The impact of culture and socio-economic differences on communication technology diffusion in different countries:

The diffusion of mobile telephones in USA and India.

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May 2003

Introduction

The present thesis deals with the diffusion of communication technologies in the context of the socio-economic and cultural environment. The main issue under investigation here is the level of innovativeness of a particular cultural setting with respect to a particular communication technology, in this case mobile telephones. This is investigated by examining the attitudes of individuals in different cultures towards various aspects of the mobile telephone. This thesis also recognizes that in addition to culture, the socioeconomic environment of a country may affect the attitudes of its inhabitants. These issues are dealt with in this thesis, and the countries investigated are India and the United States.

While it has been mentioned that culture may affect a particular country's inhabitants, there are contentions that this may not be the case anymore, at least with respect to consumer behavior. This is popularly referred to as "globalization". The issue of globalization has received great attention in present marketing literature, prominent among these being Levitt's (1983) suggestion that increasing "globalization" in the world is reducing the need for specialized marketing strategies for different countries, and hence cultures. This thesis proposes to test this claim with respect to mobile telephone diffusion in India and the United States.

Various issues that are investigated are related with innovativeness. These issues are: the individuals' perception of the innovation and self-perception of innovation adopters and non-adopters. It is examined whether cultural differences or socioeconomic status perception, or both, affect these perceptions related to a particular product (innovation). On this basis, international marketing managers can build a framework that helps them decide how to market a particular product in different cultural settings, and whether different strategies are required in different cultures. The thesis also provides suggestions to improve marketing strategies based on users' perception of product. Thus, it serves as a model for cross-cultural market research studies.

The main issues related to the innovation (in this case, mobile telephones) as perceived by consumers (or non-consumers) in different cultures are discovered using open-ended surveys. These

surveys were conducted in two culturally dissimilar countries with varying levels of economic development, namely, the United States and India. The Galileo theory and method is used to measure perceptions, conduct analyses and obtain results. The results of the analyses are discussed and conclusions are drawn from the findings. Marketing strategies for improved promotion of product are proposed.

Chapter 1: The Innovation: Mobile Telephones

The extent of the popularity of mobile telephones[1] worldwide has been impressive. In 2002, 51% of total telephone subscribers in the world owned a mobile telephone (International Telecommunication Union [ITU], 2002). In the past two decades, ever since the introduction of the mobile telephone in the United States in 1983 (Rakow & Navarro, 1993, p. 147), mobile telephone usage in the United States has grown at a phenomenal rate of 25% - 35% per year (Hausman, 1999, p. 188). In 2002, about 48.81% of the people in the United States owned a mobile telephone subscription (ITU, 2002). The extraordinary growth rate of the mobile telephone, like any other popular technology, merits it a closer investigation, both about the reasons for its popularity and its potential effect on the behavior and attitude of both the people who adopt it and those who do not. Further, as the mobile telephone is by nature a *communication* technology, its investigation is meaningful for the discipline of communication science.

The mobile telephone represents a new technology that has revolutionized the way we live and communicate, by rendering meaningless the concept of “unreachability”. People can communicate with other people instantly, with the assurance of finding the person they are looking for at the other end, unlike the traditional telephone. With the integration of various services, including accessing the Internet from the mobile telephone, the mobile telephone is increasingly appearing to be a “converging point” for various technologies.

Thus, the mobile telephone not only represents an advance in a communication technology making us more “mobile”, but also incorporates many technical qualities which enhance the quality of

our lives, such as the ability to take photographs, access the internet, set reminders, among others. Indeed, if the above-mentioned figures are anything to go by, the mobile telephone has possibly reached a popularity that has made it quite ubiquitous.

Past Research on Mobile Telephones

As with any new technology which gains popularity, it would seem that scholars would be eager to study the nature and effects of mobile telephone diffusion also. Thus, it is extremely surprising to note that in the current literature, research about this technology, especially in the behavioral context, is quite less. Compared to the diffusion of other technologies like the internet, studied widely as an interactive technology (Atkin, Jeffres & Neuendorf, 1998; Bazar & Boalch, 1997) and other technological products like the television, the VCR and radio sets (Carey, 1996), the mobile telephone represents an inexplicably ignored, although phenomenally popular, technology.

However, there have been some attempts to map out the course of mobile telephone diffusion. Most of the research related to this technology has focused on the demographical explanations of its adoption. These studies have been region-specific, and strive to explain the adoption behavior for a particular locale.

Not surprisingly, many studies have had to do with the diffusion of the mobile telephone in the United States. Jaratt and Coates (1990) predicted areas of potential use of the mobile telephone, at a time when the technology was relatively nascent and mostly used by “business users”. The estimation that service costs would fall from $125 a month to $50-60 a month (Jaratt and Coates, 1990, p. 79) has been realized, with even lower price options available. However, the researchers failed to predict the phenomenal popularity of mobile telephone use among non-business users.

One of the studies that attempted to explain mobile telephone adoption in relation with demographics and the perceived needs of the people regarding communication was conducted by Katz and Aspden (1998). They found that people did not think that mobile telephones added to their stress. Also, gender did not affect mobile telephone adoption significantly. The main conclusion, however,

was that adoption behavior can be explained by the need of frequently-commuting people to be accessible and the need of people to be able to contact anyone with ease, termed as “social location” (p. 153) factors by the authors. One interesting remark in the article was that people who are poorer tend to think that a large number of rich people are mobile telephone owners (p. 137). This is in spite of the fact that the mobile telephone is fast metamorphosing from a luxury to an everyday consumer product (p. 137) in America. It will be interesting to note what the adoption behavior of the poorer people is with respect to mobile telephones, as the above discussion would suggest low rates of adoption for poorer Americans. However, this would be in keeping with Roger's (1995) demographics regarding late adopters and laggards.

In another similar study, Batt and Katz (1998) found that the spending characteristics of American telecommunication buyers were not related to their actual income or economic status. That is, the telecommunications customers tend to be in the same income group as the average customer. Their adoption behavior is explained on the basis of their eagerness to adopt new telecommunication services, their acceptance of substitutions in the household expenditure in favor of telecommunication goods and their agreeability to spend a part of the household income on telecommunication products (p. 36).It is of interest here that the actual affluence of people is seen not to affect their adoption behavior.

The effect of the mobile telephone on the lives of women in America has been studied by Rakow and Navarro (1993). Even in this period relatively early in the diffusion process, they found that the mobile telephone did little to assert gender equality. They found that the perceived security needs of women were served by the mobile telephone. Further, it was a means by which they could also extend their private, family lives into their public sphere also. In contrast, men seem to use the mobile telephone to bring the public world into their lives. It was seen that in most cases, the decision to buy a mobile telephone had been made by the husbands of the women, as a security measure. In conclusion, the study claimed that women were not very enthusiastic adopters of this product (p. 154).

These studies are limited in that they are restricted to the United States. There have been some studies regarding mobile telephones and their impacts, and their potential users. Roos (1993) studied the adoption of mobile telephones in Finland, and the reasons for mobile telephone adoption. Finland is one of the countries with the highest mobile telephone penetration rates (ITU, 2002) and at the time this study was conducted, Finland was one of the leaders in mobile telephone technology. It was found that “perfect reachability” and a “perceived… immediate intimacy” (p. 446) were the reasons for mobile telephone adoption.

Leung and Wei (2000) studied the reasons for mobile telephone adoption in Hong Kong. Similar to Roos, they found that the perceived advantages afforded by the mobile telephone, namely “mobility” and "immediate access”, were responsible for adoption. In another study in Hong Kong, Wei (2001) found that the non-adopters of the mobile telephone were characterized significantly by the age, education and income factors, with the more elderly, less educated and lower income group individuals less likely to adopt mobile telephones.

Thus, the causes for mobile telephone adoption appear to be more or less consistent across the globe over the limited time that mobile telephone diffusion has been taking place. It should be pointed out here that the countries that were observed in the above studies are economically well established, and hence may be considered similar. This might be a factor in the discovery of similar reasons for mobile telephone adoption in these countries.

Also, there is a dearth of academic attention given to studying the diffusion of the mobile telephone in India, barring some studies commissioned by the ITU (Raina, 1998; Sinha, 2002; Srivastava, 2000). These studies are limited to explanation of the history and present situation of the telecom infrastructure in India and the trends in telecom service diffusion. In the behavioral context, there is an acute lack of research concerning Indian consumers of mobile communication related services. Even in terms of comparative research there is almost negligible attention given to this part of the world.

Chapter 2: Telecommunication policy in India and the U.S.

Considering the gradual improvement in the Indian economy and its impressive growth rate (4.4% in 2002 according to World Bank reports), it would seem about time to investigate the concerns of Indian consumers. Comparisons of economically dissimilar countries like the U.S. and India would be insightful if they help us discover possible disparities in both the perception of the technology and the reasons for its adoption, and the reasons for this. In order to put this into perspective, a short summary of the telecommunication infrastructure in both the countries in described below.

Telecommunication Policy of India

In the post-independence era in India (after 1947) telecommunication infrastructure was in its infancy. The basic needs of the people at this time of turmoil did not include telecommunications. As a result, the telecommunication infrastructure remained a largely ignored entity in India for almost forty years after independence. Also, the absence of necessary capital and the restriction on Indian markets against foreign investments made it impossible for the government to allocate necessary funds for suitable development of the telecommunication infrastructure, among other industries. Recognizing this suicidal situation, the government allowed Indian markets to accept Foreign Direct Investments (FDIs) starting 1991. This has had a positive effect on the telecommunication industry, allowing foreign players to pump money into an out-dated telecommunication system. According to Athreya (1996), this was a kind of 'economic independence' (p. 17) for India.

Along similar lines, Sinha (1996) explains that economic 'liberalization' ended the monopoly of the government over the telecommunication industry in India, opening the sector to foreign players. Formerly, the Department of Telecommunication (DoT) of India was the only telecommunication service provider for the Indian populace. After 1991, the number of 'service providers' in the country increased. Here, 'telecommunication' includes fixed-line services, Internet services and mobile telephone services.

Finally, recognizing the importance of the telecommunication sector in the development of the

country (Sinha, 1996, p. 28), the government initiated the development of policies related with telecommunication growth, starting with the National Telecommunication Policy (NTP) of 1994. This policy initiated economic reforms in the telecommunication sector, in order to attract foreign (mainly western) players to invest in the nascent industry in India. With respect to mobile telephones, the policy set forth some goals to be achieved by the end of 1995, specifically that mobile service providers would be licensed by the end of 1995. Also, at this time licenses were provided separately for separate services, for example, the same operator would have to obtain a separate license for Internet service provision and a separate one for mobile service. By the end of 1995, many of the reforms initiated in NTP 1994 were implemented, heralding the arrival of mobile telephony in India.

However, as noted in the preamble of the National Telecom Policy of 1999 (Department of Telecommunication [DoT], 2004), technological developments in the world are ushering in the concept of 'convergence'. Convergence refers to the integration of various telecommunication services so that a single device may provide many services, for example, the ability to access the Internet from a mobile telephone. Under the new policy, mobile telephone operators were free to provide services to customers in their 'service area without seeking an additional license' (DoT, 2004). The National Telecom Policy of 1999 also provided various previously unavailable concessions to mobile service providers, such as free connectivity with other providers and the increase in the number of providers that could operate in a particular service area (previously only two operators were allowed per service area). However, in keeping with the socialist spirit of India, DoT was allowed to be a player in the mobile telephony business without having to pay the substantial license fees that the private enterprises have to pay (for a complete list of service providers see Appendix A).

A recent addendum to the NTP 1999 describes the achievements thus far and reduces the remaining snags in the telecommunication policy of India in order to facilitate 'convergence' (See Addendum to the New Telecom Policy - 1999 (NTP-99), DoT, 2004). In particular, it is noted how competition has reduced the rates of various telecommunication services including mobile telephony,

and the substantial improvement in service is also noted. The addendum has made it easier for providers to enter the arena of Indian telecommunication by reducing the types of licenses to be obtained to provide telecommunication services to two, one related to telegraph and telecommunication services, and the other related to basic or mobile services. In each of these categories, the 'geographical area' will be the sole restriction on the providers, who may use any technology within the confines of this particular area.

Thus, both technological and economic advances since 1991 have led to a vast improvement in the telecommunication infrastructure in India, resulting in the provision of telecommunication services (including mobile telephony) at an affordable price to Indians. In particular, the opening of markets to private companies has resulted in competition to the erstwhile telecom systems that were government monopolies, forcing people to depend upon them for telecom needs at a high, non-negotiable price. ‘Liberalization’ ushered in reduction of rates and easier access for people to obtain these services.

The annual report of the DoT currently available (for year 2003) contains various statistics about mobile telephone usage that indicate a favorable attitude towards the technology. In particular, in the year 2002-03, it was seen that mobile telephones experienced a growth of 113% whereas the demand for Direct Exchange Lines (DELs) went down by 25% (DoT annual report 2003, p. IV). According to the DoT, at the end of the year 2003 there were 10.48 million mobile telephones in use. The share of mobile telephones in the Indian telecom network increased from 5% in 1999 to 21% in 2002 (DoT Annual Report 2003, p. IV). From 1997 to 2000, the annual growth rate of mobile telephones in India was 53.6% (Srivastava, 2000, p. 21). Thus, even though India is still, on paper, a third-world country, it is interesting to note that this is not evident in mobile telephone subscriber-ship, which is increasing everyday.

Telecommunication Policy of the U.S.

As with India, the U.S. has passed through various phases that led to the formation of its present Telecommunication policy. Surprisingly, considering importance given to democratic

principles in all American fora, the telecommunication industry was quite the opposite at its inception. AT&T emerged as not only the leader, but also the monopoly in the telecommunication system in the United States from 1876 to 1893 (Alden, 2002, p. 4). Even after the Communication Act of 1934, AT&T preserved its status as a monopoly in the telecommunication market, and was sanctioned to be so by the government. It was thought that the presence of a monopoly would serve as a stable, unifying force for the newly emerging telecommunication system.

The AT&T group continued its dominance for an impressive tenure of more than eighty years. Although many other telecommunication companies resented the presence of its monopoly, there were sufficient technological and innovative advances made by AT&T in this period to offset any fears of serious legal retribution. Being sanctioned by the government to be a monopoly, AT&T did not have much to fear. This position was further consolidated by the role of AT&T in telecommunication aspects of national security and intelligence services (King & West, 2002, p. 196).

The break-up of the AT&T officially occurred in 1982 with the Justice Department bringing an anti-trust suit against it, and in 1983 the first mobile licenses were granted by the Federal Communication Commission (FCC) (King & West, 2002, p. 191). The anti-trust suit resulted in the divestiture of the AT&T Corporation. Thus, the period around the early 1980s saw a significant change in the telecommunication infrastructure in the U.S. At the same time, mobile services were newly deployed amid an uncertain telecommunication climate. As a result, although the U.S. is credited with the invention of mobile telephony (King & West, 2002, p. 189), the diffusion of the mobile telephone in the U.S. was not as rapid as expected.

These developments were followed by the Telecommunication Act of 1996, wherein all telecommunication facilities were deregulated, promoting competition in the industry. Thus, it took more than a century to deregulate the telecommunication industry in the U.S., and this abrupt change in the structure had an adverse effect on the mobile telephone industry. In particular, as compared with the Scandinavian countries and Japan, the U.S. showed an uncharacteristic reluctance to adopt the

mobile telephone (King & West, 2002, p. 191). Even now, when the mobile telephone seems quite ubiquitous, the penetration rate is just approaching 50% (ITU, 2003). Thus, there is still scope for diffusion. Further, with the median income being around $42,000 in 2000 (Alden, 2002, p. 2), and mobile telephone plans being quite affordable for this income range, the diffusion rate should only go up (for a complete list of the major service providers see Appendix B).

As mentioned previously, mobile telephone usage in the United States has grown at a phenomenal rate of 25% - 35% per year (Hausman, 1999, p. 188). Some researchers have likened the diffusion of the mobile telephone in the U.S. with the diffusion of the television in the U.S. in the 1940s and 1950s, comparing the phenomenal growth rates respectively. Some even contend that the mobile telephone is even more "popular" than the television (Rice & Katz, 2003, p. 598). This researcher believes that the comparison is unfair, as the mobile telephone seems to be more of a personal technology than the television. Television serves the needs of more people than the mobile telephone, which is usually treated as a more proprietary, individual possession. Thus, the diffusion rates of these technologies may not be comparable due to the nature of each innovation. However, irrespective of unfair comparisons, mobile telephony popularity shows no sign of waning in the near future.

Summary

Thus, comparing the two countries, it is apparent that although the United States might have suffered from a lag in the implementation of mobile telephony, it certainly preceded India. Further, economic conditions in the United States have been, and still are better than India, and subsequently, more conducive to the diffusion of mobile telephones. Mobile telephony is taking off well in urban India. However, in rural areas where almost 70% of the Indian population resides (Census of India, 1991), mobile telephony still has to prove itself (DoT Annual Report, 2003, p. V). Thus, the extent of diffusion of mobile telephones in India, although appreciable, is concentrated. This concentration of mobile telephones in urban areas may have implications on the measurement of the perception of

mobile telephones on a national level, as the measured values may depend on the area in which the study is conducted. In contrast, since the mobile telephones is relatively more uniformly distributed in the United States, the results obtained in the United States might be a more accurate representation of the population as a whole.

Chapter 3: Diffusion of Innovations and Perception

This thesis addresses the almost universally neglected question of the effect of innovativeness on the perception of individuals regarding their economic status. Past and current diffusion research has mainly focused on the process of diffusion, specifically the various aspects of the well established elements in the process, such as the characteristics of the innovation, the rate of diffusion of the innovation, the role of communication channels in the process of diffusion, and, more recently, the consequences of diffusion in the social system (see Rogers, 1995).

Here, the focus is on the attitude of individuals in different countries towards the perceived affluence of adopters of the innovation in their respective countries. This can be referred to as macro-level research. On the micro level, the question of interest is whether people as individuals regard themselves as being more affluent if they are owners of new communication technology (in this case, mobile telephone) than when they do not own the innovation, and how this differs across countries with different economic status. In a cross-cultural context, the thesis examines cultural differences in the perception of innovations, and the reasons for these differences.

The adopter categories of the people are of particular interest. According to Rogers (1995), there are five categories into which most adopters fall: innovators, early adopters, early majority, late majority and laggards (p. 263-265). The category of non-adopters is implicit in this categorization.

Innovators are the first adopters of an innovation, and generally characterized as daring, young, with a high income and well educated (Rogers, 1995).

Early adopters are considered "opinion leaders" (p. 354): they influence adoption / rejection of an innovation by the majority of the population, and have a close conformity with "system norms" (p. 26).

Early majority are described as "deliberate" (p. 264) adopters, who adopt just before the average member of society. They are followers of initial adopters, and constitute one-third of total adopters (Rogers, 1995).

Late majority are "skeptical"(p. 265) adopters, and adopt the innovation just after the average member of society. Similar to early majority, they also constitute one-third of total adopters. They usually adopt the innovation due to economic necessity or peer pressure (Rogers, 1995).

Laggards are the last adopters of the innovation. They are characterized as "traditional", and "suspicious of innovations" (p. 265). They usually have low incomes, low levels of education and are the older members of the social system (Rogers, 1995).

However, the economic condition of adopters alone does not predict their innovativeness. Moreover, it cannot be said that innovativeness increases linearly with income, as there is evidence to the contrary (Rogers, 1995, p. 270). Thus, the relation between income and innovativeness is unsubstantiated.

Perceived affluence is defined as the economic status of an arbitrary mobile telephone owner in relation to the innovation. Based on the time of adoption of the mobile telephone, this member will belong to a particular adopter category of the mobile telephone, or be a non-adopter. This will determine the extent of innovativeness of the individual and is expected to affect his/her perception of affluence. Thus, perceived affluence is dependent on innovativeness.

Innovativeness, Perception of Innovation and Perceived Affluence

The concept of innovativeness has been subjected to considerable theoretical treatment. Rogers and Shoemaker defined innovativeness as "the degree to which an individual is relatively early in adopting an innovation than other members of his social system" (1971, p. 27). This concept was

revised by Midgley and Dowling (1978) who tentatively proposed that "innovativeness is the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experience of others" (p. 236). Hirschman (1980) used these conceptualizations and further developed the concept of innovativeness in relation with "novelty seeking and creativity" (p. 283).

This study follows the conceptualization proposed by Rogers (1995), where the time-order of adoption is the criterion on which innovative behavior is measured.

There have been some studies regarding attitude change as a result of introduction and subsequent diffusion of an innovation in a social system. Post-adoption studies abound; for example, Rodgers and Chen (2002) analyzed the post-adoption attitudes of advertising executives towards Internet advertising. Karahanna, Straub and Chervany (1999) studied pre-adoption and post-adoption beliefs of information technology users, concluding that social norms affected to a great extent the actual adoption of the information technology, while the adoption intention was solely influenced by personal attitude.

Further, Wells and Anderson (1997) studied the diffusion of the use of the Internet as an instructional tool among prospective educators. They not only measured the pre-adoption and post-adoption attitudes of the subjects under study, but also the attitude of the subjects towards the new technology during the process of diffusion. They found that, in general, the attitude towards Internet instruction became more positive with time.

In an attempt to map the cognitive structure of adopters at different steps in the diffusion process, Barnett and Siegel (1988) studied the diffusion of computer-assisted legal research (CALR) systems. They found that an individual's "cognitive structure" was related to the stage at which he/she was in the innovation-decision process (p. 232). Especially pertinent to this study was the association drawn between "perceptions and attitudes" and the diffusion process: "there are systematic cognitive differences in how potential adopters perceive the innovation, its attributes, existing practices, and the

self at various stages in the innovation-decision process" (p. 226).

However, studies concerning the perceptions of individuals, adopters as well as non-adopters, towards the self as well as other members of their social system are scarce. One of the oft-cited studies related with perception and the diffusion of innovations is the study of the effect of perceptions of the innovation and their effect on its diffusion (Ostlund, 1974). It was found that the effect of perception of the characteristics of an innovation (relative advantage, compatibility, trialability, complexity and observability) had a greater effect on the diffusion of some products than personal characteristics (e.g. family income) of the individuals surveyed. However, this contention has been questioned by various scholars (Im, Bayus & Mason, 2003; Midgeley &Dowling, 1978), who claim that personal characteristics (like age or income) are far better indicators of innovativeness. Im, et al. (2003) contend that this is especially valid considering consumer electronics. In another study, Venkataraman (1991) claims that both the cognitive structure of the innovators as well as the type of product being adopted will determine which characteristics of the innovation become important in causing adoption. Thus it is implied that in the final analysis, it is the innovation's attributes that prompt adoption. However, the perceptions of adopters and non-adopters with regard to the innovation and the social system differ significantly. There are not many studies that provide evidence to answer this question.

This thesis considers the perception of the innovation by individuals in different cultures. It further looks at the innovation characteristics developed by Rogers (1995) and relate differences in their perception to differences in culture.

Therefore, this thesis examines the perception of adopters and non-adopters regarding their economic status as related to the innovation, and the perception of individuals regarding the innovation. Also, cultural differences in the difference in perception of innovations are examined. Further, the theory of diffusion of innovations is subjected to an empirical examination.

Perception of Class Inequality

Diffusion of innovations deals with socioeconomic status, but not on a cognitive level. The

profile of the innovator includes membership in the more affluent social class, although this alone is not a complete predictor of innovativeness (Rogers, 1995, p. 269-270). In this thesis, socioeconomic class perceptions are also tested. There have been various studies in this area, although mostly in a non-diffusion context.

Robinson (1983) examined the differences in perceptions of social class inequality between the people of the U.S. and Great Britain. In this widely cited study, perceptions of class inequality were defined as:

> "…people's impressions of the nature and extent of inequality in the opportunities available to particular social groups, in the treatment accorded them by other social groups and institutions, and in the conditions of life that they experience" (Robinson, 1983, p. 345).

This study found that perceptions of inequality were independent of a person's class. It contended that both affluent and "disadvantaged" (p. 365) people view the class structure in society as equal. However, these results are limited to the two countries under study.

In another American study, Vanneman and Pampel (1977) state that the position of individuals in social classes necessarily affects their perceptions of "class and status" (p. 423). Evans, Kelley and Kolosi (1992) examined the perceptions of people regarding the organization of the social class structure, and where they placed themselves and others. They found support for the assertions that the richer one was the greater his/her estimated income of others was and that the richer one was, the poorer one expected others to be. These apparently contradictory claims are explained when the estimated income is associated with various social classes, higher as well as lower. This was a cross-cultural study (it was conducted in Australia and Hungary). Thus, it lends greater generalizability to their findings, and is especially pertinent to this study.

Dar, Erhard and Resh (1998) examined the criteria on which children and adolescents base their social class distinctions. It was found that cognitive ability influenced class perceptions the most,

and other socioeconomic factors, including ethnicity, were not very important. In another study, Gronhaug and Trapp (1988) found that consumers associated particular brands of consumer products with particular social classes. If extended to include particular products instead of brands, this could have important ramifications for this study.

Effect of culture on perception

Maitland (1995) uses the definition given by Geertz (1973, as cited in Maitland 1995) to form her own definition of culture as "…socially learned behaviors, beliefs, and values the members of a group or society share" (Maitland, 1995, p. 271). Hofstede (1991) describes culture as "the collective programming of the mind which distinguishes the members of one human group from another" (p. 25). The collective nature of culture is stressed upon.

With regard to cross-cultural research, Hofstede (1980, 1991) recommended that culture be operationalized by identification of its dimensions. These could then be studied in international research. Hofstede (1980) surveyed the values perceptions of IBM employees in 53 countries over a period of seven years (from 1967 to 1973). Statistical analyses revealed that cultures differed in systematic ways. Hofstede (1980) established popular cultural indices that rank countries (and by extension, the individuals in these countries) along the dimensions of power distance, uncertainty avoidance, individualism vs. collectivism, masculinity vs. femininity and, more recently, long-term orientation.

Power distance is "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (1991, p. 28). Countries with high power distance are more repressive, and those with low power distance are more democratically aligned (Hofstede, 1980).

Uncertainty avoidance refers to the extent to which a culture can accept uncertainty. It is defined as:

"the extent to which people within a culture are made nervous by situations which they perceive as unstructured, unclear, or unpredictable, situations which they therefore try to avoid by maintaining strict codes of behavior and a belief in absolute truths" Hofstede (1986, 307-308). Countries with a high uncertainty avoidance score are more rigid and rule-based (to reduce uncertainty), and countries with a low uncertainty avoidance score are less rule-based and less rigid.

Individualism is related to cultures where "ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family" (Hofstede, 1980, p. 51). Conversely, in *collectivistic* cultures "people from birth onwards are integrated into strong, cohesive ingroups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (p. 51). Individuals in highly individualistic cultures value their independence and are concerned with their own interests. Collectivistic cultures value group interest over individual interest and support group values and beliefs (Hofstede, 1980).

Masculinity refers "to societies in which social gender roles are clearly distinct. *Femininity* pertains to societies in which social gender roles overlap" (p. 82-83). Highly masculine cultures are more differentiated in terms of sex roles, value ambition, aggressiveness, money, achievement, performance and assertiveness. Feminine cultures have less rigid sex roles, value people, the quality of life, helping others, preserving the environment, and being unobtrusive (Hofstede, 1980).

Thus, the being a member of a particular nation-state is deemed as causing the likelihood of certain perceptions in these individuals. For example, consider the indices for India and the U.S. in Table 1.1.

	Power Distance	Uncertainty Avoidance	Individualism	Masculinity	Long term orientation
India	77	40	48	56	61
U.S.	40	46	91	62	29

Table 1.1: Hofstede's cultural data for India and the U.S. (Data obtained from http://spectrum.troyst.edu/~vorism/hofstede.htm)

It can easily be inferred that according to these cultural indicators, Indians, as a national group,

are considered more likely to accept imbalances in social structure (power distance), more tolerant of uncertainty than their American counterparts, less individualistic, and having a more long-term orientation. Interestingly, India scores lower on the masculinity index than the U.S., implying that there is less gender discrimination in India than in the U.S. Thus, Hofstede (1984) implies that perceptions of individuals in different countries differ significantly.

There have been various other studies that examine the effect of culture on cognition, and on perceptions of the self (Aaker, 2000; Hempel, 1974; Markus & Kitayama, 1991; Massey, Montoya-Weiss, Hung & Ramesh, 2001; Triandis, 1989). Massey, et al. (2001) explored whether cultural differences existed in GVTs (Global Virtual Teams) and how this affected "positive or negative reactions to communication and to technology"(p. 83). They claim that culture has a part to play in the development of an individual's "communication behavior" and perceptions (p. 84). Maitland (1995) proposed a generalized theory linking the characteristics of innovation adopters with Hofstede's dimensions.

Thus, there is a general agreement that belonging to a culture does affect the perception of individuals, causing different reactions to similar concepts. There are some scholars who disagree, for example Hempel (1974) found that cultural differences were not significant in explaining the buying decisions made by families: here gender was seen to be a more powerful predictor of the decision. But, while culture may not be a powerful indicator of consumer product buying decisions, most scholars agree that it has a part to play in the shaping of individuals' perceptions.

Along the same lines, this study will measure, on a cross-cultural plane, the perceived affluence of mobile telephone owners, as estimated by members in a social system. In particular, Asian Indian and North American attitudes towards ownership of an innovation and belonging to a particular socioeconomic class will be measured. Various studies mentioned above ascertain that belonging to a particular class affects individuals' perceptions. In this thesis, it is posited that this variation in perception is a result both of the culture of the adopters and their membership in certain socioeconomic

groups.

Chapter 5: Cross-national diffusion studies

Cross-cultural studies related with the effect of culture on the diffusion of innovations (mainly consumer products) abound. These studies usually follow two tracks: either for globalization or against. The studies emphasizing globalization are based on Levitt's (1983) contention that in today's world, marketing strategies should be uniform across countries as the world is converging in the cultural context, that is, people are assimilating into the "world culture" (see Appadurai, 1990, as cited in Steenkamp, 2001). According to Steenkamp (2001), although there exists "systematic variation" between the cultures of different countries, the mass media are reinforcing a global culture. Thus, the level at which culture is operationalized is important, and it is fairly valid at the national level (p. 36). Steenkamp further relates the cultural dimensions developed by Hofstede with national level variables, for example, economically stronger nations are higher on the individualism index, and low on uncertainty avoidance and power distance (p. 39).

Other studies contend that product acceptance in countries is moderated by the culture (Yeniyurt & Townsend, 2003) and that there is, in fact, "evidence of increased divergence" (p. 378). Some of these studies use the four cultural dimensions given by Hofstede (1984) - power distance, individualism, uncertainty avoidance and masculinity. Others use different cultural frameworks (Steenkamp, 2001; Steenkamp, Hofstede & Wedel, 1999) and country level variables. The results of these studies are fairly reliable, as there exist a variety of replications of the various hypotheses (see Kumar, Ganesh & Echambadi, 1998 for replication studies).

Many studies are dissatisfied with the pronouncement of globalization taking place. Diffusion patterns across countries are predicted by national level variables, and are found to differ for different countries. Steenkamp, et al. (1999) found "systematic differences in innovation between countries" and also found that a country's cultural characteristics affected individuals' cognition (p. 65). Gatignon, Eliashberg and Robertson (1989) sought to develop a model to predict cross-national diffusion based

on characteristics such as cosmopolitanism and sex roles. They also found some support for "systematic patterns of diffusion" (p. 245). Dekimpe, Parker and Sarvary (1998) found that both "exogenous and endogenous" national variables were not significant predictors of a country's diffusion pattern. Thus, there is no definitive explanation for cross-national diffusion patterns.

Helsen, Jedidi and DeSarbo (1993) attempted to group countries based on similar diffusion patterns, but found that macro level variables (e.g. GNP) were insufficient to predict diffusion patterns. They found that the type of product being diffused had an effect on the predictive power of the model. In a similar attempt, Hsieh (2002) attempted to group countries based on identical brand images, which are thought to result from similar national characteristics, with no tangible results.

Some studies related with the lead-lag effect of diffusion in different countries may be pertinent here. In studying the international diffusion of technological innovations, Dekimpe, Parker and Sarvary (2000) found that if an increasing number of nations adopt an innovation, there is a stronger chance that other countries will adopt it too. Thus, the temporal discrepancy in adoption of an innovation has certain implications for the nations that adopt innovations later than others. Takada and Jain (1991) discovered that diffusion in these "lag" nations is affected both by their culture and by the time lag between the introductions of the innovation in different countries (p. 53). Culture is seen to affect the communication of and about the innovation, and time provides the opportunity to gain more information about the product. Hence, the possibility of imitation increases. Spatial closeness of countries and economic similarity of countries are not significantly related with this imitation "learning effect" (Ganesh, Kumar & Subramaniam, 1997). Tellefsen and Takada (1999) further contend that mass media availability also affects diffusion patterns in different countries. Finally, all studies take into account the limitation that the validity of results is reduced considering the type of innovation being diffused.

Most of the studies that have been conducted seek easily determined predictors of diffusion (like GDP and GNP). But these are not good predictors of diffusion (Helsen, Jedidi and DeSarbo,

1993). Some studies consider the culture of the countries under investigation at the macro level (Takada and Jain, 1991). Nonetheless, there is no consensus about a good predictor of innovativeness. Thus, the suggestion that the diffusion of innovations in different countries may vary because of differences in perceptions of people regarding these innovations is worthy of investigation.

Chapter 6: Theoretical Development

Cultural Differences in Innovativeness and Perception of Innovation Characteristics

Various studies have sought to investigate cultural influences on the diffusion of innovations. Maitland (1995) proposes a framework that integrates two of Hofstede's (1980) cultural indicators (uncertainty avoidance and power distance) and the theory of diffusion of innovations. Yeniyurt and Townsend (2003) test all of Hofstede's cultural dimensions in relation to new product adoption. Although Maitland (1995) does not explicitly mention the dimension of masculinity, it is addressed implicitly as "gender equality" (p. 282). She has set forth some hypotheses that, while not tested empirically in her study, provide a good foundation for cross-cultural diffusion research.

Individuals in countries with a high score on the power distance dimension value "status symbols" (Maitland, 1995, p. 281). According to Maitland (1995), these individuals would be more likely to adopt interactive innovations. Similar assertions are made, tested and confirmed by Yeniyurt and Townsend (2003), although these are not restricted to interactive innovations. However, the innovations tested did include the mobile telephone, which is an interactive innovation that might be considered a status symbol (Maitland, 1995, p. 281).

Considering "interactive networks" (Maitland, 1995) in particular, Maitland hypothesizes that diffusion rates will be higher in countries that are low on the uncertainty avoidance index (p. 279). Thus, individuals in countries low on the uncertainty avoidance index would be more venturesome and

as a result more likely to adopt an interactive innovation, for e.g. mobile telephones (p. 280). Yeniyurt and Townsend (2003), find partial support for this assertion in the case of mobile telephones (p. 384). Considering consumer innovativeness in general, Steenkamp, et al. (1999) also found empirical support for this hypothesis.

Various researchers address the dimension of masculinity with regard to diffusion research. Less masculinity would imply greater acceptance of innovations. Yeniyurt and Townsend (2003) found that masculinity diminished a culture's acceptance of innovations (p. 384). Along similar lines, Maitland (1995) proposed that regions with greater "gender equality" would have higher diffusion rates for interactive innovations (p. 282). However, Steenkamp, et al. (1999) did not find support for this proposition. They found that diffusion rates in fact increased with increase in masculinity. Thus, there is no clear conclusion as to how masculinity is related to diffusion.

Considering the fourth cultural dimension, individualism, Steenkamp, et al. (1999) and Yeniyurt and Townsend (2003) found support for the assertion that more individualistic countries tend to be more innovative. Individualism is characterized by placing one's own interests higher than that of one's social group. Collectivistic cultures, value the interests of society are more than individual interests (Hofstede, 1980).

Let us again consider the four cultural dimensions with respect to India and the U.S.

	Power Distance	Uncertainty Avoidance	Individualism	Masculinity	Long term orientation
India	77	40	48	56	61
U.S.	40	46	91	62	29

From the above table, it can be inferred than the U.S. is more individualistic, more masculine, less status conscious (considering power distance) and less tolerant of ambiguousness (considering uncertainty avoidance). According to the above-mentioned studies, all these characteristics, possibly barring masculinity, reflect more innovativeness in a culture. This implies that the U.S. would possibly be more innovative than India.

Thus, the major research question of the thesis is:

R_1: Which of the two countries – India or the U.S. – is more innovative with respect to the mobile telephone?

An innovative culture may identify more with the innovation than a less innovative culture, and be more familiar with it. This familiarity may have certain implications for the perception of the characteristics of the innovation by different cultural groups.

Perceived Ease of Use: Considering Complexity.

Of particular interest here is one characteristic of innovations related with their ease of use, termed by Rogers (1995) as *complexity*. It is defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 1995, p. 242). The more innovative a culture, the lesser the perceived complexity of the innovation in question. This leads to the second research question:

R_2: Which of the two countries – India or the U.S. – perceives the mobile telephone as less complex to use?

Indians, having a lower uncertainty avoidance index than Americans, may accept an innovation more easily, thereby increasing their interaction with it. This increase in interaction may lead to decrease in perceived complexity. Thus, it would be interesting to see how mobile telephone technology is perceived in two distinct cultures.

Reducing Uncertainty Through Communication.

The U.S. scores slightly higher (46) on the uncertainty avoidance indicator than India (40). Thus, Americans would probably seek out more uncertainty reducing factors of mobile telephones. Based on the above difference on the uncertainty avoidance dimension, one can expect that the perceptions of Indians and Americans regarding the uncertainty reducing features of mobile telephones may differ. Americans might perceive the mobile telephone's uncertainty reduction characteristics (e.g. communication facility) as more favorable that Indians. This leads to the third research question:

R_3: Which of the two cultures considers the mobile telephone's uncertainty reduction features more important?

Cultural Cohesiveness: Considering Compatibility and Collectivism.

The U.S. is immensely more individualistic (91) than India (48), which is quite collectivistic in comparison. This implies that Indians value cultural cohesiveness more than their American counterparts. Considering mobile telephones, the need to communicate with in-group members would be higher in cohesive cultures as opposed to less cohesive cultures.

It is worthwhile to mention the innovation characteristic of *compatibility* here. This is defined by Rogers (1995) as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 1995, p. 224). Thus, since the mobile telephone can be perceived as increasing likelihood of communication between in-group members, it may be more compatible with the values of Indians.

It would be interesting to see whether features of the mobile telephone reinforcing in-group behavior matter more to Indians or Americans. This leads to the fourth research question:

R_4: Which of the two cultures places more importance on the in-group reinforcing features of the mobile

telephone?

Cultural Differences and Perception of Affordability.

As stated previously, various scholars have studied the effect of culture on perception (Aaker, 2000; Hempel, 1974; Markus & Kitayama, 1991; Massey, Montoya-Weiss, Hung & Ramesh, 2001; Triandis, 1989). Hofstede's cultural indicators study (1980) is perhaps the most prominent among empirical cultural studies.

According to Hofstede's cultural dimensions (1980), the U.S. scores much lower (40) than India (77) on the power distance dimension (see Table 1.1 for details on cultural dimensions for the U.S. and India). This indicates that status roles are much more rigidly defined in India than in the U.S. The perception of higher status may include the perception of higher income (Rogers, 1995, p. 269), and hence, affordability.

Considering socioeconomic conditions in the two countries, the U.S. is richer than India, as reflected by its GDP, and India's population is much larger than that of the U.S. (see Table 6.1).

Country	Gross Domestic Product (in billions of dollars)	Population
United States	9196.4	288.6 million
India	515.0	1.0 billion

Table 6.1: 2002 data from World Bank and OECD for India and the U.S. respectively

Thus, it is apparent that economic conditions in the U.S are better than that in India. This is reflected in the World Bank's classification of India as a "low income" country and the U.S. as a "high income" country (World Bank, 2004). India and the U.S. differ economically, and this may lead to differences in the socioeconomic climate and infrastructure in the two countries. These differences may affect their inhabitants' perception of status. U.S. and India also differ on the power distance

dimension, which is related to perception of status (Maitland, 1995, p. 281). The mobile telephone was introduced in India almost 12 years after the U.S., and this might have an additional effect on perceptions related to affordability of the mobile telephone in India and the U.S. This leads to the fifth research question:

R_5: How do perceptions of Indians and Americans differ regarding the affordability of the mobile telephone?

Innovativeness and Perception of Socioeconomic Class

Social class perceptions have been studied extensively (Dar, Erhard & Resh, 1998; Evans, Kelley & Kolosi, 1992; Gronhaug & Trapp, 1988; Robinson, 1983; Vanneman & Pampel, 1977). However, the relationship between the social class membership of individuals and their perceptions of social classes is unclear: some found a relationship (Vanneman & Pampel, 1977), while others did not (Robinson, 1983).

This thesis posits that innovativeness may affect the self-perceptions of individuals with respect to their socioeconomic status. It has been mentioned that economic status does not affect innovativeness (Rogers, 1995, p. 270). However, it will be investigated whether individuals' innovativeness affects their perception of their own economic status. As mentioned previously, innovativeness is measured as the point in time an individual comes in possession of the innovation since its introduction. Thus, the longer one owns an innovation, the more innovative he/she is, and consequently the richer one perceives oneself to be. This leads to the sixth research question:

R_6: How do individuals with different levels of innovativeness differ in their self-perceptions of economic status?

Summarizing all the research questions, the thesis examines whether cultural differences affect the innovativeness of individuals. Other aspects of innovations are also investigated with respect to cultural differences, for example perception of ease of use, perception of affordability, perception of uncertainty reduction and perception of in-group reinforcement. The effect of innovativeness on the perception of one's income is also investigated.

Chapter 7: Methodology

The research questions posited above were investigated using questionnaires in both India and the U.S. In each country, two questionnaires were administered: one open-ended questionnaire and one Galileo style pair-comparison questionnaire (Woelfel and Fink, 1980). Thus, there were, in all, four questionnaires administered to the different samples in India and the U.S.

Phase I: Using Content Analysis - CATPAC

Sample for the First Questionnaire.

The first questionnaire administered in both the U.S. and India was the open-ended questionnaire. In the U.S., this was administered to a sample consisting of 192 undergraduate students enrolled in an introductory communications course in a public university in the United States. A web-based survey tool was used to obtain data from undergraduates. Since access to the Internet is relatively easy in American universities, this did not pose a problem in data collection. Also, the level of computer literacy among American undergraduates is satisfactory, so none of the respondents reported any major difficulty in completing the survey. The survey was online and respondents could choose whether to participate in it or not. However, this survey resulted in a sizeable number of responses.

In India, the same questionnaire was administered after about five months later to a sample consisting of 70 graduate and undergraduate students at two colleges in India. These were paper-pencil based surveys, as the availability of the Internet in an average Indian academic institution is limited. Although this sample consists of some graduate students also, this is not expected to cause major bias

in the findings. The responses from the phase I questionnaire were analyzed with CATPAC (Woelfel, 1994).

Overview of CATPAC.

Kincaid et. al (1983) postulate that in order to ascertain how a culture responds to a particular issue, the concepts associated with it by that particular culture need to be known. They contend that these concepts may be related to the words used by that culture to describe the topic (p. 11). Thus, it may safely be assumed that these words can be deemed equivalent to the concepts, and thus uncovered linguistically.

The same assumption was made in this research. Thus, in order to uncover the main concepts underlying attitudes towards mobile telephones, a questionnaire consisting of open-ended questions related to various issues dealing with mobile telephones was constructed (see Appendix C for the complete questionnaire). The purpose of this questionnaire was to uncover the main concepts related with the mobile telephones as perceived by individuals. The answers to the questions were content-analyzed to uncover the main concepts related with mobile telephones using a content analysis software, CATPAC. CATPAC is:

"…a self-organizing artificial neural network that has been optimized for reading text. Catpac is able to identify the most important words in a text and determine patterns of similarity based on the way they are used in text" (Woelfel, 1994).

This software is based on a clustering algorithm, and forms clusters of related words. Thus, the software does not only tell us which words occur most frequently, but also how these words form different groups on the basis of their relations with each other (or the lack of these).

CATPAC was used to determine the concepts that may be considered most important by the sample under consideration. The first open-ended survey was conducted in the U.S. The concepts discovered were chosen on the basis of their frequency of occurrence in the text. Qualitative analysis by the researcher further narrowed down the number of concepts based on how well they represented

the issue under consideration. For example, grammar-determined words like articles ("a", "an" or "the"), most conjunctions and most prepositions were excluded from this analysis for obvious reasons. The concept *yourself* was added by the present researcher in order to measure the relation of all the above concepts with each respondent.

The Indian part of this questionnaire was also analyzed using CATPAC, and the concepts were found to be similar, although not identical, to the American concepts.

Content analysis of text related to individuals' perception of mobile telephones was carried out in order to ascertain the most important issues related to the same in each culture. These concepts were chosen by the researcher based on their frequency in individuals' responses, which may be thought to reflect their relative importance to the respondents. Thus, the choice of the concepts, while not foolproof, is sufficiently reliable (Barnett, 1972, p. 16).

These concepts were used to construct a pair-comparison questionnaire using the Galileo software, which is described in the next section.

Phase II: Using Metric Multidimensional Scaling - Galileo

Sample for the Second Questionnaire.

The second American sample is almost identical to the first, consisting of 339 students enrolled in an introductory communications course in a state university in the United States. The second questionnaire was administered in the U.S. about three months after the first U.S. survey, and is not expected to be significantly different from the first demographically.

The Indian sample used for the first questionnaire was also used for the second questionnaire. Thus, 70 responses were obtained for the second questionnaire. This survey was conducted immediately after the first survey.

In both the U.S. and India, the second questionnaire was paper-pencil based.

Overview of Galileo Theory and Method.

Kincaid et. al (1983) describe cultural processes as "…average representation[s] of a social

system" (p. 9). In order to obtain average representations of Indian and American perceptions regarding adoption of the mobile telephone, the Galileo theory and method (Woelfel and Fink, 1980) was used.

The Galileo software is designed to accept square dissimilarity matrices of the order N, where N is the number of concepts to be studied. For each individual in this study, there is one dissimilarity matrix that represents the cognitive structure of that individual related to the concepts under study. Each cell in this matrix represents the dissimilarity between the corresponding row and column concept. The larger this value, the more dissimilar these concepts. Each row of the matrix describes the relation of a particular concept with all other concepts under study (Barnett and Siegel, 1988). The matrices are averaged over a particular sample and an average matrix is formed, which represents the aggregate opinion of the particular collective under study. Metric Multidimensional Scaling (MDS) is used to obtain a geometric space of a particular culture, and this collective space can be compared with other cultural spaces using a least squares best fit approach (Woelfel, Saltiel, McPhee, Danes, Cody, Barnett & Serota, 1975). This best fit is obtained using rotation techniques, also integrated into the Galileo software.

The concepts obtained in the first survey (conducted in the U.S.) are used to construct the second questionnaire in order to measure perceptions of both cultures on the same reference frame.

Concepts and their measurement.

As mentioned, CATPAC was used to determine the important concepts related with mobile telephones. Various concepts regarding mobile telephones were discovered, of which the most important ones were chosen. The number of chosen concepts was restricted (in this case, 12) because of respondent-fatigue and reliability concerns (Barnett, 1972).

In the U.S. the final concepts chosen were:

1. Text Messaging
2. Affordable

3. Friends
4. Family
5. Easy
6. Camera
7. Expensive
8. Emergency
9. Convenient
10. Mobile/Cellular Telephone
11. Communicate
12. Yourself (Added by researcher)

The full analysis of U.S. responses is given in figures 1.1 and 1.2

TOTAL WORDS	4038	THRESHOLD	0.000
TOTAL UNIQUE WORDS	40	RESTORING FORCE	0.100
TOTAL EPISODES	4032	CYCLES	1
TOTAL LINES	2292	FUNCTION	Sigmoid (-1 - +1)
		CLAMPING	Yes

DESCENDING FREQUENCY LIST

WORD	FREQ	PCNT	CASE FREQ	CASE PCNT
I	1217	30.1	3583	88.9
PHONE	533	13.2	2588	64.2
PEOPLE	193	4.8	1137	28.2
CELL	191	4.7	1099	27.3
MOBILE	155	3.8	896	22.2
CALL	102	2.5	654	16.2
FRIENDS	94	2.3	641	15.9
FEATURES	78	1.9	492	12.2
CONTACT	72	1.8	479	11.9
TIME	69	1.7	454	11.3
FAMILY	64	1.6	432	10.7
AFFORDABLE	61	1.5	407	10.1
LIFE	61	1.5	387	9.6
HOME	60	1.5	409	10.1
TEXT	59	1.5	380	9.4
SERVICE	58	1.4	371	9.2
TOUCH	55	1.4	370	9.2
PLANS	50	1.2	313	7.8
SOMEONE	49	1.2	324	8.0
CALLER	45	1.1	307	7.6
ID	45	1.1	307	7.6
TELEPHONE	45	1.1	295	7.3
TALK	44	1.1	295	7.3
COMMUNICATE	42	1.0	278	6.9
EVERYONE	41	1.0	276	6.8
MESSAGING	41	1.0	266	6.6
EXPENSIVE	40	1.0	276	6.8
PRICE	40	1.0	250	6.2
ANYONE	39	1.0	264	6.5
DIFFERENT	39	1.0	241	6.0
GOOD	39	1.0	262	6.5
DISTANCE	38	0.9	239	5.9
PAY	37	0.9	235	5.8
EMERGENCY	36	0.9	252	6.2
BUY	35	0.9	232	5.8
CAMERA	35	0.9	222	5.5
MINUTES	35	0.9	226	5.6
CONVENIENT	34	0.8	238	5.9
FACT	34	0.8	232	5.8
EASY	33	0.8	220	5.5

ALPHABETICALLY SORTED LIST

WORD	FREQ	PCNT	CASE FREQ	CASE PCNT
AFFORDABLE	61	1.5	407	10.1
ANYONE	39	1.0	264	6.5
BUY	35	0.9	232	5.8
CALL	102	2.5	654	16.2
CALLER	45	1.1	307	7.6
CAMERA	35	0.9	222	5.5
CELL	191	4.7	1099	27.3
COMMUNICATE	42	1.0	278	6.9
CONTACT	72	1.8	479	11.9
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EVERYONE	41	1.0	276	6.8
EXPENSIVE	40	1.0	276	6.8
FACT	34	0.8	232	5.8
FAMILY	64	1.6	432	10.7
FEATURES	78	1.9	492	12.2
FRIENDS	94	2.3	641	15.9
GOOD	39	1.0	262	6.5
HOME	60	1.5	409	10.1
I	1217	30.1	3583	88.9
ID	45	1.1	307	7.6
LIFE	61	1.5	387	9.6
MESSAGING	41	1.0	266	6.6
MINUTES	35	0.9	226	5.6
MOBILE	155	3.8	896	22.2
PAY	37	0.9	235	5.8
PEOPLE	193	4.8	1137	28.2
PHONE	533	13.2	2588	64.2
PLANS	50	1.2	313	7.8
PRICE	40	1.0	250	6.2
SERVICE	58	1.4	371	9.2
SOMEONE	49	1.2	324	8.0
TALK	44	1.1	295	7.3
TELEPHONE	45	1.1	295	7.3
TEXT	59	1.5	380	9.4
TIME	69	1.7	454	11.3
TOUCH	55	1.4	370	9.2

Figure 1.1: Most frequently occurring words in the U.S. sample

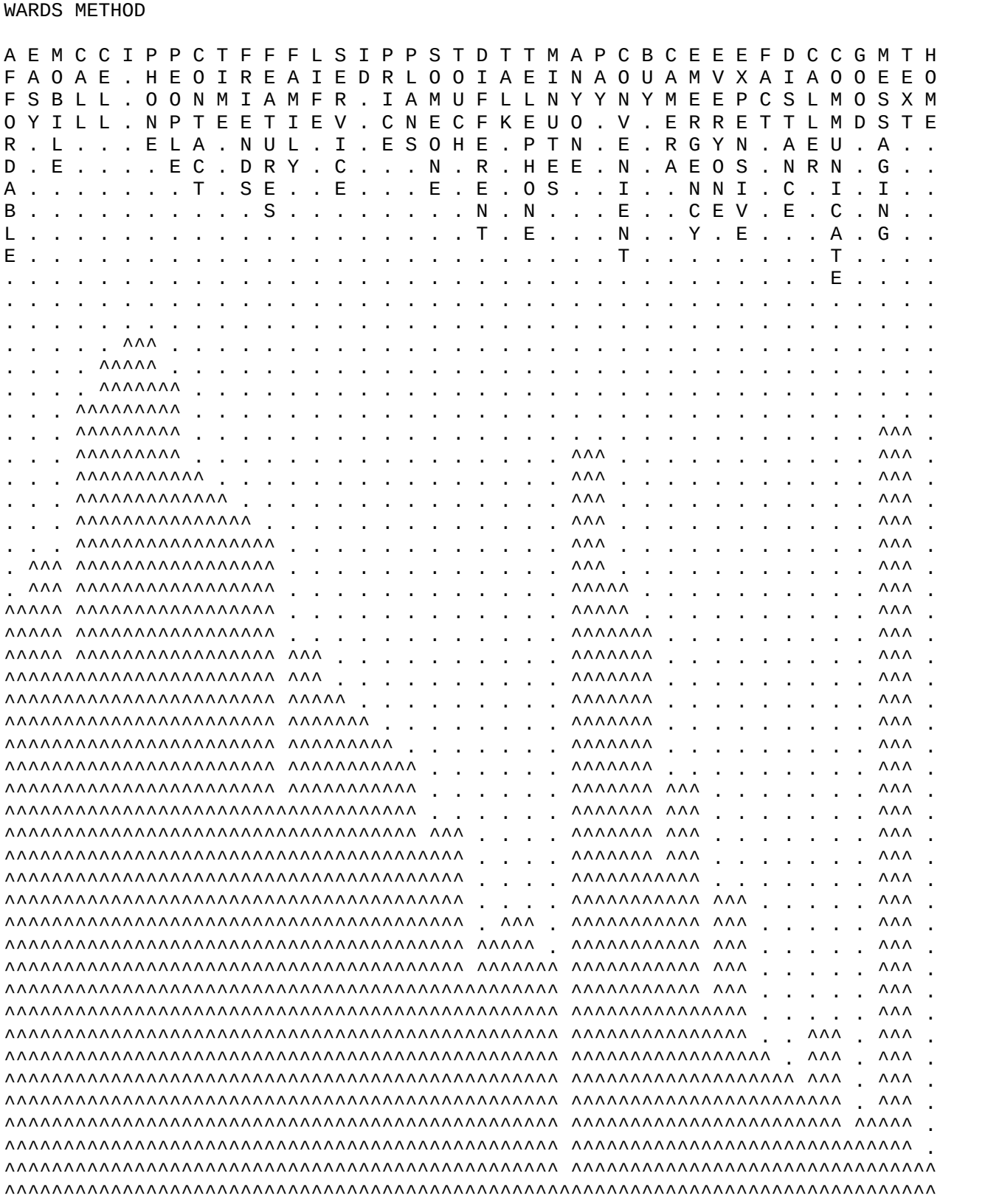

Figure 1.2: Most important concepts in the U.S. sample

In India, the most important concepts were:

1. Mobile/Cellular Telephone
2. Friends
3. Affordable
4. Communication
5. Family
6. Easy
7. Camera
8. Messaging
9. Connection
10. Internet
11. Games
12. Price

The full analysis is given in figures 1.3 and 1.4.

TOTAL WORDS	816	THRESHOLD	0.000
TOTAL UNIQUE WORDS	40	RESTORING FORCE	0.100
TOTAL EPISODES	810	CYCLES	1
TOTAL LINES	312	FUNCTION	Sigmoid (-1 - +1)
		CLAMPING	Yes

DESCENDING FREQUENCY LIST

WORD	FREQ	PCNT	CASE FREQ	CASE PCNT
I	73	8.9	365	45.1
MOBILE	62	7.6	334	41.2
FRIENDS	46	5.6	285	35.2
PEOPLE	45	5.5	267	33.0
AFFORDABLE	35	4.3	221	27.3
TOUCH	34	4.2	218	26.9
COMMUNICATION	33	4.0	197	24.3
FAMILY	33	4.0	221	27.3
EASY	32	3.9	182	22.5
CAMERA	25	3.1	150	18.5
PHONE	25	3.1	131	16.2
LIFE	22	2.7	136	16.8
MESSAGING	22	2.7	149	18.4
SMS	21	2.6	130	16.0
FEATURES	19	2.3	106	13.1
TIME	19	2.3	125	15.4
CALL	17	2.1	99	12.2
TELEPHONE	15	1.8	104	12.8
ANYWHERE	14	1.7	87	10.7
CONNECTION	14	1.7	93	11.5
COST	13	1.6	81	10.0
GOOD	13	1.6	77	9.5
INTERNET	13	1.6	86	10.6
CELL	12	1.5	60	7.4
BUY	11	1.3	73	9.0
CHEAPER	11	1.3	73	9.0
CONTACT	11	1.3	77	9.5
GAMES	11	1.3	77	9.5
HELPS	11	1.3	64	7.9
MOBILES	11	1.3	66	8.1
PRICE	11	1.3	65	8.0
EVERYONE	10	1.2	68	8.4
PARENTS	10	1.2	67	8.3
ANYTIME	9	1.1	63	7.8
CHANGED	9	1.1	63	7.8
COMMODITY	9	1.1	53	6.5
FACILITY	9	1.1	44	5.4
VIDEO	9	1.1	60	7.4
WORLD	9	1.1	63	7.8
BETTER	8	1.0	56	6.9

ALPHABETICALLY SORTED LIST

WORD	FREQ	PCNT	CASE FREQ	CASE PCNT
AFFORDABLE	35	4.3	221	27.3
ANYTIME	9	1.1	63	7.8
ANYWHERE	14	1.7	87	10.7
BETTER	8	1.0	56	6.9
BUY	11	1.3	73	9.0
CALL	17	2.1	99	12.2
CAMERA	25	3.1	150	18.5
CELL	12	1.5	60	7.4
CHANGED	9	1.1	63	7.8
CHEAPER	11	1.3	73	9.0
COMMODITY	9	1.1	53	6.5
COMMUNICATION	33	4.0	197	24.3
CONNECTION	14	1.7	93	11.5
CONTACT	11	1.3	77	9.5
COST	13	1.6	81	10.0
EASY	32	3.9	182	22.5
EVERYONE	10	1.2	68	8.4
FACILITY	9	1.1	44	5.4
FAMILY	33	4.0	221	27.3
FEATURES	19	2.3	106	13.1
FRIENDS	46	5.6	285	35.2
GAMES	11	1.3	77	9.5
GOOD	13	1.6	77	9.5
HELPS	11	1.3	64	7.9
I	73	8.9	365	45.1
INTERNET	13	1.6	86	10.6
LIFE	22	2.7	136	16.8
MESSAGING	22	2.7	149	18.4
MOBILE	62	7.6	334	41.2
MOBILES	11	1.3	66	8.1
PARENTS	10	1.2	67	8.3
PEOPLE	45	5.5	267	33.0
PHONE	25	3.1	131	16.2
PRICE	11	1.3	65	8.0
SMS	21	2.6	130	16.0
TELEPHONE	15	1.8	104	12.8
TIME	19	2.3	125	15.4
TOUCH	34	4.2	218	26.9
VIDEO	9	1.1	60	7.4
WORLD	9	1.1	63	7.8

Figure 1.3: Most frequently occurring words in the Indian sample

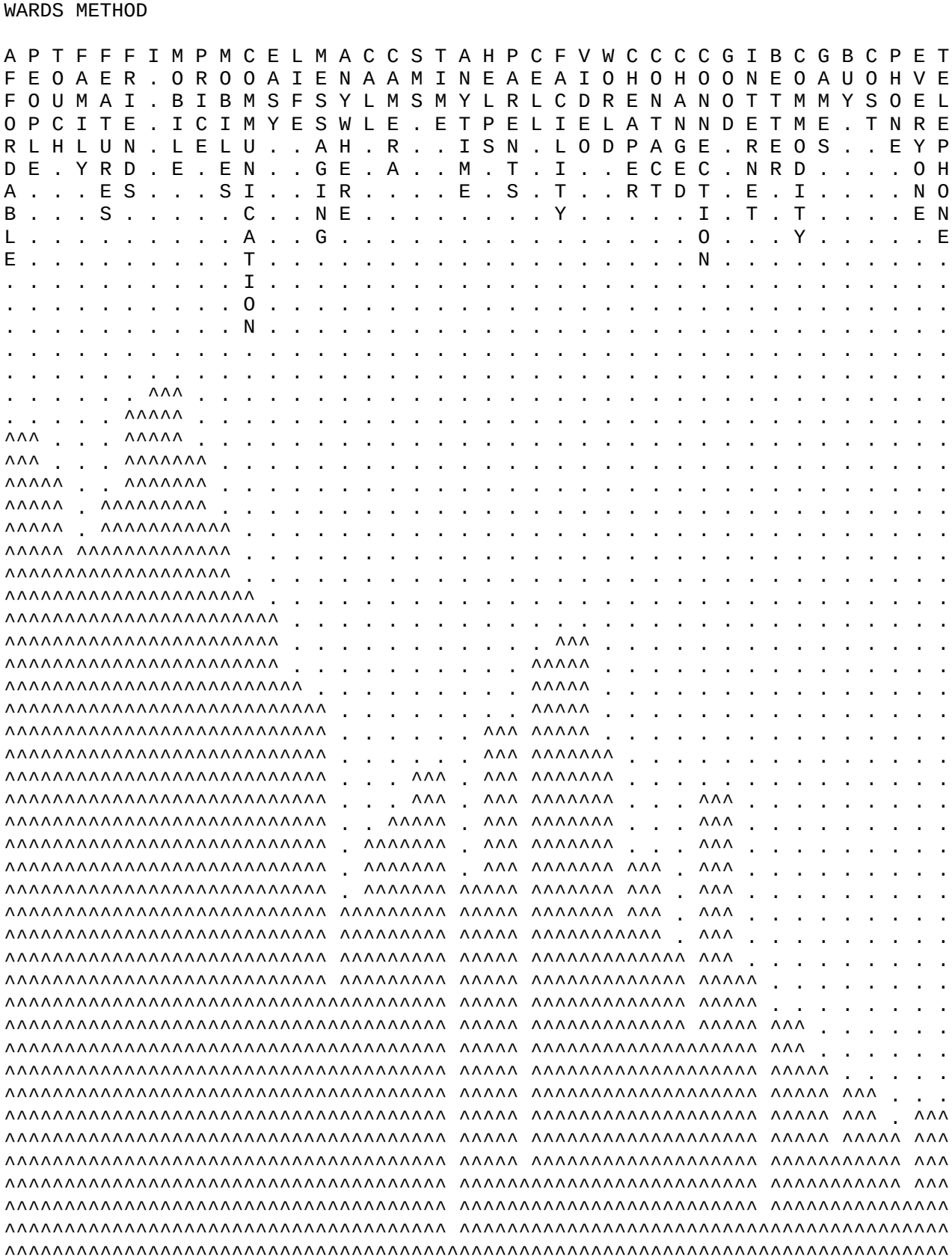

Figure 1.4: Most important concepts in the Indian sample

The concepts related to the Indian sample are quite similar to the American sample. Thus, the second survey in India consists of exactly same questions as the one in the United States.

The second questionnaire consists of pair-comparison type questions. These pair-comparisons "pair" the concepts, and the respondents are then asked to estimate the distance (or dissimilarity) between each possible pair based on a given standard of reference, in this case: "Affordable and expensive are 100 units apart". The measure of distance is a non-negative ratio measure. Comparison of the concept with itself is excluded from the analysis, as it is zero by definition. In this thesis, there are 12 concepts (n = 12). Thus, the respondents had to make n (n-1)/2 = 66 paired comparisons.

These data are analyzed using components of the Galileo software. The analysis of the pair comparison data led to the formation of multidimensional spaces, one for each culture, representing the perception of individuals regarding mobile telephones. The U.S. and Indian samples were first analyzed separately, and the results obtained were integrated onto the same reference frame by the process of rotation to form a common reference frame, using a facility provided by the Galileo software (see Figures 1.5, 1.6 and 1.7). This enables us to view the perceptions of the American and Indian respondents in the same multidimensional space. Using the perceptual maps and generated matrices, it can be inferred whether these cultures differ in their perception regarding mobile telephones.

Measuring Innovativeness.

In order to measure innovativeness, the respondents in both the samples were asked whether they own a mobile telephone currently, and if so, the period that they have owned it. The earlier a person's reported mobile telephone adoption date, the greater his/her innovativeness, where innovativeness is measured in the number of years the mobile telephone has been in use. Thus, the greater the number of years of use, the higher the innovativeness of an individual. This is consistent with Rogers and Shoemaker's definition of innovativeness as the period of innovation ownership (1971, p. 27).

Along with these questions, various demographic questions, including self-reported household income, are also asked (see Appendix D).

Equivalence of samples: Maximizing Cultural Differences

The Indian and the American samples were chosen such that cultural differences between them would be maximized. Various demographic characteristics, such as age, gender or education are listed in Table 7.1 for detailed comparison. The individuals in both samples are college students. Thus, there are minimum age-related differences. There may be socioeconomic differences considering the economies of India and the U.S., but the Indian sample consists of higher-income individuals, that, while not representative of the entire Indian population, may be comparable to the U.S. sample. Education exhibited some difference, with the Indian sample more highly educated than the U.S. sample, but that may be due to the presence of more graduate students in the Indian sample or misunderstanding of demographic questions in the different cultures.

	Average age (in years)	Average Income (in $)	Education	Gender
India	22.05	47132.34	High School: 8.6 % Diploma: 4.3 % Bachelors: 72.9 % Masters: 7.1 % Ph.D.: 2.9 % Others: 1.4 %	Males: 60.0 % Females: 37.1 %
United States	20	81652.88	High School: 72.2 % Associate: 12.7 % Bachelors: 9.8 % Masters: 0.0 % Ph.D.: 0.3 % Others: 4.1%	Males: 59.5 % Females: 30.2 %

Table 7.1: Comparison of demographic data for U.S. and Indian samples

The income in the Indian sample was converted to U. S. dollars, but not using the current

exchange rate. The exchange rate is not a correct predictor of the buying power of individuals. According to the OECD,

"Purchasing Power Parities (PPPs) are currency conversion rates that both convert to a common currency and equalize the purchasing power of different currencies. In other words, they eliminate the differences in price levels between countries in the process of conversion" (OECD, 2004).

In this thesis the purchasing power parity (PPP) of India with respect to the U.S., which was 8.7 per U.S. dollar for 2000, is used to compute the income of Indians in dollars (World Bank, 2002). This renders the comparison of the two incomes possible and error-free. SPSS was used to compare the U.S. and Indian samples for the second survey, and it was found that the samples, barring possibly the income range, are quite comparable.

Thus, the goal of maximizing cultural differences while minimizing all other differences seems to be met in the cross-national samples, although with some limitations. The implications of the differences in demographics between the Indian and American samples will be discussed in the results chapter.

Reliability and Validity

According to Barnett (1972), the reliability of a MDS instrument cannot be measured by computing coefficient alpha, because "this method assumes unidimensionality of the items in the test" (p. 9). Also, the individual pair comparisons used in this research are not independent, which would be required by the coefficient alpha test. As this thesis deals with multidimensional measures, reliability needs to be computed using other means. Barnett (1972) further suggests that for MDS instruments, reliability can be measured by the test-retest method. In this case, temporal and spatial limitations restricted the possibility of conducting a retest. Thus, past studies are relied upon to provide credence to the reliability of the Galileo procedure (Woelfel and Fink, 1980).

The reliability of the questionnaire with respect to the number of pair-comparisons is affirmed

by Barnett's (1972) conclusion that the shorter the study, the more reliable it is. Since the number of concepts obtained in the open-ended questionnaires was more than 12, selection of the most important ones on the basis of their frequency of occurrence in responses is justified in the light of making the study more reliable.

There were 339 U.S. respondents and 70 Indian respondents. The different sample sizes may be thought to affect reliability of the study, but these were analyzed separately, and only the aggregate perceptions were compared. Thus, variation in sample size of the U.S. and Indian samples does not reduce the reliability significantly.

The generalizability of the results is restricted by the nature of the samples, which consist of middle-income college students. Ideally, a stratified sample (Barnett, Hamlin & Danowski, 1981, p. 462) representing all social classes for each country would be desirable to measure cross-cultural perceptions, but this was unavailable to the present researcher. However, there was minimal difference in the nature of the Indian and American samples, which led to greater reliability in comparison, as all differences except cultural ones were factored out.

Summary

Thus, the concepts related to mobile telephones are very similar in both U.S. and India. These were obtained using content analysis of answers to open-ended questions. CATPAC was used to perform the content analysis, and the major concepts identified were: Text Messaging, Affordable, Friends, Family, Easy, Camera, Expensive, Emergency, Convenient, Mobile/Cellular Telephone and Communicate. The twelfth concept, Yourself, was added by the researcher in order to measure the relations of the other concepts with the self. The Galileo method and theory were used to obtain different cultural spaces for the U.S. and India, and to compare these. The results are presented in the next chapter.

Chapter 8: Results

The pair comparison questionnaires in the U.S. and India yielded raw data that were used by the Galileo software to form perceptual maps of the two cultures related to mobile telephones. The raw data consisted of self-reported measures of distances between each pair of concepts, given a standard of reference. The concepts used in the pair-comparison were: Text Messaging, Affordable, Friends, Family, Easy, Camera, Expensive, Emergency, Convenient, Mobile/Cellular Telephone, Communicate and Yourself. The standard of reference used was: “Affordable and Expensive are 100 units apart”. The questionnaires administered in the U.S. and in India were exactly similar in the pair-comparison questions; the only changes were in some demographic questions (see appendix D for both questionnaires).

The Galileo software was used to analyze the data for both countries. The data were analyzed separately for each country at first, and some data were first combined and then analyzed so that the countries could be compared. “999” was set as the maximum value to be considered in the analysis, and reported values over 999 were excluded. This exclusion has been used in various studies conducted using the Galileo theory and does not significantly affect the analyses (Barnett and Siegel, 1988, p. 229).

The graphic representation of concepts in India and the U.S. serve as a good representation of the placement and movement of the concepts. Figure 8.1 represents the first two dimensions of the cultural space of respondents from the U.S. The first two dimensions accounted for 59.7% of the variance in the U.S. cultural space, and they serve as a good visual representation of its spatial structure.

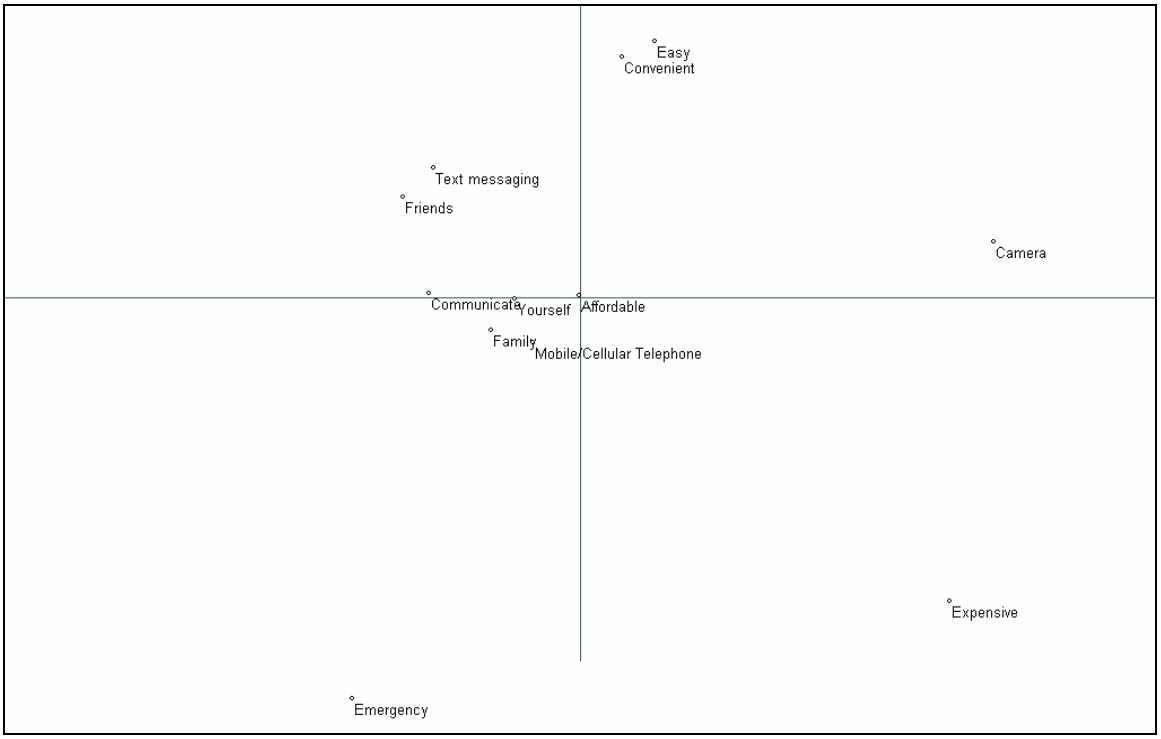

Figure 8.1: Perceptions of Americans regarding mobile telephones

Figure 8.2: Perceptions of Indians regarding mobile telephones

Figure 8.2 represents the first two dimensions of the cultural space of respondents from India. The first two dimensions accounted for 64.4% of the variance in this cultural space, and they also serve as a good visual representation of its spatial structure.

In order to compute the aggregate perception of a culture, the mean of the distance between each concept pair was generated. The software used for this analysis was the v56 facility provided by the Galileo suite of software. The software v56 does not recognize demographic formats, which were also included in the data. However, apart from flagging the occurrences of the demographics, there was no adverse effect on the analyses (refer to Appendix E for demographic flags). The mean distances and the standard deviations about these means for both cultures are given in Table 8.1.

However, these distances may not be comparable, as Americans might simply be choosing larger numbers as compared to Indian (the American mean is 42.09 and the Indian mean is 35.00). Thus, for comparison, the mean distance for each concept-pair is divided by the corresponding overall mean to yield a normalized score. For example, if Text Messaging and Affordable are to be compared, the mean distance between the two concepts in India will be divided by the Indian grand mean for all concept-pairs, and that in the U.S. will be divided by the American mean for all concept-pairs. These two scores can be considered “normal” scores, and are comparable. For ease of comparison these have been multiplied throughout by 10. Henceforth all the distances mentioned in discussion will be the normalized distances.

		India		United States	
CONCEPT PAIR		MEAN	STAN. DEV.	MEAN	STAN. DEV.
Text Messaging	Affordable	28.123	32.374	43.489	43.878
Text Messaging	Friends	25.394	30.825	32.822	32.569
Text Messaging	Family	23.328	26.803	44.830	42.777
Text Messaging	Easy	25.857	31.093	30.571	41.262
Text Messaging	Camera	49.226	35.946	65.740	40.562
Text Messaging	Expensive	50.576	35.152	54.305	35.517
Text Messaging	Emergency	35.063	35.734	55.364	52.416
Text Messaging	Convenient	27.523	31.399	30.124	31.003
Text Messaging	M/C Phone	27.875	35.071	21.943	42.359
Text Messaging	Communicate	23.754	32.550	21.205	40.819
Text Messaging	Yourself	40.955	36.500	56.746	46.496
Affordable	Friends	41.359	34.538	47.310	40.841
Affordable	Family	37.188	33.009	48.822	44.535
Affordable	Easy	38.787	39.732	38.347	35.394
Affordable	Camera	67.375	57.375	60.612	41.206
Affordable	Expensive	75.100	70.464	82.318	35.962
Affordable	Emergency	41.458	37.720	63.021	50.292
Affordable	Convenient	27.180	28.578	36.324	34.456
Affordable	M/C Phone	38.063	32.371	46.510	31.614
Affordable	Communicate	28.714	28.837	45.786	41.902
Affordable	Yourself	35.694	38.579	49.448	46.720
Friends	Family	27.806	30.605	23.348	28.981
Friends	Easy	31.919	32.736	39.106	34.664
Friends	Camera	53.000	42.583	47.859	34.806
Friends	Expensive	50.233	47.935	64.437	44.317
Friends	Emergency	35.016	40.357	46.511	35.053
Friends	Convenient	22.836	26.117	34.920	34.766
Friends	M/C Phone	28.435	27.599	29.329	39.879
Friends	Communicate	25.597	28.422	20.644	27.305
Friends	Yourself	27.984	31.693	21.801	28.968
Family	Easy	21.467	25.812	37.774	35.021
Family	Camera	47.684	38.140	46.393	33.779
Family	Expensive	43.188	33.587	54.135	40.748
Family	Emergency	30.323	32.025	38.066	50.152
Family	Convenient	25.875	28.973	33.696	35.779
Family	M/C Phone	28.967	35.130	34.433	36.551
Family	Communicate	27.825	31.016	23.197	28.382
Family	Yourself	22.644	30.023	20.931	28.492
Easy	Camera	43.373	34.553	37.636	32.966
Easy	Expensive	51.541	40.290	57.799	44.066
Easy	Emergency	30.317	35.281	61.721	41.784
Easy	Convenient	21.710	25.507	23.072	31.833
Easy	M/C Phone	24.246	25.773	29.600	32.265
Easy	Communicate	23.387	26.871	27.544	29.797
Easy	Yourself	33.932	36.373	39.294	43.621
Camera	Expensive	39.098	34.470	42.725	33.481
Camera	Emergency	58.333	39.526	67.862	42.586
Camera	Convenient	38.717	32.774	42.116	34.532
Camera	M/C Phone	44.814	38.584	42.250	53.830
Camera	Communicate	46.483	33.187	47.764	43.350
Camera	Yourself	44.949	35.652	51.269	35.597
Expensive	Emergency	39.086	31.981	55.098	43.903
Expensive	Convenient	52.804	32.785	57.526	37.446
Expensive	M/C Phone	42.879	33.755	46.201	33.565
Expensive	Communicate	44.724	33.132	54.943	37.739
Expensive	Yourself	47.192	42.501	54.772	40.576
Emergency	Convenient	28.707	31.169	60.535	40.933
Emergency	M/C Phone	25.224	34.273	28.560	32.887
Emergency	Communicate	22.915	26.094	34.617	36.653
Emergency	Yourself	30.630	32.527	48.034	37.327
Convenient	M/C Phone	24.207	27.106	25.894	44.358
Convenient	Communicate	24.550	27.849	37.883	98.149
Convenient	Yourself	23.298	27.263	32.494	34.158
M/C Phone	Communicate	20.649	26.812	21.609	33.563
M/C Phone	Yourself	22.786	28.883	30.848	35.916
Communicate	Yourself	19.745	26.891	25.801	32.759
GRAND MEAN		**35.00**		**42.09**	

Table 8.1: Mean distances between concepts for India and the United States.

Considering the maximum and minimum distances for both samples, it was found that the concepts “Affordable” and “Expensive” were judged to be the farthest concepts by both Indians (21.46) and Americans (19.56). This is not surprising as these concepts formed the criterion pair – “Affordable and Expensive are 100 units apart”. However, concepts between which distance was judged to be minimal differed for both cultures. For the Indian sample, the concepts closest to each other were “Communicate” and “Yourself” (5.64), whereas for the American sample the closest concepts were “Communicate” and “Friends” (4.9). This is interesting as it implies the identification of the self with respect to the need to communicate in case of the Indian sample, and the importance of the need to communicate with friends in case of the American sample.

The movement (or distance) of a concept in one cultural space relative to the corresponding concept in the other cultural space is represented in Table 8.2.

Concept 1 (Text Messaging	) moved	13.670	units.
Concept 2 (Affordable	) moved	11.710	units.
Concept 3 (Friends	) moved	9.197	units.
Concept 4 (Family	) moved	11.089	units.
Concept 5 (Easy	) moved	15.852	units.
Concept 6 (Camera	) moved	9.096	units.
Concept 7 (Expensive	) moved	13.912	units.
Concept 8 (Emergency	) moved	22.496	units.
Concept 9 (Convenient	) moved	9.657	units.
Concept 10 (Mobile/Cellular Telephone	) moved	7.418	units.
Concept 11 (Communicate	) moved	11.755	units.
Concept 12 (Yourself	) moved	13.224	units.
Grand Mean		**12.423**	**units.**

Table 8.2: Distance between corresponding concepts in the two cultures

The mean distance between corresponding concept-pairs (e.g. text messaging in India and text messaging in the U.S.) was 12.423, which is quite low. Concepts with higher movements than the mean were Text Messaging, Easy, Expensive, Emergency and Yourself. This would imply that the perceptions of Indians and Americans regarding these issues are different, particularly when related to the mobile telephone. Thus, the above-mentioned subset of concepts exhibited above-average difference in the two cultures.

However, many concepts exhibited lower levels of movement between the cultural spaces. Prominent among these were: Friends, Camera, Convenient and Mobile/Cellular Telephone. Interestingly, mobile telephone exhibited the least movement between the spaces, suggesting that its perception in both cultures does not differ to a great extent, and the definition of convenience also seems to be similar. This is significant is the present study, as it reflects the commonality in both the culture regarding the perception of convenience of the mobile telephone. The perception of friendship is also significantly similar.

The common cognitive space for the U.S. and India was created using the means matrices for each country. These were used to generate the dimensions of the cultural space for each culture and coordinates of each concept for each country. These spaces obtained for both cultures were further rotated so that they could be viewed on the same reference frame. This enabled easy visual comparison of the spaces. The rotated coordinates of both spaces are available in Appendix F.

The number of dimensions of the cultural spaces for both the U.S. and India was twelve, with four imaginary and eight real dimensions. The similarity in the number of dimensions follows from the fact that the concepts under used in both countries were the same, obtained from the U.S. This enabled easy comparison of the data, as the reference frame for both cultures was the same. For the sake of clarity only two dimensions are depicted in figure 8.3.

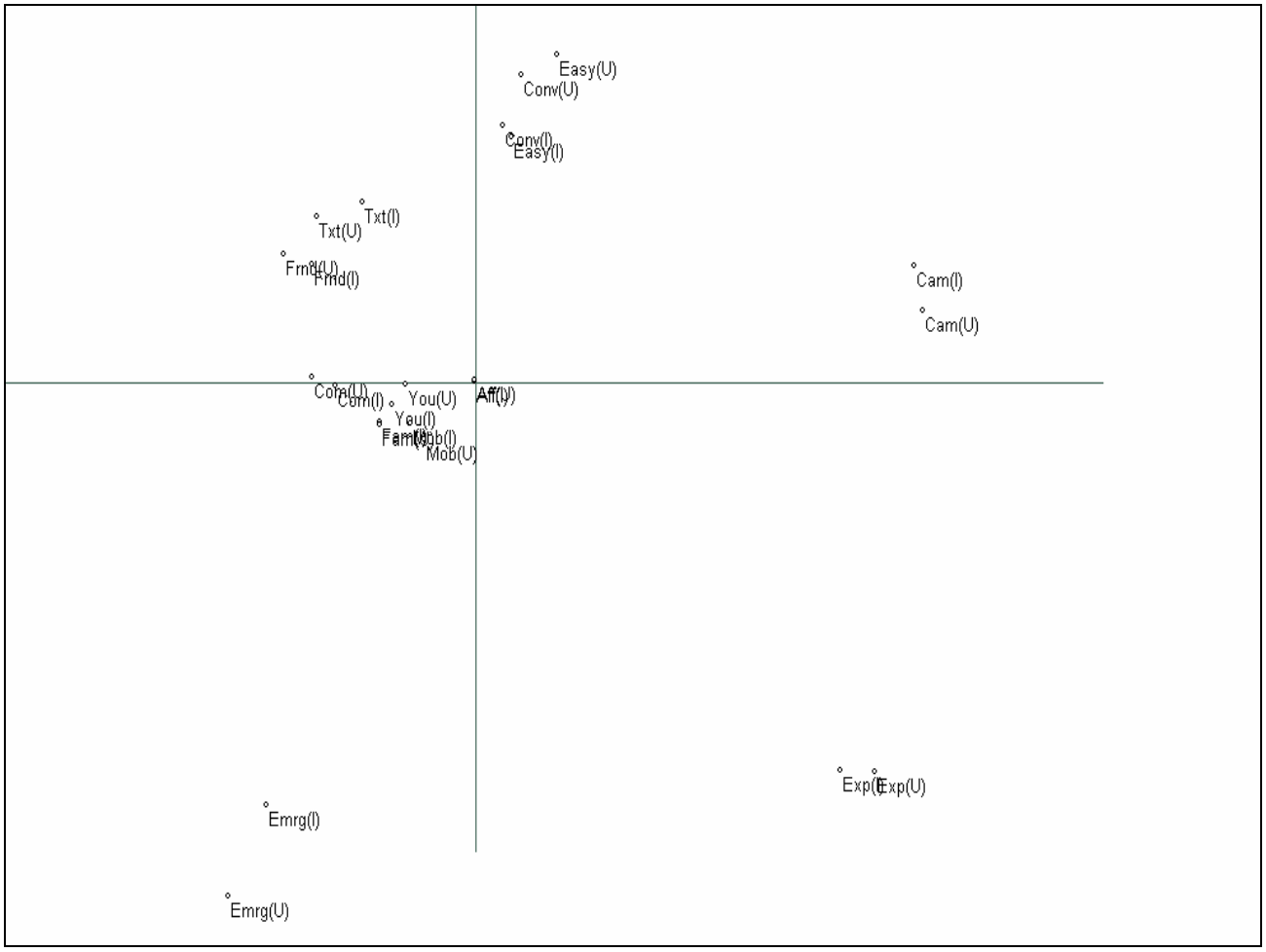

Figure 8.3: Comparison of Indian and U.S. perceptions

Figure 8.3 represents the concepts of both India and the United States, rotated onto the same reference frame using Galileo software. This representation mirrors the above analysis in the similarity of perceptions of the two cultures. The concepts related to India are suffixed with (I) and those related with the U.S. are suffixed with (U). Labels for the concepts are shortened to increase comprehension of the depiction of the comparison of cultures. It can easily be seen that most of the concepts are quite similar across the two cultures. However, it should be kept in mind that these two dimensions do not explain the position of the concepts completely. Thus, this thesis relies more on numeric data rather than visual representations to answer the posited research questions.

Cross-cultural Comparison: Analysis of Research Questions

R_1: Which culture is more innovative?

It can safely be assumed that cultures in which the self-concept is closer to the innovation would be more innovative (Barnett & Siegel, 1988). More innovative cultures would be closer to the innovation itself and its beneficial features than less innovative cultures (see Rogers, 1995 for explanation of characteristics of innovators).

Table 8.1 represents distances between the concepts for India and the U.S. The distance between the mobile telephone and the self-concept is less in India (6.51) than in the U.S. (7.33). This implies that people in India identify more with the mobile telephone than Americans. This is contrary to expectations as the mobile telephone was introduced in India almost twelve years after its introduction in the United States in 1983. Also, the need to communicate seems to be stronger among Indians (5.64) than Americans (6.13). This may be due to the collectivistic nature of the Indian culture. However, given the greater need of the U.S. to avoid uncertainty (U.S. scores higher on the uncertainty avoidance index than India), this result seems surprising.

Worth noting is the fact that both cultures seem to perceive the mobile telephone as quite close to communicating, with the difference between the mobile telephone and communicate being 5.9 in Indians and 5.13 in Americans. Thus, regardless of culture, the mobile telephone is seen as a strongly communicative device.

R_2: Which culture perceives the mobile telephone as easy to use?

The concepts related with the ease of use of mobile telephones are “easy” and “convenient”. In India, the distance between easy and mobile telephone was 6.93 and between convenient and mobile telephone was 6.92. The distances between the same concepts in the United States were 7.03 and 6.15. This suggests that the difference between Indians and Americans regarding the complexity of the

mobile telephone are not great, and both the samples regard it fairly easy to use. This is also indicated in the distances between various features and the concepts related to ease of use. For example, the distance between text messaging and easy is 7.39 for the Indian sample and 7.26 for the American sample, which are quite comparable. However, in case of “camera” and “easy”, Indians perceived a greater distance between the two concepts (12.39) than Americans (8.94). This indicates that Americans are more comfortable with the newer features of mobile telephones than Indians.

On the whole, both Indians and Americans do not consider the mobile telephone particularly complex to use.

R_3: Which culture stresses the mobile telephone’s uncertainty reduction features?

In a culture with a high need to reduce uncertainty, the need of the “self” to communicate would be more. As the United States is higher on the uncertainty avoidance index than India, it would seem that the distance between the self-concept and “communicate” would be lower in the U.S. However, it can be seen in table 8.3 that this is not the case, as the distances are 5.64 and 6.13 for India and the U.S. respectively. Also, differences between mobile telephones and “communicate” are 5.9 and 5.13 in India and the U.S., which are quite comparable. This suggests that although Indians have a greater need to communicate than Americans, more Americans than Indians satisfy their communication needs using mobile telephones. Thus, the need to reduce uncertainty using mobile telephones is higher in Americans than in Indians.

R_4: Which culture places more importance on in-group reinforcing features of the mobile telephone?

Collectivistic cultures would be expected to place more importance on in-group reinforcing features of mobile telephones. As India is much more collectivistic than the U.S., it would be expected to place mobile telephones closer to the concepts related to collectivism, like family and friends. The

need to communicate with these in-groups would also be stronger.

The distance between the mobile telephone and family is 8.28 in India and 8.18 in the U.S. Friends and mobile telephones are closer in the U.S. (6.97) than in India (8.12). Friends are closer to mobile telephones than family for Americans. This implies that Americans use the mobile telephone for communication with friends much more than with family, whereas Indians place the same importance on both. There may be a cultural difference in this result, as traditionally friends are considered an "independent" part of one's life, tending towards individualism. Moreover, family is more often identified as an ingroup than friends. Thus, Americans seem to regard the mobile telephone as more suited to communication with friends than with family. On the other hand, Indians seem to regard meeting communication needs for friends and family as equally important. On the whole, this finding supports Hofstede's classification as India being more collectivistic than the U.S., and consequently reinforcing ingroup features slightly more than Americans.

R_5: Which culture considers the mobile telephone more affordable?

Two concepts related to the price of mobile telephones were "affordable" and "expensive". The distance between the mobile telephone and affordable is 10.88 in India and 11.05 in the U.S. This difference is surprising, as it would be expected that Americans, being members of a stronger economy, would perceive the mobile telephone as being more affordable. The difference between expensive and mobile telephones is 12.25 in India and 10.98 in the U.S. This implies that Indians consider the mobile telephone as less expensive than Americans. Thus, in this study, Indians seem to consider the mobile telephone as more affordable than Americans. However, the perceptions are quite comparable, and in all possibility Americans also consider the mobile telephone affordable.

R_6: Does innovativeness affect self-perceptions of economic status?

Demographic data obtained in the second survey is used to answer this question. The data used

is the number of years of mobile telephone use and the self-reported income of the respondents. The number of years of mobile telephone usage is considered as representative of a respondent's level of innovation: the greater the number of years of use, the higher the innovativeness.

In order to investigate the relationship between perceived income and innovativeness, self-reported income of respondents was correlated with the number of years of use of the mobile telephone. This was done first separately for both cultures, and later for both cultures combined.

When the data were analyzed separately for each country, the correlation between income and years of use of mobile telephone was significant for the Indian sample ($r = 0.476$, $p < 0.05$), as well as the American sample ($r = 0.289$, $p < 0.01$). This indicates a significant positive relation between the perception of income and the number of years of mobile telephone use, or innovativeness. Combined data yielded the same results: the correlation between income and innovative was positive and significant ($r = 0.309$, $p < 0.01$). However, this does not indicate the relationship is causal. That is, the attribution of causality to innovativeness in the formation of perception of one's income is incorrect, even though the two variables covary.

Innovativeness should be both necessary and sufficient in for the formation of economic perceptions for it to be causal. However, it is not evident here that innovativeness is necessary for the formation of one's socioeconomic perceptions, or sufficient. One's socioeconomic perceptions may be affected by a variety of factors, such as current living conditions. Thus, while it may certainly be a factor in determining the self-perception of one's income, it is not a causal factor.

Thus, the results of our analyses reveal unexpected patterns. The United States and India seem to be quite close as far as attitudes towards mobile telephones are concerned, contrary to expectations based on Hofstede's dimensions (1980). This may be a suggestion that the world is becoming more homogeneous everyday, and that globalization is taking place (Levitt, 1983). It should be borne in

mind, however, that the results obtained above are based on perceptions related to mobile telephone usage, and do not reflect actual usage patterns. The discussion of the results in the context of actual mobile telephone usage in the two countries is presented in the next section.

Chapter 9: Discussion

Findings

The results obtained in the analyses in this thesis are not fully predicted by many cultural theories, including Hofstede's dimensions (1980). Americans and Indians are not very different when it comes to innovative behavior, in spite of differing vastly on Hofstede's (1980) cultural dimensions (R_1). Also, Indians seemed to perceive the mobile telephone almost as affordable and inexpensive as Americans (R_5). There were similar levels of perception of ease of use of the mobile telephone in both cultures (R_2). However, Americans were seen to be more in need of uncertainty reduction, placing higher importance on communication and mobile telephone usage than Indians (R_3). Indians, on the other hand, were more ingroup seeking than Americans, the ingroup being defined as family (R_4). For R_3 and R_4, however, the differences between the countries were quite small. On the whole, pair comparison tests indicate that there are minimal differences between Indian and American attitudes towards mobile telephone adoption. For both countries, perception of one's income increased with innovativeness. This indicates that cultural differences between Indians and Americans are very small, at least at the level of consumer behavior. It also suggests the need to revamp the cultural dimensions proposed by Hofstede in light of increasing globalization.

Globalization or not

Some studies suggest that wealthier countries and those with less heterogeneity adopt an innovation earlier (Dekimpe, Parker & Sarvary, 2000). Dekimpe et al used the diffusion of mobile telephony to test this. This finding is partially supported in the thesis findings. The U.S. is wealthier than India, and the mobile telephone was introduced in the U.S. before India. The issue of

heterogeneity needs to be defined and tested, as the U.S. has traditionally been a country of migrants. This trend is continuing at present also, the only change being the origin of the migrants. India is probably more heterogeneous than the U.S., which may make it more receptive to globalization as a uniting force, thereby increasing homogeneity in a subtle manner.

In the present context, we can define heterogeneity in terms of the variance in the responses for India and the U.S. The greater the variance, the greater the heterogeneity in the sample. For comparison, several calculations were made. First, the standard deviations of all the pair comparisons were averaged for both samples. This mean standard deviation was then "normalized" by dividing the same by the average pair comparison distance. The resultant fraction indicated the extent of heterogeneity of the particular sample under study. The findings are given in table 9.1, and the mean distances and standard deviations for each pair comparison are given in table 8.1.

Country	Average Standard Deviation (x)	Mean pair comparison distance (y)	Normalized Standard Deviation score (x/y)
United States	38.94	42.09	0.93
India	33.39	35.00	0.95

Table 9.1: Measure of heterogeneity of samples

This indicates that the variance in India is slightly higher than that in the U.S. Given the nature of the sample, which consists of national and international students both for India and the U.S., this finding is not surprising. Also, India is composed of many more strong cultures that the U.S., which may account for the slightly greater heterogeneity. This finding is consonant with Dekimpe, Parker and Sarvary's claim that wealthier and less heterogeneous countries are more innovative (2000).

Some studies have tried clustering countries on the basis of certain dimensions (for a meta-analysis of studies including Hofstede, 1980 see Ronen & Shenkar, 1985). The U.S. and India fall into the same cluster in some of these studies. Sirota and Greenwood (1971, as cited in Ronen & Shenkar, 1985) obtained a cluster called "Anglo", which included India and the U.S. This was replicated in

Ronen & Kraut (1977, as cited in Ronen & Shenkar, 1985). Ronen and Shenkar (1985) attribute similarities of clusters to geographical proximity, language and religion. However, they address the issue of colonization in case of geographical proximity. They also suggest that countries in the same cluster tend to speak the same language and follow the same religion. In case of India and the U.S., the linguistic similarity is great, as both countries use English extensively. This is a result of colonization of India, which also serves as a proxy for geographical proximity with the U.S. Thus, the main dimension on which these two countries differ is religion. Considering the specialized case of international telecommunication, Barnett (2002) finds that while the U.S. is at the core of the telecommunication network, India is at the semi-periphery. However, India is quite close to the core, which may be the result of linguistic similarity. In any event, it can safely be concluded that India and the U.S. are moving closer in the telecommunication network. Thus, this thesis supports the inclusion of U.S. and India in the same cluster, as the differences observed here are minimal.

In the context of this thesis, there were no major attitudinal differences between Indians and Americans. Although this may hastily be attributed to the present sampling, some studies have made a distinction between globalization among older and younger people, and have found that younger people are more “global” in their outlook than older people (Noble & Schewe, 2003). This is consistent with analyses comparing the U.S. with other countries. Noble and Schewe (2003) found that younger Jordanians and Americans shared the same values whereas older people in the respective cultures were comparatively more different. This would indicate that the present young sample seems to mirror the same trend. Although Americans are consistently close to the concepts related to the mobile telephone and its positive features such as affordability and ease of use, their Indian counterparts are usually not far behind, and surpass the U.S. occasionally. Thus, it would seem that globalization is taking place, at least in the populations represented by the samples: young individuals with above-average household incomes.

An obvious drawback in the above studies is that they view a culture as a static entity with temporally invariant qualities. If a culture is considered a dynamic *process*, then the results obtained here are not surprising or unpredictable. Kincaid et al (1983) and Barnett and Kincaid (1983) have proposed a model of "cultural convergence" wherein a culture is treated as "an organized system of significant symbols" (Barnett and Kincaid, 1983, p. 172) and as a "property of groups rather than individuals" (p. 172). Also stressed is the transitional nature of culture: it changes with time, and these changes are a result of intercultural communication, or the lack of it (p. 173). Information and communication are important in determining cultural change, and the state of a culture at a particular point in time. Culture can be viewed as a system. If this system is closed, that is, there is no flow of information into the system, then its "participants" will "converge over time in the mean collective pattern of thought if communication is allowed to continue indefinitely" (p. 175). Conversely, if it is an open system (as more often is the case), it can be inferred that the theory predicts increased communication between the members of a particular culture and those of other cultures, leading to exchanges of information through communication *between* cultures, not just within cultures. This would lead to homogenization on a cross-cultural level, ultimately leading to destruction of cultural boundaries.

The theory of cultural convergence explains the results obtained in this thesis. It is seen that with increasing global communication, cultures are converging. Information reaching Americans and Indians is similar, and there is an increase in the communication between these two countries. Mass media and improved Internet and telecommunication services may be responsible for these changes (Barnett, 2001; 2002). This similarity of information received is reflected in the similarity in perceptions of Americans and Indians. As mentioned above, this finding is also supported by globalization theory.

This result leads to the question of reassessing Hofstede's dimensions for the present context.

In their study of the Internet and the international telecommunication network, Barnett and Sung (2003) report various studies that do not support the classification of countries according to Hofstede's dimensions (Lee & Rogan, 1991; Graham, Evenco & Rajan, 1992; Stohl, 2001). They further find that between economic status and national culture, the former is a better predictor of the position of a country in a particular network. However, national culture also has a prominent role to play in the organization of each of the networks. This may guardedly be considered further evidence of cultural convergence and globalization (Barnett and Kincaid, 1983), as the authors themselves observe that the operationalization of culture using Hofstede's dimensions may be flawed (Barnett & Sung, 2003, p. 20).

Comparison with Actual Usage

Table 8.4 compares the actual mobile telephone usage in the U.S. and India and the usage obtained in our sample.

	Actual countrywide ownership (ITU, 2002)	Sample ownership
India	1.22%	70.0%
United States	48.81%	92.0%

Table 8.4: Actual and obtained mobile telephone penetration

Considering the ownership of mobile telephones in this context, 70.0% of the Indian sample owned a mobile telephone, whereas 92.0% of the American sample owned one. Comparing this with the actual penetration in the two countries, a vast difference in the adoption status of the Indian sample and the Indian population as a whole can be found. This may be due to the nature of the sample: the mean age of the sample is 22.05 years and the mean income is quite high, even in dollar terms (refer to table 7.1). However, the median age of the population in India in 2000 was 23.4 years, which is comparable to the present sample, and this extends the generalizability of the results to the majority, if

not the entire population. However, discrepancy in income, especially within India, is a major restriction in the present study.

An additional factor may be that these data are from the year 2002, and this may mark a crucial time in the diffusion of mobile telephones in India. In 2000, the penetration of mobile telephones was 38.9% in the U.S. and 0.35% in India (ITU, 2000). Thus, there has been an increase in the number of subscribers from 2000 to 2002 in both countries (see table 8.4 for 2002 figures), an addition of 9.91% in the U.S. and 0.87% in India. Also, the population of the U.S. was 285 million in 2000 and that of India was 1.02 billion (United Nations, 2000). This translates into an approximate addition of 28,243,500 subscribers in the U.S, and 8,874,000 subscribers in India over a period of two years. Thus, the addition of subscribers is proceeding at a slower rate in India than in the U.S. This suggests that India is in the "decision" stage of the adoption process, wherein a decision about adoption or rejection will be made; whereas the U.S. is in the "confirmation" stage already, wherein people have already made a decision to adopt (in this case) and will continue to do so (Rogers, 1995, p. 171-180).

Although the data mentioned above suggest that the U.S. is more innovative than India in case of mobile telephones, this thesis does not find full support for this assertion. However, in this thesis, a majority of both Indian and American respondents were adopters. This indicates that the Indian sample, being more of an elite in case of mobile telephone adoption in India, might have reported closer scores than the U.S. sample, which is not an elite in case of mobile telephone adoption in the U.S. This follows from the fact the there is a huge gap between the average Indian and the Indian sample used here, and although there is a gap between the average American and the American sample used here, it is not that huge. Keeping in mind that perception is being studied, not actual adoption, external factors like inadvertent comparison of the self with the supposed "average individual" may also distort perception of the distance, apart from the given standard of reference (Affordable and Expensive are 100 units apart).

Shortcomings and Future Research

In order to test whether older Indians and Americans differ in their perceptions, the study needs to be replicated with a stratified sample across all demographic indicators (Barnett, Hamlin & Danowski, p. 462), including age, educational qualification and income. The present sample is chosen from an introductory undergraduate course, so the breadth of educational diversity is considerably restricted. There is a bias in the sample regarding the economic status of the students also.

Another important factor to be considered in this analysis is the directionality factor. It has been assumed that the pair-comparison matrix obtained in the second questionnaire is symmetric, and so there are no "directional" measurements of concept pairs. For example, the distance between "Affordable" and "Yourself" is assumed to be the same as that between "Yourself" and "Affordable". Thus, reverse measurements for concepts are not obtained. Even if they were to be obtained, they would double the number of pair comparisons, leading to tedious questionnaires. However, this problem can be solved by creating subsets of the pair comparisons randomly and assigning one to each respondent.

An important factor to consider is also the events occurring in the social system at the time the study is conducted, which may affect the perceptions of people in a different way than normally expected. For example, if there is a sudden drop in mobile telephone prices, there may be an overall drop in perceived affluence, regardless of the innovative behavior of the respondents.

Further studies using other consumer products should also be proposed to increase generalizability of results for a culture as a whole, or to identify characteristics which segment populations regarding their values, beliefs and perceptions across cultures. As the innovation under investigation in this study restricted to the mobile telephone, further tests are needed to improve the predictability of adopter and non-adopter attitudes across cultures. Technological products such as

PDAs and mp3 players would be the obvious choice for such studies.

Various studies concerned with cultural measurements and comparisons using MDS have been conducted (see Barnett and Kincaid, 1983, p. 179 for a collection of studies). These studies cover more than ten countries of the world, and lend greater reliability to this study. Future research should look at the possibility of determining an independent, invariant standard of measure of cultural processes, which could be used to effectively standardize comparisons between cultures. In this thesis, it is seen that even given a standard of reference, in this case that "Affordable and Expensive are 100 units apart", respondents perceived this difference differently in different cultures. The mean distance reported between the two concepts by Indians was 21.46, and by Americans was 19.56. This indicates that the development of a standard of measure invariant across cultures is possible and imminent.

Future research can also look at the trends of discontinuance of the mobile telephone in the future, and how this varies across cultures. It would seem that discontinuance, like adoption, would follow similar trends in India and the U.S. with increasing globalization. However, this needs to be tested over time.

Thesis Summary

This thesis dealt with the measurement of cultural differences in the context of mobile telephone diffusion. Also investigated was the effect of innovative behavior on self-perceptions of economic status. In the cultural context, the innovative characteristics of Americans and Indians were investigated in order to determine which culture is more innovative. Questions related to the use of mobile telephones, the perception of affordability of mobile telephones, perception of uncertainty reduction features of mobile telephones and the perception of ingroup reinforcement features of mobile telephones were investigated. The cultural context was investigated in relation with Hofstede's cultural dimensions (1980) and the economic context was studied in relation to social class perceptions.

The telecommunication systems in both India and the U.S. were also studied. It was found that although the mobile telephone was introduced much earlier in the U.S. than in India, the development

of mobile telephony in the U.S. was quite stunted, in part due to the instability wrought by the break-up of AT&T in 1982 (King & West, 2002). Now however, the situation is much removed from the early 1980s with mobile telephone becoming a cheap and therefore ubiquitous technology in the U.S. In India, initially mobile telephony was an urban market but now it is spreading all over the country, with an increasing share in the rural market. This has been facilitated by various government interventions (DoT Annual Report, 2003, p. V) for rural and urban areas in the form of subsidized mobile services (e.g. BSNL), and increasing privatization and competition in the urban areas leading to decreased costs. Thus, in both countries, mobile telephone diffusion is progressing smoothly.

The telecommunication climate of India and the U.S. is reflected in this thesis. There are minimal cultural differences in the perception of mobile telephones in both the countries. A glance at the perceptual maps for both the countries indicates the same (see figures 8.1, 8.2 and 8.3). The effect of innovativeness on social class perceptions is seen to be significant in both the cultures. Although India would seem to be a more rigid culture with regard to social classes, it is seen that more innovative people have a higher self-perception of affluence in both cultures. Thus, a person from a "low" social class also perceives himself/herself to be more affluent than the average individual, irrespective of culture.

These findings indicate that globalization is taking place. It is a further attestation of the theory of cultural convergence, whereby increasing information exchange between cultures is leading to homogenization of cultures into a global culture (Barnett and Kincaid, 1983). This is indicated by the measures of heterogeneity in India and the U.S., which are almost the same (see table 9.1). These results imply that marketing strategies across cultures may be standardized, as proposed by Levitt (1983). On a theoretical level, this research indicates that the time is right for the formation of a global standard for the measurement of cultural and communication processes. However, it should be kept in mind that this research spans only two countries, and further research in other countries is needed on both practical and theoretical planes to ascertain the global credibility of these results.

NOTES

1. The term "mobile telephones" is used synonymously with cellular telephones, mobile telephones, mobile phones and cellular phones.
2. According to Rogers (1995), there is inconsistent evidence regarding the effect of age on innovativeness.
3. For a detailed treatment of the social class structure, the reader is referred to Gilbert and Kahl's book: The American Class Structure: A New Synthesis.

The average annual household income in the United States is $40,000 (U.S. Census Bureau, 2001).

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APPENDIX A
Mobile telephone companies in India

APPENDIX B

Mobile telephone companies in USA

Please answer the following questions:

1. What is your view of the economic status of a mobile telephone owner?

2. Do you own a mobile telephone? (Please check one)

   ☐ Yes ☐ No

3. If yes, indicate the period that you have owned it:

   ___ Year(s) ___ Month(s)

Please answer the following questions about yourself (This information will be kept strictly confidential).

4. Age: ___ Years

5. Household income (annual)

   $ _____

6. Gender (Please check one):

   ☐ Male ☐ Female

7. Race / Ethnicity:

   ☐ White ☐ African-American ☐ Hispanic

   ☐ East Asian / Pacific Islander ☐ South Asian

   ☐ Other (Please Specify) _____

8. Highest Level of Education: _____

The coding scheme for categorizing responses to question 1 in Questionnaire B has been adopted from the classification scheme proposed by Gilbert and Kahl (1982), as modified by Gronhaug and Trapp (1988, p. 72). We have made minor changes in Gronhaug and Trapp's (1988, p. 75) approach.

The categories we use are defined as:

1. Very high income: "This is the highest social class. This group of people is the social elite of the society. A number of people in this class have inherited their wealth. Others are very-high-income professionals who have "earned" their position in this class ("the new rich"). Only a few percent of the American population belong to the upper class." (Gronhaug and Trapp, 1988, p. 75)

2. High income: "This social class is largely college educated, and is represented by upper managers and professionals. Family income is nearly twice the national average family income. Approximately 13-15 percent of the American population belongs to this class. " (Gronhaug and Trapp, 1988, p. 75)

3. Middle income: "This group of people tend to have incomes somewhat above the national average income. In most cases, they have completed some post-high school education. Roughly 30-35 percent of the American population falls within this social class. " (Gronhaug and Trapp, 1988, p. 75)

4. Low income: "This class consists of middle-level blue collar workers who have incomes slightly below the national average. Education as well is slightly below the national average. Approximately 30-35 percent of Americans belong to this social class. " (Gronhaug and Trapp, 1988, p. 75)

5. Very low income: "This class has a standard of living below that of mainstream America. Many are low-paid workers with some high school education" (Gronhaug and Trapp, 1988, p. 75) or unemployed with no high school education. They may be living on welfare.

The coders will code the answers based on the similarity of responses to the above descriptions.

APPENDIX C

First survey

APPENDIX D

Second survey

APPENDIX E

Demographic flags

APPENDIX F
Rotated crds