

CROSS-CULTURAL ISSUES IN GLOBAL INFORMATION SYSTEMS

Sven Aelterman, Troy State University

ABSTRACT

This paper will examine the importance of managing cultural issues related to information technology. The main focus will be on issues related to organization behavior. The increasing global economy and associated cross-cultural issues on the one hand and the technology boom on the other hand have largely been discussed separately. However, findings indicate that the proactive manager must effectively manage both to be successful in a global, technological environment. Based on a review of literature and on analysis, this paper will provide some points of attention and potential remedies to the global issues discussed.

INTRODUCTION

E-commerce has helped managers see the global picture in technology development and management. However, it has gone largely unnoticed to the business manager that differences on cultural dimensions may affect perceptions and satisfaction with information systems (Choi & Choi, 2003; Simon, 2001). This paper is not intended to discuss technical issues related to global information systems. Rather, cross-cultural issues based on Hofstede's dimensions (1980) will be reviewed.

Global and cultural issues related to information systems are not a new research topic (Simon, 2001; Mao & Palvia, 2000; Ein-Dor, Segev, & Orgad, 1993). Nevertheless, until the late 1990s, information systems were often information islands, even in global firms. Each department and geographical location had its own information systems. The end of the 20th and the beginning of the 21st century has seen a move towards integration and consolidation. Global issues have come along with global integration and global partnerships.

INFORMATION SYSTEMS AND ORGANIZATIONAL BEHAVIOR

It has been suggested that culture may influence the acceptance and perceived success of information systems (Peterson, Kim, & Kim, 2003; Kim, Peterson, Chin, & Barrier, 2001; Bunker, 2001; Claver, Llopis, Reyes Gonzales, & Gasco, 2001). If this is indeed the case, handling cultural differences related to IS has a direct effect on the organization's success. Furthermore, employees in all levels of organizations have to use information systems on a daily basis to complete tasks. Their satisfaction with the IS provided by their organization is said to have an effect on the satisfaction of the employees with the organization as a whole (Lee, Kim, & Lee, 1995; Cheney & Dickson, 1982).

Authors have also suggested that information systems can be used to initiate organization design (Oura & Kijima, 2002). While this premise sounds attractive, if the perception of information systems across cultures differs, the resulting use of IS for organization design will also be different. Furthermore, recently a lot of attention has been spent on the interrelatedness of

information systems and organizational success (Claver, et al., 2001). Each of these issues indicates interdependence between organizational behavior and information systems.

CULTURE

If culture indeed influences IS, it helps understanding to give a definition of culture. Hofstede's definition is both simple and appropriate for this paper: "The collective mental programming of the people in an environment." (Hofstede, 1980, p. 43) By this, Hofstede refers to two important concepts generally agreed upon when discussing culture: a person is "programmed," or behavior is learned; and culture is not something physical, but rather cognitive. Geert Hofstede's son provides a similar definition: "It is the way you were brought up." (Hofstede, 2000, slide 4)

Through his studies, Hofstede (1980) uncovered five dimensions along which culture can be mapped. These dimensions are power distance (PDI), individualism (IND), Masculinity (MAS), uncertainty avoidance (UAI), and long-term orientation (LTO). Hofstede was further able to create country clusters: groups of countries where the shared values of the inhabitants are similar along all dimensions (Hofstede, 1980).

While Hofstede's research can be critiqued for a number of reasons (Gibson, Ivancevich, Donnelly, Konopaske, 2002; Peterson et al., 2003), his research has allowed other researchers to study the causes of differences in behavior in different cultures. It has also allowed international managers to understand how individual behavior can be explained.

Based on national cultural dimensions, Kedia and Bhagat suggested as early as 1988 a model of information technology transfer across cultures (Kedia & Bhagat, 1988). Since then researchers have found several links between national culture and information systems success.

PERCEPTIONS OF INFORMATION TECHNOLOGY

Several researchers have attempted to analyze the impact of culture on the perception of information systems. Each has selected individuals with specific relationships to IS: IS professionals (Peterson et al., 2003; Kim et al., 2001), managers (Leidner, Carlsson, Elam, & Corrales, 1999), and users (Huang, Keser, Leland, & Shachat, 2003). There is, however, a lack of studies that address the impact on entire organizations and a lack of studies that address a multitude of cultures. Unlike Hofstede's classical study, most researchers only analyze two or three cultures at once. The researchers also stop short of suggesting practical solutions to managers. A number of frameworks related to global information technology transfer (GITT) have also been developed (Fagan, 2001; Peppard, 1999). Unfortunately, very few of them address cultural issues.

This leaves managers with no or little practical guidance in the area of cross-cultural IS development and use. This article attempts to fill this gap by combining the findings of several studies and providing practitioners with advice to handle the issues that result from multinational IS implementations. The perceptions of three groups (based on Kim et al., 2001) will be discussed: IS professionals, management, and users.

Information Systems Professionals

Peterson, Kim, and Kim (2003) have used a subset of Hofstede's expanded five dimensions of culture in their research. They analyzed the differences in perceptions of US and South Korean IS professionals using a questionnaire. The researchers suggested a number of hypotheses related to the importance of short-term versus long-term objectives of information systems. Their expectation was that the Korean professionals would view the long-term objectives as more important than the short-term objectives, and that the US professionals would prioritize the objectives the other way around. This expectation was based on the differences on the time-orientation dimension identified by the later Hofstede-studies. Other hypotheses were based on the uncertainty avoidance and masculinity/femininity dimensions.

A final hypothesis was based on the premise that professionals who see long-term objectives as more important will perceive lower IS success. Peterson et al. arrived at that hypothesis by assuming that because of the higher effort IS professionals spend on short-term objectives, IS professionals who only evaluate short-term objectives will indeed perceive higher success rates. Organizational-level (long-term) objectives may be ignored by those professionals when measuring the success of IS. However, failure is more likely to occur in achieving long-term objectives.

While the Peterson et al. study can be critiqued for a number of reasons, it does provide important insights. Perhaps the single most important conclusion drawn by the researchers is that the hypothesis that related short-term versus long-term objectives to perceived success was supported by evidence. Analysis revealed that the influence of culture on the perceived importance of IS objectives was mixed. Peterson et al. therefore suggested that time-orientation may be less influential on perceptions than some other cultural dimensions.

In a similar study, Kim et al. (2001) found that some differences exist as to what Korean developers identify as critical success factors (CSFs) and critical failure factors (CFFs). Specifically, they found that Korean developers attach more importance to the project leader's monitoring and control than US developers do. Kim et al. suggested that this difference can be explained by the high power distance culture of Korea versus the low power distance culture of the United States.

Managerial Impact

The managerial impact of the findings of Peterson et al. and Kim et al. is considerable. The study indicates that IS professionals from around the globe, even though they share the same profession, hold different views of information systems objectives, critical success factors, and even success rates. These different views are related to their national culture and can be partially predicted using existing cultural dimensions, such as the dimension identified by Hofstede.

The results of these studies indicate that developing global information systems using a global, cross-cultural team may represent more challenges than is generally accepted or than has been studied before (Ensworth, 2003).

Business Leaders

While business leaders are of course also users of information systems, their needs are generally different than those of line workers and knowledge workers (Harris, 1993), discussed in the next section. The impact of business leaders (managers) on information systems has been documented thoroughly (Harris, 1993; Vandebosch & Huff, 1992; Stamen, 1992). Some research has been done to determine the cultural influences on manager's perceptions of information systems success and impact.

Leidner et al. (1999) have studied perceptions of managers using Executive Information Systems (EIS) in Sweden, Mexico, and the United States. They found that culture in many cases influences the use and results of these information systems. The effectiveness of the EIS seemed to be related to the uncertainty avoidance dimension. The higher the level of uncertainty avoidance, the less trusted (and therefore effective) the information from the EIS was considered to be. EIS were also more effective in low-context cultures where the hard-and-fast information is more valuable than in high-context cultures. Another important outcome of the study is that cultural dimensions are not always an accurate predictor of IS use and impact. (Leidner et al., 1999)

Kirlidog (1996) has evaluated the adoption of EIS in Turkey. He found, after analyzing the use of the EIS in four organizations, that information systems are not culturally neutral. This research further implies that in order for information systems to be effective, the mindset of the users (executives in this case) must change. While Turkey was considered to be a Least Developed Country (LDC) in this study, it was also stated that the organizations were fairly computerized compared to organizations in other LDCs. But this computerization has apparently not lead to an increase in the implementation of EIS. Kirlidog attributed this lack to managerial practices in Turkey not being suitable to reap the benefits of IS (Kirlidog, 1996).

Managerial Impact

Information systems are perceived, and therefore used, differently by managers with different cultural backgrounds. Unfortunately, culture does not appear to be the only determinant of effectiveness of EIS. Leidner et al. (1999) suggested that economic and political conditions might also affect the outcome of IS use by business leaders. The research that has been conducted has also suggested that in order for information systems to be effective, the managerial mindset (i.e., culture) must change (Kirlidog, 1996). This is somewhat contradictory to most statements that information systems should be adapted to the national culture in which they will be used.

Knowledge & Clerical Workers

The perceptions of lower-level employees have not been studied in a similar fashion as the perceptions of IS professionals or managers. This is probably because these users mainly use transaction processing systems (TPS). These systems are not as prone to perceptual differences because they do not significantly alter the way employees make decisions or perform other tasks. Transaction processing systems are used to increase efficiencies and collect information later

used in EIS and decision support systems (DSS). However, some researchers have described differences in perceptions towards web sites and communication technology (Simon, 2001).

Simon (2001) conducted a study that compared perception and satisfaction of web sites among four different cultural clusters. He found that subjects from Asia and Latin America, who in general have been less exposed to Internet use than North Americans and Europeans, were more satisfied with the web sites presented to the participants (Simon, 2001). If web sites can be considered a measure for information systems in general, it appears that users in cultures that are relatively new to information technology would be more satisfied with the IS than users from more “experienced” cultures. However, perception is the basis for satisfaction. Therefore, if IS use increases, the satisfaction with those IS may decrease.

St.Amant (2002) has researched the effect of information systems on cross-cultural communication. He points out that the creation of an identity, which is said to be easier online than in the real world, may conflict with expectations of communicators in other cultures. For high uncertainty avoidance cultures, a stable identity is an important aspect when conducting business. Especially when developing countries will gain increased access to the Internet, cross-cultural communication issues might be amplified because of the increased uncertainty associated with online transactions and communication.

Another study that has interesting applications for the design of global IS was conducted by Huang et al. (2003). The study attempted to identify causes for differences in Internet adoption rates among countries other than economic causes. Huang et al. concluded that trust is positively related to Internet adoption rates. This conclusion has implications for IS designers. Dillon (2003) stated that trust in the people who design and promote the information system may be related to the users’ willingness to accept it.

Trust has also been mentioned in the study by Leidner et al. (1999). They asserted that data and information not coming from trusted sources will not be used in high uncertainty avoidance cultures. Their research has supported this assertion.

Managerial Impact

Users’ perceptions of information systems affect their acceptance behavior significantly. It is therefore important that users have positive perceptions of the IS so that they will accept it, use it, and thereby create efficiencies and/or competitive advantage for the organization. User involvement must be carefully used to ensure that the system works in such a way that user expectations are met and organizational objectives are met.

Trust related to information systems has a considerable influence on the way IS are used and perceived. The issue is complicated by research supporting the premise that different cultures treat information systems data differently than other cultures. Information systems designed without user input or deployed without adequate, culturally adapted, user training may fail to deliver their value.

RECOMMENDATIONS

As usual, managers must be aware of cultural differences before they can deal with these differences effectively. The Hofstede-studies can help managers in determining how a person in a certain culture *may be* programmed. By applying this study on an individual, the manager can evaluate how that person's view of information systems will affect organizational success.

When working with IS professionals, IS managers must stress the importance of long-term outcomes. To achieve this, a manager can involve the IS professionals in later stages of the system lifecycle than just deployment. By increasing the involvement, IS professionals are expected to put more effort into these later stages. This is then expected to increase the success rate of information systems in achieving the long-term, organizational goals.

Furthermore, in cultures similar to the East Asian cultures, where there is a high degree of power distance and centralized decision making, focusing on increased user involvement can help ensure the success of IS. During the analysis stage of the development cycle, users from different countries can be involved. Technology itself now provides the means for this involvement by providing electronic communication.

Specifically, when developing an information system for global use, time must be taken to ensure that users from different cultures are involved in the design and development. However, this poses some obvious and less obvious issues on its own. Obvious problems that might occur as organizations create cross-cultural user teams are those that occur when forming any cross-cultural team (Ensworth, 2003). Also, as Dillon (2003) has suggested, user involvement has downsides in all cases. It is not hard to imagine that cross-cultural user involvement is even more flawed.

Managers must therefore allow users to have input in the design of the global IS. But they should do so with care and with an understanding of the behavior of each individual user (Dillon, 2003).

A potentially controversial stance would be to suggest that perhaps organizations should refrain from designing global information systems. With the current state of technology, it may be considerably easier to build different information systems that connect and share information than to design one information system for use around the globe. There may be issues with efficiency and coordination with this solution, but there definitely are issues of localization and perceptions when developing global IS.

Considering the impact national culture has on information systems success, managers must also be aware of the fact that organizational culture has a similar impact on the success of IS. Researchers have argued that an information system implementation requires an analysis of "organizational fit" to determine if the planned IS is suitable for the organization's needs (Gwynne, 2001).

CONCLUSION

The lack of one or more broad studies relating culture to information systems perceived value in organizations is understandable because of the complexity involved. By integrating

existing research into the topic, it appears that national culture does influence the perceptions of information systems in all “categories” of users. Therefore, managers must be prepared to deal with these differences. However, as Peterson et al. (2003) have noted, it would be inappropriate to generalize the existing body of research. There are many more opportunities for research.

Hofstede (2000) and Leidner et al. (1999) have also proposed an intriguing result of the use of global information systems that was beyond the scope of this paper. They suggested that the adoption of information systems around the world may lead to a global culture rather than different national cultures. Although the evidence to support this argument is low, the continued adoption of IS combined with the emerging global economy could potentially affect national cultures as we know them and as Geert Hofstede first mapped them over 20 years ago.

The failure of some information system implementations could potentially be related to cultural differences that exist within the global organization or cultural differences between the developers of the system and the users. This knowledge should encourage managers to identify cultural issues related to the design and implementation of global information systems.

These findings not only have important implications for managers in global firms, but also for international consultants. Consultants providing advice for companies expanding globally also need to be aware of the impact of culture on information systems. Information systems are often touted as tools to solve integration problems. The research discussed in the present paper indicates that the information systems may come with their own problems.

REFERENCES

- Bunker, D. (2001). A philosophy of information technology and systems (IT & S) as tools: Tool development context, associated skills, and the global technology transfer process (GTT). *Information Systems Frontiers*, 3 (2) 185-197. Retrieved on November 2, 2003 from Proquest database.
- Cheney, P. H. & Dickson, G. W. (1982). Organizational characteristics and information systems: An exploratory investigation. *Academy of Management Journal*, 25 (1), 170-184. Retrieved on November 30, 2003 from Proquest database.
- Choi, H. & Choi, H. (2003). An exploratory study and design of cross-cultural impact of information systems managers' performance, job satisfaction, and managerial value. *Journal of Global Information Management*, 11 (2), 1-29. Retrieved on November 11, 2003 from Proquest database.
- Claver, E., Llopes, J., Reyes Gonzalez, M., & Gasco, J. L. (2001). The performance of information systems through organization culture. *Information Technology & People*, 14 (3), 247-260. Retrieved on November 2, 2003 from Proquest database.
- Dillon, A. (2003). On trust and users. *Bulletin of the American Society for Information Science and Technology*, 29 (2), 29. Retrieved on October 9, 2003 from Proquest database.

- Ein-Dor, P., Segev, E., & Orgad, M. (1993). The effect of national culture on IS: Implications for international information systems. *Journal of Global Information Management*, 1 (1), 33-44. Retrieved on October 26, 2003 from Proquest database.
- Ensworth, P. (2003, October 1). Culture clash. *CIO Magazine*, October 1, 2003. Retrieved on November 17, 2003 from <http://www.cio.com/archive/100103/peer.html>
- Fagan, M. H. (2001). Global information technology transfer: A framework for analysis. *Journal of Global Information Technology Management*, 4 (3), 5-26. Retrieved on November 11, 2003 from Proquest database.
- Gibson, J. L., Ivancevich, J. M., Donnelly, J. H., & Konopaske, R. (2002). *Organizations*. Boston: McGraw-Hill Irwin.
- Gwynne, P. (2001). Information systems go global. *MIT Sloan Management Review*, 42 (4), 14. Retrieved on November 30, 2003 from Proquest database.
- Harris, J. (1993). Is your EIS too stupid to be useful? *Chief Information Officer Journal*, 5 (5), 52-56. Retrieved on October 26, 2003 from Proquest database.
- Hofstede, G. (1980). Motivation, leadership, and organization: Do American theories apply abroad? *Organizational Dynamics*, 9 (1), 42-63.
- Hofstede, G. J. (2000). The information age across countries. *Presentation*. Retrieved on October 25, 2003 from http://www.info.wau.nl/educational_files/gjh/InfoAge%20across%20countries%20Nov%202000.ppt
- Huang, H., Keser, C., Leland, J. W., & Shachat, J. (2003). Trust, the Internet, and the digital divide. *IBM Systems Journal*, 42 (3) 507-518. Retrieved on October 25, 2003 from Proquest database.
- Kedia, B. L. & Bhagat, R. S. (1988). Cultural constraints on transfer of technology across nations. *The Academy of Management Review*, 13 (4), 559-672. Retrieved on November 2, 2003 from Proquest database.
- Kim, C., Peterson, D., Chin, J., & Barrier, T. (2001). Critical strategies for information systems development projects: Perceptions of developers in Korea. *Global Perspective of Information Technology Management* (Felix B. Tan, editor). Retrieved on October 9, 2003 from NetLibrary.
- Kirlidog, M. (1996). Information technology transfer to a developing country: Executive Information Systems in Turkey. *Information Technology & People*, 9 (3), 55-76. Retrieved on October 26, 2003 from Proquest database.
- Lee, S. M., Kim, Y. R., & Lee, J. (1995). An empirical study of the relationships among end-user information systems acceptance, training, and effectiveness. *Journal of Management*

- Information Systems*, 12 (2), 189-202. Retrieved on November 30, 2003 from Proquest database.
- Leidner, D. E., Carlsson, S., Elam, J., & Corrales, M. (1999). Mexican and Swedish managers' perceptions of the impact of EIS on organizational intelligence, decision making, and structure. *Decision Sciences*, 30 (3), 633-658. Retrieved on September 9, 2003 from Proquest database.
- Mao, E. & Palvia, P. (2000). Culture's effect on information technology acceptance. Retrieved on November 2, 2003 from <http://wpcarey.asu.edu/content/dsi/abstracts/CULTURES%20EFFECT%20ON%20INFORMATION%20TECHNOLOGY%20ACCEPTANCE.pdf>
- Oura, J. & Kijima, K. (2002). Organization design initiated by information systems development: A methodology and its practice in Japan. *Systems Research and Behavioral Science*, 19 (1), 77-86. Retrieved on November 2, 2003 from Proquest database.
- Peppard, J. (1999). Information management in the global enterprise: An organising framework. *European Journal of Information Systems*, 8 (2), 77-94. Retrieved on November 11, 2003 from Proquest database.
- Peterson, D. K., Kim, C., & Kim, J. H. (2003). Perceptions of information systems objectives: A comparison of IS professionals from the United States and Korea. *Journal of Global Information Technology Management*, 6 (2) 27-44. Retrieved on
- Simon, S. J. (2001). The impact of culture and gender on Web sites: An empirical study. *Database for Advances in Information Systems*, 32 (1), 18-38. Retrieved on September 6, 2003 from Proquest database.
- St.Amant, K. (2002). When cultures and computers collide. *Journal of Business and Technical Communication*, 16 (2), 196-214. Retrieved on October 26, 2003 from Proquest database.
- Stamen, J. P. (1992). When will EIS deliver? *Chief Executive*, 75, 22-24. Retrieved on October 26, 2003 from Proquest database.
- Vandenbosch, B. & Huff, S. L. (1992). Executive Support Systems and Managerial Learning. *Ivey Business Journal*, 57 (2), 33-38. Retrieved on October 26, 2003 from Proquest database.