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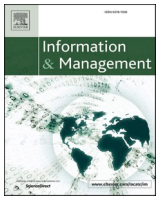

Global perspectives on organizational information systems issues: An enigma in search of a theoretical framework

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ABSTRACT

Information Systems (IS) research paradigms, models and findings are largely developed in the context of the United States and Western Europe and thus are largely applicable to the Western world and have limited relevance elsewhere. One area of IS research interest to both practitioners and academics is the elicitation of organizational/management issues related to the use of information technology (IT). The US-based Society for Information Management conducts an annual survey on these issues, but its findings are limited to the US. Given the current ethnocentric approach, the World IT Project, among other topics, examined the organizational IS issues in 37 countries and found that, as expected, the organizational IS issues varied widely from one organization to another and from one country to another. To better understand the nature of these issues and their driving factors, we have developed a multitiered theoretical framework to unravel these factors. This framework comprises three layers: an outer layer with three national-level factors, a middle layer with two macro-IT factors, and an inner layer with three organizational-level factors. Furthermore, 17 propositions are supported by the World IT Project data and secondary data. Such a framework has been long overdue and offers both practitioners and researchers value in understanding the global IS landscape.

1. Introduction

Information technology (IT) is widely used in organizations in all corners of the world. While the technology keeps evolving at a breathtaking speed, at any given time the specific technologies available to any organization or country are relatively similar with a few exceptions, yet the organizational implications and concerns related to the deployment of these technologies vary widely. One of the perennial concerns in organizations over the last several decades has been IT–business alignment [1] or, simply put, how IT serves the needs of the business. This concern necessitates heightened attention to management and organizational issues related to IT, to a greater degree than to any technological complexities. Fortunately, there has a dedicated effort in the United States and the rest of the Western world to report the important IT management issues over the years. For example, each year the journal *MIS Quarterly Executive* reports the results of a survey of IS executives about important IT management issues (e.g., [1–4]). Outside the United States, a notable exception is the journal *Information & Management*, which has over the years published IS management studies in such countries as Australia, Canada, China, Singapore, Slovenia, and Taiwan [5–10].

More recently, to balance the dominance of US-centric and Western-centric views, the World IT Project [] reported results and provided ranked lists of organizational IS issues[1] in 37 countries [11,12]. Both theory and empirical evidence suggest that the world is not uniform, given dramatic national differences at the individual and organizational levels. At the individual level, people living in different countries differ in their intelligence quotients [13], educational attainment [14], personality traits [15], cultural values [16], cognitive styles [17], and decision making processes [18]. At the organizational level, there are differences due to national income [19], demographics [20], industrial

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[1] The study team preferred the term "organizational IS issues." In the literature, these issues have been referred to by different names, such as "key IS issues," "IT issues," and "key IS management issues." These are not necessarily all management issues or within the domain or control of management; thus, the term "organizational IS issues" is more appropriate.

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development, labor markets, education, political systems [21], laws, and physical and IT infrastructure. Thus, differences among the countries investigated were expected.

The results of the present study demonstrate the limitations of the Western-centric views and reveal that the rest of the globe does not always have the same perspective. At first glance, the results are chaotic and enigmatic, defying any easy explanation. Previous efforts (e.g., [5–7,9,10]) have found differences among countries but have not offered cogent explanations for these variations. In this study, careful examination and inspection of the results reveal major insights, which we weave into a theoretical framework for global organizational IS issues. In all humility, given the complexities and vagaries of the world, we do not claim that the resulting framework is a "be-all and end-all," but rather consider it a starting point for improving our understanding of the nature of organizational IS issues, taking into account regional and national differences.

The theoretical framework is developed based on a deep and extensive analysis of the data collected from 37 countries under the auspices of the World IT Project [11]. Rather than taking the typical top-down approach prevalent in IS research, which starts with a theory to develop propositions and conduct subsequent analysis, this study used a bottom-up data-driven approach to develop theory. Our systematic methodology begins with quantitative data obtained from the World IT Project and secondary sources, identifies various themes and relationships in the data, develops various hypotheses, and, after much scrutiny and reflection, culminates in the construction of an overarching framework. The theoretical framework for organizational IS issues is described later in the paper. In summary, it comprises three superimposed layers of hierarchy: national factors, macro IT factors, and organizational factors (see Fig. 1), the latter two embedded within the higher hierarchical levels. A total of eight factors are explicated that influence the organizational IS issues: three national factors (economic level, national culture, and political system), two macro-level IT factors (IT infrastructure and IT occupational culture) and three organizational factors (business strategy, organizational culture, and environmental turbulence). The framework is described and discussed indepth later in the article.

In this paper, to provide context, we first offer a brief overview of the results from the 37 countries. The focus then turns to conducting a "bottom-up" analysis of the quantitative results to develop 17 propositions and a theoretical framework for an enhanced understanding of the global organizational IS issues.

This paper makes several contributions. While the global organizational issues have been reported earlier in a descriptive manner [12] and are valuable in their own right, the development of the 17 propositions and a theoretical framework have profound implications for both academics and practitioners in developing a nuanced understanding and subsequently take proper actions in a multinational environment. Statistical analysis revealed several underlying factors influencing organizational concerns, thus leading to several high-level propositions. These propositions provide a starting point from which to launch studies to further corroborate and refine the hypothesized relationships. Furthermore, the theoretical framework can guide future researchers in embarking on well-conceived and theoretically grounded studies related to global organizational IS issues. More significantly, this study opens a new frontier in global IS research and suggests several productive research streams for further exploration. For practitioners, a good understanding of the global organizational IS issues and the underlying factors is important. Today's multinational companies operate in multiple locations around the world that differ greatly in terms of national characteristics, political systems, and IT infrastructure. One size does not fit all; therefore, the research objective is to build a theoretical framework that would enable a wide variety of organizations to address the multitude of factors that need to be considered when developing IS strategies designed to accommodate the specific needs of various regions of the world.

This paper proceeds as follows. The next section provides a literature review of existing studies on organizational IS issues. This is followed by a brief description of the World IT Project and the data collection approach and then an overview of the organizational IS issues. A deeper

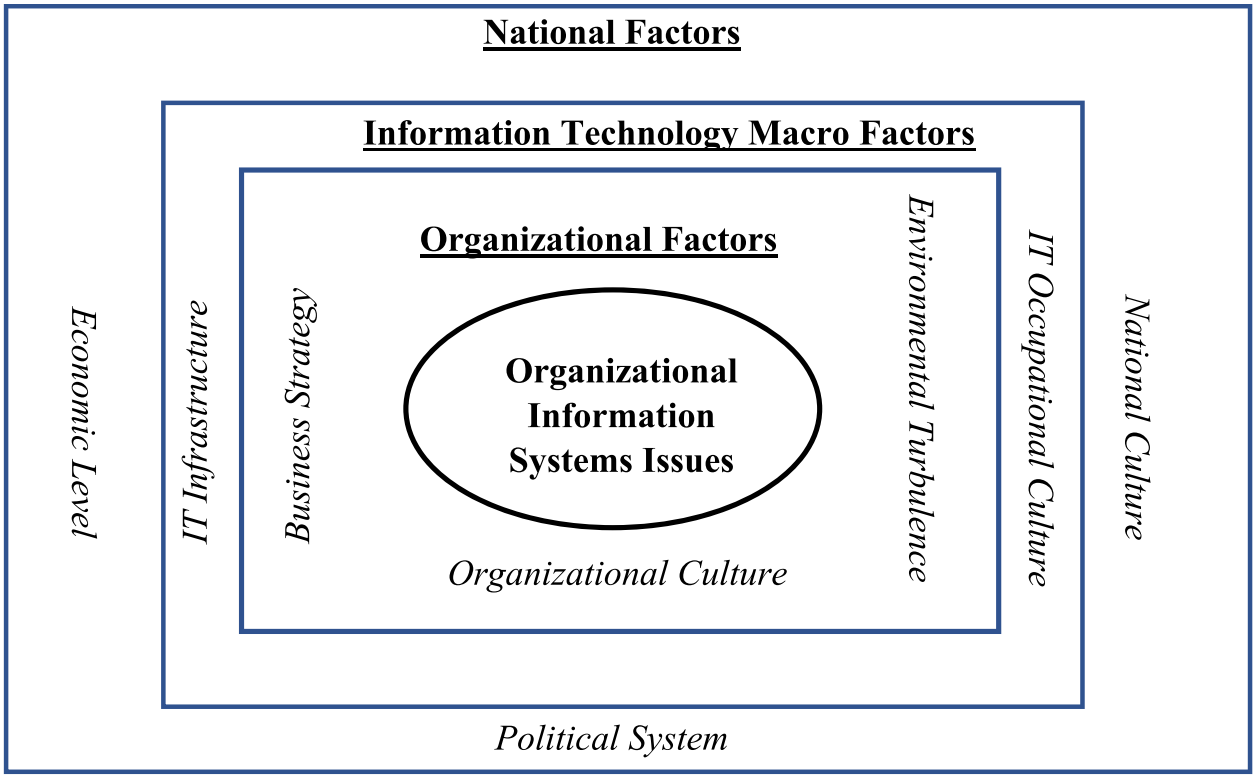

Fig. 1. A theoretical framework for the determinants of organizational IS issues.

analysis and theoretical development are provided next, followed by a discussion section covering the theoretical framework, its usefulness, practical implications, future research suggestions, and limitations, and ending with conclusions.

2. Literature review

Organizational IS issues refer to the IS issues that are important to the organization [1,2], referred to in the literature by such terms as "key IS issues," "IT issues," and "key IS management issues." Typically, these issues are examined from the perspective of senior IS mangers (such as CIOs) and sometimes other IT professionals as well, for example, the membership of the US-based Society for Information Management ([1–3]).

The literature on critical organizational IS issues dates back to the 1980s, when Ball and Harris [22] surveyed the membership of the Society for Management Information Systems for key IS issues. This society is located in the US and was later renamed the Society for Information Management (SIM). Subsequent reports started appearing every 2 to 4 years based on a survey of the same membership (e.g., [23–26]). Since the early 2000s, SIM started conducting these surveys annually, and the SIM-sponsored report is published annually in the journal *MISQ Executive*. The last two reports are from the years 2022 [2] and 2023 [1]. These reports describe only the US views. Of note, studies reported before roughly a decade ago used different approaches for eliciting the top issues (e.g., ranking, rating, and the Delphi method), making comparisons across studies difficult; however, recent studies have used similar methods, facilitating such comparisons. It is interesting to note that organizational IS issues have remained relatively stable in the U.S. over the years, in spite of the emergence of new technologies (e.g., blockchains and AI) and changing business and socio-economic conditions (e.g., COVID-19 and changes in economic outlook). A key thesis of this study is that the socioeconomic factors are likely to have greater and differential impacts on organizational IS issues when compared globally and not within a single country.

Inspired by the US reports, similar (albeit sporadic) investigations have been conducted in various other countries. For example, key issue studies have been reported for Australia [9], Canada [7], China [6,27], Estonia [28], India [29], Nigeria [30], Singapore [9], Slovenia [5], Taiwan [31,10], Thailand [32], and the UK [33]. There also have been attempts to report issues in major regions of the world, such as Europe, Asia, and Latin America [9,34,35]. These studies often included a subset of countries in a particular region and extended over decades. However, countries within regions exhibit heterogeneity, making the results less useful. These studies also used different data collection methods, making across-country comparisons extremely difficult.

Although some of the aforementioned studies make comparisons among countries, there has been little effort to systematically understand the factors underlying the differences in organizational issues across countries. One notable exception is the meta-analysis of available studies reported by Palvia et al. [8] that investigated the nature of IS issues based on a country's level of economic development. Their primary finding was that economically advanced countries rank strategic issues higher, newly industrialized countries rank management and control issues higher, and developing countries rank operational issues higher. Although the authors focused on the economic factor, they also identified cultural, political, and organizational factors as worthy of further investigation. Other scholars have speculated that economic development and cultural environment have a bearing on the nature of the IS issues [6,9]. The World IT Project and the present study dive deeper into this much acknowledged and needed line of research.

3. The World IT Project and methods

The World IT Project [36,11] was launched by a group of researchers who noted that IS research is dominated by American and Western views, and that, unfortunately, the views of other nations are underrepresented. In summary, the World IT Project captures the organizational, technological, and individual issues of IT employees across the world and relates them to national, cultural, and organizational factors. Data are collected from 37 countries, representing different economic, political, religious, and regional settings. This paper focuses only on the organizational IS issues in those 37 countries (including the US). The descriptive results of the organizational issues have been published elsewhere ([37], Palvia et al. 2022). Results from technological and individual issues have been reported elsewhere [38,39].

The World IT Project is currently headed by a core team of five IS researchers based in four countries: the US, Canada, Turkey, and India. This team is aided by country teams who were instrumental in collecting the data in their countries. The core team developed a survey instrument to address the research goals of the project, based on existing instruments and scales. It was important to use previously validated items for the various constructs for the instrument to have good psychometric properties. The instrument contained a total of 160 items. Pilot tests were conducted in several countries to refine the instrument. The final instrument was reviewed by the Institutional Review Board (IRB) at the university of one of the core team members and received its clearance and exemption from further review. Country teams received their own IRB approvals if necessary.

The World IT Project's goal was to get data from countries representing every major region of the world and to include different cultures, levels of economic growth, religious preferences, and political systems. Local country teams were recruited because they understood the local culture and how to best approach local businesses to participate. These teams were also charged with translation/back-translation[2] of the instrument (if a translation to the local language was necessary) to ensure that the wording and meaning were appropriate for the local culture. Although true representative sampling was not feasible, the goal was to collect a large dataset that would be respected for its breadth of cultures and countries. A good representation of IT employees was achieved by instructing the country teams to collect data from small, medium, and large organizations in a variety of industries. A high goal of obtaining 300 data points from each country was set; most countries either achieved or exceeded this sample size.

The organizational IS issues in the instrument were adapted from key issue studies published annually. Several previous US-based investigations were consulted (e.g., [4,7,23,26,40]). Given the Western slant inherent in these studies, numerous multinational and international (i.e., non-US) projects (e.g., [27–29,31,32,34,35]) were consulted as well. A special effort was made to minimize any overlap among the various issues which may result in multicollinearity effects [41]. As a result, several issues were added, deleted, merged, or altered in wording. Table 1 shows the final list of eighteen issues. Each issue was rated by each respondent on a 5-point Likert-type scale, with 1 representing "most important" and 5 representing "not important."

For the purpose of this study, of the 160 data items in the instrument, items related to the following factors were selected from the dataset: organizational IS issues, national culture, IT occupational culture, organizational culture, business strategy, and environmental turbulence. Data related to economic level, political system, and IT infrastructure were obtained from secondary sources.

4. Summary of results

While these results from the World IT Project have been reported and discussed elsewhere (see [37], Palvia et al. 2022), a summary is provided here for context and understanding of the analysis that follows.

[2] The instrument has been translated into the following languages: Chinese, French, Italian, Japanese, Korean, Malay, Polish, Portuguese, Russian, Spanish, Thai and Turkish.

Table 1
Organizational IS issues.

Business productivity and cost reduction
Alignment between IT and business
Business agility and speed to market
Revenue-generating IT innovations
IT cost reduction
IT strategic planning
Business process reengineering
Enterprise architecture
Security and privacy
IT reliability and efficiency
IT service management (e.g., ITIL)
Globalization
Outsourcing
Attracting and retaining IT professionals
BYOD (bring your own device)
Continuity planning and disaster recovery
Project management
Knowledge management

Table 2
Thirty-seven countries in the world IT project.

Argentina	Iran	Portugal
Bangladesh	Italy	Romania
Brazil	Japan	Russia
Canada	Jordan	South Africa
China	Lithuania	South Korea
Egypt	Macedonia	Taiwan
Finland	Malaysia	Thailand
France	Mexico	Turkey
Germany	New Zealand	U.K.
Ghana	Nigeria	U.S.
Greece	Pakistan	Vietnam
Hungary	Peru	
India	Poland	

Our global dataset includes 37 countries (Table 2) and exceeds 10,000 data points. Table 3 shows the global ranks[3] of the 18 issues, listed by rank order. A lower number denotes a higher rank and thus greater importance. The top three issues when looking at all 37 countries are IT reliability and efficiency, security and privacy, and alignment between IT and business. Further discussion is provided in Palvia et al. [37].

Table 4 shows the ranks of the top five issues for all 37 countries. An explanation and discussion of these findings is provided in [12].

5. Theory development

Studies on the nature of organizational IS issues are descriptive in general and do not explore the underlying factors that drive these issues. This is not to say that these studies are not valuable and useful—they are. They help the various stakeholders (e.g., industry, government, policy makers, educational institutions, researchers) keep up to date on current IS practices and be proactive in their decisions, policies, and initiatives. In the literature, although numerous studies have examines the possible effects of economic development and national culture (e.g., [6,9,34]), only one attempt has been made to develop some kind of model or theory to explain the nature of the key issues [8]. Among the country factors affecting the nature of organizational IS issues, Palvia et al. [8] listed level of economic development, national culture, and political/regulatory system. However, they explored only the effect of economic development based on an array of previous studies spread over 9 years. Although not definitive and likely incomplete, their results provided us with a starting point for developing our own theory.

Table 3
Global ranks of organizational IS issues.

Organizational IS Issues	Global Rank
IT reliability and efficiency	1
Security and privacy	2
Alignment between IT and business	3
IT strategic planning	4
Project management	5
Knowledge management	6
Continuity planning and disaster recovery	7
Business agility and speed to market	8
Revenue-generating IT innovations	9
Business productivity and cost reduction	10
Attracting and retaining IT professionals	11
IT service management (e.g., ITIL)	12
Enterprise architecture	13
Business process reengineering	14
IT cost reduction	15
Globalization	16
Outsourcing	17
BYOD (bring your own device)	18

We used a hierarchical approach to develop our theoretical framework for organizational IS issues. Generally, a complex phenomenon is embedded in a web of overlapping domains that have interacting relationships. For example, an early framework for IS research included four layers: external, organizational, user, and the IS organization itself [42]. Similarly, culture has been visualized as having superimposed layers of national culture, organizational culture, and occupational culture [43]. In this vein, it was possible to explicate three layers of dominant forces that impact organizational IS issues pertaining to (1) national, (2) macro IT, and (3) organizational factors. Each set of these three factors is described below, along with accompanying propositions.

5.1. National factors

Various scholars have suggested that the relative importance of IT concerns varies from country-to-country based on national characteristics, such as level of economic development [6,8,44], culture ([37], Palvia et al. 2022; [9,45]), and political system [46,47]. More specifically, Palvia et al. [8] investigated the nature of IT issues based on the country's level of economic development. There even may be a reciprocal relationship between IT and economic development, in that IT may lead to economic development and vice versa. While the "IT to economic development" relationship has received some attention in the IS literature (e.g., [48–50]), there are many instances of an "economic level to IT" relationship (e.g., [8,35,40]), which posits that the prevailing economic conditions drive the nature of organizational IT priorities.

5.1.1. Analysis by economic level

For the economic analysis at the country level, the 37 countries in the dataset were categorized by economic level. The World Bank categorizes countries into four income groups—high, upper-middle, lower-middle, and low—based on the Gross National Income (GNI) per capita using the Atlas method, which smooths exchange rate fluctuations by using a 3-year moving-average, price-adjusted conversion factor. Using the 2018-2019 classification [51], each of the 37 countries was placed in a single category. In the dataset, there were no countries in the low-income category, leading to a 3-way classification of countries as high, upper-middle, or lower-middle income. There were 17 countries in the high-income group, 13 in the upper-middle group, and 7 in the lower-middle income group. The GNI per capita based on purchasing

[3] Methodological note: The analyses were conducted based on ranks within each country rather than actual average scores for the 18 issues. This is because, likely due to cultural differences, respondents in some countries had a tendency to give all issues either a very high score or a very low score (see [108]). Using ranks provides a relative comparison and mitigates discrepancies due to overall higher or lower scores.

Table 4
Top five ranks of the 37 countries.

	Business productivity & cost reduction	Alignment between IT and business	Business agility & speed to market	Revenue-generating IT innovations	IT cost reduction	IT strategic planning	Business process reengineering	Enterprise architecture	Security and privacy	IT reliability and efficiency	IT service management (e.g., ITIL)	Globalization	Outsourcing	Attracting & retaining IT professionals	BYOD	Continuity planning & disaster recovery	Project management	Knowledge management
Argentina		1				4			3	2						5		
Bangladesh	1					5			2	3								4
Brazil		2				3				1							5	4
Canada		5							1	2						4		3
China						3			2	1						5	4	
Egypt		3							1	2						5	4	
Finland		3				4			2	1							5	
France		5		1					2	4							3	
Germany						5			2	1				4				3
Ghana	2		5						1	4							3	
Greece		4				3			2	1								5
Hungary		3							2	1				5				4
India									1	3				2			4	5
Iran	5	3	2	1					4									
Italy		5				2				1	3							4
Japan		4	3						1	2							5	
Jordan	3	5		4					1	2								
Lithuania				4		5			2	1				3				
Macedonia									4	3				5			2	1
Malaysia	5					3			2	1								4
Mexico		3		4		5			2	1								
New Zealand		3				4			2	1				5				
Nigeria			3			5	2		4	1								
Pakistan	4			1		2											3	5
Peru		1		4		2				3							5	
Poland									3	2						5	4	1
Portugal		2				4			5	1				3				
Romania									2	3						1	5	4
Russia	4		5	3					2	1								
South Africa		2				4			3	1								5
South Korea	4		3						1	2						5		
Taiwan						4			1	2						3	5	
Thailand						5			2	1							4	3
Turkey	5								2	1			3			4		
U.K.		3				4			2	1							5	
U.S.		4				5			2	1				3				
Vietnam			3	2					1	5								4

Table 5
Economic classification of countries.

High-Income Countries		Upper-Middle Income Countries		Lower-Middle Income Countries	
Country Name	GNI per capita PPP	Country Name	GNI per capita PPP	Country Name	GNI per capita PPP
Argentina	$ 20,250	Brazil	$ 15,200	Bangladesh	$ 4,040
Canada	$ 46,070	China	$ 16,760	Egypt	$ 11,360
Finland	$ 45,400	Iran	$ 20,880	Ghana	$ 4,280
France	$ 43,790	Jordan	$ 9,110	India	$ 6,980
Germany	$ 51,680	Macedonia	$ 14,680	Nigeria	$ 5,700
Greece	$ 27,620	Malaysia	$ 28,660	Pakistan	$ 5,830
Hungary	$ 26,960	Mexico	$ 17,840	Vietnam	$ 6,450
Italy	$ 39,640	Peru	$ 12,880		
Japan	$ 44,850	Romania	$ 25,940		
Lithuania	$ 31,910	Russia	$ 24,890		
New Zealand	$ 39,740	South Africa	$ 13,090		
Poland	$ 27,970	Thailand	$ 17,040		
Portugal	$ 30,980	Turkey	$ 26,170		
South Korea	$ 38,340				
Taiwan	$ 49,800				
U.K.	$ 42,560				
U.S.	$ 60,200				

power parity (PPP) for each country also was captured using the World Bank Database [51].[4] Data for Taiwan were not available in the World Bank Database and were obtained from another source [52]. Table 5 provides the economic data.

Statistical analyses were conducted to probe the relationship between a country's economic level and its organizational IS issues. Given the ordinal nature of data, nonparametric Spearman rank-order correlations were computed. Significant Spearman correlations were observed for revenue-generating IT innovations ($rho = 0.31, p < 0.1$), IT reliability and efficiency (rho = -0.38, $p < 0.05$), outsourcing (rho = 0.52, $p < 0.001$), bring your own device (BYOD) (rho = -0.46, $p < 0.005$), and continuity planning and disaster recovery (rho = -0.40; $p < 0.05$). Given that a lower number represents a higher rank, a positive correlation indicates a negative relationship and vice versa. It is interesting to examine the direction of these relationships. For instance, revenue-generating IT innovations are valued more by lower-income countries compared to higher-income countries. This can be explained by the fact that lower-income countries have a greater need for additional sources of revenue, which may come from IT innovations. Continuity planning and disaster recovery are emphasized more by higher-income countries, reflecting their advanced levels of IT maturity and heavy dependence on IT for business continuance. For the same reasons, IT reliability and efficiency are valued more in higher-income countries. BYOD may be an issue only in higher-income countries, as the penetration of such devices may be low in lower-income countries. On the other hand, outsourcing was deemed a more pressing need in lower-income countries as they aspire to be world players like their more advanced counterparts and desire to enter the outsourcing market at the supplier end. Furthermore, offshore outsourcing clients are typically organizations in high-income countries, and the vendors are in low-income countries. The vendors are affected by a host of their own issues, which have received relatively less attention in the literature [53,54].

Based on the foregoing analysis and discussion, the following proposition is postulated:

Proposition I. *Several organizational IS systems issues in a country are impacted by the economic development level of the country.*[5]

5.1.2. Analysis by national culture

In his landmark work, Hofstede [16] described culture as "the collective programming of the human mind that distinguishes the members of one human group from those of another" (p. 24). Culture is based around the shared values, meanings, practices, and norms of groups [43]. A myriad of studies have explored the role of national culture in various IT-related issues. Over a decade ago, Leidner and Kayworth [55] conducted a review of 82 articles that studied the relationships between national culture and various aspects of IS. Since then, scores of additional investigations have examined the link between national culture and various IT phenomena, such as IT adoption [56], IS development [57], IT use [58], e-government [45], IS outsourcing [59], IS security [60], and IS management [61]. Several cross-national studies of IS management issues have discussed the importance of culture when explaining differences among countries [6,9].

Researchers have developed various frameworks to measure national cultural dimensions. Of these, Hofstede's [16] framework is most widely used in IS research, although it has some critics. Hofstede originally identified four value dimensions: uncertainty avoidance, individualism, masculinity, and power distance. A follow-up study added a fifth dimension—long-term orientation—to account for important differences in Asian cultures [62]. Two decades later, House et al. [63] identified nine dimensions of national culture. In the World IT Project, we chose to use Hofstede's five dimensions, given their wider use and appeal. These are defined briefly [16] as follows. *Power distance* (PDI) is the degree of inequality among people, from people being relatively equal (small power distance) to extremely unequal (large power distance). *Uncertainty avoidance* (UAI) is the extent to which a society feels threatened by uncertain situations and avoids these situations by providing career stability, establishing formal rules, and not tolerating deviant ideas. A higher UAI implies less risk-taking propensity and vice versa. *Individualism-collectivism* (IDV) contrasts a society in which the individual takes care of him/herself with a society in which groups take care of one another. *Masculinity-femininity* (MAS) reflects whether the dominant values are associated with the collection of money and things (masculine) versus values associated with caring for others and quality of life (feminine). *Long-term orientation* (LTO) is when one is focused on the future as opposed to short-term orientation, in which the focus is on the present or past. Of these dimensions, UAI and PDI are considered dominant in studying organizations within a particular culture [16].

Hofstede's scores of these dimensions for 76 countries are publicly available (https://www.hofstede-insights.com), and generally researchers use these scores directly in their own studies. The Hofstede model and the dimension scores were initially developed based on a single organization, IBM [64–66], and the data are getting old [64]. Although many of Hofstede's scores have been updated over time, concerns remain about the overreliance on data from only a single company; thus, the national culture scores may be confounded with the company's organizational culture. Furthermore, there are reasons to believe that the values and behaviors of IT workers differ from those of other occupations and the general population [67,68]. According to Schein [69], occupation is a more important driver of behavior than either country or organization.

[4] Note that the Atlas method and the "GNI per capita based on PPP" method provide similar groupings but there is not an exact match. For example, Jordan with a slightly lower GNI is placed in a higher group than Egypt with a higher GNI. The difference does not materially affect the results and "GNI per capita based on PPP" was used for the analysis.

[5] Given the multitude of issues that may be affected, they are combined as "several." Also, the direction of impact is not specified, as it depends on each issue. Moreover, many of the issues and the direction of impact are described in the prior analysis. As the purpose of this paper is to build a theoretical framework, not a causal model, it is left for future studies to specify the precise hypotheses and test them with further data.

Given these concerns, we independently measured these five dimensions for IT employees in the 37 countries using Hofstede's original survey items [12]. As in most previous studies, we used the culture dimension scores at the country level. Several recent studies have applied the culture dimensions at the individual level, referring to them as "espoused" national culture values [70].

The scores for the five national culture dimensions, derived using our present data [68], are shown in Table 6. As per Hofstede, these scores are interval scores providing relative comparisons and can be scaled up or down by adding or subtracting a constant number chosen arbitrarily by researchers; for example, one may add 50 to all uncertainty avoidance scores to make them all positive.

A statistical analysis conducted to examine the relationships between the five national culture dimensions and the organizational IS issues revealed significant relationships between UAI and various organizational issues, including business productivity and cost reduction (rho = -0.38, $p < 0.05$), alignment between IT and business (rho = 0.42, $p < 0.01$), business agility and speed to market (rho = -0.51, $p < 0.001$), revenue-generating IT innovations (rho = -0.42, $p < 0.01$), IT strategic planning (rho = 0.28, $p < 0.1$), IT reliability and efficiency (rho = 0.28, $p < 0.1$), globalization (rho = -0.37, $p < 0.05$), outsourcing (rho = - .31, $p < 0.1$); and attracting and retaining IT professionals (rho = 0.51, $p < 0.001$). Enumerating these, with more uncertainty or risk-taking propensity (i.e., less risk avoidance), the importance of the following issues became higher: alignment between IT and business, IT strategic planning, IT reliability and efficiency, and attracting and retaining IT professionals. On the other hand, with more uncertainty or risk-taking propensity, the importance of the following issues decreased: business productivity and cost reduction, business agility and speed to market, revenue-generating IT innovations, globalization, and outsourcing. Although a clear pattern is difficult to discern and is a subject for future investigations, two observations can be made. First, the uncertainty avoidance dimension has an impact on many organizational IS issues, and second, many of these impacts suggest a greater focus on strategic and tactical issues and reduced focus on traditional operational concerns in the context of reduced levels of uncertainty avoidance (i.e., greater risk-taking propensity). Given the multitude of relationships, the following proposition is advanced:

Table 6
Country culture scores.

Country	UAI Index	IDV Index	MAS Index	PDI Index	LTO Index
Argentina	-6.12	106.25	79.69	69.30	80.98
Bangladesh	29.64	32.10	72.43	63.01	68.68
Brazil	-13.32	105.32	57.44	72.21	65.53
Canada	-8.71	76.11	41.22	76.67	50.58
China	14.06	62.73	76.87	80.32	56.09
Egypt	35.64	51.98	84.40	106.80	43.83
Finland	-42.92	116.13	26.12	73.23	58.25
France	8.74	72.45	74.25	78.48	58.18
Germany	-16.40	119.30	41.25	63.75	88.20
Ghana	-12.90	51.40	68.90	56.60	66.05
Greece	-1.30	85.35	71.70	83.05	62.90
Hungary	-14.20	79.05	58.75	64.00	79.00
India	-7.75	58.40	61.55	54.50	92.20
Iran	51.90	44.05	80.80	31.25	59.20
Italy	25.65	78.00	42.30	69.20	49.65
Japan	37.95	62.60	34.25	46.80	88.35
Jordan	12.70	34.60	76.25	101.45	75.90
Lithuania	16.85	97.95	61.20	79.40	76.35
Macedonia	-11.55	102.50	73.10	59.50	66.70
Malaysia	29.70	61.20	58.75	78.10	75.85
Mexico	9.80	31.45	36.00	43.25	60.65
New Zealand	-34.75	115.80	46.50	66.20	59.05
Nigeria	-9.60	63.30	72.05	52.80	39.55
Pakistan	32.15	53.50	67.15	60.70	67.75
Peru	-26.15	74.85	76.95	64.05	45.60
Poland	5.05	57.00	88.15	68.90	56.20
Portugal	-11.20	108.10	91.30	89.30	86.65
Romania	7.15	66.80	86.40	54.15	65.65
Russia	42.70	87.10	68.55	62.45	92.20
South Africa	-15.45	84.65	61.55	72.45	64.90
South Korea	48.45	66.10	55.25	66.95	54.55
Taiwan	35.70	52.80	58.40	96.10	75.60
Thailand	45.10	64.35	48.95	84.30	68.45
Turkey	26.31	40.73	53.90	63.80	38.80
U.K.	-23.30	113.35	56.30	67.65	68.75
U.S.	-25.90	92.70	46.15	77.10	48.15
Vietnam	29.40	63.30	68.55	83.70	60.80

Proposition II. *Several organizational IS issues in a country are impacted by the Uncertainty Avoidance dimension of its IT employees.*

Another national culture dimension—IDV—had significant relationships with several organizational issues, including business productivity and cost reduction ($rho = 0.51, p < 0.001$), alignment between IT and business (rho = -0.35, $p < 0.05$), revenue-generating IT innovations ($rho = 0.36, p < 0.05$), IT strategic planning (rho = -0.30, $p < 0.10$), enterprise architecture (rho = -0.29, $p < 0.10$), security and privacy ($rho = 0.30, p < 0.10$), IT reliability and efficiency (rho = -0.45, $p < 0.005$), outsourcing ($rho = 0.45, p < 0.005$), and attracting and retaining IT professionals (rho = -0.47, $p < 0.005$). The results suggest that individualists seem to be more planning oriented, as indicated by their preference for such issues as alignment between IT and business, IT strategic planning, enterprise architecture, IT reliability and efficiency, and attracting and retaining IT professionals. On the other hand, collectivists place greater value on business productivity and cost reduction, revenue-generating IT innovations, security and privacy, and outsourcing. It can be argued that some of these issues require collective effort, and that group safety and stability are more highly valued in collectivist cultures. In any case, there are multiple relationships, leading to the following proposition:

Proposition III. *Several organizational IS issues in a country are impacted by the Individualism-Collectivism dimension of its IT employees.*

Of the remaining three culture dimensions, PDI and LTO were related to only one organizational issue. The MAS dimension was related to four organizational issues: IT reliability and efficiency (rho = 0.45, $p < 0.005$), outsourcing (rho = -0.53, $p < 0.001$), BYOD (rho = 0.39, $p < 0.05$), and project management (rho = -0.31, $p < 0.10$). IT employees with masculine characteristics tended to favor outsourcing and project management, which are more outcome-oriented, while those with feminine characteristics emphasized IT reliability and efficiency and BYOD, which are more process-oriented. These findings are generally in line with what would be expected from the definition of this dimension, but further probing will help elaborate the underlying rationale. In any case, the following proposition is presented:

Proposition IV. *Several organizational IS issues in a country are impacted by the Masculinity-Femininity dimension of its IT employees.*

5.1.3. Analysis by political system

The countries of the world have many different political systems. The political system of a country is characterized by its governmental, legal, and economic systems; social and cultural systems; and other state- and government-specific systems [21], which affect various aspects of the organizational IT environment [71]. While finer classifications exist, the major types of political systems are democracies, monarchies, and authoritarian and totalitarian regimes. For the purpose of this analysis, we further narrowed the political systems into two types: democracies and authoritarians. We used the Democracy Index [72] compiled by the Economist Intelligence Unit (EIU), the research division of the Economist Group, a UK-based private company, to categorize the 37 countries in this study into one of the two types. The 2021 EIU report [73] classifies countries into four types: full democracies, flawed democracies, hybrid regimes, and authoritarian regimes. We combined full and flawed democracies into a single category, "democracies," and

combined the latter two into the "authoritarian" category. The 37 countries included 27 democracies and 10 authoritarians (Table 7).

We compared the ranks of the 18 organizational IS issues between the two groups of countries. Given the ordinal nature of data, the nonparametric independent-samples Mann-Whitney *U* test was used to compare each organizational issue across the two groups (Table 8).

Three issues had statistically higher ranks for authoritarian countries than democracies: revenue-generating IT innovations, business productivity and cost reduction, and outsourcing. The common denominator for all three is the use of IT for greater business profitability; apparently, these authoritarian regimes have not been able to use their IT resources for business needs and see a strong need to focus on the basics of operational business issues. Authoritarian environments are rarely concerned with keeping workers happy. On the other hand, democracies gave higher importance to attracting and retaining IT professionals where presumably there is greater potential job mobility. IT workers are a scarce resource and are in high demand. In many countries, the IT industry is strong and continuously growing, leading to talent shortage and making it much easier for employees to find new employment opportunities [74].

The foregoing analyses suggest that organizational IS priorities differ in countries with different political systems, leading to the following proposition:

Proposition V. *Several organizational IS issues in a country are impacted by the prevailing political system in the country.*

5.2. IT macro factors

Two macro factors from the IT domain are relevant and are likely to influence organizational IS issues: IT infrastructure capability and IT occupational culture.

5.2.1. Analysis by IT infrastructure capability

The International Telecommunication Union (ITU), an agency of the United Nations, collects telecommunications/ICT (information and communication technology) statistics for almost all countries. Many statistics are collected [75] pertinent to a country's ICT infrastructure capability, such as the use of and access to computers, fixed phones, mobile phones, and the Internet. The most appropriate indicator for our purpose seems to be Internet use, which captures several dimensions of computing and communication. The ITU Statistics web page [76] provides the "percentage of individuals using the Internet" for each country. The latest data from 2017 were downloaded. Only Macedonia's statistics were not available from the ITU; they were obtained from another website [77]. Table 9 presents the data. These numbers were correlated with issue ranks for each issue individually.

Some interesting findings were revealed, including significant correlations of Internet use (i.e., proxy for IT infrastructure) with IT reliability and efficiency ($rho = -0.30, p < 0.1$), outsourcing ($rho = 0.48, p < 0.005$), BYOD ($rho = -0.32, p < 0.1$), and continuity planning and disaster recovery ($rho = -0.39, p < 0.05$). All these issues seem to have the common denominator of ICT availability. The results of the infrastructure analysis very much paralleled the economic analysis results, except for revenue-generating IT innovations, and were in the same direction. The higher-infrastructure countries valued IT reliability and efficiency, BYOD, and continuity planning and disaster recovery more, while the lower-infrastructure countries valued outsourcing more (where presumably ICT availability is not as stable and thus needs to be outsourced to other countries). The explanations for these findings are similar to those articulated above for economic analysis.

Based on the foregoing results and analysis, we postulate the following:

Proposition VI. *Several organizational IS issues in a country are impacted by the IT infrastructure of the country.*

The foregoing discussion points to an overlap between the economic impact and the IT infrastructure impact on organizational IS issues. Previous scholars generally have found a positive relationship between ICT infrastructure and economic development (e.g., [78,79]). In this study, a very strong positive relationship between percentage of Internet users and GNI per capita PPP also was observed ($rho = 0.85, p < 0.0005$). Note that ICT infrastructure is positioned as a consequence[6] of the economic level of the country, and thus ICT impacts the organizational IS issues more directly. This leads to the following:

Proposition VII. *The impact of a country's economic development level on several organizational IS issues is mediated by its IT infrastructure.*

5.2.2. Analysis by IT occupational culture

While there is much IS research on the role of national culture, the well-known cultural scholar Schein [80] has argued that the most important driver of organizational behavior is neither country nor organization, but rather occupation. It has been generally accepted that IT professionals have their own unique occupational culture that spans organizations and industries [81,82]. Thus, IT occupational culture (ITOC) has become a topic of growing importance in recent years [67,69,82,83]. Simply stated, ITOC is defined as the basic assumptions, cultural forms, ideologies, and behaviors that grow uniquely in the context of the IT occupation [81].

The original Theory of Occupational Culture [84] asserts that occupational culture spans organizational boundaries. Thus, there are more similarities among IT professionals from one organization to another than there are differences. However, research in ITOC has been conducted primarily in US-based firms. While ITOC may remain relatively stable across US organizations, there are reasons to believe that ITOC may exhibit greater differences across countries; in fact, there is emerging evidence of such differences [85]. These differences can be attributed to many factors, including the differing patterns of IT evolution over the last 50 years (e.g., [86,87]), existing IT infrastructure, values and beliefs, and IT supplier/client role of each country.

Recently, researchers have taken steps to create measurable value dimensions for ITOC [67,88]. In an exploratory study, Jacks and Palvia [88] proposed a framework of six cultural value dimensions specific to ITOC. In a subsequent mixed methods study, Jacks et al. [67] built on this work to develop an expanded and validated theoretical framework for ITOC. Ultimately, they developed six value themes for ITOC: (1) autonomy in decision-making, (2) structure in environment, (3) precision in communication, (4) innovation in technology, (5) reverence for technical knowledge, and (6) enjoyment at the workplace (abbreviated as ASPIRE) (Table 10), and created a validated instrument to measure these six value dimensions. The World IT Project used the ASPIRE instrument to assess the six ITOC values in all 37 countries.

Each ITOC dimension was measured using multiple items on a 5-point Likert-type scale, with 1 indicating most important and 5

Table 7
Political systems of countries in the World IT Project.

Democracies	Authoritarians
Argentina, Brazil, Canada, Finland, France, Germany, Ghana, Greece, Hungary, India, Italy, Japan, Lithuania, Macedonia, Malaysia, Mexico, New Zealand, Peru, Poland, Portugal, Romania, South Africa, South Korea, Taiwan, Thailand, U.K., U.S.	Bangladesh, China, Egypt, Iran, Jordan, Nigeria, Pakistan, Russia, Turkey, Vietnam

[6] As pointed out earlier, an argument can be made for a reciprocal relationship between IT infrastructure and economic level. This would be an interesting line of research for further investigation.

Table 8
Rank comparison across democracies and authoritarians.

Organizational IS Issue	*Average Rank: Democracies	*Average Rank: Authoritarians	Mann-Whitney U	Significance (*p*-value)
IT reliability and efficiency	1.7	4.0	100.0	.242
Security and privacy	2.6	2.7	139.5	.880
Alignment between IT and business	5.3	6.8	97.5	.203
IT strategic planning	5.6	6.3	107.0	.353
Project management	5.8	6.9	115.5	.511
Knowledge management	6.0	7.5	93.5	.158
Continuity planning and disaster recovery	7.6	9.2	106.5	.335
Business agility and speed to market	8.4	7.4	168.5	.257
Revenue-generating IT innovations	9.5	5.8	197.5	.031**
Business productivity and cost reduction	9.3	6.5	194.5	.040**
Attracting and retaining IT professionals	8.1	11.1	75.0	.040**
IT service management (e.g., ITIL)	10.4	11.4	115.5	.511
Enterprise architecture	13.0	12.2	161.0	.389
Business process reengineering	13.1	12.3	139.0	.906
IT cost reduction	14.4	14.1	133.5	.960
Globalization	15.4	15.3	143.5	.775
Outsourcing	17.3	14.8	217.0	.004***
BYOD	17.3	16.7	107.0	.353

* Note that a lower value represents a higher rank.
** Significant at 0.05 level.
*** Significant at 0.01 level.

Table 9
Internet users by country.

Country	Percent of Internet Users	Country	Percent of Internet Users	Country	Percent of Internet Users
Argentina	75.81	Iran	60.42	Portugal	73.79
Bangladesh	18.02	Italy	61.30	Romania	63.75
Brazil	67.47	Japan	90.87	Russia	76.01
Canada	92.70	Jordan	66.79	South Africa	56.17
China	54.30	Lithuania	77.62	South Korea	95.10
Egypt	44.95	Macedonia	75.90	Taiwan	92.78
Finland	87.47	Malaysia	80.14	Thailand	52.89
France	80.50	Mexico	63.85	Turkey	64.68
Germany	84.40	New Zealand	90.81	U.K.	94.62
Ghana	37.88	Nigeria	27.68	U.S.	75.23
Greece	69.89	Pakistan	15.51	Vietnam	49.57
Hungary	76.75	Peru	48.73		
India	34.45	Poland	75.99		

Table 10
ITOC value dimensions.

Value	Definition
Autonomy in decision-making	Level to which members of an occupation believe that they should be empowered with decision-making for the organization, access to tools, and access to data.
Structure in the environment	Level to which members of an occupation believe that orderliness, process, and role definition are needed in the work environment.
Precision in communication	Level to which members of an occupation believe that communication about work tasks must be detailed, accurate, and exact.
Innovation in technology	Level to which members of an occupation believe that technological improvement, novelty, and creativity are valued.
Reverence for technical knowledge	Level to which members of an occupation believe that intelligence and increasing technical knowledge are what determines respect and admiration.
Enjoyment at the workplace	Level to which members of an occupation believe that their work should include play, fun, and socializing.

indicating not important. Table 11 presents the average scores for the six dimensions for all 37 countries. Note that with the framing of the Likert-type scale, a lower average means greater importance. Also note the variation across countries, supporting our earlier argument that ITOC can vary by country.

A statistical analysis was conducted to examine the relationships between the ITOC dimensions and the organizational IS issues. Each ITOC dimension was correlated with the 18 organizational issues. For the "autonomy" dimension, four relationships were found to be significant: alignment between IT and business ($rho = 0.42$, $p < 0.01$), business agility and speed to market ($rho = -0.40$, $p < 0.05$), IT strategic planning ($rho = 0.28$, $p < 0.10$), and globalization ($rho = -0.30$, $p < 0.10$). It seems that placing a higher value on autonomy leads to greater alignment and strategic planning efforts to the detriment of business agility, which was unexpected. However, it is possible that IT workers who care more about autonomy (i.e., themselves) care less about business agility (i.e., the organization).

For the "structure" dimension, four relationships were found to be significant: enterprise architecture ($rho = -0.35$, $p < 0.05$), IT reliability and efficiency ($rho = -0.32$, $p < 0.1$), outsourcing ($rho = 0.28$, $p < 0.1$), and project management ($rho = 0.45$, $p < 0.005$). The relationship with project management was in the expected direction, in that the countries emphasizing more structure rated the importance of project management higher. However, the relationship with enterprise architecture was in the opposite direction. This led to the provocative idea that placing too high a value on rigidly defined work structures might not always be beneficial.

The "precision" dimension had only one significant relationship, with project management ($rho = 0.36$, $p = < 0.05$), and in the expected direction such that precision led to greater emphasis on project management, where, for example, communicating exact timelines and technical specifications are required. For the "innovation" dimension, three relationships were identified as significant: business productivity and cost reduction ($rho = -0.30$, $p < 0.1$), enterprise architecture ($rho = -0.28$, $p < 0.1$), and project management ($rho = 0.40$, $p < 0.05$). With higher innovation values, business productivity and cost reduction was rated less important. This may seem contrary at first, but it actually is consistent with the assertion that ITOC values differ from traditional business management values [67].

Numerous relationships were significant for the "reverence for knowledge" dimension, including business productivity and cost reduction ($rho = -0.42$, $p < 0.01$), alignment between IT and business ($rho = 0.31$, $p < 0.10$), business agility and speed to market ($rho = -0.28$, $p < 0.10$), IT strategic planning ($rho = 0.31$, $p < 0.10$), security and

Table 11
Country ITOC scores.

Country	Autonomy	Structure	Precision	Innovation	Reverence	Enjoyment
Argentina	2.15	2.19	1.74	1.72	1.57	1.88
Bangladesh	2.27	2.19	1.92	1.99	1.92	2.34
Brazil	2.06	2.08	1.92	1.91	1.66	2.22
Canada	2.28	2.42	2.17	2.22	2.05	2.34
China	2.21	2.20	1.94	2.14	2.15	2.27
Egypt	1.84	1.62	1.65	1.55	1.55	1.97
Finland	2.04	2.87	2.54	2.02	1.87	2.06
France	2.30	2.20	1.87	1.96	1.80	2.03
Germany	2.21	2.68	2.23	2.08	1.91	2.05
Ghana	2.28	1.99	1.92	1.92	1.87	2.65
Greece	2.18	2.21	1.95	1.96	1.83	2.25
Hungary	2.18	2.18	1.74	1.92	1.91	2.13
India	1.76	1.81	2.18	1.48	1.36	1.72
Iran	2.59	2.52	2.88	2.58	2.56	2.71
Italy	2.14	2.57	2.22	1.80	1.70	2.18
Japan	2.09	2.08	1.95	2.00	1.93	2.10
Jordan	2.22	1.86	2.03	2.05	2.03	2.36
Lithuania	2.29	2.14	2.26	1.89	1.75	2.18
Macedonia	2.15	2.42	1.97	1.80	1.76	2.09
Malaysia	2.43	2.31	2.11	2.04	2.02	2.28
Mexico	2.06	2.07	1.71	1.87	1.76	2.08
New Zealand	2.22	2.62	2.21	2.09	1.91	2.15
Nigeria	2.26	2.41	2.31	2.21	2.20	2.12
Pakistan	2.18	2.10	1.87	1.88	1.88	2.24
Peru	1.82	1.71	1.65	1.71	1.66	2.03
Poland	2.42	2.02	1.96	1.98	1.95	2.56
Portugal	2.26	2.23	1.88	1.89	1.78	2.20
Romania	2.07	1.84	1.64	1.81	1.84	1.96
Russia	2.58	2.36	2.25	2.08	1.96	2.48
South Africa	2.18	2.21	1.91	1.77	1.70	2.10
South Korea	2.43	2.41	2.11	2.08	2.06	2.23
Taiwan	2.28	2.11	1.91	1.93	2.02	2.16
Thailand	2.33	2.13	1.78	1.78	1.82	1.94
Turkey	2.19	2.20	2.12	2.14	2.07	2.17
U.K.	2.28	2.58	2.24	2.13	2.06	2.15
U.S.	2.29	2.27	2.02	2.04	1.76	2.14
Vietnam	2.52	2.44	2.47	2.43	2.32	2.52

privacy ($rho = -0.28, p < 0.10$), attracting and retaining IT professionals ($rho = 0.39, p < 0.05$), and project management ($rho = 0.29, p < 0.10$). In other words, a greater focus on valuing technical knowledge led to a greater emphasis on planning issues, such as alignment between IT and business, IT strategic planning, attracting and retaining IT professionals, and project management, but to less emphasis on day-to-day operational issues such as business productivity and cost reduction, business agility and speed to market, and security and privacy.

Finally, the "enjoyment" dimension had some negative consequences. While higher levels led to greater emphasis on attracting and retaining IT professionals ($rho = 0.19, p < 0.10$), which has face validity, it reduced the emphasis on business productivity and cost reduction ($rho = -0.48, p < 0.005$) and IT cost reduction ($rho = -0.31, p < 0.05$). Again, these results support the assertion that ITOC values differ from traditional business management values. They also provide some evidence that a too-large gap between ITOC values and business values can lead to negative business outcomes for the organization.

It was possible to offer explanations for most of the findings reported above. There are some somewhat incongruous findings that require further exploration. In any case, we advance the following propositions:

Proposition VIII. *Several organizational IS issues in a country are impacted by the "autonomy" dimension of its IT employees.*

Proposition IX. *Several organizational IS issues in a country are impacted by the "structure" dimension of its IT employees.*

Proposition X. *Several organizational IS issues in a country are impacted by the "innovation" dimension of its IT employees.*

Proposition XI. *Several organizational IS issues in a country are impacted by the "reverence for knowledge" dimension of its IT employees.*

Proposition XII. *Several organizational IS issues in a country are impacted by the "enjoyment" dimension of its IT employees.*

5.3. Organizational factors

Three organizational factors are particularly relevant in affecting an organization's IS issues: business strategy, organizational culture, and environmental turbulence.

5.3.1. Analysis by business strategy

A time-honored and well-established theoretical typology for business strategy is that of Miles and Snow [89], which has been applied extensively in the field of strategic management and related disciplines, including IS (e.g., [90,91]). The typology postulates four general strategic types of organizations: prospector, defender, analyzer, and reactor organizations. In brief, a prospector organization is highly innovative, constantly seeking out new markets and opportunities, and oriented toward growth and risk-taking. A defender organization concentrates on protecting its current markets, maintaining stable growth, and serving its current customers. An analyzer organization both maintains market share and seeks to be innovative, although usually not as innovative as a prospector. A reactor organization has no consistent strategic approach but rather drifts with environmental events, reacting to but failing to anticipate or influence those events.

The organizational strategy was captured in the World IT Project instrument, and responses were classified into one of the four typologies. The more than 10,000 responses worldwide included 3,425 prospectors, 3,006 defenders, 2,782 analyzers, and 1,132 reactors.

Table 12
Comparison of organizational IS issues by business strategy.

Organizational IS Issue	Prospector (P)	Defender (D)	Analyzer (A)	Reactor (R)	Significant Differences in Pairs ($p < .05$)
Business productivity & cost reduction	2.02	2.08	2.13	2.09	P > D, P > A
Alignment between IT and business	1.90	1.97	1.88	1.92	P > D, A > D, R > D
Business agility and speed to market	1.94	2.09	2.06	2.09	P > D, P > A, P > R
Revenue-generating IT innovations	1.97	2.11	2.13	2.12	P > D, P > A, P > R
IT cost reduction	2.29	2.36	2.44	2.36	P > D, P > A, D > A, R > A
IT strategic planning	1.88	2.00	1.96	1.98	P > D, P > A
Business process reengineering	2.16	2.29	2.26	2.32	P > D, P > A, P > R
Enterprise architecture	2.18	2.30	2.23	2.39	P > D, P > R, A > R
Security and privacy	1.75	1.81	1.77	1.87	P > R, A > R
IT reliability and efficiency	1.75	1.80	1.70	1.89	P > R, A > D, A > R
IT service management (e.g., ITIL)	2.05	2.15	2.19	2.23	P > D, P > A, P > R
Globalization	2.30	2.48	2.61	2.65	P > D, P > A, P > R, D > A, D > R
Outsourcing	2.69	2.80	2.98	2.95	P > D, P > A, P > R, D > A, D > R
Attracting and retaining IT professionals	1.95	2.05	2.01	2.16	P > D, P > A, P > R, A > R
BYOD	2.85	2.89	3.07	3.00	P > A, P > R, D > A
Continuity planning and disaster recovery	1.94	2.03	1.97	2.13	P > D, P > R, A > R
Project management	1.87	1.98	1.95	2.05	P > D, P > A, P > R
Knowledge management	1.86	2.00	1.95	1.99	P > D, P > A, P > R

The responses on the central tendency of the four groups were compared using both parametric one-way analysis of variance and the nonparametric Kruskal-Wallis test. With large sample sizes, we were able to detect small differences, and both tests rejected the hypothesis of equal means/medians across the four strategies for all 18 issues at p values of 0.05 or less. We report the results using the nonparametric Kruskal-Wallis test in Table 12. Note again that a lower score indicates higher importance for an issue. The last column of the table presents pairs with a significant difference.

Some remarkable observations can be drawn from these results. First, prospectors seem to be most concerned about organizational IS issues, and reactors seem to be the least concerned about them. Prospectors may see IS as a primary enabler for business, while reactors simply consider IS as order-takers in a secondary support role. In fact, prospectors assigned the most importance to 17 of the 18 issues, followed by analyzers and then by defenders. Analyzers rate alignment between IT and business the highest and 10 other issues the second highest. Defenders rate 7 of the 18 issues among the second highest.

Second, what is revealing to also note is that for each of the 18 issues, of the six pairs of strategies—prospector-defender, prospector-analyzer, prospector-reactor, defender-analyzer, defender-reactor, and analyzer-reactor—several (but not all) showed significant differences (see the last column in Table 12). Once again, the prospectors showed the most significant differences from the other strategies.

Given the foregoing observations, the following propositions are postulated:

Proposition XIII. *Organizational IS issues are impacted by the business strategies predominant in organizations.*

Proposition XIV. *Organizational IS issues are most impacted by the Prospector strategy, followed by Analyzer and Defender strategies.*

5.3.2. Analysis by organizational culture

While several typologies of organizational culture exist, the competing values framework (CVF) is one of the most influential and widely used models in organizational culture research [92]. This framework was developed to identify the factors that lead to organizational effectiveness [93]. Cameron and Quinn [94] identified four culture types in CVF: clan, adhocracy, market, and hierarchy. These four cultures exist on a spectrum of two dimensions: control versus flexibility and internal focus versus external focus [94]. The *clan* culture exhibits a high degree of flexibility and is internally focused. There is a friendly working environment, and the organization resembles a large family. In the *adhocracy* culture, there is a high degree of flexibility, and the organization is externally focused. Innovation is key with the aim of remaining visible in the market. The *market* culture has a high degree of controlling behavior and is externally oriented. The focus is on producing results and the completion of work. The *hierarchy* culture shows a high degree of controlling behavior and is internally focused. This culture is extremely formal and has a structured working environment.

All of the World IT Project respondents classified their organization into one of the four culture types. In the global sample, 1,800 respondents identified their organizational culture as adhocracy; 3,126, as clan; 3,404, as hierarchy; and 1,794, as market. Once again, the responses for central tendency were compared using both parametric one-way analysis of variance and the nonparametric Kruskal-Wallis test. Using the Kruskal-Wallis test, 16 of the 18 null hypotheses of equal medians for the 18 issues were rejected at $p < 0.05$; the two that were not rejected were for attracting and retaining IT professionals and continuity planning and disaster recovery, meaning that these two issues were equally important regardless of organizational culture. These results are shown in Table 13, with the caveat that lower numbers represent higher importance for the issue.

The results are similar in spirit to the results reported for business strategy. Organizations with the adhocracy culture rate 15 of the 18 issues higher than any other culture. Given the external focus and innovative practices in the adhocracy culture, the greater focus on organizational IS issues confirms the important role of IT in these types of organizations. The hierarchy culture rates 2 of the 18 issues as most important and 8 of the 18 issues as second most important, followed closely by the market culture, which rates 1 issue as most important and 8 issues as second most important. The clan culture rates the organizational IS issues as the least favorably overall, perhaps because people and relationships are considered more important and this culture tends to be more insular. Another interesting observation is that for 16 of the 18 issues of the six pairs of strategies (adhocracy-clan, adhocracy-hierarchy, adhocracy-market, clan-hierarchy, clan-market, and hierarchy-market), several (but not all) showed significant differences (see the last column in Table 13). The adhocracy culture showed the most significant differences from the other three cultures and also rated the organizational issues the highest of the four cultures. Overall, the

Table 13
Comparison of organizational IS issues by organizational culture.

Organizational IS Issue	Adhocracy (A)	Clan (C)	Hierarchy (H)	Market (M)	Significant Differences in Pairs ($p < .05$)
Business productivity and cost reduction	1.95	2.13	2.07	2.11	A > C, A > H, A > M, H > C
Alignment between IT and business	1.88	1.97	1.90	1.91	A > C, H > C, M > C
Business agility and speed to market	1.90	2.09	2.05	2.06	A > C, A > H, A > M, H > C
Revenue-generating IT innovations	1.92	2.12	2.11	2.06	A > C, A > H, A > M
IT cost reduction	2.22	2.36	2.37	2.43	A > C, A > H, A > M, C > M
IT strategic planning	1.85	1.98	1.97	1.94	A > C, A > H, A > M
Business process reengineering	2.14	2.30	2.25	2.25	A > C, A > H, A > M
Enterprise architecture	2.13	2.32	2.24	2.30	A > C, A > H, A > M, H > C
Security and privacy	1.78	1.86	1.74	1.77	A > C, H > C, M > C
IT reliability and efficiency	1.77	1.81	1.74	1.75	H > C
IT service management (e.g., ITIL)	2.04	2.21	2.13	2.13	A > C, A > H, A > M
Globalization	2.25	2.56	2.49	2.53	A > C, A > H, A > M
Outsourcing	2.55	2.90	2.86	2.95	A > C, A > H, A > M
Attracting and retaining IT professionals	1.98	2.04	2.03	2.02	None
BYOD	2.73	2.93	2.99	3.07	A > C, A > H, A > M, C > M
Continuity planning and disaster recovery	1.99	2.03	1.98	1.97	None
Project management	1.86	1.99	1.95	1.93	A > C, A > H, M > C
Knowledge management	1.91	1.98	1.94	1.91	A > C, M > C

CVF dimension of internal/external focus introduced more variability in the organizational issues compared to the dimension of control.

Based on the foregoing observations, we offer the following proposition:

Proposition XV. *Organizational IS issues are impacted by the prevailing organizational culture.*

Proposition XVI. *Organizational IS issues are most impacted by the adhocracy culture.*

5.3.3. Analysis by environmental turbulence

Environmental turbulence refers to the degree of uncontrollability of the environment faced by an organization. It affects an organization in multiple ways, including its various strategies and its IS function [95]. A turbulent environment exists when changes are unexpected and unpredictable and is characterized by the speed, complexity, novelty, and unpredictability of change [96]. The World IT Project instrument captured environmental turbulence using four items from Johannesson and Palona [96]. These were averaged to find a combined score for each response. To compare the high-turbulent and low-turbulent environments, the sample was divided into two halves (of approximately 5,150 cases each), representing the two levels of turbulence, high and low.

Table 14
Comparison of organizational IS issues by environmental turbulence.

Organizational IS Issue	Low Turbulence (L)	High Turbulence (H)	Significance ($p < 0.05$)
Business productivity and cost reduction	2.09	2.06	Non sig
Alignment between IT and business	1.94	1.89	H > L
Business agility and speed to market	2.10	1.97	H > L
Revenue-generating IT innovations	2.13	2.01	H > L
IT cost reduction	2.37	2.34	H > L
IT strategic planning	1.96	1.94	Non sig
Business process reengineering	2.26	2.22	H > L
Enterprise architecture	2.28	2.22	H > L
Security and privacy	1.82	1.76	H > L
IT reliability and efficiency	1.81	1.73	H > L
IT service management (e.g., ITIL)	2.14	2.14	Non sig
Globalization	2.51	2.43	H > L
Outsourcing	2.82	2.83	Non sig
Attracting and retaining IT professionals	2.04	2.00	H > L
BYOD	2.94	2.94	Non sig
Continuity planning and disaster recovery	2.03	1.97	H > L
Project management	1.98	1.91	H > L
Knowledge management	1.97	1.91	H > L

Table 14 compares data between the two groups. The nonparametric Mann-Whitney *U* test was used to compare the two subsamples. Given that a lower issue score indicates its higher importance, the direction of significant differences is shown in the last column. Of the 18 issues, the differences between high and low turbulent environments are significant in 14 cases. Remarkably, all of these 14 issues are rated higher in high turbulent environments. Consequently, we advance the following proposition:

Proposition XVII. *Many organizational IS issues are impacted by the environmental turbulence faced by organizations. Specifically, IS organizational issues tend to be more important in high turbulent environments.*

6. A Theoretical Framework and Discussion

Based on the foregoing analyses and by combining the 17 high-level propositions, a theoretical framework emerged for the determinants of organizational IS issues, as shown earlier in Fig. 1. This framework not only integrates current knowledge and findings, but also extends our knowledge based on new data, prior literature, and theoretical arguments. More importantly, the theoretical development meets many of the requirements of the eight "ions" proposed by Rivard [97]: motivation, definition, erudition, imagination, explanation, presentation, cohesion and contribution. More specifically, the framework fits the "explanation and prediction" type of theory, as enunciated by Gregor [98], by having both causal explanations and testable propositions.

The outer box of the framework represents national factors that may influence organizational IS issues. It includes three national factors: economic level, national culture, and the prevailing political system of the country/region. Each of these factors influences what an organization can or cannot do. As a result, several relationships between these factors and the organizational issues were identified, and five propositions were developed. Several studies have investigated organizational IS issues in various countries with differing economic levels, national

cultures, and political systems (as described earlier), but they tended to be of a descriptive nature, with little examination of these issues' effects or causality. In particular, studies of the impact of national political systems on IT and organizational issues are virtually nonexistent. As a simple example illustrating the importance of this factor, many enterprises in China are state-owned and thus directly impacted by the decisions and policies of the state [99].

The next box embedded in the outer national box represents macro factors related to IT. Two such important factors were identified: IT infrastructure and ITOC. Several salient relationships were discovered, and seven propositions were advanced. It is important to note that while much anecdotal evidence exists of a unique ITOC, only recently has it been operationalized and examined in a concerted manner [67,85,88,100]. ITOC occupational culture was found to be an important factor and its several dimensions had significant bearing on organizational IS priorities. In addition, IT infrastructure has implications for organizational IS priorities. An auxiliary observation is that a country's economic level seems to influence its IT infrastructure.

The innermost box represents organizational factors that may impact organizational IS priorities. The literature posits that the most important factors at this level are the business strategy of the organization [89], organizational culture [94], and environmental turbulence [96]. While older US-based studies provided a breakdown of organizational issues by organization type (more specifically, the industry [e.g., [101]]), more recent studies have reported only aggregate rankings, and obviously, nuanced analysis and insights are diminished. The analysis documented in the present report is more complete, considers more appropriate factors, and reveals important insights. For example, it shows that firms with a prospector strategy and adhocracy culture in a high-turbulence environment value organizational IS issues more than firms of other types. Furthermore, the proposed framework suggests that while national and macro IT factors are important, organizational factors most directly influence the organizational IS issues.

The development of a framework rooted firmly in the global data from the World IT Project makes several contributions. First, in line with the adage "*the perfect is the enemy of the good*," this study provides a good start with a powerful yet parsimonious framework for understanding organizational issues. This framework is not intended to be exhaustive but is comprehensive and includes the most salient factors with three superimposed layers of hierarchy.

Second, at a practical level, it affords managers and decision makers the opportunity to understand and identify the organizational priorities in their firms. In this regard, several examples were provided earlier in our various analyses. For instance, as our analysis has shown, firms operating in high-income countries may want to put more focus on IT reliability and efficiency, continuity planning, and disaster recovery; firms functioning in individualistic and high-risk propensity cultures would want to emphasize business-IT alignment and IT strategic planning; and firms operating in authoritarian regimes (versus democracies) would want to put more resources on revenue-generating IT innovations and cost reduction. Without considering the global factors, managers may make decisions that are suboptimal and result in misallocation of limited resources.

Third, the framework is global compared to previous IS frameworks, which were based primarily on US and Western contexts (e.g., [42,102]). The tendency to fall back on US and Western models and to assume that the world is flat [103] has its own perils [12]. Our framework specifically includes national factors as well as macro IT factors that may influence organizational IS priorities. Most business endeavors today are conducted globally, and IT is an important enabler of global business. Multinational executives with IS operations in multiple countries may find the framework especially useful.

Importantly, our framework provides a rich agenda for research in global IT for many years to come. Much of the research in global IT is characterized by ad hoc studies spread over multiple publications and conferences. This study offers several avenues of global IT research that can result from the overarching framework. While the possibilities are numerous, here are a few to consider by future researchers. First, the effects of the individual factors on IT and organizational priorities may be investigated in a more rigorous manner. Second, multiple factors can be included in a single study. Third, the interaction among factors may be considered. Fourth, suitable operationalizations and valid measures may be developed for the various factors. Fifth, the framework itself may be validated with future studies and refined as necessary. Sixth, while the central dependent variable in our framework is organizational IS issues, it can be extended to other global contexts, such as offshore outsourcing [104], global IS development [105], global IS governance [106], and multinational virtual teams [107].

7. Limitations

As an extensive study, the World IT Project itself has certain limitations. Some of these limitations are associated with surveys in general, such as sample size and representativeness. The desired threshold for sample size in each country was 300; fortunately, in most countries, this threshold was met or exceeded. Representativeness was attempted by specifying to the country investigators that they should identify IT employees from various levels of staff and management, in organizations of various sizes, and in different industries. The instrument was developed based on English language literature; thus, its implementation posed challenges in some countries. The instrument was translated into 12 languages. To maintain semantic equivalence between the English version and the local language version, the instrument was translated into the local language and back-translated to English by two different bilingual investigators. The core team maintained regular communication with the local investigators to resolve any discrepancies, and a limited number of changes were allowed to accommodate local meaning and expressions.

Furthermore, the framework developed by the research team may be subject to critique on several grounds. No claim is being made that the framework is complete or perfect, only that it provides a good starting point for understanding the many complexities of the world and organizations in determining organizational IS priorities. It is based largely on the data collected under the auspices of the World IT Project. Although the project was large, it did not and could not account for every conceivable nuance on the world stage and manifestation of IT in an organizational context. The framework has some inherent subjectivity, as it was developed by examining the literature, and data were interpreted by authors with decades of experience in global IT research as well as in industry. The framework was developed at a high level of abstraction, although several specific factors at the national, macro IT, and organizational levels were identified. We anticipate that more detail and more specificity will be added by future generations of global IT researchers. Finally, the framework is theoretical; its value will be enhanced as it is applied in future research, validated, and extended as necessary to make it even more useful.

8. Conclusion

Organizational and management concerns related to IT vary widely from one organization to another and from one country to another. Previous efforts to enumerate organizational IS issues have done so only in a descriptive manner [1,2]. The present study took a deep dive to understand the factors driving the nature of these issues. Based on the data collected from the World IT Project [11] and supported by the literature, a multitiered theoretical framework for a more intelligent understanding of organizational IS issues was developed. The outer layer of the framework includes three national level factors (economic level, political system, and national culture), the middle level consists of two macro IT factors (IT infrastructure and ITOC), and the inner layer comprises three organizational level factors (business strategy, environmental turbulence, and organizational culture). In all, 17

propositions were offered with support from the World IT Project data and secondary data.

It is our intent and hope that the theoretical framework will be useful in conducting systematic research in global IT, and that the framework itself will be subject to further validation and refinement.

CRediT authorship contribution statement

Prashant Palvia: Writing – review & editing, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Jaideep Ghosh:** Writing – review & editing, Formal analysis, Data curation. **Tim Jacks:** Writing – review & editing, Formal analysis, Data curation. **Alexander Serenko:** Writing – review & editing, Formal analysis, Data curation.

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