

Research Issues in Global Information Technology Management

PRASHANT C. PALVIA
University of Memphis

Information technology (IT) is rapidly becoming an essential requirement for the conduct of international business. In many cases, IT is a driving force as evinced by its role in business expansion and competitive advantage in worldwide markets. Anecdotal accounts of innovative uses of IT in international business continue to appear in popular press as well as in many practitioner journals. Lately, the academic research community has taken note of IT in international business and has begun inquiry into global IT management. Yet at this early stage of inquiry, neither the issues nor their relative importance are clearly known. This article is an attempt to define the appropriate research issues and their relative importance in global IT management (GITM). Based on opinions of a large sample of IS professionals, six topical areas in GITM have been identified. The topical areas as well as specific research issues are further evaluated for their relative importance. The article should be of value and provide direction to researchers in this challenging and growing subdomain of MIS. It is also intended to stimulate further interest and investigation by a greater number of researchers.

The past few years have witnessed the expansion of a growing number of businesses into world markets. The chase for global expansion has been fueled by fierce competitiveness, rapid political changes around the world, and the information revolution. Information technology (IT) has become a requirement for global business, and in many firms and many industries has become a driver for globalization, e.g., in world finance, and transportation and logistics (Ballester & Marcarelli 1992; Browne 1991). While businesses increasingly rely on IT for global expansion, in the author's opinion, the MIS research community is generally lagging in global IS research. It is only in the past five years that we have seen research articles that specifically address global IT management (GITM) issues.

Early articles in GITM were exploratory and speculative. For example, Deans et al. (1991), based on a survey, identified the key international IS issues confronting U.S. based multinational corporations. Ives and Jarvenpaa (1991) extrapolated key issues for management based on interviews

conducted with 25 senior managers in Fortune 500 industrial and service firms. McFarlan (1992), and Kanter and Kesner (1992) described challenges for the chief information officer in the new era of globalization. A stream of research also appeared where researchers examined specific IS issues in different countries and regions of the world (e.g., Badri 1992; Burn et al. 1993; Janz et al. 1994; Palvia & Palvia 1992; Palvia & Wang 1995; Rao et al. 1987; Watson 1989). Early books on international IS were by Deans and Kane (1992), by Roche (1992), and by Palvia, Palvia, and Zigli (1992).

Serious inquiry has now begun in GITM. For example, there are international IS journals that deal exclusively with international IS topics. Established IS journals, such as *MIS Quarterly*, *Journal of MIS*, and *Information & Management* now publish international IS articles. New books on international IS have been published, e.g., by Deans and Jurison (1996) and by Palvia, Palvia, and Roche (1996). Conferences, such as AIS, ICIS, and IRMA, now have entire tracks devoted to global IT management. This is all good, but research in

global IT management is in many ways selective and opportunistic, and suffers due to a general lack of cohesiveness. This is to be expected in a new field of inquiry, and is not necessarily counter-productive or unrewarding in initial stages. However, as the field grows, there is a need to define the research agenda in a careful manner, so that future efforts are coordinated and synergistic. Furthermore, the identification of a research agenda may aid in the emergence of a “theory-based” mature field.

This article makes an initial attempt to define the research issues in global IT management (GITM). It should be of value to current and future GITM researchers in analyzing and synthesizing the current literature, as well as in pursuing potential and promising avenues of research. Additionally, the extensive set of references at the end will be helpful to the researcher.

Methodology

The analysis and results presented are based on data from a survey of IS educators. The scope of the survey was much broader than the results reported in this article. The survey was designed as a “needs assessment study” of global IT research and global IT education in the United States. Only the “research issues” results are presented herein. The methodological steps listed below pertain to the “research issues” component of the study only.

1. A literature review was conducted to identify potential research topics/items. Given the newness of the GITM field, the subject matter is largely untreaded territory and lacks focus. Because of the lack of focus, the review can be vast especially if one begins to examine the reference disciplines (e.g., international business). This approach was not used because of the inherent inefficiencies. Instead, we relied on literature dealing directly with global IS issues. Fortunately, a few books and a limited number of articles dealing with global IS issues (some cited earlier) have appeared in the past few years. These sources and selected articles from reference disciplines were reviewed to identify potential research topics. The initial compilation resulted in fifty research items. These items were incorporated into a “Global IT Needs Assessment” questionnaire, which among other things asked an educator to rate the research importance of each item on a 4-point Likert scale.
2. The questionnaire was refined and finalized using a two-stage process. In the first stage, the questionnaire was tested with MBA students and doctoral students, and minor modifications were made. In the second stage, a pilot study was conducted where the modified questionnaire was sent to twenty GITM educators/researchers in the U.S. At both stages, comments were obtained on the wording and suitability of the items, as well as on the need to add, delete, or

1. MIS issues in advanced countries
2. MIS issues in less-developed countries
3. MIS issues in communist/socialist countries
4. Frameworks and models for IIS
5. Global issues of IIS
6. Impact of globalization on IS organization
7. Impact of globalization on IS management
8. Planning for international information systems
9. Management of international information systems
10. Management and organization theory for multi-national corporations
11. New challenges for chief information officer in an international context
12. Role of IT in global competitiveness
13. Elements of a global IT strategy
14. New organizational forms made possible by IT
15. Systems analysis and design of IIS
16. Systems theory in an international context
17. Technological components of an IIS
18. Managing the development of IIS
19. Implementation of IIS
20. Evaluation (cost-benefit analysis)/audit of IIS
21. Maintenance of IIS
22. Internationally distributed databases
23. Telecommunications (in international context)
24. Computer hardware, international vendors, and compatibility issues
25. Software, international vendors, and compatibility issues
26. International standards
27. Data integrity issues
28. Security and control issues
29. Trans-border data flows, problems and issues
30. International electronic data interchange
31. Strategies and methods for IT transfer
32. Data storage and data transfer technologies in the international context
33. Global strategic information systems for competitive advantage
34. Global decision support systems
35. Expert systems in international context
36. Applications of international information systems
37. Laws and policies of other nations on software, hardware, and information systems
38. Accounting and financial practices of nations
39. Culture and societal differences in nations
40. Ethics (e.g., software piracy) in nations
41. Socio-economic differences among nations
42. Language and its barriers in other nations
43. Organization structures, goals, norms in nations
44. Management styles in other nations
45. Motivational needs of people (especially IS professionals) in other nations
46. Basic infrastructure in other nations
47. IT levels in other nations
48. Levels of IS adoption in other nations (i.e., current stage of IS growth)
49. Economic resources for IT development in nations
50. Role and level of end-user computing in nations
51. User interface differences among cultures
52. Human resources for IT/IS development in nations
53. Government and political climate for computerization in other nations
54. National developmental priorities
55. Labor markets and emphasis on manual vs. automated processing in other nations
56. Performance and measurement criteria in nations

Table 1: Global Information Technology Research Issues

modify items. The questionnaire was finalized after incorporating "worthwhile comments". The revised questionnaire had 56 research items as shown in Table 1.

3. The final questionnaires were mailed to all MIS department chairs, as listed in the 1989 Directory of MIS Faculty in United States and Canada. Each department chair was asked to complete the questionnaire himself or forward to a faculty member with knowledge and interest in GITM. There are 445 schools listed in the 1989 MIS directory. A total of 96 responses were received (a 21.5% response rate). Considering that schools of all sizes and emphases are listed in the directory, and many have little or no interest in global IT, we believe that this response rate is quite high. In fact, from the author's own knowledge of international business programs and international IS courses in U.S., we believe that we received responses from almost all schools that have an interest in global IT.

Research Topic Identification

Survey responses were subjected to factor analysis in order to develop research themes within global IT. In addition, individual items were examined for their relative importance.

Factor Analysis

The number of items in the questionnaire (i.e., 56) is too large to conduct an orderly and systematic study. Besides, it is likely that several items may be highly correlated, suggesting item redundancy. A factor analysis was conducted to extract the important factors underlying the 56 items.

It has been recommended that for factor analysis, there should be four to five times as many observations as there are items to be analyzed. However, in practice, as pointed out by Hair et al. (1984), several researchers have used factor analysis when the ratio of the number of observations to the number of items is about two. The ratio in this study is 1.7, which is in the range of many previous studies. Nonetheless, when dealing with a smaller sample size and a lower ratio, one has

to be cautious in analysis and interpretation, as well as use lower levels of significance to increase the power of a test (Baroudi and Orlikowski 1989).

Factor analysis was conducted using principal components analysis as the extraction technique and varimax as the method of rotation. Rotated factor loadings were examined to identify the constituent items of each factor. Rotated factor loadings of + .30 are considered significant, + .40 more significant, and + .50 very significant (Hair et al. 1984). In order to increase the power of the tests and yet not lose significant variables, we used factor loadings of .40 to indicate significance.

Without specifying the number of factors, twelve factors with eigenvalues greater than one emerged. First eight of these factors could be approximately interpreted as: (1) cultural issues, (2) management & planning, (3) technology, (4) resources & human issues, (5) system management & evaluation, (6) decision support and expert systems, (7) system development, and (8) regional issues. These factors, while providing preliminary estimates of underlying factors, were imprecise and had overlaps. Moreover, of the remaining four factors, only one had one primary item, and the rest of the items were nonprimary. Finally, none of the four factors provided any clear direction on the nature of the factors.

Based on content analysis of the literature, the author had previously grouped the GITM items under eight categories, although this grouping was different from the eight factors listed above. Therefore, eight factors were prespecified, and factor analysis was conducted again in order to achieve more precise and interpretable factors. This time the first six factors could be interpreted as follows: (1) country environment & culture, (2) management and planning, (3) technology, (4) system development, (5) advanced technological issues, and (6) regional issues. The last two factors combined had only three factor loadings higher than .40 and did not provide any clear factor interpretation. The factor analysis was therefore conducted again, after specifying five, six, and seven factors.

In our judgment, six factors provide the most interpretable structure. Five factors led to two factors having conceptually unrelated items, and seven factors resulted in the sixth

Factor Number and Label		Eigenvalue	Percentage of variance	Cumulative Percentage
One.	Country environment and culture	21.69	38.7	38.7
Two.	Management and planning	5.61	10.0	48.7
Three	Technology	3.48	6.2	55.0
Four	Systems development and operations	2.76	4.9	59.9
Five	Advanced and miscellaneous issues	2.18	3.9	63.8
Six	Regional issues	2.03	3.6	67.4

Table 2: Selected Statistics for the Six Factors

Items		Factors					
		One	Two	Three	Four	Five	Six
1.	MIS issues in advanced countries		.4503	.4502			
10.	Management and organization theory for MNCs	.5844	.4151				
37.	Laws, policies of nations on software, hardware, and IS		.7205		.4178		
38.	Accounting and financial practices of nations		.6272		.4290		
39.	Culture and societal differences in nations		.7725				
40.	Ethics (e.g., software piracy) in nations	.5133					.4119
41.	Socio-economic differences among nations		.7690				
42.	Language and its barriers in other nations		.8205				
43.	Organization structures, goals, norms in nations	.7586					
44.	Management styles in other nations	.7919					
45.	Motivational needs of people (IS professionals) in nations	.	.7110				
46.	Basic infrastructure in other nations	.7494					
47.	IT levels in other nations	.7647					
48.	Levels of IS adoption in other nations	.5994				.5188	
49.	Economic resources for IT development in nations		.7332				
51.	User interface differences among cultures		.6382				
52.	Human resources for IT/IS development in nations		.6861				
53.	Government/political climate for computerization	.7185					
54.	National developmental priorities		.8014				
55.	Labor markets and manual vs. automated processing		.6813				
56.	Performance and measurement criteria in nations	.6208					
4.	Frameworks and models for IIS			.5326			
5.	Global issues of IIS		.7190				
6.	Impact of globalization on IS organization			.8078			
7.	Impact of globalization on IS management			.8952			
8.	Planning for international information systems		.7750				
9.	Management of international information systems			.7570			
11.	International challenges for CIO			.7341			
12.	Role of IT in global competitiveness		.6730				
13.	Elements of a global IT strategy			.6581			
33.	Global strategic information systems for competitive advantage			.6584			
22.	Internationally distributed databases			.5621			
23.	Telecommunications (in international context)			.6407			
24.	Computer hardware, international vendors, and compatibility				.5169		
25.	Software, international vendors, and compatibility issues				.5401		
26.	International standards				.8128		
27.	Data integrity issues				.8110		
28.	Security and control issues			.8450			
29.	Trans-border data flows, problems and issues				.5798		
30.	International electronic data interchange			.4165	.5810		
32.	International data storage and data transfer technologies				.5522	.4374	
15.	Systems analysis and design of IIS					.5134	
16.	Systems theory in an international context					.4221	
17.	Technological components of an IIS			.4682	.5867		
18.	Managing the development of IIS			.5365		.7356	
19.	Implementation of IIS			.4512		.7312	
20.	Evaluation (cost-benefit analysis)/audit of IIS					.6222	
21.	Maintenance of IIS				.6238		
35.	Expert systems in international context				.4425		
36.	Applications of international information systems				.4933	.4180	
14.	New organizational forms made possible by IT					.5401	
31.	Strategies and methods for IT transfer					.6386	
34.	Global decision support systems					.5367	
50.	Role and level of end-user computing in nations	.5738				.5785	
2.	MIS issues in less-developed countries						.6579
3.	MIS issues in communist/socialist countries						.6559

Table 3: The Rotated Factor Matrix

and seventh factors being imprecise and having a very few items with high factor loadings. The six factors are interpreted as: (1) country environment & culture, (2) management & planning, (3) technology, (4) systems development and operations, (5) advanced and miscellaneous issues, and (6) regional issues. As shown in Table 2, these six factors together explain 67.3% of the total variance. Table 3 shows the rotated factor matrix along with factor loadings that are greater than .40 (factor loadings less than .40 are omitted to improve clarity of presentation). The items are grouped under the six factors by their highest (primary) factor loadings. A number of items had factor loadings above .4 on additional (nonprimary) factors. As can be seen, very few items had nonprimary loadings, which attest to the soundness of the six-factor model. In the author's view, the six-factor model simultaneously satisfies the properties of soundness and parsimony.

The six factors are now described in more detail.

Factor 1: Country Environment and Culture

Much of the IS concepts and reported research are from the U.S. perspective. When information systems transcend national boundaries, it becomes essential to study issues related to various aspects of national environment and culture. "Culture" is a difficult term to define, and defies a single all-purpose definition (Ajiferuke & Boddewyn 1970). Several important traits of culture have been suggested in the literature (e.g., Hoftstede 1980; Kedia & Bhagat 1988). However, the items that grouped under this factor imply an all-encompassing meaning of culture, as was proposed by Ein-Dor et al. (1993). Ein-Dor et al. developed three major groups of cultural variables: economic, demographic, and psycho-sociological. A majority of the items extracted by factor analysis fall under one of these three categories. For example, items included under the economic variable are: economic resources for IT development, national developmental priorities, and labor markets; items under demographic variables are: human resources for IT/IS development, and language; and items under psycho-sociological variable are: cultural and societal differences, ethics, management styles, and motivational needs. Note that there are other country-specific factors that do not fall under any of these categories, e.g., accounting and financial practices, laws, government and political climate, and organizational structures.

Factor 2: Management and Planning

Management and planning of global information systems are inherently complex due to the increased number of variables and uncertainties, and requires attention to new issues and skills. Such systems interconnect subsidiaries, and therefore involve management issues in setting up such systems and in the development of subsidiary IS operations (King and Sethi 1992). Specific items included under this factor are: elements of global IT strategy (Ives et al. 1993, Simon & Grover 1993), impact of globalization on IS management and

IS organization, management and planning for global IS (Bartlett & Ghoshal 1989; Vitalari & Wetherbe 1996), and new roles for the chief information officer (Kanter & Kesner 1992; McFarlan 1992). As examples of alignment between global business strategy and IT strategy, Alavi & Young (1992), Jarvenpaa & Ives (1993), and Cheung & Burn (1994) have proposed contingency models based on the global business strategies of Bartlett & Ghoshal (1989). Subsequent research needs to examine the efficacy of such models.

This factor also includes items concerned with the explication of specific global issues and the development of frameworks, models, and theory¹ that will provide guidance for systematic research. Presumably, such models and frameworks will be able to delineate the various planning and management issues. Many frameworks and models exist today (e.g., Dickson et al. 1977; Gorry & Scott Morton 1971; Ives et al. 1980; Mason & Mitroff 1973; Nolan & Wetherbe 1981); however, they were developed primarily in the U.S. context. In the author's opinion, appropriate frameworks are needed to guide international IT research. It is heartening to note that a few preliminary frameworks for global IS have been proposed (e.g., Deans & Ricks 1991; Ein-Dor et al. 1993; Nelson & Clark 1994).

Factor 3: Technology

IT is generally viewed as a key requirement for business globalization. But IT frequently can and does go beyond a pure support role; often times it actually drives and accelerates the process of globalization. Nevertheless, technology poses significant challenges and opportunities. The type and extent of technology used will have a significant impact on the design, effectiveness, and usefulness of the global IS. Further exacerbating the situation are the vast differences in the levels of technology that is available and the manner in which it is utilized in different parts of the world (Palvia & Palvia 1996). Technological issues that need to be examined include hardware, software, telecommunications (including the role of PTTs²), and international standards (McCreary et al. 1993); distributed processing and databases, and IT architectures (Alavi & Young 1992; Jarvenpaa & Ives 1993; Cheung & Burn 1994). Also worthy of examination are issues concerned with security and control, transborder data flows (Oz 1994) and electronic data interchange (Trauth & Thomas 1993). Transborder data flow (TBDF) issues focus on the privacy, integrity, and confidentiality of machine-readable data across national borders. Different countries have different laws related to people and "legal persons"; their impact needs to be explored in the context of global systems.

Factor 4: Systems Development and Operations

Traditional systems design and development methods (e.g., systems development life cycle methodology, prototyping, and structured development methods) have additional strains and dimensions placed on them in a global

environment. The development and operation of a transnational IS require satisfying the information needs as well as social/cultural needs of users in different national environments (e.g., addressing many of the items reported under the first factor). They also require collaboration among team members in different countries. Specific issues include 24-hour system availability and support, a reduced set of hardware and software platforms, selection of qualified vendors, location of data centers, fast cycle time, international outsourcing, etc. (Ives & Jarvenpaa 1991; McFarlan 1996; Wetherbe et al. 1994). Challenges are also present in selecting the proper development approach from a human resource perspective, e.g., developing a system completely at the headquarters, engaging in parallel development, using off-the-shelf packages or farming out portions of the system to the various subsidiaries (Vitalari & Wetherbe 1996). Subtle design issues may also surface; for example, Federal Express Corporation found that they had to be careful in the use of the yellow color on a computer graphics screen, as it is viewed negatively in some countries of the Far East (Jones 1993). In broad terms, the research issues for global systems include systems analysis and design, managing the development, implementation and operation, evaluation, and maintenance.

Factor 5: Advanced and Miscellaneous Issues

This factor included items that could not be categorized into any of the prevalent labels. Closer examination revealed that these are issues related to innovative and non-conventional uses of IT. The first item is about new organizational forms made possible by IT. Bartlett and Ghoshal (1989) have proposed four strategies for organizational forms of multinational corporations. These are called: multinational, global, international, and transnational. IT is an enabler in the implementation of any of these strategies. Additionally, alternatives to traditional and hierarchical forms of organizational structure are being constantly sought, e.g., reduced layers of management, matrix organizations, ad-hoc structures, and the networked/virtual organization (Roche 1996). Once again, IT can facilitate such organizational forms. In particular, the advent of the Internet is revolutionizing the ways of conducting global business.

Other items included under this factor are strategies for IT transfer, and global decision support systems. Non-conventional systems in international environment are practically non-existent and would seem to offer plenty of opportunities for exploration. For example, Eom (1996) has examined the architecture and requirements of global management support systems. Fitzgerald (1992) and Watson et al. (1992) have compared executive information systems in the U.K. and the United States, and Sauter (1992) has examined the cross-cultural aspects of decision support systems. Another promising line of research is on the development and use of expert systems in a global environment. Expert systems seem to offer an attractive proposition for rapid technology transfer from

advanced to less-developed countries (Eom 1996). Another potential research area is GDSS in international context. This research will benefit from the incorporation of a "culture" variable as more and more group meetings involve international participants (Sharma et al. 1996).

Factor 6: Regional issues

As pointed out earlier, much of the IS research is from the U.S. and from an advanced country perspective. Much less is known about the underdeveloped and communist block countries. This factor indicates that while the study of individual country environments and cultures of the world is worthwhile, it may be more efficient and necessary to study these two groups of countries. Note that these two groups are not mutually exclusive. It is, of course, understood that while countries within each group will share common traits, they will also differ on some other characteristics.

Advanced countries were not included under the factor, presumably because MIS issues for advanced countries have already been widely reported. For example, among a series of planned studies, the latest by Janz et al. (1994) report the U.S. issues. In the same vein, CSC Index (1995) has reported the top ten issues for USA and Western Europe, and found remarkable similarities between the two.

Similar studies are needed to identify the key MIS issues in less-developed and communist countries. It is encouraging, however, that reports of regional IT issues have now begun to surface. For example, Palvia & Palvia (1996) attempt to generalize the IS issues of developing and under-developed countries. Other country studies include: Hong Kong (Burn et al. 1993), Taiwan (Palvia & Wang, 1995), Brazil (La Rovere, 1996), Slovenia (Dekeleva, et al. 1993), Estonia (Dexter, et al. 1993), Russia (Chepaitis, 1994), Singapore (Rao, et al. 1992), and Pakistan (Hassan 1994)

Research Topic and Item Importance

Based on the 4-point likert scale, an average score was computed for each item, to be called its importance rating. The highest importance rating can be 4 and the lowest can be 1. The lowest average rating for any item was 2.31, which is between marginally important and important. Thus, before examining at the specific scores, it should be borne in mind that all items and topics have a certain degree of importance. This is to be expected given that so little has been done in GITM research. With this caveat, we report below the relative importance of the six topical areas developed above as well as the individual item importance ratings.

Research Topic Importance

A simple average of the importance ratings of all items under each topic was computed to obtain topic importance rating. Table 4 lists these topics in prioritized order together with three highest rated items under each topic. An argument

Factor	Mean Importance Rating
Management and planning	3.25
Technology	2.93
Regional issues	2.86
Advanced and miscellaneous issues	2.82
Systems development and operations	2.74
Country environment & culture	2.60

Table 4: Relative Importance of Factors

can be made for using a weighted average; however, the weights are not known nor easily available and at best would be subjective. Moreover, a simple average satisfies the purpose of exploratory analysis. Further, Ives et al. (1983) have observed that weighted and unweighted scores are highly correlated, making the additional information provided by weights unnecessary.

The research topic in need of most attention as per the educators' indications is management and planning for global IS. These global systems present major new complexities and challenges for managers. The implication is that traditional and contemporary management/planning approaches used for domestic systems are no longer adequate. Specific issues within planning and management were listed earlier. The first item in this category is "global issues," which is a meta-item itself, pointing to the need for further explication of issues. If we exclude this meta-item, then the next two items point to the need for conducting research on the application of IT and IS for global competitiveness. Strategic information systems (SISs) for competitive advantage have been developed and studied largely from a domestic U.S. perspective (Mahmood & Soon, 1991; McFarlan, 1984; Wiseman & MacMillan, 1984). However, IT offers opportunities to excel in global competition, as many of the SISs described in literature are actually global in scope, e.g., at General Motors (Livingston 1990), and at Federal Express (Jones, 1993). Furthermore, Palvia (1996) provides an instrument to identify global IS opportunities for strategic advantage.

Ranked second on the list is research on technological issues. While IT has certainly facilitated global expansion, there are a myriad of problems and issues that still need to be resolved before full exploitation of technology is possible. For example, the lack of worldwide technology standards (Gordon, 1993) and different levels of technology adoption in different countries (Palvia & Palvia, 1996) pose special problems worthy of serious investigation. Items rated highest within this factor include telecommunications, security & control, and EDI. A sound telecommunications architecture is

the backbone to any global IS, and research issues in telecommunications are abundant. These include: Internet and electronic commerce, EDI, standards, network architecture, role of PTTs, services of global carriers, deregulation, etc. EDI is emerging as one of the central enabling technologies for the creation of a global business environment (Trauth & Thomas 1993). Saxena and Wagenaar (1996) have recommended a multi-level model for the global transfer of EDI technology. A few global EDI systems already exist (e.g., Australia's TradeGate and Singapore's TradeNet). Internet and associated technologies deserve a special mention. They promise to bring exciting opportunities in global electronic commerce (Roche 1996).

We need to make an explicit comment about the issues that are ranked lower. These issues may not be as high priority for IS researchers, but that does not necessarily imply that they are not important for the global application of IT. It may just indicate that these issues have been adequately researched already, perhaps in the reference disciplines of MIS, and information about them can be readily transferred to global IT. For example, country and cultural issues have received a great deal of attention in international business and international management (e.g., Ajiferuke & Boddewyn 1970; Hoftstede 1980; Kedia & Bhagat 1988; Negandhi 1983). In our opinion, cultural issues impact the application of global IT significantly and manifest themselves into planning, management, and system development concerns. As such, culture/country as a variable needs to be incorporated into most areas of global IT inquiry. For the same reasons, it needs to be incorporated into any program in global IT education.

Individual Item Importance

The importance ratings of the top fifteen items are listed in descending order in Table 5. The lowest average score of the twentieth item is 3.03; therefore, all of the fifteen items represent significant importance for research, as judged by the respondents..

The top item is the identification of global issues. This really is a "meta" category, and once again confirms that the field is new and unexplored and that we still do not have a firm grip on "what are the relevant issues in GITM research?". Several other items on the top-fifteen list also pertain to meta-research issues (e.g., frameworks and models, country issues). Reports like this and by Deans et al. (1991) and Ives and Jarvenpaa (1991) fulfill this need to some extent. Also needed are frameworks and models to synthesize existing research, and generate synergistic future research. Some frameworks were cited earlier.

Note that most of the top items are related to management and planning of global IT applications. As discussed above, management and planning is the highest rated factor/topic. Besides the use of IT for global competitiveness, which has already been discussed, other items under this topic include the impact of globalization on IS organization and IS

Rank	Research Item	Mean Importance Rating
1.	Global issues of IIS	3.43
2.	Role of IT in global competitiveness	3.38
3.	Global strategic information systems for competitive advantage	3.35
4.	Impact of globalization on IS organization	3.34
5.	Telecommunications (in international context)	3.30
6.	Elements of a global IT strategy	3.27
7.	Planning for international information systems	3.25
8.	Impact of globalization on IS management	3.23
9.	Frameworks and models for IIS	3.19
9.	Management of international information systems	3.19
11.	MIS issues in less-developed countries	3.13
12.	Security and control issues	3.10
12.	International electronic data interchange	3.10
14.	Strategies and methods for information technology transfer	3.09
15.	New organizational forms made possible by IT	3.03

Table 5: Relative Importance of Research Items—Top Fifteen Items

management. Some research has been conducted in this area by Jarvenpaa and Ives (1993) and Cheung and Burn (1994), where they examine the fit of alternative organizational designs for IT with corporate organizational structure in globally competing firms. More research needs to be conducted to determine the impact of IT organizational design on organizational performance.

Many other items in this list are technology issues, which were rated the second highest topic earlier. Besides telecommunications and EDI, which were discussed earlier, other technology issues are data related. These include: global databases, data integrity issues, and transborder data flows. Global applications pose formidable data management challenges. As data from different world locations need to be shared in a global application, a suitable data architecture as well as adherence to well-defined data standards (Gordon,

1993) are required. Much research has been conducted on data architecture and distribution, but it lacks a worldwide view. At the same time, transborder data flows (TBDFs) and laws pertaining to them need to be examined in the context of society, security, national sovereignty, privacy, integrity, and confidentiality (Oz, 1994), and how they inhibit or facilitate global IT.

Conclusion

There is mounting evidence that global IT applications are being used increasingly in many corporations of the world today, and are in fact vital to many of their operations. Global firms that fail to nurture global IT linkages will be at a significant competitive disadvantage in the worldwide market place. Yet, as in the beginning of any new phenomenon, the evidence is largely anecdotal in nature. Consequently, practitioners and researchers do not have a clear understanding of the issues involved in global IT management or the variables that are essential for its successful application.

This article has investigated the various issues confronting the global IT researcher. A topic analysis was conducted and six topic areas were identified as worthy of research in global IT management. In addition, specific research issues were identified and prioritized in terms of their importance. We expect that the article will provide direction to future researchers in terms of research question selection and formulation. We also had a somewhat altruistic motive in writing this article. We believe that we have demonstrated the importance of global IT management as a viable research area in its own right, and also one that has paucity of research. We expect that it will arouse enough curiosity and interest among IS researchers that they will contemplate serious inquiry into this futuristic and exciting research arena.

Endnotes

¹ Issues, frameworks, models, and theory may be called meta-items, i.e., research on what research to conduct. Such meta-research has been reported in the IS literature (e.g., the key IS issue studies in the MIS Quarterly). As the entire GITM area is just beginning to be explored, these meta-items were included in the questionnaire and were recommended for inclusion by pilot participants. More knowledgeable readers may focus only on the categorical items.

² PTTs (Postal, Telephone, and Telegraph units) are the state-owned post office and telecommunication operators. They are typically monopolies that closely regulate the telecommunications industry.

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Prashant Palvia is Professor of Management Information Systems at the University of Memphis. He received his Ph.D, M.B.A. and M.S. from the University of Minnesota, and B.S. from the University of Delhi, India. In addition to thirteen years in academics, he has nine years of industry experience. Dr. Palvia is the Editor-in-Chief of the Journal of Global Information Technology Management, and is on the editorial board of several journals. His research interests include international information systems, strategic information systems, database design, and software engineering. He has published over 50 articles in journals, such as: MIS Quarterly, Decision Sciences, Communications of the ACM, Information & Management, Decision Support Systems, and ACM Transactions on Database Systems, and over 60 articles in conference proceedings. He has co-edited two books on Global Information Technology, the latest being "Global Information Technology and Systems Management: Key Issues and Trends," published by Ivy League Publishing, 1996.

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