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An Overview of the Impact of National Culture on the Adoption of Mobile Commerce

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ABSTRACT

The predictions that mobile technologies would greatly benefit both firms and individuals have now come under increasing scrutiny. Some of the authors suggest that the industry must move beyond "nice-to-have" services and devise new "must-have" services that positively affect people's lives (Jarvenpaa, et al. 2003). Others believe that mobile commerce is facing many obstacles as an emerging market, this is particularly so in some countries such as United States (Venkatesh et al, 2003). This study provides a brief overview of the literature on the impact of national culture on the adoption of mobile commerce. The study focuses on Singapore, Japan, UK and Germany.

Keywords: Mobile Commerce, Mobile payment, National Culture

1. INTRODUCTION

This study follows the suggestion made by Malone (2001). He suggests that academic Information Systems researchers accelerate the rate at which businesses learn from each other's experiments. The IS researchers observe the experiments, gather and analyse data in systematic and interesting ways and disseminate the lessons to anyone who wants to listen. Mobile commerce is distributed computing that involves elements whose location changes in the course of computing (Samaras, 2002). The opportunities associated with mobile commerce are the ability to compute, to do commerce and access information from anywhere and at any time. Payment over mobile networks, while bearing some relation to fixed-line eCommerce, will be very different. Firstly, mobile devices are unlikely to support traditional online shopping, such as buying a book or piece of furniture, even if higher speed mobile networks are available.

The mobile environment is, however, ideally suited for payments for digital content, and for payments that use the device as a secure, mobile payment instrument. Unlike eCommerce, mobile commerce is inherently global given the popularity of mobile phones in every major market worldwide.

It has been suggested by many authors (eg, Khalifa and Cheng, 2002) that mobile commerce is the next big wave of business. It is also suggested that given the already high mobile phone penetration the rapid growth of mobile commerce is assured. It is generally agreed that mobile phones have offered great convenience, but they lack the screen space and bandwidth available in traditional desktop computers. Although several technologies such as WAP/WML, Palm.Net, and HDML, have been developed specifically for mobile devices, it is agreed that there is no successful and dominant technology for displaying Web pages over mobile devices (Urbaczewski, et al, 2002).
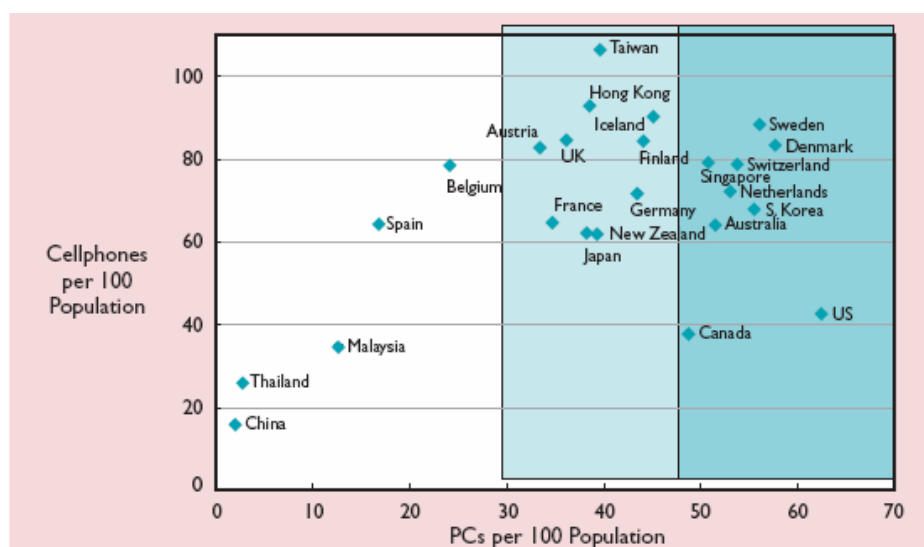

Figure 1: Cellphones and OCs in 2002 from "The Diffusions of Mobile Data Applications" by Elizabeth Fife and Francis Pereira

Figure 1 shows the difference between PC and Cellphones adoption in different countries. It is also suggested that although the use of mobile data applications has grown across the world, the adoption rates of these applications and services has been very uneven across countries. Figure 2 shows the different growth rates in adoption of PC and Cellphones by different countries.

Many of the standards designed to transfer information from one terminal to a mobile device (most notably with SMS, a fairly mature technology based on text messages of 160 characters or less), can also originate with a mobile device. Some of these technologies are more developed than others, and some cultures and nations use these technologies more widely than others. Table 1 shows the relative penetration of SMS messaging in different nations (see Table 1).

It is important to capture the influence of the national environment, as contrary to early predictions, mobile commerce has not been adopted similarly by different nations. It has been suggested that those with well-developed infrastructures, resources and skills have gained the initial advantage (eg, Brown et al. 2004). In December 2000, Germans sent 1.8 billion SMS messages and Britons sent 803 million messages, both up about 50% from the levels listed in the table.
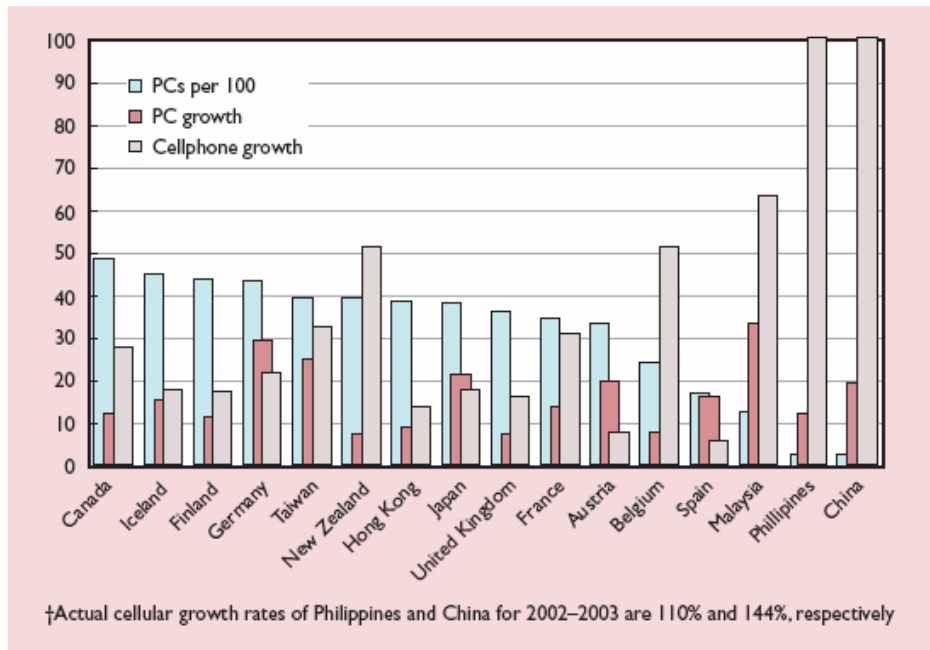

†Actual cellular growth rates of Philippines and China for 2002–2003 are 110% and 144%, respectively

Figure 2: PCs, and growth rates of PC and Cellphones penetration (2000-2002) from "The Diffusions of Mobile Data Applications" by Elizabeth Fife and Francis Pereira

Nation	Population (millions) (June 2000)	Mobile Users (millions)	SMS sent per month (millions)	SMS/mobile user/ month
Australia	18.6	8.1	30 (3/2000)	3.7
Finland	5.2	3.4	175	51.47
Germany	82	28.2	1000	35.46
Norway	4.5	2.9	150	51.72
Philippines	73	4.1 (6/2000)	540 (12/2000)	131.7
Sweden	8.8	5.4	175	32.41
UK	59	28.3	400	14.13
USA	280	134 (7/2000)	20 (3/2000)	0.15

Table 1: Penetration of SMS in everyday life (Urbaczewski, et al. 2002)

SMS accounts for 12 percent of European mobile operators' revenues. According to Forrester, 156 million SMS messages are sent in Europe every month. Nearly 90 percent of these messages are person-to-person (P2P) traffic. Application-to-person (A2P) traffic, such as weather reports sent by SMS, accounts for 11 percent of traffic. Forrester predicted SMS revenues to account for 47 percent of total messaging revenues in 2007. Multimedia messaging (MMS) will account for 32 percent, Instant Messaging (IM), 10 percent, Mobile Email, 9 percent, and Enhanced Message Service (EMS), 3 percent. Forrester also forecasted that SMS traffic will rise to 11.5 billion messages per month in 2004. Still why is short message service (SMS) messaging so popular in Europe but barely used in the US? The use of SMS has been relatively low in the United States, as compared to Asia and Europe, where, in Europe alone, it is a $14

billion dollar market. Of the estimated 576 million people reported to be using SMS, 256 million are in the Asia-Pacific Region and 196 million are in Europe. One of the crucial differences between European and

American companies, according to a survey conducted by Protogeros (2002) was the payment system for on-line sales.
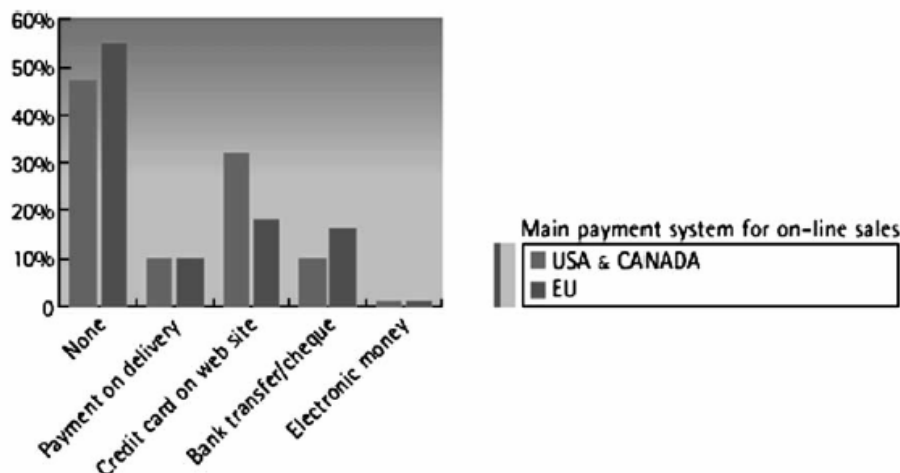

Figure 3: Payment systems for online sales a comparison between businesses from EU and US

Lee et al. (2002) used values as the core concept of culture in their comparative cultural study on the adoption of mobile commerce by Japan and Korea. The authors focused on values as the core concept of culture to address the impact of values on people behaviour and the attitudes which in turn affect the ways people behave in their lives (also cited in Geertz, 1973; Straub et al. 2002, Trompennaars and Hampden-Turner, 1993).

Xu et al. (2004) include different factors under Technology, Organizational and Environmental Contexts, to compare the ecommerce adopting countries with non-adopters. At technology level they are concerned with 1- technology readiness- which refers to technology infrastructure and IT human resources. 2- technology integration- which refers to the extent of inter-connection among IT systems and databases within and beyond firm boundaries. At the organizational level they are concerned with 1- firm size- which refers to the number of employees in the organization, 2- global scope and 3- managerial obstacles. Under the Environmental Context they look at competition intensity and regulatory environment. The present study examines Hofstede's work on national culture. Then using the culture level factors provided by his study compares the use of mobile commerce in Singapore, Japan, UK and Germany.

2. DIFFERENT APPROACHES TO CULTURAL STUDIES

There are different approaches to study the national culture impact on mobile commerce in different countries. Lee et al. (2002) on the basis of the findings of previous research on values (eg, Sweeney and Soutar, 2001, Sheth et al., 1991) suggest four dimensions of values. Their suggested dimensions are

Functional Values; Emotional Values; Social Values and Monetary Values. They use this four sub-value structure to interpret the different usage patterns of mobile internet users in Korea and Japan. Their findings indicate a significant difference between Korean and Japanese users in terms of the suggested dimensions of value structure.

Markus and Soh (2002) argue that although effects of national culture are an important line of research on global information management, the researchers should not lose sight of structural conditions related to ecommerce. They suggest structural conditions as physical, social and economic conditions that shape ecommerce activity.

Different models have been suggested for the adoption of any new technology, eg mobile commerce technologies. One of the suggested models is suggested by Xu et al (2004). To study the contextual factors that influence the innovation process they use earlier work by Tornatzky and Fleischer (1990) and suggest three aspects of a firm's context that influences the process by which it adopts and implements technological innovations: 1-Technological Context (both internal and external technologies with impact on the company). 2- Organizational context (eg, size, scope, managerial structure, etc). 3- Environmental context (eg, industry, competitors, government, etc). There are also suggestions regarding the combinations of many factors such as National Culture, Infrastructure and Access Costs on the adoption of mobile commerce in different parts of the world (Heales, 2004).

2.1 Hofstede's Framework On Culture

Hofstede identified five different variables in the study of culture, namely power distance, uncertainty avoidance, individualism, masculinity and long-term

orientation.   Each of the five concepts of culture is defined as follows:

- Power distance: the degree in which members of a society accept that power is unfairly distributed (Teng, Calhoun, Cheon, Raeburn and Wong, 1999). Hofstede believes that High Power distance at work place means that subordinates expect to be told what to do (Hofstede, 1980).
- Uncertainty avoidance: the extent to which people in a society are unnerved by the unknown and ambiguity, thus leading them to look for conformity (Teng, et.al., 1999). Hofstede (1980) suggests that societies with high uncertainty avoidance need written or unwritten rules. They need formalization and standardization.
- Individualism: the degree in which a society believes that individuals should take care of themselves and their family as opposed to collectivism, whereby there is absolute loyalty towards a larger group (Teng, et.al., 1999). According to Hofstede (1980) in a collectivist society relationship prevails over task and values standards differ for in-group and out-groups.
- Masculinity: the extent in which a society adopts a competitive and assertive nature, constantly striving to achieve success over others as opposed to femininity where members of a society care for everyone and cherish relationships with others (Teng, et.al., 1999)
- Long-term orientation: the extent in which a society embraces tradition and values long-term commitments.   A high long-term orientation society is said to be more resistant to change.   A low long-term orientation society is one where traditions are not

generally observed and thus are more receptive to change (International Business Centre, 2003)

Heales (2004) only uses Uncertainty Avoidance, Performance Orientation (Javadian, 2001) and Future Orientation (Kluckhohn and Strodtbeck, 1961). Performance orientation is the degree to which a society encourages and rewards group members for performance improvement and excellence. Singapore, Hong Kong and New Zealand score the highest, Russia, Argentina and Greece the lowest, whereas Australia has a medium performance Orientation. Future Orientation is the extent to which a society encourages and rewards future-oriented behaviours such as planning and investing in future. Countries with high future orientation include Singapore, Switzerland and Netherlands.

3. A CROSS-CULTURAL REVIEW

Using Hofstede's cultural framework above, four different countries will be examined to determine whether cultural differences in European and Asian countries will have an impact on the adoption of mobile payment applications.   In this research, Germany, Britain, Singapore and Japan are used as case studies since mobile payments have been widely established in these countries.   Tables will be used to summarise the various findings.

Judging from table 2 below, it appears that both regions although have different power distance indexes; both are receptive to mobile technologies.

JAPAN	SINGAPORE	GERMANY	BRITAIN
Medium power distance score = 54 Mobile phone used as a tool to reflect social status (Barnes & Huff, 2003) This can have beneficial impact on the adoption of mobile payment.	High power distance score = 74 Strong government policies imposed to ensure smooth and controlled adoption into the global networked economy (Warshauer 2001).	Low power distance score = 35 Mobile phone is not a status symbol (Hofvenschiold, 2003)	Low power distance score = 35 Mobile phone is not a status symbol (Hofvenschiold, 2003)

Table 2: Power Distance Between The East And West

However, it seems that there are some social pressure in adopting mobile technology in Asian countries, but this is absent in European countries. This is in agreement with the findings of Hofstede study. He

believed that in High power distance nations the adoption of the technology, if encouraged by the government or the superiors have a positive impact on the adoption by the members of the society.

JAPAN	SINGAPORE	GERMANY	BRITAIN
High uncertainty avoidance score= 92 Japanese people are used to having innovative entertainment devices being developed regularly. Thus there is not much uncertainty about Imode (Barnes & Huff, 2003)	Low uncertainty avoidance score= 8 The adoption process of mobile payment technologies is controlled and regulated by government organisation (IDA, 2003) Thus eliminating uncertainty.	High uncertainty avoidance score = 65 Mobile applications in Germany are popular, but not as much interest as Japan The reason being personal information security is a major concern for Germans (Martin, 2003)	Low uncertainty avoidance score= 35 More tolerant to innovative ideas, yet not capable of attaining full-scale implementations due to considerable demand for detail and timeliness (Hofstede, 1997) Mobile payment still not widely used as compared to Japan

Table 3: Uncertainty Avoidance between East and West

Based on table 4, Asian countries are more collectivist as compared to European countries. Societies with low individualism believe in 'learn how to do' and 'learning is for the young'. This can mean that the younger generation are expected to adopt the new technology faster than the older generation. On the other hand in countries with high individualism, there is a belief about 'permanent education'. This combined with the 'self-interest' should serve as a positive impact on the adoption of the mobile commerce by different generations alike.

JAPAN	SINGAPORE	GERMANY	BRITAIN
Medium individualism score= 46 Main application of Imode is E-mail. (Mizukoshi, Okino & Tardy, 2001). Thus suggesting keeping in touch is important to the Japanese	Low individualism score= 20 Increased in work hours and mobility in society resulted in mobile phones being commonly used to keep in contact with family (Burgess, 2004)	High individualism score= 67 Paybox, a mobile payment application Imode is more popular than Imode. (Pousttchi & Zenker, 2003). Thus suggesting personal convenience is more important.	High individualism score= 89 Mobile entertainment and small payments like M-pay and M-live are most popular mobile applications (Shannon, 2003). Thus suggesting personal convenience is more important.

Table 4: Individualism between East and West

It appears that there are some conflicting findings into whether masculinity can affect the rate of mobile payment adoption in countries of different regions. This is because in Western countries where masculinity is high, people do not necessary use the mobile phone as a tool to achieve competitiveness. On the other hand, people in Eastern countries such as Japan, a highly masculine society, tend to use the mobile phone to gain a competitive edge. Therefore, it should be noted that masculinity does not necessary influence the rate of adoption of mobile payments in western countries as it does to eastern countries.

JAPAN	SINGAPORE	GERMANY	BRITAIN
High masculinity score= 95 Need to read important e-mails and news anytime anywhere to be competitive (Fife & Pereira, 2003).	Medium masculinity score= 48 Mobile payment applications mainly used for making payments such as paying for car parking (IDA, 2003). Thus suggesting personal convenience than competitiveness	High masculinity score= 66 Relatively low interest for Imode in Germany as compared to Paybox, which is used for making mobile payments, attracted more users (Pousttchi & Zenker, 2003). Thus suggesting personal convenience than competitiveness	High masculinity score= 66 Mobile entertainment and small payments like M-pay and M-live are most popular mobile applications (Shannon, 2003). Thus suggesting personal convenience than competitiveness.

Table 5: Masculinity between East and West

JAPAN	SINGAPORE	GERMANY	BRITAIN
High long term orientation score= 80 Imode is locally developed and proved very popular. No foreign mobile commence application in Japanese market as yet.	Medium long term orientation score= 48 A few locally developed mobile payment applications with foreign company collaborations Government regulates the rate of adoption (IDA, 2003)	Low long term orientation score= 31 A few locally developed and foreign mobile payment applications available on the German market.	Low long term orientation score= 25 A few locally developed and foreign mobile payment applications available on the British market

Table 6: Long term Orientation between East and West

As can be seen from table 5, it can be concluded that in eastern countries, although have differing long-term orientation indexes; the people are generally more receptive of locally developed mobile payment technologies which is developed over time, for example iMode. Western countries on the other hand, have a number of local and foreign mobile payment applications being successfully implemented into the market.

The above review suggests that culture is a complex notion which is best assessed in terms of multiple dimensions. Markus and Soh (2002) suggested that in addition to examining the impact of national culture on the adoption of mobile commerce one should not lose sight of physical, social and economic arrangements that shape ecommerce business models and influence individual use of these technologies. The next step would be to develop a mobile commerce adoption model by individual users considering different factors including national culture, economic, social, geographic and technological infrastructure.

REFERENCES

1.   Barnes, S. & Huff, S.L., (2003) Rising Sun: iMode and the wireless Internet. *Communications of the ACM*, 46 (11), 78-84

2.   Brown, I., R. Hoppe, P. Mugera, P. Newman, and A. Stander (2004); 'The impact of national environment on the adoption of Internet Banking: comparing Singapore and South Africa'; Journal of Global Information Management; April-June v12, i2, pp1-26.

3.   Burgess, A. (2004).   Cellular Phones, Public Fears, and a Culture of Precaution.   (1ˢᵗ Ed.).   Cambridge.

4.   Fife, E. & Pereira, F. (2003) The Diffusion of Mobile Data Applications. [Online paper]. Accessed on 27/03/04 from the World Wide web at: http: /www.marshall.usc.edu/ctm/publications/ Research/diffusion%20of%20mobile%20data.pdf

5.   ForresterResearch   http://www.forrester.com/ ER/Press/Release/0,1769,709,00.html.

6.   Geertz, C, (1973). "The interpretation of Cultures", Basic Books, New York, NY.

7.   Heales, J. (2004); " National Culture, Infrastructure, and Costs: Factors that Lead to the Use of Wireless Technologies", *Proceedings of the Tenth Americas Conference on Information Systems*, New York, New York, August 2004.

8.   Hofstede, G. (1997). Cultures and Organizations: Software of the Mind. (Revised Ed.). United Kingdom: McGraw-Hill International.

9.   Hofvenschiold, E. (2003) Determining Cultural Issues in Attitude to and Use of Mobile Phones. *Proceedings of the 1ˢᵗ Annual GC-UPA Track*, Stuttgart, Germany, pg. 171-174.

10. International Business Center, (2003). [Online article] Accessed on 27/03/04 from the WWW

11. Javadian, M. (2001), "Organizational dimensions of global change: No limits to cooperation", *Administrative Science Quarterly*, (46-2), 354-356.

12. Jarvenpaa Sirkka L., Lang Karl Reiner, Takeda Yoko, and Virpi Kristiina Tuunainen; 'Mobile Commerce at Crossroads', Communications of The ACM December 2003/Vol. 46, No. 12.

13. Khalifa M., Cheng S.K.N.; 'Adoption of Mobile Commerce: Role of Exposure'; Proceedings of the 35th Hawaii International Conference on System Sciences – 2002.

14. Kluckhohn, F.R., and F.L. Strodtbeck. (1961), Variations in Value Orientations. Greenwood Press, Westport CT.

15. Lee, Y., Kim, J., Lee, I. and Kim, H. (2002). " A cross-cultural study on the value structure of mobile internet usage: comparison between Korea and Japan"; *Journal of Electronic Commerce Research*, Vol.3, No.4. 227-239.

16. Malone, T.W. (2001); "The Future of E-Business", *MIT Sloan Management Review*; Fall, Vol 43, Issue 1, pp104.

17. Markus, M.L., Soh, C. (2002) "Structural influences on global E-Commerce activity", *Journal of Global Information Management*, Jan-March, V10: 5(8).

18. Martin, R. (2003).   Germany: Expecting Growth. [Online article]. Accessed on 27/03/04 on the World Wide Web.

19. Mizukoshi, Y., Okino, K. & Tardy, O. (2001) Lessons from Japan. [Online article].   Telephony Online. Accessed on 27/03/04 on the World Wide Web at: http://telephonyonline.com/ar/ telecom_lessons_japan

20. Pousttchi, K. & Zenker, M. (2003).   Current Mobile Payment Procedures on the German Market from the View of Customer Requirements. *Proceedings of the 14ᵗʰ International Workshop on Database and Expert Systems* Applications. Prague, Czech Republic pg.870-874

21. Samaras, G. (2002), 'Mobile Commerce: Vision and Challenges'; *Proceedings of the 2002 Symposium on Applications and Internet*.

22. Shannon, V. (2003) DoCoMo aiming to bring i-mode service to Britain. [Online article]   Accessed on 27/03/04 on   the   World   Wide   Web   at: http://www.iht.com/articles/113527.html

23. Straub, D. W. Loch, R. Aristo, E. Karahanna, and M. Strile, (2002); "Towards a Theory-Based Measurement of Culture', Journal of Global Information Management, Vol.10, No. 1: 13-23.

24. Sheth, D., W. Loch, R. Aristo, E. Karahanna, and M. Strite, "Towards a Theory-Based Measurement of Culture", Journal of Global Information Management, Vol. 10, 1:13-23, 2002.

25. Sweeney, J.C. and G.N. Soutar, "Consumer Perceived Value: The Development of a Multiple Item Scale", Journal of Retailing, Vol 77: 203-220.

26. Teng, J.T.C., Calhoun, K.J., Cheon, M., Raeburn, S. & Wong, W. (1999) Is the East really difference from the West: A cross-cultural study on information technology and   decision-making. *International Conference of Information Systems*, North Carolina, USA pg. 40-46

27. Tornatzky, L.G., and Fleischer, M. (1990)*The Processes of Technological Innovation*, Lexington, MA: Lexington Books.

28. Trompennaars, F. and C. Hampden-Turner, (1993); "Riding the Waves of culture", McGraw-Hill Inc., New York, NY.

29. Urbaczewski A., Wells J., Sarker S., Koivisto M., Amattikorkeakoulu M.; 'Exploring Cultural Differences as a Means for Understanding the Global Mobile Internet: A   Theoretical   Basis   and   Program   of   Research'; Proceedings of the 35th Hawaii International Conference on System Sciences – 2002.

30. Venkatesh Viswanath, Ramesh V., and Anne P. Massey; 'Understanding Usability in Mobile Commerce'; Communications of The ACM December 2003/Vol. 46, No. 12.

31. Warshauer, M. (2001). Singapore's Dilemma: Control vs. autonomy in IT-led development.   *The Information society*, 17 (4), 305-311.

32. Xu, S., Zhu, K. and Kraemer, K.L. (2004), "Factors Affecting   E-Business   Diffusion   in   Organizations: Differences   between   Developed   and   Developing Countries"; *Proceedings of the Tenth Americas Conference on Information Systems*, New York, New York, August 2004.