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KEY INFORMATION SYSTEMS MANAGEMENT ISSUES
IN DEVELOPING COUNTRIES:
DIFFERENCES IN THE INDIAN AND US CONTEXTS

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94-011

Key Information Systems Management Issues in Developing Countries: Differences in the Indian and US Contexts*

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February 1994

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Abstract

This paper uses the Minnesota instrument to do a comparative study of the key information systems issues in the Indian and US contexts. The results indicate that seventeen of the top 25 and six of the top ten issues coincide. The top ten issues to coincide are: Data Resource, Strategic Planning, Aligning IS Organization, Competitive Advantage, Quality of Software Development, and Telecommunications Systems. The issues making the top ten list in the US context but not so in the Indian context are: Information Architecture, IS Human Resources, and Organizational Learning. Technology Infrastructure did not appear on the questionnaire administered in India. From this study it can be concluded that the gap between the state of IS in India and US has been narrowed.

1. Introduction

Over the past decade, there have been several studies undertaken to elicit from practicing IS managers the issues that they deem critical or key to survival in the immediate future. Much of the studies center around IS practices in the US (Ball & Harris 1982; Dickson et al 1984; Herbert & Hartog 1985; Martin 1985; Hartog & Herbert 1986; Brancheau & Wetherbe 1987; Babad & Reeves 1989; Niederman et al 1991). Some studies are available for other contexts, including Europe (Hirschheim et al 1988), Singapore (Rao et al 1987), and Australia (Watson 1989). An international perspective seeking to integrate these findings is presented in (Watson & Brancheau 1991). On further examining these studies it appears that while the issues seen to be critical in developed nations (US, Europe, and Australia) appear to be similar, the data from the Singapore study indicates preoccupation with other issues. Some of this may be attributed to differences in the instruments employed and difficulties in mapping these instruments onto a common basis. However, it appears that the differences may be more fundamental. In the comparison study, Watson and Brancheau (1991) suggest that cultural differences and technological advancement play a role in the differences that are observed. This paper seeks to examine whether such differences represent an isolated case, or apply generally across developed and developing countries. To facilitate comparison, an instrument similar to that used in the US studies was administered to a set of IS executives in another developing country, namely India. The paper also seeks to provide qualitative and quantitative explanations concerning these differences in assessments of key issues.

2. IS Environment in India

As with most developing nations, the IS environment in India tends to be somewhat different from that of a developed nation. Some of this can be attributed to cultural differences,

economic conditions, government priorities, among others. Traditional socialist views have also played a major role, mainly through the nation's import policies. The initial view that technology import should be controlled so as to nurture indigenous development has been quite observable in the computer industry (Subramaniam 1992). Though computers have been imported since the early sixties, widespread adoption in large organizations appears to have lagged behind, with significant usage occurring only in the seventies. Even then, computers did not generally displace personnel to any great degree, with manual and automated systems often running in parallel as cross-checks for each other. As with the case in developed nations, most early systems were directed at easily automatable operations, particularly accounting and financial functions. However, the technology generally remained a generation or two behind that in developed nations.

More recently, since the mid eighties, liberalization in the import policy concerning computers has led to a dramatic shift in practices. Personal computers are more widely available, forming a considerable segment of computing in large organizations, and the only form of computing available to smaller organizations. New technologies are constantly being integrated into the computing environment, with adoption rates frequently outpacing that of developed nations. However, the progression has not been quite uniform, and a spectrum of different generations of computing technology can be observed across different organizations. In addition, a sizable variation in IS philosophies is also observable, possibly stemming from the low turnover rates among senior IS executives.

Another factor that distinguished India from other developing nations is the availability of trained or easily trainable human resources. In fact, the abundant supply of computer literate personnel has often been drawn upon for software export purposes. In addition to the growing number of indigenous software exporters, several other consulting firms have branches or partnerships with Indian software development organizations. Outsourcing to

Indian software development organizations, or offshoring, appears to have caught on significantly in many developed nations, given the reliability and low costs associated with software development in India. A recent survey of prominent US and European hardware and software manufacturers conducted by the World Bank ranked programmers from India first among traditional offshore software development provider nations (OECD 1992).

Another characteristic of the Indian IS environment is the wide diversity on the basic technology available. Given the restrictive initial import policies, and the practice of major international vendors of providing obsolete equipment, there remains a sizable investment in third generation systems. More recently, the establishment of joint ventures between Indian organizations and Western technology firms, (DEC, HP, TI, Sun, Motorola, to name a few), has spawned a massive influx of leading edge technologies.

Two other issues of note that have an indirect impact on the IS environment are the concern about copyrights on the part of foreign collaborators, and the push to achieve ISO-9000 certification on the part of domestic developers. The Indian government's reluctance to sign and honor copyright agreements has led to situations where intellectual property rights are often at risk. This is evident in both the pharmaceutical and software industries. Consequently, it may be expected that certain critical computer technology may be unavailable in the Indian context, as was recently evidenced by the extreme reluctance with which super computing technology was finally made available. The ISO-9000 certification process is perceived as a necessary prerequisite for export to Europe, and thus forms an important thrust in the industry.

3.   Research Methodology

Prior surveys have adopted a spectrum of methodologies for devising the instrument and administering it. For example, the studies by Dickson et al (1984), Brancheau & Wetherbe (1987), Watson (1991), and Niederman et al (1991) have used a Delphi approach wherein a set of twenty issues was culled through three rounds of interaction with SIM members, though in the Australian context, the respondents were drawn from the top 200 organizations. The earlier studies required respondents to rank issues, while the more recent approaches used ratings, suggesting less taxing response efforts and the ability to focus on a single issue at a time. In addition, in a minor deviation from a true Delphi approach, non-respondents at the earliest stage were invited to participate at the intermediate stage so as to improve response rates. In other studies, the instrument was constructed through interaction with key local IS practitioners, and then administered to local IS executives (Hartog & Herbert 1986), and Fortune 1000 organizations (Herbert & Hartog 1986).

Given the consistent usage of the Minnesota instrument, it was determined that a similar structure would be employed when surveying IS managers in India. On account of the differences outlined in the prior section, it was determined that merely reusing an existing instrument to capture the assessment of key IS issues in the Indian context would be inappropriate. The instrument would have to be modified to adequately address the factors that are peculiar to the Indian context. In addition, the use of a Delphi approach proved problematic, given the geographic separation and temporal delays in administering and collecting such data, and an alternative process of administering the instrument was employed for more effective data collection.

Since the Indian IS environment can be characterized by sizable variation in generations of computer technology, it was felt that issues which have been used in early surveys but have

since lost prominence could very well be relevant to IS managers. Likewise, in the case of some organizations, issues that have appeared in newer studies may also prove relevant. Thus attempts were made to include all issues from prior studies. Despite the overlap between the studies, this led to a set of 54 issues. In addition, a further 11 issues that were applicable specifically to the Indian context were included, bringing the total to 65. This set was then closely examined and several issues which were similar were eliminated or consolidated so as to make the set more manageable. This resulted in a set of 52 issues. This was further whittled down on the basis of insights provided by people familiar with the Indian IS context to 47 final issues. Issues were initially grouped into broad areas as IS planning, IS technology, IS development, IS operation, personnel issues, and the like. This classification was abandoned in an effort to eliminate any bias in responses. The final set of 47 issues used in the instrument appears in Appendix I. Respondents did have the opportunity to add further issues that they deemed important.

The instrument was administered to eight for pilot testing, for purposes of understandability and time requirements. Based on the results, the wording associated with a three issues was modified. Most respondents were able to complete the instrument within twenty to thirty minutes, which was deemed acceptable.

Data was collected during the summer of 1993 when two of the co-authors were touring India giving seminars on emerging information technology. The participants of these seminars filled out the questionnaire. Respondents came primarily from three regions of the country -- north, south, and west; although eastern and central regions were also represented. The respondents comprised of system developers, middle-level managers, and some upper-level managers. The industries covered were manufacturing, banking and insurance, management consultants, software exporters, and government. In all, there were 92 respondents.

4. Findings

Issues were ranked based on average scores and were informally clustered into four, somewhat overlapping, classes. The first cluster, representing the top ten issues, primarily addresses the strategic concerns. The second cluster, comprising of ranks 11 through 20, refers to the management issues. The third cluster, featuring ranks 21 through 30, refers to the technology adoption issues, and the final cluster features IS practices and emerging technologies. Each of these clusters are briefly discussed below.

4.1 Class 1: Strategic Issues

Table 1 ranks the top ten issues in the Indian context. These issues are strategic in nature. Quality of software development emerged as the number one IS issue in India. This was not surprising because India's software export market is growing rapidly. In order to be eligible for software development contracts in Europe and the US, a firm must have ISO-9000 certification. This has resulted in an increased awareness to quality issues. Telecommunication systems reliability and implementation are major concern to Indian companies. Although India has made tremendous strides in the telecommunication arena, the overall architecture is still scattered and the performance is sporadic. Some information infrastructure issues to make the top ten list are: data resource, relational database, security and control, and disaster recovery. In addition, most respondents felt that information systems can be used as strategic advantage as such IS strategic planning and aligning IS organization were considered important.

TABLE 1: STRATEGIC ISSUES

Rank	Key Issue	Question Number	Mean	Standard Deviation	Number	Range
1	Quality of Software Development	1	8.359	1.442	92	3-10
2	Telecommunications Reliability	2	8.098	1.729	92	3-10
3	Implementing Telecommunications	5	7.924	1.768	92	3-10
4	Data Resource	3	7.837	1.393	92	4-10
5	Relational DBMS	4	7.815	1.650	92	3-10
6	Competitive Advantage	20	7.742	1.585	89	2-10
7	Security and Control	27	7.707	1.544	92	4-10
8	IS Strategic Planning	12	7.573	1.595	89	2-10
9	Aligning IS Organization	13	7.565	1.686	92	2-10
10	Disaster Recovery	16	7.565	1.737	92	4-10

4.2 Class 2: Management Issues

The second group primarily comprises of management issues as shown in Table 2. Next to the strategic and infrastructural concerns, the respondents felt that the IS environment and management are most important. Job satisfaction issue ranks highest in the second group. Respondents felt that companies must take measures to increase job satisfaction by providing productivity tools (rank 14) such as CASE technology (rank 15), organizational learning (rank 18), and fourth generation languages (rank 19). The other managerial issues of concern are cost justification of IS; information architecture, distributed systems, and hardware maintenance; and role and contribution of IS within the organization.

TABLE 2: MANAGEMENT ISSUES

Rank	Key Issue	Question Number	Mean	Standard Deviation	Number	Range
11	Job Satisfaction	6	7.544	1.944	90	2-10
12	Information Architecture	15	7.433	1.642	90	1-10
13	Cost Justification	8	7.352	1.702	91	2-10
14	IS Effectiveness/Productivity	32	7.341	1.477	91	4-10
15	CASE Technology	18	7.337	1.605	92	2-10
16	Hardware Maintenance	19	7.315	1.869	92	2-10
17	Distributed Systems	17	7.275	1.542	91	3-10
18	Organizational Learning	14	7.267	1.347	90	4-10
19	Fourth Generation Languages	10	7.261	1.709	92	1-10
20	Role and Contribution of IS	9	7.256	1.660	90	3-10

4.3 Class 3: Technology Adoption Issues

The third class addresses the technology adoption issues as shown in Table 3. Technological issues featured in this class are office automation, client/server technology, decision and executive support systems, object-oriented technology, direct manipulation interface, integration, and access to external data. Two misfits, human resources for IS (a management issue) and end user computing (an IS practice issue) made this group. Technology adoption falling in the third group suggests that there is considerable confidence among Indian IS professionals that they can adopt emerging technologies but, strategic and managerial issues must be addressed first.

TABLE 3: TECHNOLOGY ADOPTION

Rank	Key Issue	Question Number	Mean	Standard Deviation	Number	Range
21	Office Automation	11	7.178	1.488	90	4-10
22	Client-Server Technology	22	7.167	1.486	90	2-10
23	Human Resources for IS	7	7.157	1.924	89	3-10
24	End User Computing	23	7.136	1.669	88	1-10
25	Decision and Executive Support Systems	28	7.079	1.583	89	3-10
26	Integrating IS Technologies	23	7.076	1.705	92	3-10
27	Information Resource Manager	25	7.045	1.522	89	3-10
28	Object-Oriented Technology	35	6.912	1.805	91	3-10
29	Direct Manipulation Interfaces	34	6.750	1.681	92	2-10
30	External Data	39	6.739	1.886	92	2-10

4.4 Class 4: IS Practices and Emerging Technologies

The last class relates to the IS practices and the emerging technologies issues as shown in Table 4. IS practices issues to feature in the list are government regulations, application portfolio, labor relations, global systems, software packages, funding levels, IS ethics, outsourcing, and compliance to standards. Although these issues rank between 31 and 44, their mean scores are greater than 5.5, implying that these are sufficiently important issues. Among technology issues, electronic data interchange and decentralization have above scores

worth the note. Clearly, image technology, artificial intelligence, and neural/parallel computing are not considered important at this time.

TABLE 4: IS PRACTICES AND THE EMERGING TECHNOLOGIES

Rank	Key Issue	Question Number	Mean	Standard Deviation	Number	Range
31	Government Regulations	29	6.685	2.130	89	1-10
32	Applications Portfolio	24	6.600	1.634	90	2-10
33	Downsizing/Upsizing	36	6.557	1.953	88	1-10
34	Electronic Data Interchange	42	6.522	1.969	92	1-10
35	Labor Relations	21	6.517	2.214	87	1-10
36	Centralization/Decentralization	37	6.465	1.793	86	3-10
37	Global Systems	44	6.407	2.033	91	2-10
38	Selecting Packages	30	6.293	1.947	92	1-10
39	IS Funding Levels	31	6.256	1.777	90	2-10
40	Influencing Organizational Structure	38	6.236	1.726	89	3-10
41	Computer Graphics	26	6.233	1.642	90	2-10
42	IS Ethics	45	6.034	2.020	88	2-10
43	Outsourcing	40	5.871	1.549	85	1-9
44	Compliance Issues	41	5.699	2.100	83	1-10
45	Image Technology	43	4.913	2.084	92	1-9
46	Artificial Intelligence	46	4.152	2.011	92	1-10
47	Neural/Parallel Computing	47	4.011	2.170	90	1-10

5. Differences in the Indian and US Contexts

Table 5 presents a comparison of ranking of key issues between the Indian and the US contexts. Seventeen of the top 25 issues coincided with the 1989 study. It is interesting to note that six of the top ten issues are the same. These issues are: Data Resource, Strategic Planning, Aligning IS Organization, Competitive Advantage, Quality of Software Development, and Telecommunications systems. Among the issues that do not match, the most prominent one is information architecture, the number one issue in the US is number 12 in India. The main reason for the discrepancy is that very few Indian companies had mainframe computers. Most companies started with local area network based systems. Therefore, the architectural need to make mainframe and the LAN based systems to co-exist

does not arise. Yet, there is sufficient concern to accommodate heterogeneous platforms. IS human resources is second prominent US issue (4th) not appearing in India's top ten list. As most US companies are migrating from a mainframe based environment to client/server environment, there is a dearth of trained professionals. Therefore, workforce retraining is a cause of major concern. In India on the other hand, do not face such problem as there is sufficiently large supply of trained professionals. Organizational learning is the third major US issue not considered as important in the Indian context (ranked 4th in US and 18th in India). There is a clear dichotomy in the use of computers in Indian companies -- in some companies the use of advanced technologies is pervasive while in others there is skepticism about the role computers in organizations.

Issues not making the top 25 list in India are: Electronic Data Interchange (EDI), Application Portfolio, Organizational Structure, Technology Islands, Global Systems, Image Technology, and IS Asset Accounting. Of these issues, EDI and imaging technologies are emerging technologies in India. With the increase in globalization of Indian companies, the use of these technologies are also increasing. Although application portfolio, organizational structure, and technology islands are important issues, they are currently being addressed within overall information infrastructure.

6.   Conclusion

This paper uses the Minnesota instrument to study the key information systems issues in India and compares them with those in the US Results indicate that India has made tremendous strides in IS within the last decade and the gap in between the two countries have narrowed. This is evident from the ranking of the issues -- six of the top ten and 17 of the top 25 issues between the two countries are the same. This information is useful for the US and the European companies who plan to outsource or off-shore IS development projects.

TABLE 5: A COMPARISON OF RANKING OF KEY ISSUES

Key Issue	US 1980	US 1983	US 1986	US 1989	India 1993
Information Architecture	NR	NR	8	1	12
Data Resource	4	9	7	2	4
Strategic Planning	1	1	1	3	8
IS Human Resources	7	8	12	4	23
Organizational Learning	8	6	3	5	18
Technology Infrastructure	NR	NR	NR	6	NR
Aligning IS Organization	9	7	5	7	9
Competitive Advantage	NR	NR	2	8	6
Quality of Software Development	13	4	13	9	1
Telecommunication Systems	3	13	11	10	3
IS Role and Contribution	NR	15	4	11	20
Electronic Data Interchange	NR	NR	14	12	34
Distributed Systems	NR	NR	NR	12	17
CASE Technology	NR	NR	NR	12	15
Application Portfolio	NR	10	16	15	32
IS Effectiveness Measurement	2	5	9	16	14
Executive/Decision Support System	5	10	NR	17	25
End-User Computing	11	2	6	18	24
Security and Control	12	14	18	19	7
Disaster Recovery	NR	NR	NR	20	10
Organizational Structure	18	NR	NR	21	40
Technology Islands	NR	3	10	22	26
Global Systems	NR	NR	NR	23	37
Image Technology	NR	NR	NR	24	43
IS Asset Accounting	NR	NR	NR	25	NR

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Appendix I

A Survey of
Key Information Systems Management Issues in India

What do you consider to be the most critical issues facing IS executives in India over the next three to five years? Please indicate your views by rating each issue on a scale of 1 to 10, where 10 indicates your highest priority issue(s) and 1 indicates your lowest priority issue(s). The more important the issue, the higher the rating.

Rating scale:									
Indifferent				Moderately Important				Critically Important	
1	2	3	4	5	6	7	8	9	10

Your Rating   *Key Issues and their Rationale*

____ 1. Planning, Implementing and Managing Telecommunications
          Communications is the lifeblood of an organization. Rapid changes in this industry make this a
          complex and formidable task.

____ 2. Enabling Electronic Data Interchange and Multi-Vendor Integration
          Electronic communications with vendors and customers may offer tremendous competitive
          advantage to an organization, though standardization is clearly needed.

____ 3. Integrating Data Processing, Office Automation, Telecommunications, and Factory
          Automation
          The capability exists to integrate systems based on these diverse technologies, though planning
          and facilitating such integration needs further attention.

____ 4. Planning and Using Image Technology
          The use of facsimile and scanner technology is growing in organizations, but the need to
          effectively manage its integration with other systems has not been effectively addressed.

____ 5. Managing the Impact of Artificial Intelligence
          AI may prove to be a major force that transforms IS and the organization, though not enough is
          known about this still evolving technology.

____ 6. Making Effective Use of Computer Graphics
          Graphics offer an effective way to present information. However, some problems still exist in
          integrating them with traditional IS.

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_____ 7. Planning, Implementing, and Managing Office Automation
Office automation can improve "white collar" productivity. Problems arise in determining how this should be done and what the role of the IS department should be.

_____ 8. Planning, Implementing, and Managing Client-Server Technology
Client-server technology promises effective utilization of mixed computing platforms. Procedures to effectively exploit it are not readily available, though.

_____ 9. Applying Object-Oriented Concepts to IS Development
O-O concepts can significantly ease IS maintenance and reduce development effort through widespread software reuse. Its utilization requires a major paradigm shift, though.

_____ 10. Using Windows and Direct Manipulation Interfaces
The use of a point-and-shoot or direct manipulation interface permits more meaningful interaction, as well as offers the opportunity for multiprocessing, thereby changing the way in which users perceive information systems.

_____ 11. Introducing and Using Neural/Parallel Computing
Neural networks may provide solutions to problems that are currently intactable. However, the technology has yet to prove itself.

_____ 12. Improving the Quality of Software Development
Application development backlogs and high system development costs have tended to frustrate users, demonstrating a need for improved effectiveness of IS development.

_____ 13. Developing and Managing Distributed Systems
Distributed systems offer the capability of localized computing, though they present several challenges to effective implementation.

_____ 14. Planning and Using CASE Technology
CASE offers the opportunity to automate part or all of the systems development process. It also involves significant costs and learning effort, and is still evolving.

_____ 15. Facilitating/Managing Decision and Executive Support Systems
Increasing the ability to exploit situations for competitive advantage depends on the ability of managers to experiment with decision possibilities. Results are to some extent mixed.

_____ 16. Using External Data as an Integral Part of IS
Successful organizations utilize considerable data about competitors, industry, and markets. The accuracy, collection, and maintenance of this data remains a problem.

_____ 17. Selecting and Integrating Packaged Applications Software
The increasing availability of competent packaged applications software may ease the development backlog to some extent. However, no effective strategy is available to manage this make-buy decision effectively. Also, costs may be prohibitive.

_____ 18. Converting to and using Relational DBMS
The relational data model appears to be the standard for the immediate future. Issues including design, conversion, and administration need more attention, though.

_____ 19. Fourth Generation Languages
Fourth generation languages offer the potential of reduced development and maintenance effort. This may be offset by poorer performance, additional training, and higher costs.

_____ 20. Reliability of Telecommunications Facilities
The basic telecommunications infrastrcuture affects the IS department's ability to effectively employ this technology for new and innovative IS.

_____ 21. Hardware Maintenance
Hardware maintenance times and costs play a major role in the availability of IS. For critical systems, problems in this area can bring the business to a halt.

_____ 22. Developing an Information Architecture
A corporate/global information architecture is needed to identify the major information categories used within an enterprise and their relationships to business processes.

_____ 23. Improving IS Strategic Planning
It is increasingly critical to an organization's success that it can integrate strategic and information systems planning and make competitive use of changing IS technologies.

_____ 24. Making Effective Use of the Data Resource
The organization's data resource is growing in size, complexity, and value. Despite this, it remains largely unrecognized, inaccessible, and underutilized.

_____ 25. Using Information Systems for Competitive Advantage
In many businesses, long-term survival is dependent on using information systems to gain competitive advantage.

_____ 26. Aligning the IS Organization with that of the Enterprise
The effectiveness with which IS can support the enterprise's information needs is dependent on the IS department's position within the enterprise.

_____ 27. Planning and Management of the Applications Portfolio
The applications portfolio is rapidly increasing in size, complexity, and maintenance cost. Despite the longevity of the maintenance problem, very few good strategies are available to manage it effectively.

_____ 28. Using IS to Influence Organizational Structure
Information technologies offer the potential to flatten organizational structures, thereby creating a more responsive, flexible, and innovative firm.

_____ 29. Moving Towards Global Systems
With increasing global orientation of markets, suppliers, and customers, organizations need to adopt IS that will address global concerns including data transfer, national regulatory policies, and time and language differences.

_____ 30. Downsizing/Upsizing
Moving towards smaller or larger computers may offer significant changes in IS capabilities, accompanied by sizeable economies of scale.

_____ 31. Cost Justification for Automation
Given the relative costs for material and personnel resources, investment in hardware and software needs careful consideration.

_____ 32. Facilitating Organizational Learning and Use of IS Technologies
The organizations that will prosper are those that can integrate appropriate new IS technologies into the operations of the entire organization.

___ 33. Increasing Understanding of the Role and Contribution of IS
IS is sometimes viewed as an overhead expense with little appreciation of its contributions to the organization, possibly leading management to make infeasible demands and cut funding, thereby resulting in missed opportunities for the organization.

___ 34. Measuring IS Effectiveness and Productivity
The measurement of IS performance is crucial to its effective management. This assumes greater importance as organizations invest more money in information systems.

___ 35. Improving Information Security and Control
As organizations become increasingly dependent on IS, there is a greater risk of disclosure, destruction and alteration of data, and disruption of information services.

___ 36. Facilitating and Managing End User Computing
The proliferation of end user computing offers the promise of improved productivity but also the dangers of inadequate management control.

___ 37. Establishing Effective Disaster Recovery Capabilities
Risks from potential loss of business due to a disaster that affects IS can be minimized if effective and proven recovery plans are in place.

___ 38. Determining Appropriate IS Funding Levels
There is no generally accepted way of establishing IS funding levels vis-a-vis other budgetary needs of an organization, thereby putting both IS and general managers at a disadvantage.

___ 39. Centralization/Decentralization Issues
Control of an IS activities and services is facilitated through consolidation at a centralized location, though this may limit flexibility.

___ 40. IS Ethics
Affects many aspects of IS departments including use of personnel, privacy matters, and industrial espionage.

___ 41. Outsourcing IS Development
As a means of reducing the development backlog, this offers some respite, though at increased development costs and uncertain maintenance responsibilities. Additionally, procedures for selection of candidate applications and providers may not be well defined.

___ 42. Specifying, Recruiting, and Developing Human Resources for IS
Current and future shortages of qualified IS personnel threaten the IS department's ability to keep up with the information needs of its parent organization.

___ 43. Developing the Role of the Information Resource Manager
For information systems to become widespread in organizations, a variety of resources need to be employed for their effective deployment. Managing these resources becomes critical for an effective IS department.

___ 44. Employee Job Satisfaction
Ensuring that IS personnel have challenging yet satisfying tasks is conducive towards less turnover, disruptions, and morale problems.

___ 45. Impact of IS on Labour Relations
The impact of an information system on unionized staff, or changes in job requirements, may exclude some applications from an organization's portfolio, or severely compromise others.

____ 46. Government Regulations concerning IS Technology
Government regulations concerning the import and use of IS technology considerably restrict the range of IS functionality and the cost of IS technology to an organization.
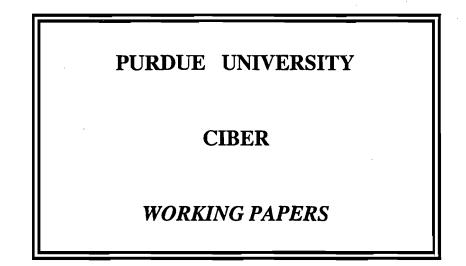
____ 47. Compliance with Regulatory Bodies
There is an increasing set of regulations that organizations have to comply with. While many of these can be addressed by IS, it entails a larger and less productive portfolio.

Please add any other issues that you deem relevant, rating them similarly.

____ 48. _____

____ 49. _____

____ 50. _____

Part B. General Information

1. Please indicate your primary business   _____

2. What is your approximate annual turnover (in rupees)?   _____

3. Approximately how many employees does your organization employ?   _____

4. How many employees work in the IS department?   _____

5. When did your organization acquire its first computer?   _____

6. What types of computers does your organization currently use?

		Type	Number
a.	Mainframes	_____	_____
b.	Minicomputers	_____	_____
c.	Workstations	_____	_____
d.	PCs	_____	_____
e.	Others	_____	_____

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