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A QUANTITATIVE ANALYSIS OF REGIONAL DIFFERENCES IN PIVOTAL IT OUTSOURCING CONTRACT FEATURES

Research paper

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Abstract

More than 30 years after its first implementation, IT outsourcing (ITO) is unanimously considered a critical component of corporate strategy for private and public institutions alike. While implementations of ITO around the world share some common characteristics like typical reasons for outsourcing, key success factors, or dimensions along which they can be classified, extant research also points to regional differences. However, research on this topic, specifically regarding pivotal contract features like contract value, contract length, or pricing methods, is still in its infancy, and quantitative analyses on the subject are particularly scarce. We address this research gap by analyzing data on 14,917 ITO contracts closed between 2007 and 2017 through the lens of cultural regions and three statistical methods. The contribution of our paper is threefold. First, our descriptive analysis points to globally decreasing contract lengths and contract values, confirming previous studies and practice reports. Second, an ANOVA with independent post-hoc testing provides quantitative support for the degree of dissimilarity among individual regions in pivotal ITO contract features. Finally, our quantitative replication of a previous study identifies culture-induced regional differences between USA and Japan regarding the effect of influence factors on ITO contract features.

Keywords: IT Sourcing, IT Outsourcing, Sourcing Strategy, Contract Design, Cultural Regions.

1 Introduction

IT Outsourcing (ITO) is a global phenomenon. First implemented in the 1980s as a means to realize cost reductions, gain access to external expertise, and focus on core capabilities, it has since developed into a critical component of IT service provision for companies and public institutions worldwide. Consequently, a global industry with annual revenues of around \$300 million (Blackmore et al. 2018; Faisal and Raza 2016; Huntley and Blackmore 2017) and a considerable body of research have evolved around ITO (Dibbern et al. 2004; Gonzalez et al. 2006; Lacity et al. 2016; Liang et al. 2015).

While almost every Fortune 500 company and many public institutions around the world engage in ITO, no two engagements are identical. ITO can take on many different forms along several dimensions, including its scope (full vs. partial outsourcing), the IT services that are outsourced, the number of vendors (single-vendor vs. multi-vendor sourcing), location of service provisioning (onshore, nearshore, offshore), or the duration of the engagement. From a contractual perspective, the cost and how this cost is calculated (pricing method, PM) are additional distinguishing features. In sum, each ITO engagement is unique, be it across individual organizations or, on an aggregated level, across different regions.

Much research has been devoted to analyzing differences in ITO behavior or processes between client and vendor companies in different regions, oftentimes through the lens of culture (Leidner and Kayworth 2006; Schmidt et al. 2016; Su 2015). However, to our best knowledge, little is known about how regions differ in pivotal ITO contract features, specifically contract length (CL) and contract value (CV).

There are some qualitative case studies or survey-based evaluations about ITO engagements in individual companies or specific topics, for example characteristics and application scenarios of different pricing methods or costs and benefits of shorter or longer contracts (Goo et al. 2007; Ravindran et al. 2015b; Susarla 2012). However, these studies are either dated and do not reflect developments in the past ten years, or their sample sizes are small. This limits the relevance and generalizability of their findings. In addition, certain characteristics of ITO engagements such as costs, duration, or pricing method are commonly kept confidential and are hard to obtain. They are rarely published, let alone in sufficient quantity to allow for empirical quantitative studies. Consequently, Ravindran et al. (2015b) conclude that there is “limited guidance in the literature on how duration is awarded in contracts” (p. 380). The analogous statement holds true for other pivotal contract features. However, the development of an empirical basis on the development of contract features per region is highly relevant for both theory and practice, especially against the background of globalization and global IT sourcing.

We seek to address this gap and uncover regional differences in pivotal ITO contract features by comparing ITO contract data across different regions. We build on a similar previously published study for which we examined key characteristics of ITO contracts from Austria, Switzerland, and Germany (the ASG region) (Könning et al. 2018). In our current paper, we analyze a rich dataset containing details from 14,917 ITO contracts from around the world that were closed between January 2007 and August 2017. Building on Hofstede (1983), we categorize them into seven cultural regions and then investigate regional differences in the above-mentioned pivotal contract features CV, CL, and PM.

Our paper is structured as follows: In the next section we summarize previous work on ITO determinants and regional differences research, as well as previously conducted research in the field of inter-cultural differences in ITO decision-making. Additionally, we derive our research questions in this section. Section 3 provides our research design. In section 4 we then introduce our dataset, provide descriptive statistics, and present our findings from two studies that help understand regional differences in ITO. We then discuss our results and offer a summary as well as an outlook for further research in section 5.

2 Conceptual background and related work

2.1 ITO and pivotal contract features in ITO engagements

Given its ever-increasing importance in corporate practice, ITO has attracted much academic interest (for comprehensive reviews of ITO literature see Dibbern et al. 2004; Gonzalez et al. 2006; Lacity et al. 2016; Liang et al. 2015). Following the conceptualization by Lacity et al. (2016), the majority of studies fall into one of the following three categories.

The first major category contains articles around *ITO decisions*. These include the question of whether to outsource or not, which tasks to outsource, which ITO strategy to employ, which vendor(s) to choose, or whether to decide for onshoring, nearshoring, or offshoring. The second large category unites all publications that revolve around *ITO outcomes*. Research in this area investigates topics such as the client’s perception of ITO success, the effect of ITO on business performance, and ITO success factors. The third category is comprised of studies on *contractual and relational governance*. Typical studies in this category investigate the influence factors on contract design, pricing methods, contract duration, modes of collaboration, and other parameters of ITO contracts and the client-vendor relationship.

While there is a large body of research ITO decisions and outcomes, studies on contractual and relational governance has only recently “become more prevalent” (Lacity et al. 2016), p.3). This also implies a lack of research on specific ITO contract features, their development over time, or regional peculiarities.

One of the few quantitative studies in this field is the abovementioned study by Ravindran et al. (2015b). Drawing from a large dataset of ITO deals, the authors found evidence that the client's prestige, the provider's reputation, and a previous client/provider working relationship all led to longer CL. In a similar study, they also found that vendors with greater experience across many different industries scored significantly longer deals (Ravindran et al. 2015a).

In our own previous study on ITO contracts from the ASG region (Könning et al. 2018), we found that master service agreements with wider scope and contracts that are closed after a competitive tender featured significantly higher CVs. Also, the number of client employees showed a significant positive correlation with CV. For CL, we found that offshore sourcing deals were significantly longer, and contracts closed with public institutions significantly shorter. As could be expected, CV and CL are highly correlated, and the number of submarkets (e.g., the number of task categories that the provider fulfils) positively influence both parameters. For PM, we found that onshore sourcing has a significant positive effect on the probability for combined pricing. In contrast, contracts closed with government institutions significantly tend towards fixed pricing. Contracts built upon an existing client-vendor relationship showed a significantly higher probability of mixed pricing.

2.2 Regional differences and the concept of culture

An extension to our ASG study, this research paper explores regional differences in sourcing behavior by means of an analysis of pivotal ITO contract features. We thereby intend to provide the empirical basis for future studies to more deeply explore the root causes behind these regional differences.

Several lenses can be employed to subdivide the world into regions and analyze and explain differences among them. One of the more frequently used lenses in social sciences is culture. The concept of culture is multidimensional and multi-faceted in nature. It is hard to grasp, and scholars have brought forward a multitude of alternative definitions. Various authors have attempted to reduce the multitude of definition approaches to a few consistent attributes. In an extensive literature analysis, Kroeber and Kluckhohn (1952) compiled 164 different definitions of culture as well as further individual findings on the concept of culture, and systematically classified the cited contributions to the concept of culture.

Given its high complexity, it has been suggested to disintegrate culture into different layers, in particular national, organizational, and individual culture (Leidner and Kayworth 2006). The most popular conceptualization of national culture has been provided by Hofstede (1983), who described it along the four dimensions *power distance*, *uncertainty avoidance*, *individualism vs. collectivism*, and *masculinity vs. femininity*. He later added two dimensions, namely *long-term vs. short-term orientation*, and *indulgence vs. restraint* (Hofstede et al. 2010). More relevant to our study, he also differentiates between six different cultural regions, namely (a) America Central/South (Latin America, LA), (b) Europe South/South-East (ESSE), (c) Europe North/North-West, Anglo World (ENWA), (d) Europe Central/East, Ex-Soviet (CE), (e) Muslim World, Middle East and Africa (MEA), (f) Asia East, South-East (Asia Pacific, AP). We will build upon these regions in our research design below.

2.3 Regional differences in ITO

Looking at the ITO literature on regional differences, we can divide the knowledge base into three groups. The first group consists of *comparisons between ITO decision-making among different regions*. Research in this area depicts mostly case study approaches with quantitative comparisons based on firm surveys. Apte et al. (1997) compare outsourcing practices between Japan, USA, and Finland and find that global outsourcing yields a smaller but significant portion for all three regions. They provide the Keiretsu system as an explanation for the special role for the importance of outsourcing relationships in Japan and the close domestic relationships. The authors also describe how Finland has shifted from total outsourcing or no outsourcing at all to more diversified strategies, with companies being very selective of the outsourced services.

Barthelemy and Geyer (2001) highlight differences in outsourcing behavior between Germany and France: While Germany and France both tend to outsource about the same amount or scope of IT services, German organizations are found to outsource less critical functions than France. In addition, joint decision-making is observed more frequently in Germany (e.g., combined decision-making involving CIO and CEO instead of only the CEO or only the CIO or IT management). Dibbern et al. (2012) conducted a study to find systemic determinants of outsourcing and how they differ between Germany and the USA. They found that the firm's ITO decisions should be analyzed from multiple perspectives such as efficiency and effectiveness criteria, or in the context of environmental or social influences. They also conducted empirical experiments that confirm the effect of individualism vs. collectivism as a cross-cultural outsourcing determinant. In addition, they divide the determinants into culturally sensitive and culturally insensitive determinants and argue that only systemic determinants like in-house impact advantage and in-house view advantage are subject to cultural factors. Other comparisons in this group include Barthélemy and Geyer (2005) and Tiwana and Bush (2007).

The second group of research tries to *understand overall determinants of ITO decisions* through the lens of cultural properties of the vendor or customer region. Two studies by Bush et al. (2008) and Matsuno et al. (2009) found that several factors like client size or the specificity of IS activity influence outsourcing decisions in Japan. Schmidt et al. (2016) conduct an analysis of cultural patterns and their influence on outsourcing decisions. They especially focus on the relationship quality and the hierarchy as a factor, and depict cultural effects on the macro, meso and micro level, thus mirroring the organizational, departmental and team level of an organization. They found a significant influence of the working culture that is rooted in the country's history towards the organizational culture. A similar research direction was employed by Schneider et al. (2013), Sedera et al. (2014), and Su (2015).

The third group focuses on *management practices* to handle cultural differences during the outsourcing process. Scientific contributions include a survey of cross cultural practices by Gregory (2010) that emphasizes the strength of informal, trust-based and cultural management. Vogt et al. (2010) show the influence of cognitive flexibility as a driver to overcome intercultural differences and describe the adaption process when dealing with an offshore situation.

While there is a substantial amount of literature about these three groups around regional differences in the field of ITO strategy, there are no quantitative analyses of regional and potentially culture-induced influences on ITO contracts features. Although they are certainly connected, and conclusions may be drawn, the characteristics of ITO contracts are not linked to cultural differences yet.

In our contribution, we seek to address this research gap by empirically comparing contract data within the different cultural regions and find inter-cultural differences in outsourcing contract data. More specifically, our work is organized around three research questions:

RQ1: *Which characteristics does the recent development of the ITO market worldwide show in terms of contract value (CV), contract length (CL), and pricing method (PM)?*

RQ2: *How do regional differences influence CV and CL?*

RQ3: *Which regional differences exist among contract features that influence CV and CL?*

By answering those research questions, we aim to contribute the following: (1.) *We provide global descriptive statistics and interpretation of outsourcing contract data*, (2.) *we check for regional differences using statistical inference*, and (3.) *we connect the subdomains of outsourcing strategy and contract development*. The next section gives a detailed overview over the research design including explorative analysis base and methods regarding our research questions 1-3.

3 Research design

An ITO contract can be understood as observable result of the strategic ITO decision-making process that precedes every organization's decision to outsource. This allows us to link the related work done in the field of intercultural research to our set of ITO contract data by exploring regional differences. Consequently, we expect the regions to cause observable differences, both in our descriptive as well as

the inferential analyses. Based on our summary of extant regional comparative studies, we formulate the base of our explorative statistical analysis:

E1: There are significant regional differences when looking at pivotal contract information

E2: The contract characteristics that influence the pivotal contract features are different in either (i.) significance of effect, (ii.) effect direction or (iii.) magnitude of effect

E1 consists of an overall comparison, since most of the studies that were previously reviewed, only consists of a few comparative candidates (two to four) selected from different regional levels (e.g., country level). This novel analysis aims to shed a light onto a global perspective of differences in cultural regions. While (E1) is set on a global stage, (E2) is motivated largely by the idea of a detailed comparison as conducted by Apte et al. (1997) and Barthelemy and Geyer (2001).

Our research approach consists of two major steps: First, we conduct a descriptive analysis on pivotal contract characteristics as well as covariates that are assumed to influence those features similar to Könning et al. (2018) to answer RQ1. We therefore present descriptive statistics by cultural regions. This analysis gives a first impression and idea of the cultural differences embedded in ITO contracts.

To prepare our research data for further steps towards RQ2, we slightly modified the regions presented in Section 2. We singled out North America (NA) from ENWA to account for its importance for the global ITO market, combined the remaining countries of ENWA and ESSE to Western Europe (WE), and cut out Japan from Asia Pacific (AP), since there is indication in extant ITO literature that it stands out from this region (Apte et al., 1997). Our final list of culture region is presented in Table 1.

Asia Pacific (AP)		Central & Eastern Europe (CE)		Latin America (LA)	
Japan	Middle East & Africa (MEA)	North America (NA)		Western Europe (WE)	

Table 1. Overview of cultural regions used for our data analysis

We then conduct two further analyses, aimed at answering RQ2 and RQ3 respectively. Analysis A consists of an ANOVA for the ratio-scaled pivotal contract features (CL and CV) that aims to build on (E1). We proceed by conducting post-hoc testing procedures with pairwise comparisons for CL and CV which show specific two-group differences to get a detailed effect distribution with regard to (E1). In Analysis B we model the influences of other parameters in the dataset, where CL and CV act as dependent variables. We repeat that procedure for specific regions to identify regional differences in covariate influence strength and significance among them. In order to assess (E2), we choose the regions that relate to known outsourcing research by replicating the comparison study between USA and Japan by Apte et al. (1997).

4 Empirical study

4.1 Dataset description

Our dataset was provided by the International Data Corporation (IDC), a “global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets” (International Data Corporation 2018). It is a subset of the organization’s “BuyerPulse Deals Database” which contains data on more than 60,000 ITO and Business Process Outsourcing (BPO) contracts. IDC continuously updates its database by analyzing press releases, public financial records, media reports, and historic market data. It then complements these data points with interviews with representatives from IT service providers, client companies, and other industry experts to yield more contextual information on specific deals.

For our study, we were kindly provided with a subset of IDCs database that contains information on all observed global ITO deals that were closed between January 2007 and August 2017. This equates to

16,818 ITO deals that are described by means of 73 variables. Ten of these variables represent IDC’s internal IDs, keywords, or similar information which we did not consider relevant and were therefore excluded from our analyses. Table 2 illustrates the full list of the remaining variables.

We then removed ITO deals with missing values in core features like customer number of employees, customer region, or contract pricing method because we would ultimately fail in interpreting a connection between an unknown piece of information and other features. This resulted in a dataset of **n=14,917** ITO cases characterized by **k=58** variables which we used for Analysis A. For Analysis B, we excluded some additional variables from the analysis (see section 4.3).

Category	Variables – (**) used for explanatory modelling (Analysis B)
Client (C)	Name, Parent, Macro Industry, Industry**, Sub Industry, SIC Code, Number of Employees**, Number of Employees (Categorized), Revenue, Revenue (Categorized)
Vendor (V)	Name, Parent, Role
C-V relationship (REL)	Existing Relationship**
Contract details (CD)	Award Type**, Bid Type**, Contract Status**, Contract Type**, Pricing Method**, Contract Length**, Contract Value**, Contract Value (Categorized), Contract Run Rate, Project Owner, Advisors, Contractors
Signing (SIGN)	Macro Region, Region, Sub Region, Country, State/Province, City
Market (M)	Macro Market**, Market Full Name, Market, Sub Market(s), Number of Sub Markets**, Engagement Type, Cloud (How), Cloud (What)
Geographic scope (GS)	Macro Region**, Region, Country
Dates (D)	Press Release, Signing Period, Signing Date, Signing Year/Quarter, Start Date, End Date, Signing Period ID, Signing Year, End Period, End Period ID, Last Edited Date, Contract Status Change Date
Sourcing geography (SG)	Macro Region, Region, Country

Table 2. Overview of selected variables from the IDC dataset

In the following, we provide a brief overview of the nature of our dataset. For the sake of brevity, we chose to focus on five client characteristics and the three contract details CL, CV and PM that we further analyze in the subsequent parts of our contribution. In terms of client characteristics, we looked at client region and country (a), client industry sector (b), number of employees (c), and client revenue (d).

(a) Of the 14,917 ITO deals in our final set, 6,380 or 43% were closed with clients in Western Europe, 5,006 or 34% with North American clients, meaning that 77% of contracts were closed in these two regions alone. 1,380 (9%) with clients in the Asia Pacific Region, 1,316 (9%) with Latin American clients, 404 (3%) with clients from the Middle East or Africa, 375 (3%) with Central or Eastern European clients, and 259 contracts (2%) with clients in Japan.

(b) The client companies’ industry sectors are as diverse as their region: 2,140 ITO deals (14%) were closed with clients in the processional services sector, 1,509 deals (10%) with clients from banking, 1,426 contracts (10%) with clients from communication and media, 1,409 deals (9%) with companies in the discrete manufacturing sector, 1,221 deals (8%) with transportation companies, and 1,199 deals (8%) with process manufacturing companies. 923 contracts (6%) are with retail traders, 793 contracts (5%) with insurance companies, 762 contracts (5%) with companies from the customer and recreational services sector, and 711 contracts (5%) with healthcare companies. The remaining 2,824 deals (19%) were closed with companies from seven other sectors.

(c) The dataset is also diverse with regard to client size. 4,022 deals (27%) were closed with companies with less than 1,000 employees, 5,010 contracts (34%) with clients with 1,000 and 10,000 employees, and 4,381 contracts (29%) with clients employing at least 10,000 staff. The size of clients involved with the remaining 1,504 deals (10%) was unknown.

(d) A similar picture is apparent in terms of client revenue: 6,122 deals (41%) were closed with companies with less than \$1 billion of annual revenue, 4,181 deals (28%) with companies between \$1 billion and \$10 billion, and 17% with clients with an annual turnover of more than \$10 billion. The revenue of client contracts from 2,093 deals (14%) was unknown.

As for contract details, we describe the average and development of contract value, contract length, annual contract run rate, and pricing method. Our dataset includes deals of all lengths and sizes. Their lengths range from one month to well over 30 years, with an average of 47.3 months. Their values range from \$1,035 for small outsourcing projects to mega deals worth more than \$7 billion. The average contract is worth \$51.3 million. The annual contract run rate, i.e. the total contract value divided by contract length in years, is at \$10 million, which is consistent with the average CV and average CL.

When looking at the development over time (RQ1), we find declining values for all three contract details (see Figure 1). The average CV decreased from a three-year average of \$66.8 million between 2007 and 2009 to \$38.6 million between 2015 and 2017 (-5% per year). Similarly, contracts also became approximately ten months shorter, from 54.4 months (average between 2007 and 2009) to 44.7 months (-2% per year). Consequently, the average annual run rate fell from \$13 million (2007-2009) to \$7.9 million (2015-2017), an average annual decline of 5%. This finding is in line with our previous research on contract data from the region of Austria, Switzerland, and Germany (anonymized for review), as well as with other sources from theory and practice (King 2016; Su et al. 2016)

In terms of pricing, the dataset exhibits the prevalence of fixed price as the predominant pricing method. Of our 14,917 ITO deals, 9,999 (67%) were closed with a fixed price. 3,218 deals (22%) are based on consumption-based, on-demand, transactional, or time-and-materials pricing, and 1,691 deals (11%) employ a combination of a fixed base rate and a consumption-based component.

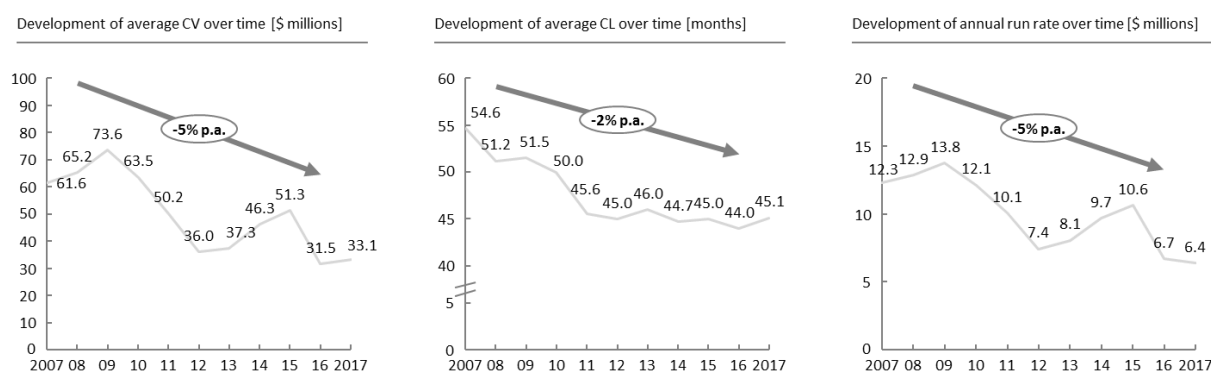


Figure 1. Development of average CV, CL, and annual run rate over time

4.2 Descriptive statistics

In a first descriptive study we characterize CV, CL, and PM per cultural region: The ratio-scaled pivotal contract parameters CL, CV in terms of average values, standard deviation, and maximum and minimum values, and the nominal-scaled PM parameter with the mode and the frequency of the mode. Table 3 shows the summary statistics for the cultural region as determined and abbreviated in Section 2. We find that contracts in WE have the highest average CV with considerable deviation. We also identify the longest average CL but again with high variability, as further reflected by the max and min values. While average CV and standard deviation for western cultures (NA, WE) seem very high, the LA region features the lowest CV and CL values alongside smaller deviations compared to other regions.

Cultural region	CV (in \$)				CL (in months)				PM
	Avg.	SD	Min	Max	Avg.	SD	Min	Max	Mode (freq.)
WE (n=6,380)	67.07*10 ⁶	241.11*10 ⁶	1,940	73.44*10 ⁸	51.8	23.6	2	444	FP (0.73)
NA (n=5,006)	41.87*10 ⁶	198.99*10 ⁶	1,035	70.00*10 ⁸	46.2	18.7	1	216	FP (0.52)
AP (n=1,380)	54.75*10 ⁶	196.24*10 ⁶	5,375	45.00*10 ⁸	49.5	26.5	3	416	FP (0.78)
LA (n=1,316)	18.28*10 ⁶	86.60*10 ⁶	1,959	15.43*10 ⁸	40.9	18.8	1	240	FP (0.91)
MEA (n=404)	55.93*10 ⁶	154.03*10 ⁶	12,576	20.00*10 ⁸	48.7	21.9	6	120	FP (0.81)
CEE (n=375)	23.02*10 ⁶	134.66*10 ⁶	18,190	23.14*10 ⁸	44.5	20.2	5	156	FP (0.66)
Japan (n=259)	38.19*10 ⁶	83.57*10 ⁶	20,000	8.20*10 ⁸	43.7	16.7	12	120	FP (0.46)
Total (n=14,917)	51.25*10 ⁶		1,035	73.44*10 ⁸	47.3		1	444	FP (0.67)

Table 3. Descriptive statistics for the IDC dataset grouped by cultural regions

While fixed pricing is the most used PM across all regions, the frequency of its implementations differs. A comparison between the regional frequencies of LA and Japan shows that in both cases fixed pricing contracts are more common; however, while 70% of contracts in the LA region feature this PM, in Japan we only observe a very narrow lead of fixed pricing. Thus, from the distributions of PMs, we can also confirm Japan’s distinctiveness within the AP region (see Figure 2).

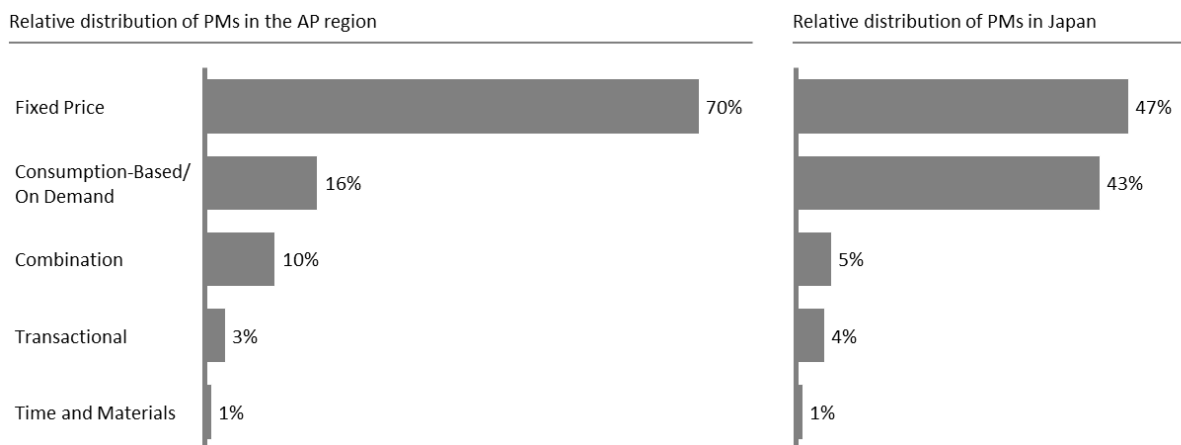


Figure 2. Relative distribution of PMs in the AP region and Japan

The AP region resembles a behavior close to LA, where 70% of all deals set fixed prices while only 16% use consumption-based pricing. Consumption-based pricing frequency is much larger in the Japan region with 42% compared to 46% in fixed pricing. Japan also has considerably less volatile contract lengths than AP, which shows an average deviation of 26.5 months. Besides the fact that Japan somehow stands out in PM distribution, there is no evidence of the sensitivity of PM for cultural differences since fixed pricing is always the most popular mode, and also the order of the PMs (consumption-based, combination, etc.) do not change with cultural region. Therefore, we omit PM as a pivotal contract feature from further analysis and focus on the cultural differences that are observable in CV and CL.

4.3 Explorative statistical analyses

4.3.1 Analysis (A)

Table 4 and Table 5 show the results of the overall ANOVA for CL and CV respectively. We find that the regional effects are significant at the level of 0.05. In preparation of conducting the ANOVA we conducted three different tests for unequal variances, namely the Bartlett Test, the Levene Test and the Brown-Forsythe Test, none of which indicated to reject the null hypothesis of equal variances (Lim and Loh 1996). In addition, we checked for normality using Jarque-Bera and Kolmogorov-Smirnov tests, all of which indicate that our dependent variables do not violate the normal distribution assumption (Bera et al. 1984; Thadewald and Büning 2007).

Source	Square Sums	DF	Mean Squares	F	p-value
Between	235906.98	6	39317.83	83.225	<0.000
Residuals	7043890.54	14910	472.43		
Total	7279797.52	14916			

Table 4. ANOVA results for dependence of contract length on cultural regions

Source	Square Sums	DF	Mean Squares	F	p-value
Between	47.27*10 ¹⁷	6	78.79*10 ¹⁶	18.77	<0.000
Residuals	62.58*10 ¹⁹	14910	41.97*10 ¹⁵		
Total	63.06*10 ¹⁹	14916			

Table 5. ANOVA results for dependence of contract value on cultural regions

Examining the p-values of both ANOVA-tests we can conclude that we can reject the null hypothesis of equal group means and therefore it is suggested that at least two cultural regions show significant differences. After that initial test we are now able to perform post-hoc testing by examining the group differences closer using independent t-tests (Armstrong and Hilton 2010).

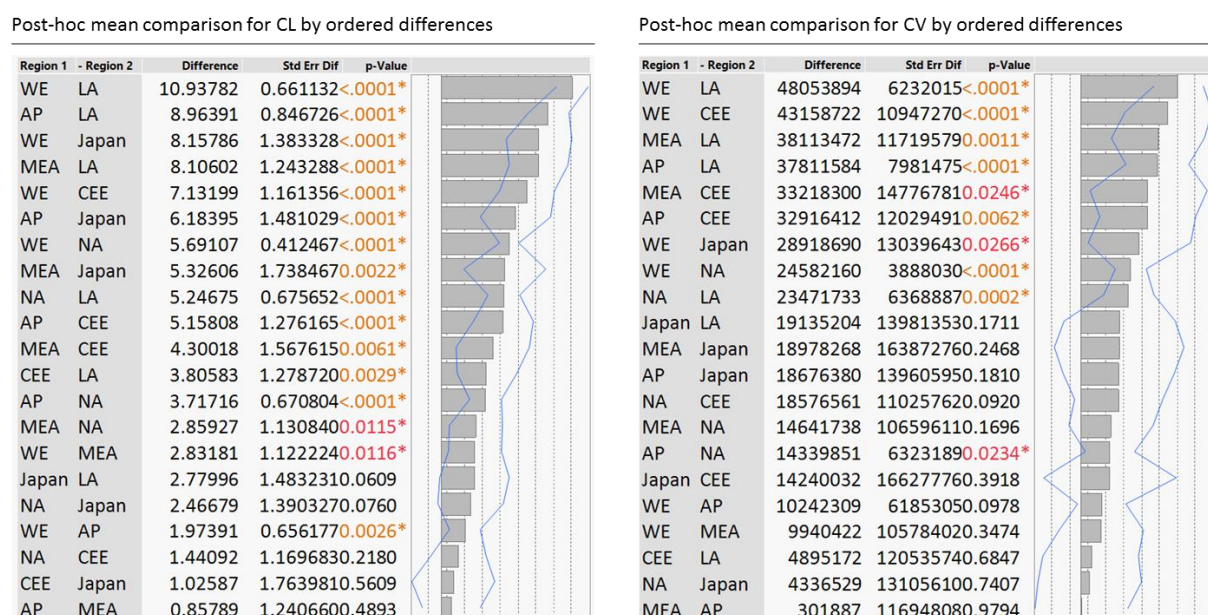


Figure 3. Post-hoc mean comparison for CL and CV, displayed by ordered differences

With this method arises the problem of a multiple test situation which affects the statistical power of the tests. Therefore, we applied a Bonferroni adjustment to receive less skewed p-values (Hochberg 1988; Nakagawa 2004). Figure 3 shows an ordered-differences report of the pairwise comparisons between the cultural regions with regard to CL (left) and CV (right). The difference between Region 1 and Region 2 is depicted as a number as well as in a bar chart with lower and upper confidence bounds based on standard error estimation of the differences. Subgroup differences are indicated in form of a list that is sorted in a descending fashion by mean comparison values.

For CL we encountered large significant differences between the regions WE, AP, MEA, and LA. Also, the special role attributed to Japan is confirmed since it has considerable differences to WE, MEA and especially AP, which confirms the outstanding position of Japan within the AP region. We also found that Japan is leaning more towards a NA culture, since we cannot reject equal group means null hypothesis for this specific comparison. This is in line with empirical investigations of strategic drivers for outsourcing decisions, stating the special role and the closeness to North American region, but also stating some crucial differences rooted in the cultural differences (Bush et al. 2008). In addition, the NA region is more similar to CEE than any other region. Due to the heterogeneous subculture structure in the AP region that also includes some neighbor countries from the MEA region, we find that there is no significant difference in CL between the two regions. While we found some significant comparisons, it is important to note that the absolute deviation seems rather small. However, if we observe it in a relative scope, we see significant differences of around 10-14% in average values. That confirms that there are differences in CL. However, there are no regions that stand out in an outlier fashion.

For the CV, depicted in the right half of Figure 3, we encounter far less significant differences. Among them, the picture is similar to the CL analysis: LA shows significant differences to the WE, AP and MEA regions. Furthermore, CEE shows considerable and significant differences to WE, MEA and AP, confirming the difference in outsourcing culture between western and eastern Europe. The role of Japan is not as outstanding in terms of CV and there is no significant difference between Japan and the AP region. Once again, Japan is found to be very similar to NA, while WE shows no significant differences from regions AP and MEA in this case. The strong connection between the AP and the MEA region that we found in the previous analysis for CL is confirmed for CV.

Summarizing this with regard to our research design and our explorative base (E1), we can state that there are significant regional differences regarding CL and CV, which was shown by the ANOVA. However, this significant effect is not true for every combination of regional differences, as our post-hoc test showed. Hence, while we showed evidence for (E1) on a general level, the null hypothesis of equal group means cannot be rejected for every combination of regions, indicating that certain similarities exist among the different regions.

4.3.2 Analysis (B)

In the second analysis, we present results that compare some empirical studies from the domain of outsourcing strategy with the domain of outsourcing contract development. We aim to find the strength and significance of IDC contract data features with regard to our pivotal, ratio-scaled contract features, CV and CL. We therefore aim to replicate a comparison situation based on outsourcing literature. We choose to conduct two comparisons: We replicate the comparison of Apte et al. (1997), who compared geographically different regions by conducting surveys in the USA and Japan. We choose this case since the two countries are also embedded in different cultural macro regions, that are dominated by them in terms of outsourcing deals, since Japan is a region by itself and Canada as the other significant part of the NA region only provides 9% of ITO deals in that region. In addition, the case was discussed with regard to three important aspects of ITO: (a) *extent of outsourcing*, (b) *outsourcing decision* and (c) *global vs domestic outsourcing*. It can be assumed that at least some of those topics will be reflected in contract details, since the contract poses the end of a strategic decision making and reflects the summary of decisions towards an ITO deal (e.g., we can assume that CL is somehow connected to (b), the CV connected to (a) and the geographic scope connected to (c)). However we cannot yet determine the

extent of the reflection of strategic decisions in contract details, since contract structures can be very heterogeneous (Chen and Bharadwaj 2009).

In order to build the regression models, we had to prepare the data and select suitable regression features. This is particularly important as the dataset consists of 53 (out of 58) polynomial variables. Some of those variables contain a large number of levels (e.g., customer name, with 609 levels) that are subject to dummy encoding, resulting in a large number of attributes that involuntarily creates the curse of dimensionality that makes explanatory modelling cumbersome (Geenens 2011). Several pre-processing steps were taken for the final model. This included dealing with missing values through imputation or deletion, and removal of several nominal attributes with low variation in level frequencies or in high-level count. We also removed highly correlated features.

After pre-processing, our dataset contained k=13 explanatory variables. For each of the two dependent variables, the other two remained in the model as explanatory variables, so that we ended up with m=12 explanatory variables for each model. The variables are marked with ** in Table 1. By applying dummy coding of polynomial features, the dataset expands to 51 variables.

For modelling purposes, we used Gaussian-based GLMs for the ratio-scaled dependent variables (SCL, CL). We implemented an iterative Reweighted Least Squares Method (IRLSM), with a collinearity check for parameter estimation (Daubechies et al. 2010). Table 6 summarizes the results of the parameter estimation process as a comparison between USA and Japan. In this table, the prefix of the variable name (e.g., “M” for market) reflects the grouping previously introduced in Table 2. For multi-nominal inputs like Client Industry we depict the effect of the active option category (e.g., “C_Industry = Banking” if Banking has a significant influence). For reasons of clarity and comprehensibility, we only point out statistically significant dependencies. The table thus presents the set of all significant explanatory variables for the four models (CL and CV for USA, CL and CV for Japan). Since not all variables are significant for each dependent variable, the table has some sparse fields denoted by an x.

Explanatory variable	USA		Japan	
	CV (R ² =0.275)	CL (R ² =0.187)	CV (R ² =0.336)	CL (R ² =0.412)
<i>C_Number of Employees</i>	-3.27*10 ⁷ **	-2.18**	x	x
<i>CD_Contract Length (CL)</i>	3.85*10 ⁷ **	x	2.81*10 ⁷ **	x
<i>CD_Contract Value (CV)</i>	x	3.22**	x	5.14**
<i>CD_AwardType = Master Svc. Agreement</i>	15.72*10 ⁷ **	-7.31*	x	x
<i>CD_AwardType = Indefinite-Delivery/IQ</i>	x	53.42**	x	x
<i>CD_Contract Status = Contract cancelled</i>	67.07*10 ⁷ **	x	x	x
<i>M_Number of submarkets</i>	2.52*10 ⁷ **	3.419**	1.98*10 ⁷ **	1.87**
<i>CD_Bid Type = Non-competitive</i>	1.80*10 ⁹ *	x	x	x
<i>CD_Contract Type=Cancel</i>	-92.47*10 ⁷ **	-47.88**	x	x
<i>CD_Contract Type=Extension</i>	x	x	x	-8.472*
<i>C_Industry = Banking/Insurance</i>	x	3.88*	x	x
<i>C_Industry = Wholesale</i>	x	-3.77*	x	x
<i>C_Industry = Education</i>				21.785*
<i>REL_Existing Relationship = Yes</i>	x	5.399**	2.33*10 ⁷ **	7.84**
<i>REL_Existing Relationship = No</i>	x	5.12**	-0.95*10 ⁷ **	-2.12*
<i>C_Industry = Communication & Media</i>	x	-0.87*	x	x

Table 6. GLM results of the explanatory study (sig. level: *=0.05, **=0.01)

We find that in the USA the number of employees as an indicator for customer size is one of the top influences when it comes to CV and CL. In Japan, on the other hand, these factors are not significant. Besides the obvious influence of CL on CV, we find that in the USA the CL varies significantly with industry. We assume this also to be true for Japan; however, the small sample size for Japan might prevent the model from detecting influences at this point. Still, we can identify the education industry as a core industry for driving ITO CL in Japan, indicating that within the educational sector more stable and longer lasting contracts are sought after. The award type also seems to play a significant role in the US culture, where indefinite delivery/indefinite quantity has a high magnitude effect on CL.

Comparing this to the case study of Apte et al. (1997), we found that, when we observe (c) offshoring/domestic comparisons, the US expects higher cost savings and therefore lower overall CV when employing domestic outsourcing, while Japan is more open to global outsourcing, which is also reflected in the geographic scope comparison from our contract data set, where 26% of contracts in Japan have a global scope while only 11 % have global scope in the US region. Both regions have, as expected, the highest scope within their respective cultural regions (NA and AP).

When looking at the (b) outsourcing decision, we find that a previously existing client-vendor relationship positively influences CL in the US while being distinguished and significant on both CV and CL in Japan. We can conclude that an existing relationship seems to lead to more trust, irrespective of the geographic scope. On the other side, a non-existing relationship influences both CL and CV in a negative way in the case of Japan. The (a) extent of outsourcing is already reflected by our pivotal contract parameters CL and CV, however, the dataset does not connect what was outsourced to those parameters and therefore we are not able to draw an in-depth comparison to the study for point (a).

Summarizing our findings against the background of our second explorative base (E2), we can state that there are differences in the significance of effects of different award types, contract types and customer industries, as well as differences in the direction of the effect with regard to existing ITO relationships. The difference in magnitude of effects, when the same effects were significant in both regions, is marginal and can therefore not be considered significant.

5 Discussion of results, limitations, and outlook

In this study, we sought to shed light on regional and cultural influences of CL, CV, and PM as pivotal ITO contract features, thereby addressing the research gap that we identified in extant empirical literature. To this end, we applied different data analyses to a dataset with characteristics of 14,917 ITO deals from around the world. Answering RQ1 in Section 4.2, we provide a focused impression of the ITO market since 2007. For RQ2 and RQ 3 we then empirically compared contract data within the different cultural regions and tried to identify inter-cultural differences in outsourcing contract data.

In our related works section in 2.3, we found that there are three main groups of cultural influence studies with regard to outsourcing. The one particularly interesting to us is the type *comparisons between specific cultures*. It reflects on intercultural differences among geographical regions in the field of outsourcing strategy. Since the field of contract development is linked to ITO strategy, we aimed to provide insides into contract features and their reflection of regional and intercultural differences by conducting comparative studies using a dataset of ~15,000 outsourcing deals. We drew on culture theory to define regions based on Hofstede (1983) and conducted a (1) descriptive study, an (2) ANOVA with independent post-hoc testing afterwards, and a (3) quantitative replication study of Apte et al. (1997).

Our findings largely support extant literature and theories from the domain of ITO strategy, in that we found similar structures with significant differences in some detailed contract features. However, the overall differences, while being significant, are not of the nature of outliers. There is no single region that stands out with a large margin in specific contract features. When comparing this to extant literature, this coincides with the findings of Barthelemy and Geyer (2001), Dibbern et al. (2012), and Tiwana and Bush (2007). However, we can see some differences reflected by the cultural behavior in communication

and relationship quality when we look at the special role of Japan where previously established relationships seem to be significantly valued.

In addition to that, Japan seems to be closer in contract development behavior to Northern America than to the Asian Pacific region which can be explained by the difference introduced by regional classification due to the global north/south difference. Another difference that is caused by the industry distribution in each country is the significant influence of certain industries, like education that stands out in Japan and influences outsourcing contract length by a large magnitude. Another global finding is given by the evidence of the post-hoc testing of the cultural regions, where we found that there are considerably more differences in the regions when it comes to CL than when it comes to the outsourcing CV that reflects the magnitude of outsourcing tasks as well as the length.

Beyond these findings, we see two theoretical contributions of our work: First, the results already help build further awareness of and understanding for regional differences in ITO. In times of globalization in general and global sourcing in particular, this matter is of increasing importance. Second, our empirical analyses add strong evidence to the empirical basis for further studies on these differences and can be seen as an interesting starting point for researchers seeking to further explore this topic, e.g., through a deeper and more specific cultural lens.

There are two limitations to our study: First, there are no empirically tested links between outsourcing determinants and contract features. While we can assume that contracts are crafted after a thorough ITO strategy decision-making process that varies with at least some of the determinants, we are in a situation of real-world contract data with no information on specific strategic intentions or other contextual factors. This information is also not part of our dataset where the focus lies on rather standardized and thus comparable contract features. Second, although IDC's BuyerPulse Deals Database contains data on more than 60,000 ITO and BPO contracts, the database is not complete. It relies on publicly available information on ITO contracts issued by the contracting parties or analysts. However, large ITO contracts of large institutions are more often published and reported on, making the database subject to an unavoidable systematic sampling error and considerable bias towards larger ITO deals. IDC estimates that their database contains 10% of all ITO deals that account for 20% of the total ITO contract value.

In light of these limitations, we suggest further research on the effect of culture-related differences on ITO contract features. This could either be done by means of in-depth case studies to improve our understanding of previously unstudied culture-specific influence factors on ITO decisions and contracts, or similar quantitative analyses to either confirm or challenge extant case-study research on this subject.

References

- Apte, U. M., Sobol, M. G., Hanaoka, S., Shimada, T., Saarinen, T., Salmela, T., and Vepsäläinen, A. P. J. 1997. "IS Outsourcing Practices in the USA, Japan and Finland: A Comparative Study," *Journal of Information Technology* (12:4), pp. 289–304.
- Armstrong, R. A., and Hilton, A. C. 2010. "Post Hoc Tests," *Statistical Analysis in Microbiology: Statnotes*, pp. 39–44.
- Barthelemy, J., and Geyer, D. 2001. "IT Outsourcing: Evidence from France and Germany," *European Management Journal* (19:2), pp. 195–202.
- Barthélemy, J., and Geyer, D. 2005. "An Empirical Investigation of IT Outsourcing versus Quasi-Outsourcing in France and Germany," *Information & Management* (42:4), pp. 533–542.
- Bera, A. K., Jarque, C. M., and Lee, L.-F. 1984. "Testing the Normality Assumption in Limited Dependent Variable Models," *International Economic Review*, pp. 563–578.
- Blackmore, D., Tornbohm, C., Sullivan, P., Roy, A., Sawai, M., Tan, S., Graham, C., Healey, C., Ackerman, D., and Notardonato, S. 2018. *Market Share Analysis: IT Services, Worldwide, 2017*. <https://www.gartner.com/doc/3879670/market-share-analysis-it-services>.
- Bush, A. A., Tiwana, A., and Tsuji, H. 2008. "An Empirical Investigation of the Drivers of Software Outsourcing Decisions in Japanese Organizations," *Information and Software Technology* (50:6), pp. 499–510.

- Chen, Y., and Bharadwaj, A. 2009. "An Empirical Analysis of Contract Structures in IT Outsourcing," *Information Systems Research* (20:4), pp. 484–506.
- Daubechies, I., Devore, R., Fornasier, M., and Güntürk, C. S. 2010. "Iteratively Reweighted Least Squares Minimization for Sparse Recovery," *Communications on Pure and Applied Mathematics* (63:1), pp. 1–38.
- Dibbern, J., Chin, W. W., and Heinzl, A. 2012. "Systemic Determinants of the Information Systems Outsourcing Decision: A Comparative Study of German and United States Firms," *Journal of the Association for Information Systems* (13:6), pp. 466–497.
- Dibbern, J., Goles, T., Hirschheim, R., Bandula, J., and Jayatilaka, B. 2004. "Information Systems Outsourcing: A Survey and Analysis of the Literature," *The DATA BASE for Advances in Information Systems* (35:4), pp. 6–102.
- Faisal, M. N., and Raza, S. A. 2016. "IT Outsourcing Intent in Academic Institutions in GCC Countries: An Empirical Investigation and Multi-Criteria Decision Model for Vendor Selection," *Journal of Enterprise Information Management* (29:3), pp. 432–453.
- Geenens, G. 2011. "Curse of Dimensionality and Related Issues in Nonparametric Functional Regression," *Statistics Surveys* (5:0), pp. 30–43.
- Gonzalez, R., Gasco, J., and Llopis, J. 2006. "Information Systems Outsourcing: A Literature Analysis," *Information & Management* (43:7), pp. 821–834.
- Goo, J., Kishore, R., Nam, K., Rao, H. R., and Song, Y. 2007. "An investigation of factors that influence the duration of IT outsourcing relationships," *Decision Support Systems* (42:4), pp. 2107–2125.
- Gregory, R. W. 2010. "Review of the IS Offshoring Literature: The Role of Cross-Cultural Differences and Management Practices," *Proceedings of the 18th European Conference on Information Systems*.
- Hochberg, Y. 1988. "A Sharper Bonferroni Procedure for Multiple Tests of Significance," *Biometrika* (75:4), pp. 800–802.
- Hofstede, G. 1983. "National Cultures in Four Dimensions: A Research-Based Theory of Cultural Differences among Nations," *International Studies of Management & Organization* (13:1), pp. 46–74.
- Hofstede, G., Hofstede, G. J., and Minkov, M. 2010. *Cultures and Organizations: Software of the Mind. Intercultural Cooperation and its Importance for Survival*, New York: McGraw-Hill.
- Huntley, H., and Blackmore, D. 2017. *Market Share Analysis: IT Outsourcing Services Worldwide 2016*. <https://www.gartner.com/doc/3744417/market-share-analysis-it-outsourcing>.
- International Data Corporation 2018. *About IDC*. <https://www.idc.com/about>. Accessed 31 March 2019.
- King, R. 2016. *CIO Journal: Outsourcing Contract Deals Are Getting Smaller*. <https://blogs.wsj.com/cio/2016/05/23/outsourcing-contract-deals-are-getting-smaller/>. Accessed 31 March 2019.
- Könning, M., Heinrich, K., Zschech, P., and Leyh, C. 2018. "Analyzing Influences on Pivotal ITO Contract Features: A Quantitative Multi-Study Design with Evidence from Western Europe," *Proceedings of the 24th Americas Conference on Information Systems*.
- Kroeber, A., and Kluckhohn, C. 1952. *Culture: A Critical Review of Concepts and Definitions*, Boston, MA, USA: Harvard University.
- Lacity, M. C., Khan, S. A., and Yan, A. 2016. "Review of the Empirical Business Services Sourcing Literature: An Update and Future Directions," *Journal of Information Technology* (31:3), pp. 269–328.
- Leidner, D., and Kayworth, T. 2006. "A Review of Culture in Information Systems Research: Toward a Theory of Information Technology Culture Conflict," *MIS Quarterly* (30:2), pp. 357–399.
- Liang, H., Wang, J.-j., Xue, Y., and Cui, X. 2015. "IT Outsourcing Research from 1992 to 2013: A Literature Review Based on Main Path Analysis," *Information & Management* (53:2), pp. 227–251.
- Lim, T.-S., and Loh, W.-Y. 1996. "A Comparison of Tests of Equality of Variances," *Computational Statistics & Data Analysis* (22:3), pp. 287–301.
- Matsuno, S., Ito, T., and Xia, Z. 2009. "Determinants of Information Systems Outsourcing: An Empirical Investigation in Japan," *Artificial Life and Robotics* (14:3), p. 337.
- Nakagawa, S. 2004. "A Farewell to Bonferroni: The Problems of Low Statistical Power and Publication Bias," *Behavioral ecology* (15:6), pp. 1044–1045.
- Ravindran, K., Susarla, A., Krishnan, R., and Mani, D. 2015a. "The Mediating Effect of Formal Contractual Controls in the Relationship Between Experience and Contract Design," in *Achieving Success and Innovation in Global Sourcing: Perspectives and Practices*, I. Oshri, J. Kotlarsky and

- L. P. Willcocks (eds.), La Thuile, Italy. February 18-21, 2015, Cham: Springer International Publishing, pp. 52–61.
- Ravindran, K., Susarla, A., Mani, D., and Gurbaxani, V. 2015b. “Social Capital and Contract Duration in Buyer-Supplier Networks for Information Technology Outsourcing,” *Information Systems Research* (26:2), pp. 379–397.
- Schmidt, N., Erdogmus, T., and Rosenkranz, C. 2016. “Are We That Different? Cultural Patterns and Their Effect on Information Technology Outsourcing Relationship Quality,” *Proceedings of the 37th International Conference on Information Systems*.
- Schneider, C. O., Bremen, P., Schönsleben, P., and Alard, R. 2013. “Transaction Cost Economics in Global Sourcing: Assessing Regional Differences and Implications for Performance,” *International Journal of Production Economics* (141:1), pp. 243–254.
- Sedera, D., Lokuge, S., Krcmar, H., Srivastava, S. C., and Ravishankar, M. N. 2014. “The Future of Outsourcing in the Asia-Pacific Region: Implications for Research and Practice-Panel Report from PACIS 2014,” *Communications of the Association for Information Systems* (35), p. 17.
- Su, N. 2015. “Cultural Sensemaking in Offshore Information Technology Service Suppliers: A Cultural Frame Perspective,” *MIS Quarterly* (39:4), pp. 959–983.
- Su, N., Levina, N., and Ross, J. W. 2016. “The Long-Tail Strategy for IT Outsourcing,” *MIT Sloan Management Review* (57:2), 81-89.
- Susarla, A. 2012. “Contractual Flexibility, Rent Seeking, and Renegotiation Design: An Empirical Analysis of Information Technology Outsourcing Contracts,” *Management Science* (58:7), pp. 1388–1407.
- Thadewald, T., and Büning, H. 2007. “Jarque–Bera Test and its Competitors for Testing Normality: A Power Comparison,” *Journal of Applied Statistics* (34:1), pp. 87–105.
- Tiwana, A., and Bush, A. A. 2007. “A Comparison of Transaction Cost, Agency, and Knowledge-Based Predictors of IT Outsourcing Decisions: A US-Japan Cross-Cultural Field Study,” *Journal of Management Information Systems* (24:1), pp. 259–300.
- Vogt, K., Beck, R., and Gregory, R. W. 2010. “Conflict as Manifestation of Culture in Global IS Outsourcing Relationships,” *Proceedings of the 18th European Conference on Information Systems*.