associated with a high level of uncertainty on matters such as the true cost of outsourcing. Organizations often have to rely upon external stakeholders such as consultants or peer organizations. The negative side of these external impacts, however, should not be overlooked. There is the danger that organizations unknowingly and unreflectively conform to external opinions and pressures (Ang & Cummings, 1997) when making an outsourcing decision.

Finally, it was perplexing to see that higher levels of decision-making discretion in the German sample were associated with a lower extent of outsourcing while less discretion was associated with higher levels of outsourcing (See Table 12). While no significant differences at the 0.05 level could be found for this link between Germany and the United States, where the link was found to be negligible and insignificant, it cannot be ruled out that the specific institutional situation in Germany may play a role in explaining this finding.

**Table 12. Decision Making Discretion Across the Decision to Outsource**

	Country	Primarily in-house (<50%)	Primarily outsourced (>=50%)	Difference	Total N
Outsourcing decision making discretion	United States	-0.28 (M=67)	0.11 (N=14)	0.39	81
	Germany	-0.08 (N=167)	-0.15 (N=111)	0.07	278
	Country Difference	0.20	0.26		

Notes: -2 = Strongly Disagree; 2 = Strongly Agree; 0 = Neutral

In Germany, labor interest groups such as labor unions and workers' councils can exert substantial bargaining power (Argyres & Liebeskind, 1999; Kieser, 1990; Richardi, 1990)<sup>4</sup>. For example,

<sup>4</sup> In Germany, the transfer of organizational units to legally independent organizations is regulated by law (§ 613 BGB) (Koffka, 1997, p. 124ff.). The works constitution act guarantees the right of employee participation and codetermination in social, economic, and personal matters (Richardi, 1990, p. 1282).

codetermination provides employees with the right to participate in organizational decisions, like IS outsourcing, which impact their personal disposition or the disposition of the group to which they belong (Chmielewicz, 1990). These potential external influences may generally lower the perception of decision-making discretion among IS outsourcing decision makers in Germany. In fact, this perception may even be reinforced in organizations that have actually experienced IS outsourcing, as indicated by a high level of IS outsourcing (see Table 12). Thus, there may be a cultural influence regarding the impact of decision-making discretion that needs to be explored in more detail in future research.

### 6.3. Study Limitations

Despite the significant findings that emerged from this study, any future research and practice drawing on the results of this study should note its possible limitations. Due to the cross-sectional nature of this study, the ability to draw causal inferences is limited. Experiences that managers may have had under the current governance of their company may have caused their initial perceptions to change after the sourcing decision was made. Despite this, managers may not be able to adjust governance structures as quickly as their managerial perceptions change. Accordingly, there are possible drawbacks associated with linking the degree of outsourcing in a company to the perceptions of managers regarding IS outsourcing. There is no evidence, however, that the cross-sectional nature of the survey should invalidate the cross-cultural differences found between Germany and the United States, as the study design was the same for both countries.

Furthermore, while the response rate in the United States was significantly lower than in Germany, resulting in different sample sizes, highly significant relationships could still be detected in both samples. This reduces the threat of limited statistical power. In addition, our Monte Carlo simulation, mirroring our exact sample size and measurement details, was found to corroborate an earlier study (i.e., Chin, 2003) showing that statistical power is acceptable.

Another limitation that should be acknowledged is that the differences in cultural profiles were determined inductively from archival data. Accordingly, the confirmation and disconfirmation of the proposed cultural differences in the structural paths of the IS sourcing model should be treated with some caution (Janssens, Brett, & Smith, 1995).

Finally, while the team of authors is composed of representatives of the two cultures being examined, as is usually recommended when conducting cross-cultural research (Pauleen et al., 2006), this may also imply that the development of the framework may have been affected by their cultural perceptions and values.

## 7. Implications and Conclusion

Several theoretical implications can be derived from our study. First, this study has substantiated the view that the IS outsourcing decision of a company should be viewed from a multi-theoretical perspective (Ang & Cummings, 1997; Cheon, Grover, & Teng, 1995; Poppo & Zenger, 1998). There is no single stream of reasoning that can fully explain why organizations choose to outsource their IS functions. Rather, our findings confirm that a sourcing arrangement chosen by an organization is a result of the consideration of multiple types of rational choice reasoning, including efficiency and effectiveness criteria as well as social and environmental influences.

Regarding effectiveness criteria, our study has introduced the new perspective of systemic influences. This new perspective was found to complement the economic rationale and the intuitional rationale in explaining the IS outsourcing behavior of organizations. Furthermore, this study has also shed light on the contextual factors that go some way to explaining the circumstances under which certain rationales are factored into the IS outsourcing decision in different organizations. To this end, we newly introduced the cross-cultural dimension of individualism versus collectivism as a possible moderating factor. The results support our contention that the recognition of systemic influences in the IS outsourcing decision is culturally sensitive, while the other IS outsourcing determinants considered in this study are culturally insensitive.

Both of these new perspectives – systemic influences and the moderating role of culture – should prove to be fertile grounds for future research. The relatively strong impact of systemic influences on the IS outsourcing decision found in this study points to the necessity for a much deeper understanding of interdependencies among IS components and IS functions as well as interdependencies between IS and non IS functions in IS outsourcing decision making. Previous research has focused strongly on studying the sourcing of individual IS professionals, IS functions, or IS projects as units of analysis. However, each of these organizational entities is responsible for creating particular IS effects that should be integrated into a coherent whole, possibly under one common architecture.

Regarding existing interfaces between particular IS artifacts (i.e., products), corresponding interfaces should exist between the resources that provide them (Schilling, 2002). In-house and outsourced provision may, therefore, be seen not only as two alternative organizational arrangements for performing particular IS functions or creating particular IS artifacts, but also as alternative arrangements that can be utilized to manage the interdependencies between IS artifacts and IS functions.

An understanding of what kind of knowledge architecture is required for a particular IS product architecture seems to be essential for grasping this issue. Further clarification should be sought as to whether systemic roles and responsibilities should have a narrow or a rather wide distribution across organizational units, and whether they should be located inside or outside the boundaries of a firm (Brusoni et al., 2001). The introduction of systemic influences on the IS outsourcing decision, as outlined in this study, opens up a variety of opportunities to research the interplay between product architectures, knowledge architectures, and internal versus external governance architectures.

Since IS outsourcing is a globally influential management practice, the impact of national peculiarities also requires more attention. This study has highlighted the impact of national context on a company's IS sourcing decision. As shown by Kumar, Bjorn-Andersen, and King (1990), differences in the values and norms of nations may translate into different IS design values. Differences in IS design values, in turn, may lead to differences in IS artifacts and associated IS architectures. While this study has incorporated the cultural dimension of individualism versus collectivism into its theoretical frame in an indirect way (by drawing on known country differences in this dimension), future research may do so explicitly by actually measuring the cultural values of IS professionals of different nations, comparing IS artifacts between nations, and examining how such differences influence IS outsourcing decision making and management.

Finally, future research may examine in more detail how the alternative rationales of the IS outsourcing decision are aggregated to result in a final outcome that is either for or against outsourcing. In particular, the interaction between different rationales should be explored in more detail. Such a theory of multiple IS outsourcing rationales may account for the reinforcing, conflicting, and dominating rationales for the IS outsourcing decision; this would be consistent with the theory of multiple contingencies (Sambamurthy & Zmud, 1999).

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## Appendix

**Table A-1. PLS Cross-loadings for German Sample**

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

Table A-2. PLS Cross-loadings for United States Sample

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

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