THE IMPACT OF THE LEVEL OF TECHNOLOGY AND ITS CORRESPONDING LEVEL OF DEVELOPMENT ON CULTURAL CONVERGENCE: A STUDY OF MEXICO AND THE UNITED STATES

By

Robert Nieves

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We herein certify that this Dissertation submitted by Robert Nieves conforms to acceptable standards, and as such is fully adequate in scope and quality. It is therefore approved as the fulfillment of the Dissertation requirements for the Degree of Doctorate of International Business Administration.

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ABSTRACT

THE IMPACT OF THE LEVEL OF TECHNOLOGY AND ITS CORRESPONDING LEVEL OF DEVELOPMENT ON CULTURAL CONVERGENCE: A STUDY OF MEXICO AND THE UNITED STATES

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Robert Nieves

According to Schwartz (1992, 1996) universal human values are a conceptual framework for complex patterns of behaviors. These behaviors are more centralized than attitudes and beliefs, transcend specific situations, and control the selection and means of arriving at goals. Hofstede (1997) asserts that managers of international firms may have a shared system of values that transcend individual cultural differences.

This study uses the Schwartz Value Survey and the Hofstede's Value Module Survey 1994 to assess the individual values and culture-level value types of two samples of engineers in Mexico and the United States to test for cultural convergence between the two samples.

Research about cultural differences has generated a debate in the academic community that encompasses a convergence and divergence framework. The proponents of divergence emphasize the role of national culture as the strongest force driving individual values apart, while those that propose a convergence viewpoint favor the strong force of economic development instead.

Webber (1969) has suggested that the level of technology and its corresponding level of economic development are converging work values across cultures. Technology has been identified as a variable that may be reducing cultural differences. This study has found that technology does play a significant role in reducing the cultural differences between two engineer samples. Other key demographic variables were not found to play a significant role. Therefore, national culture does not represent the strongest and only force driving individual work values towards divergence.

The survey sample size was 84 Mexican and United States engineers who had at least a Bachelor of Science in Engineering from an accredited university in Mexico or the United States. The cultural differences were measured using independent t-tests, Chi-square tests, and a correlation test.

The results indicated a correlation between Schwartz's culture-level dimensions and Hofstede's cultural dimensions. Results and Analysis conclude that individual values between engineer samples are converging, except for Masculinity; cultural differences are less than those in Hofstede's (1997) IBM study. These findings support and validate previous studies by Schwartz (1994, 1996), Hofstede (1980, 1997), and Ralston (1993, 1997).

The present study and its findings will provide additional knowledge to multinational firms, joint ventures, and other researchers who would benefit from a better understanding of the technological impact on cultural values and cultural differences affecting international management.

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This dissertation is dedicated to our Lord God, Creator of All Things, that through his divine love has always been there for my family and I even in the most difficult moments. It is dedicated to my family for all their continuous love, support, and encouragement through the many years needed to reach completion of this doctoral program.

I would like to express my profound gratitude to my Chairman, Dr. Pedro Pellet, and my Committee Members, Dr. Frank Cavico and Dr. Bahaudin Mujtaba, for their generous effort to review the document at various stages and provide invaluable and insightful comments.

I wish to express my sincere thanks to all the engineers who willingly participated in this study for their assistance and contribution to this research. This dissertation is further dedicated to researchers everywhere who believe and recognize the value of their contributions to the improvement of our ability to help our fellow human beings through the utmost respect and careful understanding of universal human values.

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CHAPTER I

INTRODUCTION

Background of the Problem

This chapter addresses the need for the present research, introduces the theory of convergence, divergence, and crossvergence, and their relationship to an individual, who may be an engineer. For purposes of this dissertation, an engineer is one who is running a business, managing a business function, or a professional subordinate who accomplishes on important technical or business task for the organization. All three business functions are critical to the economic success of the enterprise in different ways, but strategically interrelated to achieve the goals and desired performance of the organization.

Values serve as a link between the individual and the group, or the engineer and the organization. The individual relates to the group while still maintaining his or her own identity. Values represent psychological, biological, and social needs of the individual. This representation is the result of the relationship between attitudes, behaviors, and values. Braithwaite and Scott (1991) acknowledged the multifaceted impact of the study of values on fields like anthropology, philosophy, psychology, sociology, and business. They recognized the roles of values as constructs in social processes, and as a research interest for cultural,

educational, political, and work-related studies.

Values play a key role since people assess situations and make decisions at work using values as their criteria (Rokeach, 1973; Williams, 1968). Hofstede (1980) considers values to be central to cultural differences between managers. Managers from different cultures are expected to differ in the importance of personal values. Values influence behavior, so these differences in personal values are reflected in their managerial behavior. Dunning (1997, p. 196) states, "... firms which are best able to identify and reconcile cultural differences, or even exploit them to their gain, are likely to acquire a noticeable competitive advantage in the marketplace." The fit between cultural values and management practices is reinforced when management understands the values of the people with whom they are doing business, and this fit is important in building an excellent and lasting working relationship between superior and subordinate, or employees and customers.

In the midst of the debate concerning convergence, divergence, and crossvergence, lies the necessity to understand the difference in work values. The proponents of the convergence of values across cultures claim that non-Western countries that are exposed to Western ways of doing business are converging towards Western values (Webber, 1969). If this trend continues, there will be a huge international work culture that will be free of any obstacles towards

convergence. Ronen (1986) suggests that if this happens, there will not be a need for a cultural map of the world as one knows it today, and cultural differences will resolve themselves. Hofstede (1984, 1994, 1997) opposes this outcome, because he asserts that cultural forces are too strong to be swayed by Western ways of doing business.

On the other hand, the proponents of divergence claim the forces of economic development are divergent; countries are diverging rather than converging. Ronen (1986) suggests that if this happens, then the cultural map of the world will be all the more important.

Ralston (1993) affirms that the primary forces of convergence-divergence, national culture, and economic development are indeed shaping work values in organization. He identifies a third process, crossvergence, when the processes of convergence and divergence are at work simultaneously. Ralston (1993, p. 4) states, "an individual incorporates both national culture influences synergistically to form a unique value system that is different from the value set supported by either national culture or economic ideology."

Concurrently, technology is playing a key role in the convergence-divergence dimension. Webber (1969) asserts that as technology becomes more uniform across cultures and countries, it would influence and change work values to become more similar or to converge towards more uniform managerial styles and attitudes. The role of technology in this

convergence process has not been extensively researched, analyzed, and documented. There is a lot research that remains on the relationship of the level of technology and its corresponding level of economic development with work values, attitudes, culture, and behavior, and the converging effect technology could have on values over time.

Statement of the research problem

The passage of NAFTA is prompting a large number of firms to start joint ventures in the United States or Mexico. A key factor in the success or failure of these joint ventures is the ability of the company to manage people of diverse cultural backgrounds. The lack of understanding in an organization of managerial attitudes, work values, and behavior could result in the failure of the business venture. Shenkar & Zeira (1987) suggest that the growing popularity, substantial failure, and cultural complexity of international joint ventures require a closer examination of human resources issues.

All too often, expatriate managers assume that managerial practices that are effective in their country will be equally effective in other countries. Such is the case of managers from Mexico and the United States who are sent to live and work in each other's countries, only to find they have different work values and different responses to the same managerial practices. Managers, engineers, and employees in general, from the United States and Mexico, thus could benefit

from learning how work values differ, as well as the implications of these differences in each managerial setting.

Armstrong and Krasnostein (1995) suggest that the effect of culture in the communication process between individuals and organizations in the international world of business is a fundamentally important issue that requires a firm's full attention and understanding. A breakdown in communication between managers involved in international business could be very costly for a company. Managers from different cultures could interpret and process information differently. These differences could lead to miscommunication, inappropriate and ineffective managerial practices, and poor decision-making. Managerial practices that work in one country do not necessarily carry over to another. Companies are geared towards producing, marketing, and selling their products in the marketplace to achieve their profitability goals.

The lack of awareness and understanding of cultural values and their impact on managerial practices could lead expatriate managers, who may be extremely competent in their home country, to feel frustrated, alienated, and ineffective in their jobs, thereby resulting in high turnover or in costly mistakes in the international business process of the company. Ronen (1986) suggests that rather than from a lack of ability or talent, those expatriate managers who fail do so because the cultural differences between their home country and the host country are too great.

This study tries to bring awareness of what values influence attitudes and behavior, and helps identify cultural differences and the reasons behind them, as well as recognizing ways to lessen these cultural differences, between individuals in organizations. The objectives of this research are to compare work values of engineers in Mexico and the United States and to measure the effect that the level of technology and its corresponding level of development have on engineers that work in organizations, in an effort to provide management researchers, and managers, with a detailed and relevant set of distinctions among engineers in Mexico and the United States. This comparison thus is an empirical as well as theoretical research that hopefully will motivate other researchers to expand our understanding of this field.

Webber (1969) asserts that technology and economic development pressures, both clear and strong, influence the convergence of how a man works and makes it more alike. A man's equipment, his task, job training, and his employer's volition and man-on-the-job expectation, will all tend to be more similar in the foreseeable future.

Purpose of the Study

The purpose of this study is to identify if the level of technology and its corresponding level of development has a significant effect on reducing the cultural differences between engineers in Mexico and the United States. The main objectives of this study are as follows:

- To measure Schwartz's culture-level dimensions for engineers in Mexico and the United States, and correlate their scores to Hofstede's cultural dimensions in order to validate the linear relationship between both dimensional results.

- To measure Hofstede's cultural dimensions (power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance) for two sample populations of engineers in Mexico and the United States, to statistically compare the resultant scores to Hofstede's IBM study scores, in order to identify if a reduction in cultural differences between the two samples of engineers has taken place.

- To measure Hofstede's scores for cultural dimensions and statistically examine the scores by individual demographic variables, such as, age, gender, occupation, engineering degree level, and cultural dimensions across both samples, in order to ascertain the impact of the individual demographic variables on the cultural dimensions, and to determine any statistically significant relationships between these variables.

Justification of the Study

The purpose of this study was to conduct empirical

research focused on determining the impact of the level of technology and its corresponding level of development on cultural convergence between engineers in Mexico and the United States. This research was designed to measure the values of engineers in managerial roles, superior, and subordinate roles in both countries, to determine congruence, and to compare these results with empirical research results, such as Hofstede's IBM study, in order to produce a modest, but specific, contribution to the body of research in the convergence-divergence field of study.

Hence, this study seeks to expand research in international management literature by: (1) examining the values of a representative group of engineers from a Latin American country and compare it to an Anglo-American country; (2) suggesting implications for managerial behavior of the difference in values that might result from the study; (3) suggesting implications of the findings for international management and joint ventures, and offer suggestions on future research; and (4) examining the impact of technology on work values of the individual in an organization across cultures.

A thorough review of the literature reveals that only a little research has been done on Webber's concept of technology, as a force of uniformity in the man-work interface, or on its counterpart, cultural inertia, the force of diversity (Webber, 1969). Even less has been researched regarding a comparison between Mexico and the United States in

regards to cultural convergence, even though for a few years now Mexico and the United States have been partners in NAFTA and have become one of the most important trade partners to each other. The growth of this economic relationship in the foreseeable future is inevitable.

Any light that is shed on this relationship will greatly help joint ventures or multinationals conducting business in Mexico and the United States, and also benefit could result to expatriate managers as they try to understand the host country's managerial attitudes and behavior to perform their jobs more effectively in their new assignments.

In the convergence-divergence debate, there are presently more questions than answers; that is why this proposed study contributes to research in value congruence across national cultures by further investigating value congruence and its relationship to technology, a permeating driving force of change in today's business world.

Research Question

A comparative analysis of engineers' cultural values will be conducted on two samples of engineers in Mexico and the United States, in the electrical equipment business of the energy sector. Technology and its level of development is a force that may be working toward cultural convergence by helping to narrow cultural differences; technology is becoming more uniform across countries and may be promoting more uniform cultural values.

The specific research question to be addressed by this dissertation is as follows:

- To what extent do the level of technology and its corresponding level of development play a role in lessening cultural differences between engineers in Mexico and the United States?

Scope of the Study

As trade agreements were signed by Mexico, including the North American Trade Agreement in 1993 and the General Agreement on Tariffs and Trade in 1986, Mexico has slowly but steadily opened its doors to the world. Before embarking on a path of economic liberalism in the 1980s, Mexico discouraged foreign investment; and the government ran major industries. Mexico has privatized the telecommunication sector, mining, and even the media, but some industries still remain off-limits to private investors: oil and gas production, electricity, ports, regular mail service, and currency. Foreign investment is still regulated in Mexico (Gruben & McComb, 1997).

Mexico's relationship with the world has changed; privatization has spurred growth in the country and inspired the creation of new industries. The northern part of the country is home to dozens of maquiladoras, manufacturing

operations intended to take advantage of Mexico's low labor rates (Gruben, 2001).

A devaluation of the peso in 1994 threw Mexico into economic turmoil, triggering the worst recession in over half a century. The nation continues to make an impressive recovery. Ongoing economic and social concerns include low wages, underemployment for a large segment of the population, and inequitable income distribution.

Mexico has land area of 1,964,375 square kilometers, which is slightly less than three times the size of Texas; and Mexico has a population of 104 million people. The country is a federal republic consisting of 31 states and 1 federal district. Mexico has a free market economy with a mixture of modern and outmoded industry and agriculture, increasingly dominated by the private sector (INEGI, 2004). Recent administrations have expanded competition in seaports, railroads, telecommunication, electricity, natural gas distribution, and airports (EOM, 2004). Trade with the United Stated and Canada has tripled since the implementation of NAFTA in 1994. Following 6.9% growth in 2000, real GDP fell 0.3% in 2001, recovering to only 1% in 2002, with the United States slowdown as the principle cause (INEGI, 2004). Mexico implemented free trade with Guatemala, Honduras, El Salvador, and the European Free Trade Area in 2001, putting more than 90% of trade under free trade agreements (Infolatina, 2000). Foreign direct investment reached $25 billion in 2001, of

which $12.5 billion come from the purchase of Mexico's second-largest bank, Banamex, by Citigroup (Latin Finance, 2003).

With tariffs falling worldwide under the World Trade Organization, as the European Union gains strength by jumping to 25 members in 2004, and as Asia makes huge economic gains, NAFTA is now in serious need to update its rules. Canada, Mexico, and the United States have recently agreed to far-reaching revisions in NAFTA's rules of origin. The rule simplification, planned to go into effect on January 1, 2005, is expected to affect $20 billion of trade annually. It is the biggest set of changes in the last ten years for NAFTA, coming after another $15 billion in tariff reductions between Canada and the United States in 2003, including Mexico in 2004 (Jenssen-Moran, 1996).

Significantly, the NAFTA partners signaled their intentions to continue reducing North American tariffs, eventually reaching zero tariff levels for $200 billion in trade annually, a strategy that will help North America remain competitive in the future (AAIW, 2004).

In 2005, the NAFTA commission hopes to extend the new definition of origins to chemicals, pharmaceuticals, plastics, rubber, cars, footwear, and copper, plus any other items with a most-favored-nation rate of zero (Hendricks, 2004).

There are cultural differences in the way Americans and Mexicans conduct business. In the United States, business people are used to the following sequence: go in, sign a deal,

and get it done. There is more "courting" in Mexico. It consequently takes longer to formalize a contract or business relationship. Mexican contracts are often subject to change. In the United States business culture, when one bids a contract and wins the bid, one must sign the contract, and then go. In Mexico, one wins the bid and then starts negotiating. The contract thus may change completely.

The interactions between Mexican and United Stated business people of different cultural values provide an ideal setting for this study and accordingly for better understanding of the convergence of values across cultures. These business interactions will continue to grow in light of the growing commerce between Mexico and the United States, highlighted by the NAFTA agreement.

Hofstede (1980, 1984) found, in the IBM study, Mexican culture to be as masculine as that of the United States, but much less individualistic. The power distance between individuals in the Mexican culture is much higher than in the United States culture, as well as uncertainty avoidance. Thus, Mexican Culture is more collectivistic, traditional, and behaviorally structured than the United States, but equally masculine.

The United States is one of the leaders in technology and international business, if not the foremost, with hundreds of multinationals and joint ventures over the world. It is the economic leader of the world and a very significant

contributor to the proliferation of technology and technological innovations. Founded from British American colonies in 1776, the country was recognized as a new nation of the United States of America following the Treaty of Paris in 1783 (USNWR, 1983). The United States is now the most powerful nation state. The United States economy is marked by steady growth, low unemployment, low inflation, and rapid advances in technology. The United States has a land area of 9,161,923 square kilometers and is half the size of South America, or slightly larger than Brazil. The United States has a population of 294 million people. The United States is also a federal republic with 50 states and 1 district. The United Stated has the largest and most technological powerful economy in the world, with a per capita GDP of $37,800 (USCB, 2004).

In this market-oriented economy, private individuals and business firms make most of the decisions, and the federal and state governments buy needed goods and services predominantly in the private marketplace. United States business firms enjoy considerably greater flexibility than their counterparts in Mexico and Latin America, in decisions to expand capital plant, and develop new products. At the same time, they face more barriers to entry in their rivals' home market than the barriers to entry of foreign firms in United States markets. United States firms are at or near the forefront in technological advances, especially in computers, medical, aerospace, and military equipment.

The onrush of technology largely explains the gradual development of a two-tier labor market in which those at the bottom lack the professional, technical skills, or education of those at the top, and, more and more, fail to get comparable benefits. Since the 1970s, practically all the gains in household incomes have come to the top 20% of households. The years 1994-2000 witnessed solid increases in real output, low inflation rate, and a drop in unemployment below 5%. The year 2001 saw the end of the economic boom, with outputs increasing only 0.3%, and unemployment and business failures rising substantially (USDL, 2004).

The response to the attacks of September 11, 2001 showed the remarkable resilience of the United States economy. Moderate recovery took place in 2002 with a GDP growth rate rising to 2.4% (USDC, 2004). A major short-term problem in the first half of 2002 was a sharp decline in the stock market, fueled in part by the exposure of dubious accounting practices in some major corporations.

In 2003, growth in output and productivity and the recovery of the stock market to above 10,000 for the Dow Jones Industrial Average were promising signs. Unemployment stayed at the 6% level, however, and began to decline at the end of the year. Long-term problems include inadequate investment in economic infrastructure, sizable trade and budget deficits, and stagnation of income in the lower economic groups.

Definition of Critical Terms

Values: Athos & Coffey (1968, p. 100) define values as ideas about what is desirable. Kluckhohn et at. (1962, p. 369) define values as "a conception, explicit or implicit of the desirable which influences the selection from available modes, means, and ends of action." Rokeach (1956) defines a value as "an enduring belief that a specific mode of conduct or a state of existence is personally or socially transferable to an opposite or converse mode of conduct or end-state of existence." Schwartz (1994, p. 21) defines a value as a desirable transsituational goal, varying in importance, that serve as guiding principle in the life of a person or other social entity." All four definitions are used in this study, depending on the topic and context being addressed.

Culture/National Culture: Culture is defined by Adler (1991) as the result of a complex interaction of values, attitudes, and behaviors of the individuals in a group. Hofstede (1984, p. 21) defines culture as "the collective programming of the mind which distinguishes the members of one human group from another." The term national culture also is used for the culture of a nation.

Attitudes: Attitude is defined by Theodorson & Theodorson (1969, p. 19) as the result from the application of a general value to concrete objects.

Behavior: Behavior is defined by Connor & Becker (1975, p. 551) as an overt manifestation of attitudes and values.

Instrumental Values: Instrumental values for Rokeach (1973, p. 7) are "modes of conduct." These modes of conduct describe an ideal behavior.

Terminal Values: Terminal values for Rokeach (1973, p. 7) are images formulated by words and phrases that vary from person to person.

Masculinity: Masculinity stands for success, competition, assertiveness, good performance, service to others, and brotherhood. Masculinity is the opposite of femininity (Hofstede, 1992).

Femeninity: Femeninity stands for tenderness, warm relationships, caring, and modesty (Hofstede, 1992).

Power Distance: Hofstede (1997, p. 28) defines power distance as "the extent to which the less powerful members of institutions and organizations within a country respect and accept that power is distributed unequally."

Individualism: Hofstede (1997, p. 51) defines individualism as "pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family."

Collectivism: Collectivism is defined by Hofstede (1997, p. 51) as "the opposite of individualism and pertains to societies in which people from birth onwards are integrated into strong, cohesive ingroups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty."

Uncertainty Avoidance: Uncertainty avoidance is defined by Hofstede (1997, p. 113) as "the extent to which members of a culture feel threatened by uncertain or unknown situations."

Long-term/Short-term Orientation: De Mooij (1998, p 87) and Hofstede (1997) define long-term orientation as the extent to which a society exhibits a pragmatic future-oriented perspective or a more conventional historic or short-term point of view. Values associated with long-term orientation are thrift and perseverance; Values associated with short-term orientation are respect for tradition, fulfilling obligations, and "saving face."

Motivational Value Type: The same as a motivational domain of values. Each motivational value type contains specific values, implying that each value type consists of several beliefs (Schwartz, 1994, 1996, 1999). Please refer to Table 2.2, on Page 21, for a list of motivational value types.

Higher Value Type: A combination of two motivational value types that form a bipolar dimension of values. For instance, openness to change is obtained from the combination of self-direction and stimulation value types. Schwartz (1994, 1996, p. 5) conceptualized four higher value types. Please refer to Figure 2.1 on Page 5.

Autonomy: In autonomy cultures, individuals are considered autonomous and encouraged to express their internal attributes and uniqueness. Autonomy is divided into affective and intellectual autonomy. Intellectual autonomy motivates individuals to follow their ideas and path through values like broadmindedness, creativity, and curiosity. Affective autonomy motivates individuals to go after positive experiences through values like excitement, pleasure, and variety.

Embededdness: In embedded cultures, individuals are encouraged to participate in the group's way of life, and identify themselves with the their group. The key values in this dimension are security, social order, tradition, and wisdom.

Individuals are part of the collective and seek the meaning of life through social relationships and their groups.

Egalitarianism: Egalitarianism encourages individuals to consider one another as moral equals who share basic interests and needs as human beings. Equality, honesty, responsibility, and social justice are its related values.

Harmony: Harmony promotes engaging the environment harmoniously as one. Promoting the environment, unity with nature, and peace in the world are its related values.

Hierarchy: Hierarchy assigns roles to individuals to insure responsible behavior and legitimizes the unequal distribution of power, resources, and roles. Authority, humility, social power, and wealth are its related values.

Mastery: Mastery promotes active self-assertion in order to master, to exploit, and to change the natural and social environment to achieve personal or group goals. Ambition, competence, daring, and success are its related values.

Cultural Convergence: The convergence or coming closer together of values, cultural attitudes, and behaviors of managers, employees, and engineers for the purpose of this

study, regardless of the cultural differences that may exist between them (Ralston, 1993).

Cultural Divergence: Cultural divergence is the opposite of convergence. Divergence proposes that values, cultural attitudes, and behaviors of managers, employees, and engineers, for the purpose of this study, will keep their diverse cultural values, even if there are social and economic similarities among them (Ralston, 1993).

Crossvergence: Crossvergence is defined by Ralston (1997) as a unique value system formed by a synergy of national culture and economic ideology influences that is different from a value set supported by either influence. Crossvergence attempts to explain the dynamic interaction between convergence and divergence that results in a unique value system.

Technology: Technology is a general term for the processes by which human beings fashion tools and machines to increase their control and understanding of the material environment. Historians of Science have argued not only that technology is an essential condition of advanced, industrial civilizations, but also that the rate of technological change has developed its own momentum in recent centuries. Innovations now seem to appear at a rate that increases geometrically, without respect

for geographical limits or political systems. These innovations tend to transform traditional cultural systems, frequently with unexpected social consequences. Thus, technology can be conceived as both a creative and a destructive process (Encarta, 2004).

Summary

The first chapter of this dissertation provided an overall introduction relevant to the research problem on which the following four chapters of this dissertation are focused. Chapter I presented the research problem and established the extent to which the level of technology and its corresponding level of development play a role in lessening cultural differences. Chapter I also defined the purpose and significance of this study.

The lack of understanding in an organization of managerial attitudes, work values, and behaviors, could result in the failure of the business venture. Managers from different cultures could interpret and process information differently. A breakdown in communication between managers involved in international business could be very costly to the firm.

This study brings awareness of what values influence attitudes and behavior, and thus helps identify cultural differences and the reasons behind them, as well as recognizing ways to lessen these cultural differences between individuals and organizations. The interaction between Mexican

and United States engineers is an ideal setting for this study and accordingly for better understanding of the convergence of values across both cultures. These business interactions will continue to grow with NAFTA in the foreseeable future, and highlight the importance of this research to international management. Table 1.1 shows the organizational plan for Chapters II through V.

Table 1.1 Organizational Plan

Chapter	Objectives
II	• The literature review, the definition of values, cultures, and behaviors, are presented. • The conceptualization and relationship between values, national culture, and convergence theory is discussed. • Hofstede's IBM Study and its correlation to Schwartz's cultural-level value types studies is presented. • The impact of technology and economic development on human values is discussed.
III	• Research Design, Methodology, Hypotheses, and the Research Questions are discussed. • Description of the population sample, data collection procedures, instruments, and statistical techniques and analyses.
IV	• Presentation of findings and results, demographics, descriptive statistics, and hypotheses.
V	• Significant findings and results are discussed. • The contributions of the study, recommendations for future research are presented.

CHAPTER II

LITERATURE REVIEW

Introduction

The purpose of this chapter is to review the preliminary literature relevant to the theory of universal human values and the universal human values of people across cultures. The present study will review the history and research into human values, culture, and behavior, followed by reviews of Rokeach's Theory of Values, Hofstede's Cultural Dimensions, Schwartz and Bilky's Theory of Universal Human Values, and The Conceptualizations of Convergence-Divergence Theory.

A strong connection exists between these theories and their related empirical research, not only chronologically, but also theologically and methodologically. The subjects are presented in a temporal sequence. Thus, the work of Rokeach and Hofstede is presented first; the work of Schwartz, Bilsky, Webber, and Ralston, is more recent, but strongly linked to prior research by Rokeach and Hofstede on values and culture.

The objective of the researcher is to improve one's understanding of values and the impact that the level of technology and its corresponding level of development may have on engineers' values in different cultural environments.

Universal Human Values, Culture, Attitudes, and Behavior

The study of human values has become increasingly important to researchers trying to understand and measure the

impact that changing values have on behavior, culture, and organizations, of human beings. Today's international firms have engineers with different cultural backgrounds and value systems all over the world. These firms are trying to better understand engineers' attitudes and practices to improve the performance of the international organizations and the effectiveness of their management.

Meglino & Ravlin (1998) explained that firms and individuals would benefit from a better understanding of the relationship between values of the employees and the corporate culture. Corporate Culture is defined by the values of corporate managers and subordinates. A strong corporate culture is possible only if the employees' values are in agreement with those of the firm. Athos & Coffey (1968, p. 100) state that by "values" we mean ideas about what is desirable. Kluckhohn et al. (1962, p 369) state, "value is a conception, explicit or implicit of the desirable which influences the selection from available modes, means, and ends of action."

Rokeach consolidated much of the theory that came before him, and his work has been used as a guideline for the research that followed. He conceptualized that value was a construct. He recognized that values were ends (terminal) or means to ends (instrumental). He went further to classify values by social matrix: family, social group, or religion.

Rokeach also classified values according to the operative methodological character (competence and moral) or their locus of application (social and personal). He used a linear relationship of importance in a system of competing values and related values to behavior using the mediating variable attitude. He used abstract terms because he thought they resembled closely the cognitive nature of values.

Schwartz & Bilsky (1987, 1990) relied on Rokeach's Theory and Research Methodology. They adopted Rokeach's definitional structure. Schwartz uses Rokeach's values as value markers. He conceived the relationship between values to be circular instead of linear. The most significant aspects are the definitional and conceptual theories, the behavioral relations, the use of rating, the multiple item domain sampling, and the necessity of more contextual reference and specificity in values research.

Culture has to do with the way people live and behave in a social and organizational setting. Culture has many definitions. Hofstede (1994, p. 5) defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from another." He observed that collective mental programming, although not directly observable, is shared within, but between groups of people, and that managerial groups shared this collective programming. Hofstede (1980) found profound differences in the attitudes and behaviors of managers and subordinates across

cultures. The variance in work values was explained by national culture, and not so much by profession, title, gender, or age.

According to Adler (1991), culture is the result of a complex interaction of values, attitudes, and behaviors of the individuals in a group. Values influence attitudes; Attitudes affect behavior, and behavior impacts culture. Values, Attitudes, and Behavior reinforce one another and adjust in a circular way. Values are beliefs that describe an individual's preferences and alternatives between appropriate and inappropriate behaviors.

Hofstede (1980, 1994) recognized that values are the foundation of culture. He emphasized that an understanding of values is critical to understand behavior.

Both Hofstede (1994) and Rokeach (1968) recognized that the majority of people belong to different sub-cultures at once, having different and sometimes opposing values at the same time. This ambiguity complicates the understanding and identification of culture and values. Hofstede found that modern nations that have existed for a long time show a greater affinity for nationalization of language, the educational system, the communication media, the military, and accordingly they are geared towards national integration.

Rokeach (1973) suggested that differences between cultures, social classes, professions, religions, and political affiliations could be reflected by an individual's

answers to "values" questions, reinforcing that values research is effective across different cultural environments. An individual's values can be used to make cross-cultural comparisons in international studies.

Schwartz & Bilsky (1987) noted that societies and individuals could be compared to other societies and individuals on the basis of their values. There are instruments of "values" measurement, such as, Rokeach's (1973) Value Survey, Hofstede's (1980) Value Model, and Schwartz's (1996) Value Model, that would be useful in a study of values across different cultures. Each model or survey has shown that personal values influence behavior, beliefs, attitudes, and preferences in a wide range of situations. The Schwartz's and Hofstede's Value Models will be used in the present study.

The significance of cultural values to international business cannot be overstated. Hofstede (1983) demonstrated that more emphasis is needed on cultural sensitivity and synergy in management research because of the invasive influence of culture in organizations.

Studies performed by Ralston et al. (1993) have investigated the convergence and divergence of managerial values across different countries and cultures. The entire work of Webber (1969) helped to conceptualize three different forces that act upon cultural convergence: technology, education, and philosophy. He asserts that technology applies a major force toward making work and society more similar

wherever industrialization comes about. Technology defines social levels according to occupation, provides upward mobility in organizations and society, and will drive work towards skilled labor, a flatter organizational management structure, and increased division of labor.

Webber (1969, p. 77) also stated "ideology should fade because its irrelevancy for the problems faced." In other words, the force of convergence will be fueled by pragmatic philosophies.

Roakeach's Theory of Values

Rokeach (1956, p. 225) defines a value as "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially transferable to an opposite or converse mode of conduct or end-state of existence." Value systems consist of sets of values. Values may be arranged in a spectrum of importance. For Rokeach, a functionally integrated cognitive system was made of value systems in which beliefs were the basic units of analysis (V.A. Braithwaite & W.A. Scott, 1991). Clusters of beliefs formed attitudes that connected functionally and cognitively these value systems.

Braithwaite and Scott (1991) suggest that:

> Rokeach (1973) further postulated classes of beliefs concerned with self-cognitions representing the innermost core of the total belief system, and all remaining beliefs, attitudes, and values can be conceived of functionally as organized around the innermost core (p. 216). Like other beliefs, then values serve to maintain and enhance the self-concept (pp. 662-663).

Rokeach (1973) shared the beliefs of the 1960's that values served evaluative and prescriptive/descriptive functions in regards to attitudes and behavior with social and individual dimensions. Values were general beliefs with a motivational function. He explored the value-attitude relationship. For Rokeach, values were determinants of attitudes; Values were centralized conceptualizations that resisted change; Attitudes were not as centralized as values. Important values were instrumental to obtain attitudes that were beneficial in the acquisition of objects. He posited that there was a strong connection between self-esteem and values. The violation of these values resulted in shame, guilt, punitive action, and deflation of the ego. These values could operate as parts of the ego ideal or superego. This relationship was exemplified in the individual use of values for the purpose of self-justification.

Braithwaite & Scott (1991) reported that Rokeach's accomplishments also included: the integration into his work of the hierarchical organization of values, the operationalizing of the value construct as both modes of conduct and end-states, incorporating the views of others, and capitalizing on the emerging consensus of the 1960's. They regarded Rokeach's work as fundamental in defining and integrating into the body of research on the value concept. The Rokeach Value Survey (RVS) has both terminal and

instrumental values. The ideas associated with terminal values are very recognizable when an individual considers them. Each individual has a unique and variable conceptualization despite how people would agree on the value label. Instrumental values refer to "modes of conduct" (Rokeach, 1973, p. 7). These modes of conduct describe an ideal behavior. Terminal values are images formulated by words and phrases while modes of conduct describe behaviors and are adjectives. Instrumental values are also ideas that are both variable and personal. The descriptive labels of language portray the aspects of the human character in instrumental values. On the other hand, the ideas conceptualized by terminal values vary from person to person.

Rokeach (1968, 1973) suggested that there are more instrumental than terminal values. The Rokeach Value Survey (RVS) consists of eighteen classifications for each terminal and instrumental values. The values on the RVS are designed to be qualitatively and quantitatively different from one another. Rokeach (1973) concluded that there is even more meaning in how a respondent ranks a given value against other values. He considered his rank ordering to be extremely important to his psychodynamic theory of values, and acknowledged rank ordering as different degrees of importance to the individual's values as the additive product that reconciled conflicting values during the individual's

lifetime. Following are the lists of terminal and instrumental values from the Rokeach Value Survey:

Table 2.1 Rokeach's Terminal Values

(Rokeach, 1973, p. 359)

A comfortable life: a prosperous life
An exciting life: a stimulating active life
A sense of accomplishment: lasting contribution
A world at peace: free of war and conflict
A world of beauty: beauty of nature and the arts
Equality: brotherhood, equal opportunity for all
Family Security: taking care of loved ones
Freedom: independence, free choice
Happiness: contentedness
Inner Harmony: freedom from inner conflict
Mature Love: sexual and spiritual intimacy
National Security: protection from attack
Pleasure: an enjoyable, leisurely life
Salvation: being saved, eternal life
Self-respect: self esteem
Social Recognition: respect, admiration
True Friendship: close companionship
Wisdom: a mature understanding of life

Table 2.2 Rokeach's Instrumental Values

(Rokeach, 1973, p. 361)

Ambitious: hardworking, aspiring
Broadminded: open-minded
Capable: competent, effective
Cheerful: lighthearted, joyful
Clean: neat, tidy
Courageous: standing up for your beliefs
Forgiving: willing to pardon others
Helpful: working for the welfare of others
Honest: sincere, truthful
Imaginative: daring, creative
Independent: self-reliant, self-sufficient
Intellectual: intelligent, reflective
Logical: consistent, rational
Loving: affectionate, tender
Obedient: dutiful, respectful
Polite: courteous, well-mannered
Responsible: dependable, reliable
Self-controlled: restrained, self-disciplined

As Gordon (1999, p 50) reports, Rokeach's List of Values for the RVS has some problems when one considers, that some terminal and instrumental values are interrelated and may be in both categories. Some of Rokeach's terminal values could be

considered instrumental, and vice versa. Self-respect considered by Rokeach as terminal could also be considered as instrumental if self-respect was an important value in the attainment of a terminal value such as social recognition, and vice versa. According to Gordon, some of Rokeach's instrumental goals could be considered as micro or macro values, or might be considered as complex values. This explains the existence of synonyms in the value descriptions. Rokeach's List of Values was normative, and was based upon his expectations and perception.

Davidson (1997) suggests that there is a lack of some very clear values, especially the values surrounding power, authority, and control.

Schwartz (1990, 1992, 1994, 1996) defines his value model as a system with interrelated values. Schwartz has developed his own value model that builds upon many aspects of Rokeach's Theory and List of Values in a very unique way. Rokeach's work, therefore, is fundamental for current studies in universal human values.

Hofstede's Cultural Dimensions

Hofstede (1980) defined four dimensions of culture that described fundamental similarities and differences in human behavior, attitudes and decision-making, for culture. The four dimensions were masculinity/femininity, power distance, individualism/collectivism, and uncertainty avoidance. Masculinity was defines as the opposite of femininity.

Masculinity stands for success, competition, assertiveness, good performance, service to others, and brotherhood (Hofstede, 1992). Femininity stands for tenderness, warm relationships, caring, and modesty.

Hofstede (1997, p. 28) defines Power Distance as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally." He asserts that societies have different levels of power distance. People that live in societies with a high degree of power distance desire the inequities between members of societies. Those people in societies with low power distance try to lessen the inequalities.

Individualism is the tendency to pursue one's goal independently from one's own reference group.

Hofstede (1997) defines Individualism/Collectivism as:

> Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. Collectivism as its opposite pertains to societies in which 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).

He explains that in individualistic societies identity is based on the individual, communication is very low context, learning is how to learn, people look after themselves and their nuclear family; whereas in a collective society, identity is based on the social network of the individual,

communication is high-context, learning is how to do, people are protected by an extended family in exchange for loyalty.

Hofstede (1997, p. 113) defines uncertainty avoidance as "the extent to which members of a culture feel threatened by uncertain or unknown situations." Uncertain avoidance refers to a personal preference for situations that are structured or unstructured with well-defined rules of behavior. Hofstede & Bond (1988) defined a fifth dimension that was labeled long-term/short-term orientation. The fifth cultural dimension refers to an individual's emphasis towards the past, present, or future. When short-term orientation is towards the present and the past, members of a culture tend to respect traditions, "save face," and meet social obligations. When long-term orientation is towards the present and the future, then there is a tendency towards perseverance and saving for the future. Hofstede conducted the IBM Study by country and cultural dimension, but did not include long-term/short-term orientation in the study (Hofstede, 1980). Refer to Table 2.3, which depicts the results of Hofstede's IBM Study.

Schwarz and Bilsky (1987, 1990) theorized a value system that integrated both Hofstede's cultural level model with Rokeach's individual-level model. Schwartz and Bilsky (1987) conceptualized two regions where universal human values cluster in a two-dimensional model as Hofstede's individualism and collectivism cluster with a smaller mixed region. Schwartz (1990) found that the formation of universal values'

hierarchies are guiding social norm within a society. Thus, the values in the individualistic cluster are serving the individualistic interests of the members of a society. The mixed region cluster was identified as representing adult maturity.

Schwartz and Bilsky (1987) also found that smaller clusters of values served more specific interests, related to a basic human need. These smaller domains were called "motivational domains" that did not coincide exactly with Hofstede's cultural dimensions.

Other studies by Leung (1987) and Triandis (1987) corroborated Schwartz and Bilsky's findings that Hofstede's Individualism/Collectivism Model might be less polarized than it was topologically depicted.

Table 2.3 Hofstede's IBM Study Results of Values of the Four Dimensions for the Dimensions of the 40 Countries in Culture's Consequences* (CC) (Hofstede, 1980)

Country	Abbreviation	PD	UA	IDV	MAS
Argentina	(ARG)	49	86	46	56
Australia	(AUL)	36	51	90	61
Austria	(AUT)	11	70	55	79
Belgium	(BEL)	65	94	75	54
Brazil	(BRA)	69	76	38	49
Canada	(CAN)	39	48	80	52
Chile	(CHL)	63	86	23	28
Colombia	(COL)	67	80	13	64
Denmark	(DEN)	18	23	74	16
Finland	(FIN)	33	59	63	26
France	(FRA)	68	86	71	43
Germany -FR	(GER)	35	65	67	66
Great Britain	(GBR)	35	35	89	66
Greece	(GRE)	60	112	35	57
Hong Kong	(HONK)	68	29	25	57
India	(IND)	77	40	48	56
Iran	(IRA)	58	59	41	43
Ireland	(IRE)	28	35	70	68
Israel	(ISR)	13	81	54	47
Italy	(ITA)	50	75	76	70
Japan	(JAP)	54	92	46	95
Mexico	(MEX)	81	82	30	69
Netherlands	(NET)	38	53	80	14
Norway	(NOR)	31	50	69	8
New Zealand	(NZL)	22	49	79	58
Pakistan	(PAK)	55	70	14	50
Peru	(PER)	64	87	16	42
Philippines	(PHI)	94	44	32	64
Portugal	(POR)	63	104	27	31
South Africa	(SAF)	49	49	65	63
Singapore	(SIN)	74	8	20	48
Spain	(SPA)	57	86	51	42
Sweden	(SWE)	31	29	71	5
Switzerland	(SWI)	34	58	68	70
Taiwan	(TAI)	58	69	17	45
Thailand	(THA)	64	64	20	34
Turkey	(TUR)	66	85	37	45
USA	(USA)	40	46	91	62
Venezuela	(VEN)	81	76	12	73
Yugoslavia	(YUG)	76	88	27	21

Schwartz and Bilsky have provided significant understanding into the value conceptualization and to structural relationship mapping among values based on motivational content.

Schwartz and Bilsky's Theories of Universal Human Values

Schwartz (1994, 1996, 1999) conceptualized ten motivational domains of values. Each domain or type of value contains specific values implying that each value type consists of several beliefs. Some of these domains of values evolved from Maslow's (1959) theory of hierarchy of needs. Schwartz's universalism, achievement, security, and benevolence domains are derived from Maslow's self-actualization, esteem, security, and social needs (Williams, 1968).

Schwartz's power domain is derived from McClelland (1961), and hedonism and conformity from Freudian Theory (Freud, 1933; Morris, 1956). The remaining three domains are: tradition, self-direction, and stimulation. Each motivational domain has a specific value and an indirect effect on other motivational domains that can result in an action of change. Refer to Table 2.4, which depicts the list of the Schwartz motivational value types.

Schwartz (1996) performed experiments to relate value priorities to single behaviors: interpersonal cooperation, outgroup social contact, and voting behavior. He conceptualized that hedonism would be related to non-cooperation, and benevolence with cooperation. The studies were conducted at the Hebrew University in Israel, with a 56-item survey, where 90 students, an Israeli national voting survey, and 151 schoolteachers participated. There were three

samples for testing interpersonal cooperation, outgroup social contact, and voting behavior. The first sample was giving money to oneself or other people in the group. The second sample was using expert analysis of political parties and their platforms. The results of the study supported the conceptualized relationship between the motivational domains; however, Schwartz asserted that the motivational domains permitted the consistency of the theory of predictive behavior because the value types were prioritized.

The motivational content in Schwartz's Theory was the fundamental cornerstone for the organization of values and the interpretation of the structural relationships between types of values and motivational domains. Schwartz (1994) conducted studies to gather empirical support for the existence of universal characteristics in the content and structure of human values.

Schwartz (1994) stated:

> Somewhat modifying earlier definitions of values, I define values as desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity. Implicit in this definition of values as goals is that (1) they serve the interests of some social entity, (2) they can motivate action, giving it direction and emotional intensity, 3) they function as standards for judging and justifying action, and (4) they are acquired both through socialization to dominant group values and through unique learning experiences and individuals (p. 21).

Schwartz (1994, 1996, p.5) discusses how the total structure of individual values can be organized in two basic

dimensions. The higher value types such as openness to change (combining self-direction and stimulation value types) and conservation (combining security, conformity, and tradition) are a bipolar scale and form a dimension. This dimension is an expression of conflict between independent thought, action, and change, and submissive self-restriction, tradition, and stability. The second dimension consists of self-transcendence (combining benevolence and universalism) opposing self-enhancement (combining power and achievement). The second dimension express a conflictive relation between acceptance of others as equals and concern for their welfare, as well as two other higher value types, namely, pursuit of one's own success and dominance over others. Schwartz also explains that the hedonism value type shares elements of both dimensions.

The Schwartz individual value model has adjacent value types. These adjacent value types share motivational characteristics and tendencies. The value model has adjacent values that are more compatible than values that oppose each other. Refer to Figure 2.1, which depicts the Schwartz individual value model (Schwartz, 1996, p. 5). For instance, universalism and benevolence are value types that imply concern for others, their advancement in life, and unselfishness; whereas achievement and benevolence are located opposite each other.

Table 2.4 List of the Schwartz Motivational Value Types

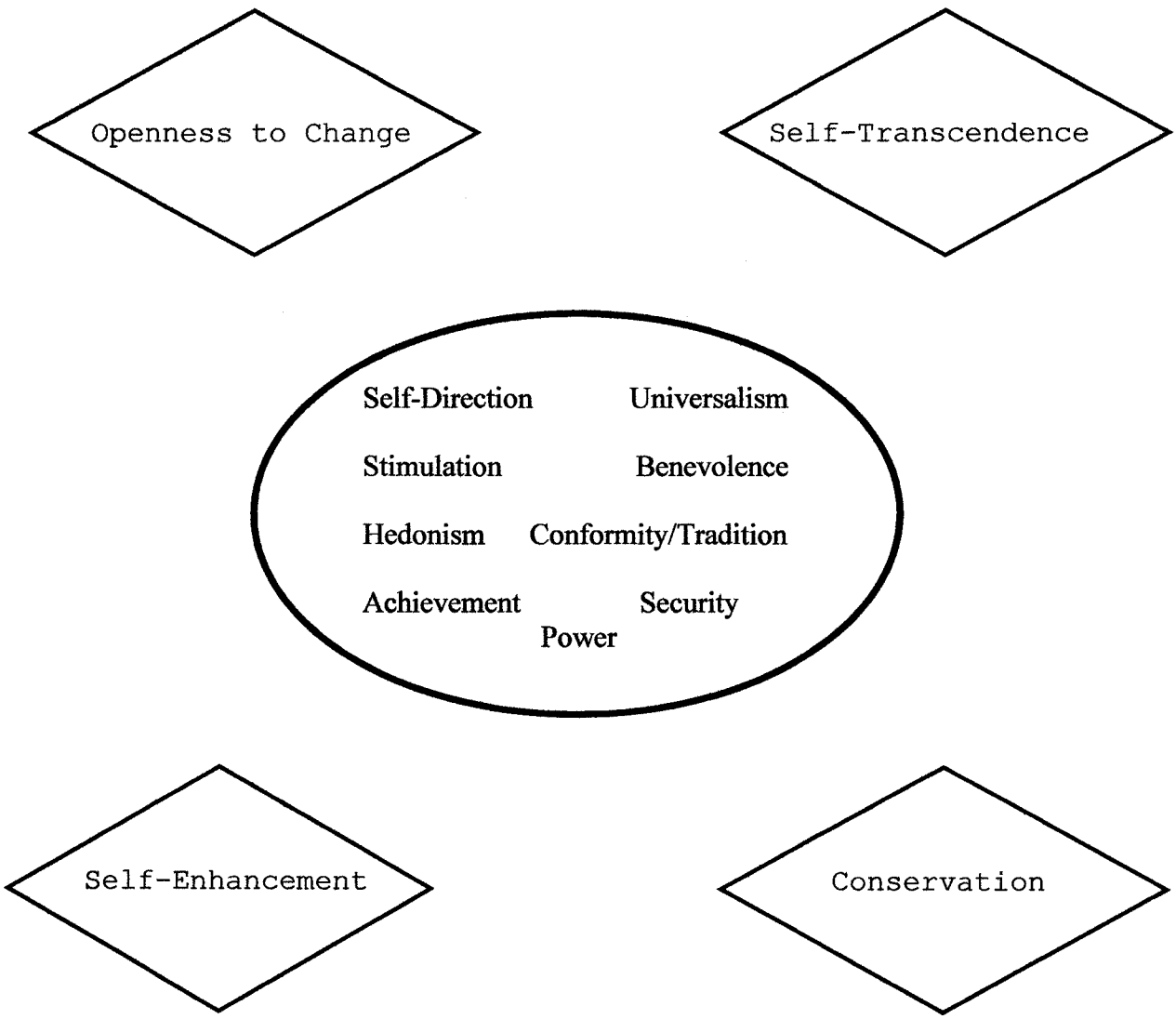
(Schwartz and Bilsky, 1987, 1990; Schwartz, 1996)

Motivational Value Type	**Value**
Power	Social Power; Wealth; Authority; Social Recognition
Achievement	Ambitious; Influential; Successful; Intelligent
Self-direction	Freedom; Creativity; Independent
Stimulation	An exciting life; A varied life; Daring
Hedonism	Pleasure; Enjoying life
Universalism	Equality; Wisdom; Broadmindedness; Justice
Benevolence	Helpful; Forgiving; Honest
Tradition	Respect for Tradition; Humble; Moderate
Conformity	Obedient; Self-disciplined; Polite
Security	Sense of belonging; Healthy; Clean

Figure 2.1 Schwartz Individual Value Model

"Prototypical Structure of Value Systems"

(Schwartz, 1996, p. 5)



Schwartz's Culture-level Dimensions

Schwartz (1994) performed research on work-related values on the cultural level based on previous findings. He emphasized culture-level value dimensions instead of individual indirect expression of work-centrality cultural values. Schwartz (1994, p. 26) depicted the values in two different lists. The first list has 30 terminal values and the second has 26 instrumental values, to be rated by a participant as "guiding principles in my life." Each participant is asked to rate each value on a nine-point Likert scale, from -1 to 7, where 7 is the supreme value, and -1 is the opposed-to-my-values other end of the importance scale.

The Schwartz culture-level value scale has predicted behaviors, attitudes, and beliefs. Schwartz (1996) was able to effectively predict a value measurement for voting behavior, interpersonal cooperation, and outgroup contact readiness, which validated his culture-level value scale.

Schwartz (1992, 2000) has defined three bipolar dimensions of culture: mastery versus harmony, embeddedness versus autonomy, and hierarchy versus egalitarianism. These dimensions of culture affect the relationship of humanity to the natural and social world, the boundary between the individual and the group, and the responsible behavior that preserves the social fabric (Schwartz & Bardi, 1997).

The mastery-harmony dimension addresses the issue of regulating the relationship of humanity to the natural and

social world. Mastery promotes active self-assertion in order to master, to exploit, and to change the natural and social environment to achieve personal or group goals. Ambition, competence, daring, and success are its related values. On the other hand, harmony promotes engaging the environment harmoniously as one. Promoting the environment, unity with nature, and peace in the world are its related values.

The embeddedness-autonomy dimension addresses the boundary and relationship between the individual and the group. The relationship in embedded societies involves participation and pursuit of the group's way of life, and identifying oneself with the group. The key values in this dimension are security, social order, tradition, and wisdom. Individuals are part of the collective and seek the meaning of life through social relationships and their groups (Schwartz & Sagiv, 2000).

The relationship in autonomous societies involves expressing the individual's internal attributes and uniqueness. Schwartz & Sagiv (2000) describe two types of autonomy: intellectual and affective. Intellectual autonomy motivates individuals to follow their ideas and path through values like broadmindedness, creativity, and curiosity. Affective autonomy motivates individuals to go after positive experiences through values like excitement, pleasure, and variety.

The hierarchy-egalitarianism dimension addresses the responsible behavior of the individual that preserves the social fabric. Hierarchy assigns roles to individuals to insure responsible behavior and legitimizes the unequal distribution of power, resources, and roles. Authority, humility, social power, and wealth are its related values. Egalitarianism encourages individuals to consider one another as moral equals who share basic interests and needs as human beings. Equality, honesty, responsibility, and social justice are its related values. The welfare of others is encouraged to precede one's own selfish interest in life, and a voluntary commitment towards a genuine concern for others (Schwartz & Sagiv, 2000).

Schwartz (1994) reanalyzed Hofstede's data and replicated Hofstede's intercorrelations. Moreover, he found correlations between Hofstede's ratings for the four dimensions in the IBM study and his value types. Schwartz's and Hofstede's teacher samples had correlations based on the same 23 nations, and the student samples had correlations on 22 nations. Schwartz's (1994) cross-cultural study consisted of 86 samples from 41 cultural groups in 38 nations. The most significant correlations included a one-tailed test, with $p < 0.05$, and r as the correlation, that resulted in the following findings:

Table 2.5 Schwartz's and Hofstede's Most Significant Teacher/Student +/- Correlations (Schwartz, 1994)

Overlapping Dimensions	**r (Student Sample)**	**r (Teacher Sample)**
Power Distance & Affective Autonomy	-0.83	-0.45
Power Distance & Intellectual Autonomy	-0.49	
Power Distance & Conservatism	+0.70	+0.45
Power Distance & Egalitarianism	-0.47	
Masculinity & Mastery		+0.56
Uncertainty Avoidance & Harmony		+0.43
Individualism & Affective Autonomy	+0.85	+0.46
Individualism & Intellectual Autonomy	+0.48	+0.53
Individualism & Egalitarianism	+0.45	
Individualism & Conservatism	-0.66	-0.56
Individualism & Hierarchy		-0.51

Conceptualizations of Convergence-Divergence Theory

The convergence-divergence debate started in the late forties in the wake of the internationalization of companies and the growth and expansion of the Japanese, United States, and Western European economies. The convergence approach proposes that the attitudes and behaviors of managers in the industrialized world will converge regardless of the cultural difference that may exist between them. On the other hand, the divergent point of view proposes that managers will keep their diverse cultural values even if there are social and economic similarities among them (Ralston, 1993). The debate has fueled numerous discussions on the effect of cultural values and the social environment on managerial values. Ronen (1986) asserts that there has been a convergence of Western values between non-Western and Western nations due to the impact of successful Western business practices.

Ronen (1986, p. 235) identifies a supra-international culture evolving in the world that will have no obstacles in converging. If this happens, there will be no need for a cultural map of the world, as we still know it. On the other hand, Hofstede (1980, 1984, 1997) posits that culture is too strong to be swayed by Western values, thus to have any significant change produced on managerial values.

A third alternative has been discussed in crossvergence research. Crossvergence was originally defined by Ralston (1993) as a value set that was "in between" the values

supported by national culture and economic ideology. Ralston (1997) describes as follows: "Crossvergence occurs when an individual incorporates both national culture influences and economic ideology influences synergistically to form a unique value system that is different from the value set supported be either national culture or economic ideology." Crossvergence attempts to explain the dynamic interaction between convergence and divergence that results in a unique value system.

There is research evidence that national cultures vary and that strategic management, managerial attitudes, leadership, and personnel management vary across national cultures. These differences between national cultures and managerial attitudes affect job performance. National culture is the employee's central organizing principle to approach and understand work, and thus provides expectations of how the employee might be treated by others. National Culture provides the set of rules to act, and the set of preferred outcomes to compare from, before an action is taken. Employees are likely to prefer management practices that are consistent with their work values and may reject those practices that are not.

National Culture Values that are not reinforced by management practices are more likely to predict behavior and performance, because congruent management practices are consistent with existing behavioral expectations and routines that transcend the workplace (Early, 1994).

The congruence between management practices and the characteristics of the national culture results in better performance. The implication of this to international firms is very significant because international firms need to adapt to national culture to reach high performance goals. A significant competitive advantage will likely be achieved from the correct adaptation and alignment of the firm's management practices with the national culture, or outside environment, the strategy systems, and the structure of the company.

As communications and movement of people and goods across national borders grow at an ever-increasing pace, markets become more integrated. Some scholars have in fact heralded such trends to globalization as among the most important and compelling in business today, with far-reaching consequences for organizational structure, management decision-making, and effective competitive strategies in world markets. Consequently, it becomes important to understand how these changes are impacting the microenvironment of a country (Craig, Douglas, and Grein, 1992).

As countries' macroeconomic environments converge, these countries will offer similar context for research, and similar strategies and administrative procedure will be employed. The growth of communication, commerce, and travel between these countries, and the advent of globalization and market integration suggest that countries will become more similar in their economic and national culture environments. Technology

is bringing people closer together and making distances shorter.

According to Weber (1969), there was an emerging commonality in the world driven by all foundations of business: technology, education, and pragmatic philosophy, but culture may be a disruptive element.

Culture gives us a feeling of security and a sense of what is right and wrong. However, what is right and wrong might be very different from culture to culture.

Culture influences what behavior is approved or disapproved by the members of a society. This prescription has an effect on management and the work performance of employees in an organization.

Webber (1969) states:

> Most of us act, think, and dream in terms of the norms and standards we have absorbed from the culture in which we are reared. That which our culture values, we value; that which our culture abhors, we abhor. By education or experience, some of us become aware that there are other values and beliefs that make sense too – as much or more that our own. But we see them hazily – and, all too often, with age the awareness slips away. As few, very few are able to escape, overcome parochialism and see the world more objectively. But escape is by no means entirely desirable. We can feel alone and unsure when the comfortable values of our old culture fall away, become irrelevant and are replaced by nothing (p. 80).

The rate of change of attitudes and acceptable behaviors is slow even when there is an economic need. The force of technology may drive change in modern industrialization.

Diversity is based on the uniqueness of cultures. Every

country and its culture is unique in its cultural characteristics, technological and economic development, natural resources, and demographic factors. The three forces that act upon convergence, technology, education, and pragmatic philosophy, are cultural values driving people towards convergence. The three forces that work towards cultural divergence are cultural inertia, time and stage of development, and natural resources and demography.

In order to analyze convergence or divergence, one needs to distinguish Webber's three levels of interfaces or relationships in management: (1) man and his work, (2) man and man (superior-subordinate, lateral and diagonal relations), and (3) organization and its environment (Weber, 1969). Webber's elements of uniformity are summarized in Table 2.6 (Weber, 1969, p. 81).

Webber asserts that it is not a matter of mathematical operation, because at the present time there was no way of totaling the forces of diversity and the forces of uniformity for a single country to get a numerical result that would suggest a direction or a quantitative rate for movement. The arguments for convergence and divergence vary on the three interfaces conceptualized by Webber (1969).

Webber (1969) suggests that other studies indicate the different values given to persuasion versus direction as managerial tactics in different cultures change. These studies have demonstrated that a positive worker's response to more

participative management in one country is not matched in a different cultural setting.

Table 2.6 The Elements and their Relationships

(Weber, 1969, p. 81)

Forces of Uniformity	**Managerial Interfaces**	*Forms of Diversity*
Technology	Man-Work	Cultural Inertia
Education	Man-Man	Time and Stage of Development
Pragmatic Philosophy	Firm-Environment	Natural Resources Demography

The three managerial interfaces conceptualized by Webber (1969, p 81-82) are described as follows:

Man-Work Interface: The relationship between man and machine is compelling and forms the basis for the argument in convergence. The force of convergence is acting on the man-work interface. Technology and economic development pressures, both clear and strong, influence the convergence of how a man works and makes it more alike. A man's equipment, his task, job training, and his employer's volition and man-on-the-job

expectation, will all tend to be more similar in the foreseeable future.

Firm-Environment Interface: The forces of convergence are very strong in the interface between the firm and its environment: government, customers, and competitors. The professional manager is in conflict with ignorant owners, politicians, and bureaucrats. Managers must be relatively free to make decisions and operate. They also need to know the customer, what customer goods are in demand, be accountable to others, and provide excellent customer support.

Man-Man Interface: Convergence is less clear in the man-to-man or superior-subordinate relationship within the organization, but nevertheless the forces of convergence are active and prevalent. The increasing level and intricacy of technology will tend to make a subordinate that operates the technology more knowledgeable, important, and stronger in bargaining power, within the organization, relative to the superior. This implies that superiors would have to be more responsive to subordinate's needs.

The democratic business processes in decision-making may become more prevalent in the managerial process of the organization as superiors respond to subordinates' higher needs brought about by improved living standards, technical

sophistication, and employees' skills. Higher needs, such as competence, achievement, and autonomy, may become more relevant. Technology would be the driving force behind improved standard of living for subordinates. The superior or manager would need to tap his or her subordinate's technological skills and commitment through his or her attempt to satisfy higher needs in the hierarchy of needs.

Webber (1969) asserts that convergence in managerial practice will be a slow process. Demographic conditions affect managerial leadership, when there is labor shortage or excess, management will respond differently. Cultural values would exert significant influence on managerial relations, philosophy, and practice, especially on motivation, communication, and leadership style.

Webber (1969) states:

> Cultural factors such as attitudes toward authority, achievement, and personal risk, exercise more influence on the interpersonal aspects of management than on the man-technology or firm-environment interfaces. The forces of uniformity are less clear and imperative on the methods management uses to communicate, coordinate, and motivate. The sharp differences existing in these processes between United States and foreign companies, and indeed between domestic firms, testify to the divergence in managerial philosophy and practice that exists, and may always have, within organizations (p. 83).

Summary

Chapter II presented a literature review which included definitions of universal human values, cultures, and behaviors, with aspects of values theories that assisted in

clarifying the relationship between universal human values, motivation, the concept of national culture, the conceptualizations of convergence-divergence theory, and other research in these areas. The literature review has shed light on fundamental concepts of values, the early work of researchers into universal human values, resulting in the development and integration of the value theory under Rokeach (1973), its continuing development by Schwartz and Bilsky (1987), and the advent of convergence, divergence, and crossvergence by Webber (1969) and Ralston (1993, 1997).

The impact and implications of Hoftede's cultural dimensions were described and demonstrated by Hofstede during the IBM Study, focusing on the evolution and application of motivational values by Schwartz and Bilsky (1987, 1990). The most significant correlations between Schwartz (1994) and Hofstede's ratings for the teacher/student studies were described.

In this chapter, values were described as instrumental or as terminal values referring to the end-state of behavior that a person looks for to achieve self-realization in his or her life.

All in all, research has indicated how cultures differ in their choice of, and the significance given to, values, and how superiors and subordinates differ in their values across cultures, as well as how values tend to remain and resist

change in a specific national culture or society.

The impact of technology and economic development is well described by Webber (1969) in the relationship between man and his work. The force of technology is very strong and compelling in human organizations and is a key concept behind the theory and forces of convergence for human values. Technology is rapidly changing in ways and at a pace that is hard for people to keep up with, and is having a profound effect on human values across cultures.

The next chapter presents the research design, methodology, hypotheses, and research question. It includes a description of the population sample, a discussion on data collection procedures and instruments, as well as statistical techniques and analyses.

CHAPTER III

METHODOLOGY

Overview of the Chapter

This chapter presents the research methodology of this study. The general research design is discussed in the first section. This is followed by nine sections which include the research design, research sample, data collection, research population, definition of variables, research instrumentation, reliability and validity of Hofstede's VSM 94 - English/Spanish versions and Schwartz's SVS - English/Spanish versions, research question, research hypotheses, and statistical techniques and analysis.

Research Design

This study uses a comparative research design because it seeks to compare the cultural scores for engineers in Mexico and the United States to identify whether the level of technology and its corresponding level of development influence cultural convergence. Cultural convergence is assumed on the basis of theory (Webber, 1969; Ralston, 1997). The influence of level of technology on cultural convergence was determined as follows:

- Measuring Schwartz's culture-level value dimensions for engineers in Mexico and the United States, and correlating their scores to Hofstede's cultural

dimensions in order to validate the linear relationship between both dimensional results.

- Measuring Hofstede's cultural dimensions (power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance) for two sample populations of engineers in Mexico and the United States, in order to statistically compare the resultant scores to Hofstede's IBM study scores, to identify if a reduction in cultural differences between the two samples of engineers has taken place.

- Measuring Hofstede's scores for cultural dimensions and statistically examining the scores by individual demographic variables such as: age, gender, occupation, engineering degree level, and cultural dimensions, across both samples, to obtain the impact of the demographic variables on the cultural dimensions, and to determine any statistically significant relationships between these variables.

The research design used in the present study also constitutes research of the type Heuer et al. (1999) and Armstrong and Krasnostein (1995) described as a form of field research involving cultural convergence with culture-level dimensions. Ralston et al. (1993, 1997) also conducted similar

studies in managerial work values, national culture, and economic ideology across cultures. In this study, Schwartz's culture-level dimensions are compared to Hofstede's cultural dimensions from the IBM study.

Research sample and data collection

This section describes the sample, sampling procedure, and data collection, with a detailed description of the package sent to potential respondents. Research data was collected by conducting surveys in Mexico and the United States, with a minimum of 20 engineers that work for companies that manufacture, distribute, or service electrical equipment, using two questionnaires: the Schwartz Value Survey (SVS) and Hofstede's VSM 94. The study began with a sample of Mexican and United States companies that the researcher has access to in both countries. These companies are part of a global manufacturing and distribution network for major multinational companies.

The sample is expected to be well-matched with regards to engineering education, gender, age, and occupation. In this study, the goal is to obtain 20 to 50 well-matched engineers per country, even though, Hofstede recommended a minimum of 20 respondents per country to remove individual influences and assure statistical significance (VSM 94 Manual). The sampling procedure was conducted via regular mail and electronic mail. Each questionnaire included a cover letter, which described the nature of the research study, the importance of

participating in the study, and the reason why engineers were selected for the study. The research package was sent to key engineers or contacts with access to other engineers within their department or organization. The cover letter offered confidentiality and encouraged response. Respondents were asked to mail, or email the questionnaires as attachments, to the researcher. Respondents were cautioned not to share the research instruments with other engineers in their organization as each answer is subjective, and thus there are no correct or incorrect answers. Only respondents who are citizens of Mexico or the United States and had an engineering degree were asked to take the survey to avoid erroneous results and conclusions. A sample of each cover letter and questionnaire in English/Spanish is provided in Appendices A and B.

Approximately a week after the mailings, the key engineers were contacted by phone or e-mail to remind them of the survey and kindly request that it be completed if not already done so, and returned. The distribution of the research package, cover letter and questionnaire, to Mexico and the United States, began in February 18, 2005.

Research Population

The surveys were conducted in Mexico and the United States, a developing country and a developed country. The choice of countries allowed for cultural diversity and minimized language barriers, with the validated surveys

available in English and Spanish from the key researchers in the field.

Small and medium-sized companies and professional engineering societies were targeted; the small companies are distributors of electrical equipment and machinery that design, sell, service, or rent products, or electrical and civil engineering consultants, and the medium companies are manufacturers of electrical equipment and machinery sold by distributors.

Professionals in Mexico and the United States who at least hold a Bachelor of Science in Engineering degree were asked to participate in the research study. In Mexico, four small companies targeted are distributors located in four major cities: Guadalajara, Ciudad Obregon, Chihuahua, and Monterrey, and electrical engineering consultants. The medium-sized companies are located in Mexico City.

The research population consisted of sales engineers, design engineers, service engineers, and managers who are in very technical positions at various levels of the organization. The majority of these engineers have an electrical engineering, mechanical engineering, civil engineering, or software engineering background. Their educational studies at the university have consisted of two years of general education courses in English or Spanish composition, social science, physics, chemistry, humanities, and mathematics, and the last two years of college studies for

their career have been concentrated on their specialty or engineering field.

In order to achieve the best possible response, key department managers were asked by e-mail or phone to serve as ombudsmen for the research study. These managers motivated the other engineers in their organization to reply directly to the researcher and also communicated the purpose and the importance of the study.

The engineers who chose to participate were from the following companies: Eaton Electrical Mexicana S.A., Detroit Diesel de Mexico S.A., Empresas Matco, S.A. de C.V., Maquinaria, S.A. de C.V., Maquinaria Diesel, S.A., TRACSA, S.A., Coral Group, ABB Mexico, Ruiz y Asociados, Labs Pisa Mexico, IGSA, Bristol Myers Squibb, AMTROL, Colegio Nacional de Ingenieros Industriales, Caterpillar Company, Pantropic Power, Kohler Company, American Power Supply, SSR Inc., Boyle Engineering, Beckman Coulter, AC Craply, Detroit Diesel Corporation, Cummins Engine Company, Florida Department of Transportation, The American Institute of Chemical Engineers, The Florida Engineering Society, and The American Society for Engineering Education.

The combined population of Mexican engineers in the Mexican companies was 37. The combined population of United States engineers in the American companies was 47. All respondents were asked to participate willingly and voluntarily in the study.

The respondents to Hofstede's IBM study were mostly technical managers and subordinates, which should justify and support the comparative nature of the study and the choice of research population.

Definition of Variables

In the present study, Schwartz's culture-level dimensions (mastery and harmony, embeddedness and autonomy {affective and intellectual}, hierarchy and egalitarianism) as well as Hofstede's cultural dimensions (masculinity/femininity, power distance, individualism/collectivism, and uncertainty avoidance) were the dependent metric variables. Mexico and the United Sates were the independent categorical variables.

Research Instrumentation

The research instruments are included in Appendices A and B. Two proven and extensively used research instruments were utilized in this study. The first is the Schwartz Value Survey (SVS). Please refer to Appendix A for a copy of the SVS instrument and the cover letter, in English and Spanish. This is a 57-item survey provided by Dr. Shalom Schwartz from the Hebrew University in Jerusalem. Schwartz (1992, 1994) has used this instrument extensively in cross-cultural studies. The second research instrument in Hofstede's Value Module Survey 1994. This is a 25-item survey. Please refer to Appendix B for a copy of the VMS instrument and the cover letter in English and Spanish. A copy of Hofstede's VMS 1994 was provided by Tilburg University in The Netherlands through the Geert

Hofstede website (Hofstede, 2005). For the Mexico sample, the Spanish versions of both instruments were used, for the United States, the English versions were used.

A detailed description of each research instrument follows:

The Schwartz Value Survey

The Schwartz Value Survey is used to measure universal human values. This survey consists of 57 items in a 9-point Likert format, with a range of -1 to 7, featuring a short description for each value name that further specifies each value's meaning. Respondents select values that are high in importance, and then they are asked to select values that are less important. The number 7 corresponds to the most important value, zero is indifferent, and -1 is for the least important value, or a value that the respondent is opposed to. Respondents were asked to rate the most important with a number 7, and they are reminded that typically no more than two values are assigned a rating of 7.

Schwartz (1994) suggests the use of culture-level value types to differentiate the behaviors, institutions, and symbology between cultures, rather than individual values. When trying to understand differences between persons, Schwartz (1994) suggests using individual value types to understand the difference between beliefs, attitudes, and behavior. In the present study, Schwartz's culture-level

value-types will be used to assess individual culture-level value-types.

Schwartz & Bardi (1997) describe how each culture-level value type (mastery, harmony, embeddedness, autonomy {affective and intellectual}, hierarchy, and egalitarianism) has a statistical mean of importance related to the scores for the individual values that represent it that can be used to calculate the country sample scores. Ambition, competence, daring, and success are the related values to mastery. If the mean of importance is greater than the international average of 4.0, then the difference is subtracted from the scores of each culture-level value type for each member of the sample; if the mean of importance is less, then the difference is added.

The Hofstede's Value Survey Module 1994

The Hofstede's Value Survey Module 1994 (VSM 94) is used to compare culturally determined values across countries. The instrument consists of 26 items with a range of 1 to 5, for items of utmost importance to very little or no importance for each five dimensions. The fifth dimension long-term/short-term orientation will not be used in the present study because Hofstede did not use it in the IBM study. Twenty of the questions are for the five dimensions; five sets of four questions, and the last six for demographic purposes. They ask for gender, age, education level, kind of job, present nationality, and nationality at birth.

Nationality, according to the VSM 94 manual, can affect an individual's response significantly. A statistical analysis of variance shows a significant country effect. However, there are 20 content questions that will be influenced by demographic characteristics and the year the survey was performed. Therefore, respondents should be matched on any criterion, other than nationality, that can be expected to affect the answers.

The questions and dimensions of the VSM 94 have been selected for comparing countries at the country level or for comparisons across nations. If the VSM 94 is used to compare individuals, with different jobs or organizations, then each answer and question should be examined one by one and not combined into five dimensions. The minimum number of respondents per country to be compared is 20 per the VSM 94 manual. Below 20, the influence of single individuals becomes too strong. The ideal number of respondents for a comparison is 50. It is a better method to use more than one respondent sample per country. The 20 to 50 number of respondents recommendation applies to each independent sample. The method to calculate the mean score for a question is as follows:

For example, 54 respondents from country X give the following scores on question 11 (persistence)

Table 3.1 Method to Calculate Mean Score

Answers	**Numbers of Respondents**	**Product**
1	22	22
2	6	12
3	15	45
4	7	28
5	4	20
Total	54	127

The mean score = product sum/number of respondents

= 127/54 = 2.35 **

* Blank or multiple answers are invalid and excluded from calculation

** Mean scores on five-point scales should be calculated in two decimals. Using fewer decimals loses valid information. More decimals are unrealistic because survey data are imprecise measures.

The VSM 94 specifies the following formulas to calculate the four cultural dimensions used in the present study:

Masculinity Index (MAS):

MAS = +60m(05) - 20m(07) + 20m(15) - 70m(20) + 100

In which m(05) is the mean score for question 05, etc. The index value is normally 0 (strongly feminine) to 100 (strongly masculine), but values below 0 or greater than 100 are technically possible.

Individualism Index (IDV):

IDV = -50m(01) + 30m(02) + 20m(04) - 25m(08) + 130

The index value is normally 0 (strongly collectivistic) to 100 (strongly individualistic), but values below 0 or greater than 100 are technically possible.

Power Distance Index (PDI):

PDI = -35m(03) + 35m(06) + 25m(14) - 20m(17) - 20

The index value is normally 0 (small power distance) to 100 (large power distance), but values below 0 or greater than 100 are technically possible.

Uncertainty Avoidance Index (UAI):

UAI = +25m(13) + 20m(16) - 50m(18) - 15m(19) + 120

The index value is normally 0 (weak uncertainty avoidance) to 100 (strong uncertainty avoidance), but values below 0 or greater than 100 are technically possible.

Reliability and Validity

Schwartz Value Survey - English/Spanish version

The SVS is not a standard, reflective scale for which internal-consistency reliability is an adequate reliability measure, although the fact that values cluster into motivational domains is smallest-space analysis does indeed suggest a certain degree of arguable applicability (Schwartz, 1999). Reliability is typically assessed on the basis of the degree to which values consistently cluster into the same motivational domains. A value is considered stable if it falls into a given motivational domain at least 75% of the time in small-space analysis, and if it falls into either the specified motivational domain or an adjacent one 85% of the time. Of the 57 values in the SVS, 46 have been shown to be stable across cultures (Schwartz, 1999).

Schwartz (1992, 1994, 1999) confirmed the robustness of the culture-level types in the SVS, while Ralston et al. (1997) has confirmed the individual-level value types in cross-cultural studies. Schwartz (1994, 1999) included Mexico and other Latin American countries in his studies, providing reliability and validity to the Spanish version of the SVS instrument.

Hofstede's value Survey Module - English/Spanish versions

Hofstede (1980) confirmed the reliability and validity of the VSM instrument that evolved into the VSM 94. Hofstede's cultural dimensions are one of the most extensively used

instruments for measuring cultural differences in the managerial context. The VSM 94 has been measured accurately to scale and confirmed to represent the concept of cultural differences, and provides a reliable assessment of the consistency of multiple measurements on its variables. Hoppe (1990), Heuer et al. (1999), and Hofstede (1980) have all confirmed the reliability and validity of the VSM 94 research instrument.

Hofstede's IBM study is regarded one of the most comprehensive studies on national culture ever done. MacGrain Herkenhoff (2000) has confirmed the reliability and validity of the Spanish version of the VSM 94 in a study that included a Spanish-speaking South American country.

Eckhart (2002) and Yoo & Donthu (2002) have argued against the validity of the VSM 94 instrument, saying that nations are not the best units for measuring cultural differences, and that the IBM study focused on subsidiaries which are not representative of national cultures. They have argued that Hofstede's studies are obsolete and irrelevant due to changes that have occurred over time in national cultures, and also that the social classes compared may have been unequal.

Research Question

The research question asks to what extent do the level of technology and its corresponding level of development play a

role in lessening cultural differences between engineers in Mexico and the United States.

A comparative analysis of engineers' cultural values was conducted on two samples of engineers in Mexico and the United States, in the electrical equipment business of the energy market. Technology and its corresponding level of development is a force that may be working toward cultural convergence by helping to narrow cultural differences; technology is becoming more uniform across countries, and thus may be promoting more uniform cultural values.

Research Hypotheses

Webber (1969) recognized that there was an emerging commonality driven by all foundations of business, especially technology. Technology and economic development pressures, both clear and strong, influence the convergence of how a man works and makes it more alike. A man's equipment, his job training, and his engineering education, will all tend to be more similar in the foreseeable future. The increasing level and intricacy of technology will tend to make a subordinate that operates the technology more knowledgeable, important, and stronger in bargaining power, within the organization, relative to the superior. Under this scenario, hierarchy tends to be diminished and one would expect the differences in power distance between engineers in Mexico and the United States to be less than the differences found in the IBM study. As such, the following hypotheses were formulated:

NH1: The difference in power distance scores between engineers in Mexico and the United States will not be less than the differences found in the Hofstede's IBM study.

H1: The difference in power distance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

Exposure to technology and economic development promotes independent creativity and innovation. Individualism, even in collectivistic societies, becomes more acceptable and favorable for individuals. An engineering education favors individual problem solving and design. An engineer learns to be resourceful and competitive. Mexicans engineers can be expected to become more individualistic like their American counterparts. Given the influences of technology, economic development, and an engineering education over time, the expectation would be that the Mexican sample would score higher in the individualism dimension, than their Mexican predecessors did, versus the United States sample in Hofstede's IBM study. Thus, the following hypotheses were formulated:

NH2: The difference in individualism scores between engineers in Mexico and the United States will not be less than the differences found in the Hofstede's IBM study.

H2: The difference in individualism scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

As the democratic business processes in decision-making may become more prevalent in the managerial process of the organization as engineers, managers, and subordinates, will seek higher needs brought about by improved living standards, technical sophistication, and better skills. Higher needs such as competence, achievement, and autonomy may become more relevant. Technology would be the driving force behind improved living standards for subordinates (Webber, 1969). It is expected that engineers, managers, and subordinates will become more assertive, motivated, and aggressive over time in order to achieve success within their organizations. Such attitudes and behaviors are common in very masculine societies like the United States. Thus, one would expect the Mexican sample to score higher in the masculinity dimension than their Mexican predecessors did, versus the United States sample in Hofstede's IBM study. As such, the following hypotheses were formulated:

NH3: The difference in masculinity scores between engineers in Mexico and the United States will not be less than the differences found in the Hofstede's IBM study.

H3: The difference in masculinity scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

Technology is rapidly changing in ways and at a pace that is hard for people to keep up with, and consequently is having a profound effect on human values across cultures. The force of technology is very strong and compelling in human organizations and is a key concept behind the theory and forces of convergence for human values (Webber, 1969). The rate of change of technology encourages a willingness to manage ambiguity and the need to be flexible to all the changes that come into effect very rapidly. This is more apparent today than ever in the history of the world. The attitudes and behaviors necessary to deal with technological change and uncertainty are taught both in technical universities and through the engineering work experience. These attitudes and behaviors are common in low uncertainty societies like the United States. Therefore, the expectation would be that the Mexican sample would score lower in uncertainty avoidance, than their predecessors did, versus the

United States sample in Hofstede's IBM study. Thus, the following hypotheses were formulated:

NH4: The difference in uncertainty avoidance scores between engineers in Mexico and the United States will not be less than the differences found in the Hofstede's IBM study.

H4: The difference in uncertainty avoidance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

Schwartz (1994) reanalyzed Hofstede's data and replicated Hofstede's intercorrelations. Moreover, he found correlations between Hofstede's ratings for the four dimensions in the IBM study and his value types. Schwartz's and Hofstede's teacher samples had correlations based on the same 23 nations, and the student samples had correlations based on 22 nations. Thus, Schwartz's culture-level dimensions and Hofstede's cultural dimensions are theoretically linked (Schwartz, 1994). Therefore, the expectation for this well-matched study is that the scores from Schwartz's culture-level dimensions and Hofstede's cultural dimensions would be similarly and significantly correlated as Schwartz's culture-level dimensions and Hofstede's cultural dimensions in the IBM study were significantly correlated in Schwartz's (1994) study.

Under these assumptions, the following hypotheses were formulated:

NH5: For the Mexico and the United States engineer samples, the scores on Hofstede's culture-level dimensions will not show significant correlation with the scores on Schwartz's culture-level dimensions.

H5: For the Mexico and the United States engineer samples, the scores on Hofstede's culture-level dimensions will show significant correlation with the scores on Schwartz's culture-level dimensions.

Statistical Techniques and Analysis

Hypotheses H1, H2, H3, and H4 were tested by using t-tests to ascertain the statistical significance of the difference between two independent sample means in scores between the Mexican sample and the United States sample for the masculinity/femininity, individualism/collectivism, power distance, and uncertainty avoidance dimensions. The hypotheses predict a reduction in the difference of scores between the Mexican sample and the United States sample of the present study and the differences in scores of the Mexican sample and the United States sample in Hofstede's IBM study.

The t-statistic is calculated as follows:

t-statistic = (m1 - m2)/s.e.

Where m1 = mean of sample 1

m2 = mean of sample 2

s.e. = the standard error

Where the standard error is an estimate of the difference between expected means of the samples due to sampling error. If the t-statistic were large, then one would assert that the difference between sample means is not due to chance. The t-statistic is compared to a critical value from a statistical table to determine if the null hypothesis of no difference between sample means can or cannot be supported. If the absolute value of the t-statistic was larger than the critical value, then the null hypothesis would not be supported.

Chi-square tests were performed on the cross-tabulation of the Mexican and the United States samples using the engineering degree level (Bachelor, Master, PhD), Hofstede's cultural dimension scores, and individual demographic variables, such as, age, gender, and occupation, to determine any statistically significant relationships between the variables, and the impact of the independent demographic variables on the cultural dimensions.

Chi-square is a comparative test between expected and actual frequencies to ascertain if the results would support the null hypothesis, where the null hypothesis states that two variables are independent and any sample difference found is

due to chance. The X squared statistic is compared to an X squared value from a statistical table. If the X squared statistic were larger than the X square value from the table, then the result would not be due to chance.

An independent sample t-test and a t-test for the quality of the means were performed on the cross-tabulation of the Mexican and the United States samples using the engineering degree level (Bachelor, Master, PhD.) and cultural dimension scores for power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance, to control for this specific variable, to determine its individual impact in the difference between cultural dimension scores for each sample, and to confirm the Chi-square tests results.

Hypothesis H5 was tested by a correlation test across the Mexican and the United States samples, between scores on Hofstede's cultural dimensions and Schwartz's culture-level dimensions, which are theoretically linked. This correlation test measured the linear association between Schwartz's culture-level dimensions and Hofstede's cultural dimensions.

Summary

The purpose of this chapter was to present systematically the methodology of this dissertation, including research design, research instrumentation, data collection, and statistical analysis. Two research instruments were used in this study and described in this chapter: The Schwartz Value Survey and The Hofstede's VSM 94. The basic approaches to test

five hypotheses, necessary to undertake the present study, were described. Four hypotheses predict a reduction in cultural differences and the fifth hypothesis significantly correlates Schwartz's and Hofstede's dimensions.

Lastly, the statistical tests performed included t-tests, Chi-square tests, and a correlation test; and their significance and purpose were discussed. The results of the statistical analysis will be presented in Chapter IV.

CHAPTER IV

ANALYSIS AND PRESENTATION OF FINDINGS

Overview of the Chapter

This chapter presents the results of the study. It consists of six sections. The first section is an overview of the chapter. The second section presents the response rate of the engineer samples for Mexico and the United States. The third section introduces the demographic characteristics of engineer respondents in Mexico and the United States, including the survey response rate of the study. In the fourth section, descriptive statistics are shown and discussed for the Mexico and United States engineer samples. The fifth section presents the five hypotheses, the results of the independent t-tests, Chi-square tests, and research findings. Lastly, the sixth section presents a summary of the results of hypotheses' testing.

Response Rate of Engineer Samples

The number of companies and organizations in Mexico whose engineers participated in the study were 13, which included 6 manufacturing companies, 3 distributors, 3 engineering companies, and 1 engineering organization.

The number of companies and organizations in the United States whose engineers participated in the study were 14, which included 6 manufacturing companies, 2 distributors, 2 engineering companies, 1 state department of transportation,

and 3 engineering organizations.

The response rate of the Mexico and the United States samples are shown in the following Table 4.1.

Table 4.1 Response Rates for Mexico and United States Samples

Participating Country	Number of Questionnaires	Number of Useable Questionnaires	Percent of Useable Response Rate
Mexico	37	37	100.00
United States	48	47	97.92
Total	85	84	98.82

Demographics of Engineer Respondents

The demographic characteristics of the engineer samples for Mexico and the United States consisted of the variables of engineering degree level, occupation, age, and gender, which are described in the following categories.

Engineering Degree Level

In Mexico, 75.68% of engineer respondents have a Bachelor of Science Degree, 24.32% of engineer respondents have a Master Degree, and 0% of engineer respondents have a Ph.D. Degree, in an engineering field. No engineers failed to indicate the level of an engineering degree that they had due to a misunderstanding of the instructions or simply overlooking the question in the cover letter. In the United States, 57.45% engineer respondents have a Bachelor of Science

Degree, 19.15% have a Master Degree, and 23.40% have a Ph.D. Degree, in an engineering field. No engineers failed to indicate the level of an engineering degree due to misunderstanding or overlooking the question in the cover letter.

Table 4.2 Engineering Degree Level Frequency Distribution by Country

Engineering Degree Level	**Mexico**	**Percent**	**United States**	**Percent**
Bachelor	28	75.68	27	57.45
Master	9	24.32	9	19.15
Ph.D.	0	0	11	23.40
Not Defined	0	0	0	0
Total	37	100.00	47	100.00

Occupation

According to occupation, the Mexican engineer sample has a lower number of managers than the United States engineer sample, 56.76% versus 65.96%, no Mexican engineer respondents and no United States engineer respondents failed to indicate their occupation.

Table 4.3 Occupation Frequency Distribution by Country

Occupation	Mexico	Percent	United States	Percent
Manager	21	56.76	31	65.96
Non-Manager	16	43.24	16	34.04
Not Defined	0	0	0	0
Total	37	100.00	47	100.00

Age

The Mexican engineer sample was younger than the United States engineer sample, with 43.24% of Mexican engineer respondents in the 40-49 age bracket, versus 48.94% of the United States engineer respondents in the 50-69 age bracket. Most of the engineer respondents in Mexico and the United States, 63.37% of the total, were in the 30-39 age bracket. No Mexican engineer respondents and no United States engineer respondents failed to indicate their age.

Table 4.4a Age Frequency Distribution by Country

Age	Mexico	Percent	United States	Percent
20-29	4	10.81	4	8.51
30-39	14	37.84	12	25.53
40-49	16	43.24	8	17.02
50-59	3	8.11	12	25.53
60-69	0	0	11	23.41
Not Defined	0	0	0	0
Total	37	100.00	47	100.00

Gender

In Mexico and the United States, the engineering profession remains a man's world. In Mexico, 100% of engineer respondents were men, and in the United States, 87.23% of engineer respondents were men. It would appear that the engineering field is still more attractive to men than women, or that more needs to be done to attract and provide opportunities for women in this interesting field. No Mexico engineer respondents and no United States engineer respondents failed to indicate gender.

Table 4.4b Gender Frequency Distribution by Country

Gender	Mexico	Percent	United States	Percent
Male	37	100.00	41	87.23
Female	0	0	6	12.77
Not Defined	0	0	0	0
Total	37	100.00	47	100.00

Descriptive Statistics

In this section, Hofstede's scores for four cultural dimensions are shown in Table 4.5, for Mexico and the United States, for the IBM Study. The following Table 4.6 shows the scores using Hofstede's Value Survey Module 1994 scores of the present study for Mexico and the United States.

Table 4.5 Hofstede's Scores for Mexico and the United States - IBM Study (Hofstede, 1980)

Cultural Dimension	Mexico	United States
Individualism	30	91
Masculinity	69	62
Power Distance	81	40
Uncertainty Avoidance	82	46

Table 4.6 Hofstede's Scores for Mexico and the United States - Present Study

Cultural Dimension	Mexico	United States
Individualism	66.49	89.15
Masculinity	67.03	37.87
Power Distance	38.51	34.26
Uncertainty Avoidance	52.43	63.51

The following Table 4.7 shows Schwartz's culture-level value types, for Mexico and the United States, found by Schwartz (1990, 1996, personal e-mail) and Schwartz and Ros (1995). Table 4.8 shows Schwartz's culture-level value types for Mexico and the United States for the present study. In the next section the findings of the present study are discussed

and shown in Tables 4.7, 4.8, and 4.13c, and are compared during the testing and analysis of the fifth hypothesis.

The scores obtained for Schwartz's culture-level types in this study confirmed the robustness of the Schwartz Value Survey research instrument. Thus, the results of this study validate the meaningfulness of Schwartz's culture-level value types.

Table 4.7 Schwartz's Scores for Mexico and the United States (Schwartz & Ros, 1995, Schwartz, 1990, 1996)

Culture-level Value Type	**Mexico N = 609**	**United States N = 1024**
Affective Autonomy	3.23	4.26
Intellectual Autonomy	4.46	3.70
Egalitarianism	4.70	4.59
Embeddedness	3.79	3.73
Harmony	4.43	2.88
Hierarchy	2.29	2.90
Mastery	4.17	4.52

Table 4.8 Schwartz's Scores for Mexico and the United States - Present Study

Culture-level Value Type	**Mexico N = 37**	**United States N = 47**
Affective Autonomy	3.58	3.95
Intellectual Autonomy	4.38	4.42
Egalitarianism	4.77	4.64
Embeddedness	3.99	3.74
Harmony	3.53	3.50
Hierarchy	2.67	2.82
Mastery	4.31	4.16

Hypotheses Testing and Findings

Hypotheses H1, H2, H3, and H4 will be tested using an independent sample t-test and a t-test for the quality of means of the difference in sample means between the Mexican and the United States samples, for power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance, and the result will be compared to Hofstede's IBM Study to assess statistical significance between two sample means in order to determine if there is a reduction in the difference, and that the difference is real, and it is not due to chance or sample variation.

Chi-square tests will be performed on the cross-tabulation of the Mexican and the United States samples using

the engineering degree level (Bachelor, Master, Ph.D.), Hofstede's cultural dimension scores, and individual demographic variables, such as, age, gender, and occupation, to determine any statistically significant relationships between the variables, and the impact of the independent demographic variables on the cultural dimensions.

An independent sample t-test and a t-test for the quality of the means will be performed on the cross-tabulation of the Mexican and the United States samples using the engineering degree level (Bachelor, Master, Ph.D.) and cultural dimension scores for power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance, to control for this specific variable, to determine its individual impact in the difference between cultural dimension scores for each sample, and to confirm the Chi-square tests results.

A correlation test will be performed on hypothesis H5 across the Mexican and the United States samples between scores on Hofstede's cultural dimensions and Schwartz's culture-level dimensions, which are theoretically linked. This correlation test will measure the linear association between Hofstede's and Schwartz's dimensions.

H1: The difference in power distance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

In terms of power distance for Mexico and the United States, no statistically significant difference was found between the two engineer samples at the 95 percent confidence level. Specifically, it can be stated with a 95 percent confidence level that the difference (4.258) found between the two engineer samples is due to chance or sample variation. Therefore, the null hypothesis of no difference cannot be rejected, which supports H1 as it relates to the power distance relationship between Mexico and the United States. Furthermore, the mean difference of 4.258, with a 95 percent confidence interval difference ranging from -17.724 to 26.241, implies that there is a lessening in the cultural difference between Mexico and the United States, as demonstrated by the difference in power distance scores found in this study (4.258) and the difference found by Hofstede (41) in his IBM study (Hofstede, 1984, p. 77).

Table 4.9a Independent Sample T-Test for Power Distance

Power Distance	**Number**	**Mean**	**Standard Deviation**	**Standard Error Mean**
Mexico	37	38.51	48.216	7.927
United States	47	34.26	51.836	7.561

Table 4.9b T-Test for Equality of Means for Power Distance

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Assumed	.385	82	.701	4.258	11.050	-17.724	26.241
Not Assumed	.389	79.69	.699	4.258	10.955	-17.543	26.060

Chi-square tests were conducted on cross tabulations of the Mexico-United States samples for key demographic variables, which included age, gender, occupation, engineering degree level, and cultural dimensions. No statistically significant differences were found for these sample comparisons on any of these variables. Moreover, each demographic variable was controlled for by using independent sample t-tests of the differences between power distance scores between Mexico's engineer sample and the United States' engineer sample.

The independent sample t-tests confirmed the results obtained by the Chi-square tests. The results of the independent t-tests and the cross tabulation for the engineering degree level, a key variable for the purposes of

this study, versus the power distance dimension are shown below. Refer to Tables 4.9c-e for the Mexico-United States comparison.

Table 4.9c Cross Tabulation: Engineering Degree Level vs. Power Distance

Power Distance Level	Bachelor Mexico	Master Mexico	Ph.D. Mexico	Bachelor United States	Master United States	Ph.D. United States	Total
Low (</=39)	11	6	0	12	3	8	**40**
Medium (40-69)	9	2	0	7	3	2	**23**
High (>/= 70)	8	1	0	8	3	1	**21**
Total	**28**	**9**	**0**	**27**	**9**	**11**	**84**

Pearson Chi-Square = 6.222, p = 0.622. No statistically significant relationship between Engineering Degree Level and Power Distance.

Table 4.9d Independent Sample T-Test: Engineering Degree Level vs. Power Distance

Power Distance Score	Number	Mean	Standard Deviation	Standard Error Deviation
Bachelor				
Mexico	28	43.57	46.664	8.819
United States	27	43.52	47.125	9.069
Master				
Mexico	9	22.78	52.387	17.462
United States	9	53.33	50.187	16.729
Ph.D.				
Mexico	0	0	0	0
United States	11	-4.09	48.929	14.753

Table 4.9e T-Test for Equality of Means for Engineering Degree Level vs. Power Distance

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Bachelor							
Assumed	.004	53	.997	.053	12.648	-25.315	25.421
Not Assumed	.004	52.88	.997	.053	12.650	-25.321	25.427
Master							
Assumed	-1.264	16	.224	-30.556	24.183	-81.820	20.709
Not Assumed	-1.264	15.971	.225	-30.556	24.183	-81.828	20.717
Ph.D.							
Assumed	-	-	-	-	-	-	-
Not Assumed	-	-	-	-	-	-	-

H2: The difference in individualism scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

In terms of Individualism for Mexico and the United States, the difference was found to be significant between the two engineer samples at the 95 percent confidence level. Specifically, it can be stated with a 95 percent confidence

level that the difference (-22.662) found between the two engineer samples is real and not due to chance or sample variation. Therefore, the null hypothesis of no difference must be rejected, which lends no support for H2 as it relates to the Individualism relationship between Mexico and the United States. Furthermore, the mean difference of -22.662, with a 95 percent confidence interval difference ranging from -43.874 to -1.451, implies that there is a lessening in the cultural difference between Mexico and the United States, as demonstrated by the difference in Individualism scores found in this study (22.662 in absolute terms) and the difference found by Hofstede (61) in his IBM study (Hofstede, 1984, p. 77).

Table 4.10a Independent Sample T-Test for Individualism

Individualism	**Number**	**Mean**	**Standard Deviation**	**Standard Error Mean**
Mexico	37	66.49	46.516	7.647
United States	47	89.15	50.025	7.297

Table 4.10b T-Test for Equality of Means for Individualism

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Assumed	-2.125	82	.037	-22.662	10.663	-43.874	-1.451
Not Assumed	-2.144	79.695	.035	-22.662	10.570	-43.699	-1.626

Chi-square tests were conducted on cross tabulations of the Mexico-United States samples for key demographic variables, which included age, gender, occupation, engineering degree level, and cultural dimensions. No statistically significant differences were found for these sample comparisons on any of these variables. Moreover, each demographic variable was controlled for by using independent sample t-tests of the differences between Individualism scores between Mexico's engineer sample and the United States' engineer sample.

The independent sample t-tests confirmed the results obtained by the Chi-square tests. The results of the independent t-tests and the cross tabulation for the engineering degree level, a key variable for the purposes of

this study, versus the Individualism dimension are shown below. Refer to Tables 4.10c-e for the Mexico-United States comparison.

Table 4.10c Cross Tabulation: Engineering Degree Level vs. Individualism

Individualism Level	Bachelor Mexico	Master Mexico	Ph.D. Mexico	Bachelor United States	Master United States	Ph.D. United Stated	Total
Low (</=39)	9	2	0	2	3	2	**18**
Medium (40-69)	6	2	0	7	1	2	**18**
High (>/= 70)	13	5	0	18	5	7	**48**
Total	**28**	**9**	**0**	**27**	**9**	**11**	**84**

Pearson Chi-Square = 6.468, p = 0.595. No statistically significant relationship between Engineering Degree Level and Individualism.

Table 4.10d Independent Sample T-Test: Engineering Degree Level vs. Individualism

Individualism Score	Number	Mean	Standard Deviation	Standard Error Deviation
Bachelor				
Mexico	28	67.86	48.542	9.174
United States	27	94.44	49.192	9.467
Master				
Mexico	9	62.22	41.916	13.972
United States	9	70.56	49.272	16.424
Ph.D.				
Mexico	0	0	0	0
United States	11	91.36	53.716	16.196

Table 4.10e T-Test for Equality of Means for Engineering Degree Level vs. Individualism

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Bachelor							
Assumed	-2.017	53	.049	-26.587	13.179	-53.022	-.153
Not Assumed	-2.017	52.866	.049	-26.587	13.183	-53.030	-.145
Master							
Assumed	-.386	16	.704	-8.333	21.563	-54.045	37.378
Not Assumed	-.386	15.599	.704	-8.333	21.563	-54.141	37.474
Ph.D.							
Assumed	-	-	-	-	-	-	-
Not Assumed	-	-	-	-	-	-	-

H3: The difference in masculinity scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

In terms of Masculinity for Mexico and the United States, no statistically significant difference was found between the two engineer samples at the 95 percent confidence level. Specifically, it can be stated with a 95 percent confidence level that the difference (29.155) found between the two engineer samples is due to chance or sample variation.

Therefore, the null hypothesis of no difference cannot be rejected, which supports H3 as it relates to the Masculinity relationship between Mexico and the United States. Furthermore, the mean difference of 29.155, with a 95 percent confidence interval difference ranging from -13.261 to 71.571, implies that there is no lessening in the cultural difference between Mexico and the United States, as demonstrated by the difference in Masculinity scores found in this study (29.155) and the difference found by Hofstede (7) in his IBM study (Hofstede, 1984, p. 77).

Table 4.11a Independent Sample T-Test for Masculinity

Masculinity	Number	Mean	Standard Deviation	Standard Error Mean
Mexico	37	67.03	100.716	16.558
United States	47	37.87	94.015	13.714

Table 4.11b T-Test for Equality of Means for Masculinity

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Assumed	1.367	82	.175	29.155	21.322	-13.261	71.571
Not Assumed	1.356	74.788	.179	29.155	21.499	-13.676	71.985

Chi-square tests were conducted on cross tabulations of the Mexico-United States samples for key demographic variables, which included age, gender, occupation, engineering degree level, and cultural dimensions. No statistically significant differences were found for these sample comparisons on any of these variables. Moreover, each demographic variable was controlled for by using independent sample t-tests of the differences between Masculinity scores between Mexico's engineer sample and the United States' engineer sample.

The independent sample t-tests confirmed the results obtained by the Chi-square tests. The results of the independent t-tests and the cross tabulation for the engineering degree level, a key variable for the purposes of this study, versus the Masculinity dimension are shown below.

Refer to Tables 4.11c-e for the Mexico-United States comparison.

Table 4.11c Cross Tabulation: Engineering Degree Level vs. Masculinity

Masculinity Level	Bachelor Mexico	Master Mexico	Ph.D. Mexico	Bachelor United States	Master United States	Ph.D. United States	Total
Low (</=39)	12	2	0	12	3	5	**34**
Medium (40-69)	2	0	0	3	2	2	**9**
High (>/= 70)	14	7	0	12	4	4	**41**
Total	**28**	**9**	**0**	**27**	**9**	**11**	**84**

Pearson Chi-Square = 6.098, p = 0.636. No statistically significant relationship between Engineering Degree Level and Masculinity.

Table 4.11d Independent Sample T-Test: Engineering Degree Level vs. Masculinity

Masculinity Score	Number	Mean	Standard Deviation	Standard Error Deviation
Bachelor				
Mexico	28	65.36	109.730	20.737
United States	27	35.93	96.566	18.584
Master				
Mexico	9	72.22	70.494	23.498
United States	9	57.78	81.972	27.324
Ph.D.				
Mexico	0	0	0	0
United States	11	26.36	102.594	30.933

Table 4.11e T-Test for Equality of Means for Engineering Degree Level vs. Masculinity

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Bachelor							
Assumed	1.054	53	.296	29.431	27.912	-26.552	85.415
Not Assumed	1.057	52.571	.295	29.431	27.846	-26.431	85.294
Master							
Assumed	.401	16	.694	14.444	36.038	-61.954	90.842
Not Assumed	.401	15.649	.694	14.444	36.038	-62.093	90.982
Ph.D.							
Assumed	-	-	-	-	-	-	-
Not Assumed	-	-	-	-	-	-	-

H4: The difference in uncertainty avoidance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

In terms of Uncertainty Avoidance for Mexico and the United States, no statistically significant difference was found between the two engineer samples at the 95 percent confidence level. Specifically, it can be stated with a 95

percent confidence level that the difference (-11.078) found between the two engineer samples is due to chance or sample variation. Therefore, the null hypothesis of no difference cannot be rejected, which supports H4 as it relates to the Uncertainty Avoidance relationship between Mexico and the United States. Furthermore, the mean difference of -11.078, with a 95 percent confidence interval difference ranging from -40.127 to 17.971, implies that there is a lessening in the cultural difference between Mexico and the United States, as demonstrated by the difference in Uncertainty Avoidance scores found in this study (11.078 in absolute terms) and the difference found by Hofstede (36) in his IBM study (Hofstede, 1984, p. 77).

Table 4.12a Independent Sample T-Test for Uncertainty Avoidance

Uncertainty Avoidance	**Number**	**Mean**	**Standard Deviation**	**Standard Error Mean**
Mexico	37	52.43	67.099	11.031
United States	47	63.51	65.921	9.616

Table 4.12b T-Test for Equality of Means for Uncertainty Avoidance

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Assumed	-.759	82	.450	-11.078	14.602	-40.127	17.971
Not Assumed	-.757	76.794	.451	-11.078	14.634	-40.219	18.062

Chi-square tests were conducted on cross tabulations of the Mexico-United States samples for key demographic variables, which included age, gender, occupation, engineering degree level, and cultural dimensions. No statistically significant differences were found for these sample comparisons on any of these variables. Moreover, each demographic variable was controlled for by using independent sample t-tests of the differences between Uncertainty Avoidance scores between Mexico's engineer sample and the United States' engineer sample.

The independent sample t-tests confirmed the results obtained by the Chi-square tests. The results of the independent t-tests and the cross tabulation for the engineering degree level, a key variable for the purposes of this study, versus the Uncertainty Avoidance dimension are

shown below. Refer to Tables 4.12c-e for the Mexico-United States comparison.

Table 4.12c Cross Tabulation: Engineering Degree Level vs. Uncertainty Avoidance

Uncertainty Avoidance Level	Bachelor Mexico	Master Mexico	Ph.D. Mexico	Bachelor United States	Master United States	Ph.D. United States	Total
Low (</=39)	12	5	0	10	3	5	**35**
Medium (40-69)	4	3	0	4	3	0	**14**
High (>/= 70)	12	1	0	13	3	6	**35**
Total	**28**	**9**	**0**	**27**	**9**	**11**	**84**

Pearson Chi-Square = 8.623, p = 0.375. No statistically significant relationship between Engineering Degree Level and Uncertainty Avoidance.

Table 4.12d Independent Sample T-Test: Engineering Degree Level vs. Uncertainty Avoidance

Uncertainty Avoidance Score	Number	Mean	Standard Deviation	Standard Error Deviation
Bachelor				
Mexico	28	61.43	70.170	13.261
United States	27	65.93	63.307	12.183
Master				
Mexico	9	24.44	49.777	16.592
United States	9	70.00	83.367	27.789
Ph.D.				
Mexico	0	0	0	0
United States	11	52.27	61.780	18.627

Table 4.12e T-Test for Equality of Means for Engineering Degree Level vs. Uncertainty Avoidance

Equal Variances	t	df	Sig. (2 - tailed)	Mean Difference	Standard Error Difference	95% CI	
						Lower	Upper
Bachelor							
Assumed	-.249	53	.804	-4.497	18.042	-40.685	31.691
Not Assumed	-.250	52.772	.804	-4.497	18.008	-40.620	31.626
Master							
Assumed	-1.408	16	.178	-45.556	32.366	-114.17	23.056
Not Assumed	-1.408	13.061	.183	-45.556	32.366	-115.44	24.333
Ph.D.							
Assumed	-	-	-	-	-	-	-
Not Assumed	-	-	-	-	-	-	-

H5: For the Mexico and the United States engineer samples, the scores on Hofstede's cultural dimensions will show significant correlation with the scores on Schwartz's culture-level dimensions.

The reason for formulating hypothesis H5 is to test the linear association between Hofstede's and Schwartz's dimensions for the two engineer samples for Mexico and the United States, given that as Schwartz points out these

dimensions overlap to some extent (Schwartz, 1994). The scores for Hofstede's dimensions were computed using an Excel spreadsheet following the formulas in Dr. Hofstede's VSM 94 Manual.

The scores for Dr. Schwartz's dimensions were computed using Excel spreadsheets to calculate the international adjustment constant and the dimensional scores. Pearson Correlations were computed using SPSS 13.0 Statistical Software Program. SPSS provided statistical significance at both 95 and 99 percent confidence levels. Tables 4.7 and 4.8 depict the scores obtained by Schwartz (1990, 1995, 1996) and the scores obtained in this study.

Table 4.7 Schwartz's Scores for Mexico and the United States (Schwartz & Ros, 1995, Schwartz, 1990, 1996)

Culture-level Value Type	**Mexico N = 609**	**United States N = 1024**
Affective Autonomy	3.23	4.26
Intellectual Autonomy	4.46	3.70
Egalitarianism	4.70	4.59
Embeddedness	3.79	3.73
Harmony	4.43	2.88
Hierarchy	2.29	2.90
Mastery	4.17	4.52

The scores obtained in this study for Mexico and the United States resemble those obtained by Schwartz and Ros (1995) for these two countries as part of their study of 49 nations. The engineer samples in this study and those used by Schwartz and Ros are very closely matched, both were based on samples of technical managers and non-managers in private companies. This implies that both samples hold similar demographic characteristics and validates the comparison of scores for each dimension in this study. Schwartz has referred to his Embeddedness dimension as Conservatism.

Table 4.8 Schwartz's Scores for Mexico and the United States - Present Study

Culture-level Value Type	**Mexico N = 37**	**United States N = 47**
Affective Autonomy	3.58	3.95
Intellectual Autonomy	4.38	4.42
Egalitarianism	4.77	4.64
Embeddedness	3.99	3.74
Harmony	3.53	3.50
Hierarchy	2.67	2.82
Mastery	4.31	4.16

The two sets of cultural dimensions were compared across the two countries in the study. Correlations between the scores obtained for Schwartz's and Hofstede's cultural dimensions were calculated using SPSS 13.0 statistical software program. Negative correlations were found between Affective Autonomy and Power Distance, Affective Autonomy and Uncertainty Avoidance, Intellectual Autonomy and Masculinity, Intellectual Autonomy and Power Distance, Intellectual Autonomy and Uncertainty Avoidance, Egalitarianism and Individualism, Egalitarianism and Masculinity, Egalitarianism and Masculinity, Egalitarianism and Power Distance, Egalitarianism and Uncertainty Avoidance, Embeddedness and Individualism, Embeddedness and Masculinity, Hierarchy and Power Distance, and Mastery and Power Distance.

Of these correlations, the Hierarchy and Power Distance ($r = -.243$, $p < 0.05$), and the Affective Autonomy and Individualism ($r = .348$, $p < 0.01$) were the strongest, although when compared with Schwartz's findings (Schwartz, 1994, p. 109), the Hierarchy and Power Distance correlation was in the opposite direction as Schwartz's correlation, and the Affective Autonomy and Individualism correlation found in this study was in the same direction as Schwartz's, but weaker. Refer to Table 4.13c below.

Table 4.13c Correlation Between Schwartz's and Hofstede's Dimensions for Mexico and the United States.

	Hofstede's Cultural Dimensions			
Schwartz' Cultural Dimensions	**Individualism**	**Masculinity**	**Power Distance**	**Uncertainty Avoidance**
Affective Autonomy				
Pearson Correlation	.338**	.120	-.083	.102
Sig.(1-tailed)	.001	.139	.227	.177
N	84	84	84	84
Intellectual Autonomy				
Pearson Correlation	.004	-.031	-.078	-.065
Sig.(1-tailed)	.487	.388	.239	.279
N	84	84	84	84
Egalitarianism				
Pearson Correlation	-.075	-.155	-.122	-.041
Sig.(1-tailed)	.248	.080	.135	.356
N	84	84	84	84
Embeddedness				
Pearson Correlation	-.087	-.043	.119	.025
Sig.(1-tailed)	.215	.349	.141	.411
N	84	84	84	84
Harmony				
Pearson Correlation	.019	.092	.068	.063
Sig.(1-tailed)	.432	.203	.268	.283
N	84	84	84	84
Hierarchy				
Pearson Correlation	.103	.034	-.243*	.036
Sig.(1-tailed)	.176	.378	.013	.372
N	84	84	84	84
Mastery				
Pearson Correlation	.047	.111	-.126	.012
Sig.(1-tailed)	.336	.156	.128	.458
N	84	84	84	84

* Correlation is significant at the 0.05 level (1-tailed).

** Correlation is significant at the 0.01 level (1-tailed).

Overall, only fifteen of the correlations found in this study out of the set of twenty eight correlation outcomes, 53.57 percent, have the same direction as Schwartz's correlations in his teacher sample (Schwartz, 1994, p. 109). All in all, the results offer only partial support for H5.

Summary

The results for the five hypotheses were as follows:

Hypotheses	Findings
H1: The difference in power distance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.	Supported
H2: The difference in individualism scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.	Not Supported
H3: The difference in masculinity scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.	Supported
H4: The difference in uncertainty avoidance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.	Supported
H5: For the Mexico and the United States engineer samples, the scores on Hofstede's cultural dimensions will show significant correlation with the scores on Schwartz's culture-level dimensions.	Partially Supported

Chapter V

Summary and Conclusions

Overview of Significant Findings

The purpose of this study was to determine whether the level of technology and its corresponding level of development influence cultural convergence, and lessens the cultural differences between engineers in Mexico and the United States. Specifically, the goals of this study were as follows:

- To measure Schwartz's culture-level value dimensions for engineers in Mexico and the United States, and correlate their scores to Hofstede's cultural dimensions in order to validate the linear relationship between both dimensional results.

- To measure Hofstede's cultural dimensions (power distance, individualism/collectivism, masculinity/femininity, and uncertainty avoidance) for two sample populations of engineers in Mexico and the United States, in order to statistically compare the resultant scores to Hofstede's IBM study scores, to identify if a reduction in cultural differences between the two samples of engineers has taken place.

- To measure Hofstede's scores for cultural dimensions and statistically examine the scores by individual demographic variables such as: age, gender, occupation, engineering degree level, and cultural dimensions, across both samples, to obtain the impact of the demographic variables on the cultural dimensions, and to determine any statistically significant relationships between these variables.

Summary of Results

Independent sample t-tests and t-tests for the quality of means of the difference in sample means between the Mexican and the United States samples were performed to test hypotheses H1, H2, H3, and H4. Chi-square tests were performed on the cross-tabulation of the Mexican and the United States samples using the Engineering Degree Level (Bachelor, Master, Ph.D.), and individual demographic variables such as: age, gender, and occupation, to determine any statistically significant relationships between the variables, and the impact of individual demographic variables on power distance, masculinity, individualism, and uncertainty avoidance scores.

Furthermore, independent sample t-tests were conducted to confirm the results of the Chi-square tests, and to control for each demographic variable in this study.

Review of H1: The difference in power distance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

For Mexico and the United States, power distance scores were in the predicted direction. Hypothesis H1 was fully supported, as no statistically significance difference was found between the power distance scores for the Mexican and the United States samples at the 95 percent confidence level. In high power distance societies, the concept of power distance is based on the idea that the unequal distribution of power is generally accepted by the members of society. As societies become more democratic and the impact of technology allows for greater sharing of cultural values and flatter managerial organizations, the levels of hierarchical organizations change as managers and subordinates interact with less power distance between them. The results of this study confirm the lessening in the cultural difference between Mexico and the United States, as demonstrated by the difference in power distance scores of engineers in this study when compared to the difference found by Hofstede in his IBM study (Hofstede, 1984, p. 77).

In Mexico's case, the country has been undergoing a gradual democratization over several decades and in recent years, the ruling political party of more than 90 years, Partido Revolucionario Institucional, was defeated in July, 2000, by

the Partido de Acción Nacional, and President Vicente Fox was sworn in on December 1, 2000 as the chief executive elected in free and fair elections. The president was elected by popular vote for a six-year term as both the chief of state and the head of government.

The significant difference in power distance scores between the Mexican and the United States samples may be an indication that Mexican engineers, especially those engineers that are part of the business world and willing to embrace new technology and more democratic management practices, are moving away from authoritarian forms of management and more rigid hierarchical systems.

It is not surprising that the Mexican engineer sample ranked *"be consulted by your direct superior in his/her decisions"* to be very important. As the power distance between superiors and subordinates lessens, the Mexican engineers share decision making to a greater extent as the United States engineer sample.

As Mexico and the United States continue to expand trade through NAFTA and the free exchange of ideas and cultural values driven by technology and its corresponding level of development, so would indicate the lessening of cultural difference or cultural convergence on the power distance dimension.

Review of H2: The difference in individualism scores between engineers in Mexico and the United States will be less than the difference found in Hofstede's IBM study.

For Mexico and the United States, although individualism scores were in the predicted direction, this hypothesis was not supported. For the difference in individualism scores between Mexico and the United States, the difference was found to be significant between the two engineer samples at the 95 percent confidence level. As such, the null hypothesis must be rejected, which lends no support to H2 as it relates to the individualism relationship between the Mexican and the United States samples.

However, the difference in individualism scores for Mexico between the present study and Hofstede's IBM study indicates that the Mexican engineer sample in the study scored very high in individualism. Given Mexico's impressive economic growth in recent years and the greater exposure to a market economy, increasing privatization, and the widespread of technological development, it is no surprise that the Mexican engineer sample would score higher in this dimension. Also worth mentioning is the fact that the Mexican engineer sample was representative of a younger generation of engineers than the United States engineer sample, and they are reaching top positions faster through the rapid changes of technology and the need for their technological expertise.

In terms of the individualism dimension between the Mexican and the United States samples, the Mexican engineer sample ranked *"have an element of variety and adventure in the job."* They ranked this question as more important than the United States engineer sample. This is not surprising considering the difference in age between engineer samples. It is also worth mentioning how the Mexican engineer sample ranked *"have good physical working conditions"* to be very important. Assigning a lower importance to this question when compared to the United States engineer sample is surprising due to the fact that assigning a higher importance is more commonly associated with individualistic cultures than communitarian cultures. These findings point towards greater individualism in the Mexican engineer sample and a potential convergence of values between Mexico and the United States on the individualism cultural dimension.

Review of H3: The difference in masculinity scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

In the Masculinity dimension, the engineer sample from Mexico scored the highest as would be expected. For Mexico, Masculinity scores were in the predicted direction and very close to Hofstede's result. However, for the United States engineer sample indicated a considerable drop when compared to

Hofstede's result for Masculinity. Hypothesis H3 was fully supported, as no statistically significance difference was found between the Masculinity scores for the Mexican engineer sample and the United States engineer sample at the 95 percent confidence level.

For Mexico, it is worth to mention that the Mexican engineer sample exhibits assertiveness and aggressiveness that are interestingly related to being goal-oriented, relatively egalitarian, pragmatic, concerned with developing their own career, and achievement. Traits that also indicate growing individualism.

The United States engineer sample in this study scored much lower than the United States engineer sample in Hofstede's IBM study. In reviewing how the engineer samples answered the questions that make up the Masculinity dimension, the main differences arose from the degree of trust that individuals place on others and the importance of working well with other people. When asked how important *"working with people who cooperate well with one another"* was, the United States engineer sample ranked this question as being more important than the Mexican engineer sample. This implies that the United States engineer sample prefer a working environment where competitiveness and aggressiveness are de-emphasized, which is contrary to what the Masculinity dimension encompasses.

When asked if *"most people can be trusted"*, the Mexican engineer sample scored higher than the United States engineer sample. This may be attributed to growing public distrust and infamous events in the United States in the recent past that tend to make people more cautious and may reduce the degree of trust that people are able to place on each other.

Furthermore, the apparent lack of lessening in the cultural difference between Mexico and the United States on the Masculinity dimension, may not be so much due to Mexico scoring very close to Hofstede's result in the IBM study. Instead, it may be related to the United States engineer sample scoring significantly lower. Hofstede (1997) has indicated technological developments, the state of the environment, and age structure, may play significant roles in the future, which would make people more feminine.

Review of H4: The difference in Uncertainty Avoidance scores between engineers in Mexico and the United States will be less than the differences found in the Hofstede's IBM study.

Hypothesis H4 was fully supported, as no statistically significance difference was found between the Uncertainty Avoidance scores for the Mexican and the United States engineer samples at the 95 percent confidence level.

In the Uncertainty Avoidance dimension, the engineer sample from the United States scored lower than the Mexican

engineer sample. Both engineer samples scored closer than in Hofstede's IBM study. The United States engineer sample scored higher than Hofstede's sample in the IBM study, 63.51 and 46 respectively, while the Mexican engineer sample scored much lower, 52.43 and 82 respectively. This suggests a lessening in the cultural differences in the Uncertainty Avoidance dimension and a shift in the importance that each engineer sample would assign to the Uncertainty Avoidance cultural dimension.

In relation to the United States engineer sample, when asked if *"a company's or organization's rules should not be broken, not even when the employee thinks it is in the company's best interest"*, the United States engineer sample tended to disagree more than the Mexican engineer sample. Also, the Mexican engineer sample tended to disagree more than the United States engineer sample, when asked if *"competition between employees usually does more harm than good"*, indicating that the Mexican engineer sample is assertive in a rapidly changing economic and technological environment.

These findings suggest that the more managerial and older United States engineer sample is ritualizing their behavior and justifying the existence of experts (people who are perceived to have all the answers) to favor the written and unwritten rules, to satisfy their emotional need for predictability, order, and the status quo (Hofstede, 1984).

In relation to the lessening of the Uncertainty Avoidance cultural difference gap between Mexico and the United States, it is not surprising to see a cultural convergence as engineers use technology not only to cope with uncertainty, but to increase predictability. Both Mexico and the United States are on a path of rapid acceptance and assimilation of technology and innovation. As a newer generation of Mexican engineers are exposed to higher technology, this tendency is likely to continue to drive cultural convergence on the Uncertainty Avoidance dimension.

Review of H5: For the Mexico and the United States engineer samples, the scores on Hofstede's cultural dimensions will show significant correlation with the scores on Schwartz's culture-level dimensions.

The correlation of Schwartz's dimensions to Hofstede's dimensions only offered partial support for hypothesis H5. Only two significant correlations were found between two pairs of cultural dimensions. These correlations pairs were the strongest numerically, Hierarchy and Power Distance was negatively correlated (-.243) and significant at the 95 percent confidence level across both engineer samples, and Affective Autonomy and Individualism was positively correlated (.348) and significant at the 99 percent confidence level across both engineer samples. The Hierarchy and Power Distance

correlation was in the opposite direction as Schwartz's correlation, and the Affective Autonomy and Individualism correlation found in this study was in the same direction as Schwartz's, but weaker. The Affective Autonomy and Individualism correlation, as well as 53.57 percent of the correlations in this study support Schwartz's findings in his teacher sample (Schwartz, 1994), and lend credibility to an extent to the notion that there is a linear association between Hofstede's and Schwartz's dimensions for the two engineer samples for Mexico and the United States.

The correlation between Individualism and Egalitarianism in this study was negative as expected by Schwartz (1994) in contrast to his unexpected positive correlation for this pair in the IBM study.

The lower numerical values of the correlations in this study are explained by the fact that Hofstede's dimensions measured the conceptual content differently than Schwartz (1994). Also, the passage of time, since Hofstede conducted his IBM study, has transformed Mexico and the United States engineers on the cultural dimensions that were tested in this study.

The Impact of The Level of Technology

The impact of technology on individual human values is so pervasive, that we are apt not to notice it. Technology is impossible to pin down either in precise meaning or at a particular point, because it is dynamic.

Technology has always had an impact on individual human values, as the various technologies for design, production, and communication have changed over time. There are plenty of examples of a new technology having major effects on cultural values, such as the invention of the automobile, computer, and communication devices.

It is not a question of either technology or individual human values having an overriding influence on the other; they continually interact. Technology is a permanent dynamic force that interacts with our human value system. This has a crucial effect on cultural values, organizations, and engineers.

Technology is affecting the way we think and the way we perceive the world. Technology has an impact on the sense of self. The impact of technology on individual human values will profoundly affect the way we behave and think, and thus will have a wider cultural influence as the pace and breath of technological changes grow in the future.

In this study, no statistical significance was found between the Engineering Degree Level and Individualism, Masculinity, Power Distance, and Uncertainty Avoidance. There was also a lack of statistical significance on the individual demographic variables, such as, age, gender, and occupation. Chi-square tests resulted in no statistical significance at the 95 percent confidence level for the relationships between the variables, and the impact of the independent demographic variables on the cultural dimensions. Moreover, the results of

the independent sample t-tests confirmed the lack of statistically significant relationships between the individual demographic variables and Hofstede's cultural dimensions.

The fact that there are no statistically significant relationships between Hofstede's cultural dimensions and individual demographic variables is explained by Schwartz's (1995) findings that the country variable helps explain three times the variance when compared to other individual demographic variables.

It is also worth mentioning that the engineer samples in this study for the Bachelor, Master, and Ph.D. engineering degree levels are small, so caution should be used when drawing further conclusions. For instance, there were 28 engineers holding a Bachelor in the Mexican engineer sample versus 27 in the United States engineer sample, 9 engineers holding a Master in the Mexican engineer sample versus 9 in the United States engineer sample, and 11 engineers holding a Ph.D. in the United States engineer sample, but none in the Mexican engineer sample. Furthermore, there is also the possibility that the extent and veracity of the impact of the Engineering Degree Level is not fully represented by the Hofstede's questionnaire and its cultural dimensions.

Limitation of Study

The findings presented in this study should be examined with caution since the study had some limitations. The limitations of this study include the lack of a significant

number of respondents with Ph.D. Degrees in Mexico, the fact that it was not possible to exactly duplicate Hofstede's IBM study, and the objective and intrinsic qualities of the engineer samples.

First, it would have been constructive to have ten or eleven respondents from Mexico with Ph.D. Degrees. Doctoral degrees may take at least four years to complete, and on the average it takes longer due to the length and research nature of the dissertation process. However, the number of engineers in both Mexico and the United States that hold a Doctoral degree is numerically low when compared with those that hold a Bachelor degree, and it was not possible in this study to reach the small number of engineers in Mexico, who may mostly be in the academic field, to participate in this study.

Second, Hofstede (1997) points out meaningful comparisons can be made when it can be demonstrated that the samples hold similarity. If other samples are compared to his IBM study, they are bound to be different. Nevertheless, the engineer samples in this study are demographically similar to Hofstede's IBM study, especially the technical occupations of respondents, except perhaps for those respondents holding Masters and Ph.D. Moreover, Hofstede (1997) stated that a certain level of education makes the person part of the middle-class. The engineer samples in this study are middle-class, just like Hofstede's IBM samples were claimed to be.

Third, the engineer samples in this study were objectively and intrinsically qualified, because there were certain expectations associated with the engineer samples as individual demographic variables, such as, age, gender, and occupation. As it relates to age, the Mexican engineer sample was younger than the United States engineer sample, with 43.24 percent of Mexican engineer respondents in the 40-49 age bracket versus 48.94 percent of the United States engineer respondents in the 50-69 age bracket.

It might be possible that the engineer respondents in this study might not be a true representation of the present engineer populations in Mexico and the United States, but a subset that was reachable and chose to respond to the questionnaires of this study, which adds a non-response bias in the results and prevents the researcher from generalizing about the results of the present study. Even though, it would have been perfect to have a true random sample, this was not possible given accessibility to engineers, logistics, degree of participation, and time constraints.

Contributions and Implications of Study

This study and its results add to the existing knowledge of cultural convergence or divergence. First, the present study provides a strong indication that there is a factual evidence of cultural convergence between the Mexican engineer sample and the United States sample, and that cultural

differences are lessening with respect to Individualism, Power Distance, and Uncertainty Avoidance, but not in Masculinity.

In the Masculinity dimension, there is evidence of divergence, as noted by the statistically mean difference for Masculinity between the samples. Second, the results indicate that contrary to Hofstede's (1997) assertions that the four cultural dimensions are resilient and stable, as a country's score changes vary over time, the scores do not necessary remain unchanged when compared to the scores of another country. Moreover, the lessening of the cultural differences found in this study challenge Hofstede's concept that technological advancement, economic structure, international trade, and the passage of time itself, would play a more significant and lasting role than Hofstede originally anticipated on the four cultural dimensions.

Third, the lack of statistically significant relationships between Individualism, Power Distance, Masculinity, and Uncertainty Avoidance and the demographic variables, such as, age, gender, engineering degree level, and occupation support that the concept of nation influences Hofstede's cultural dimensions more than the demographic variables examined in this study.

The results of this study confirmed that Hofstede's and Schwartz's cultural dimensions are conceptually linked and both provide a conceptual system to explain and test the concept of national culture and its effect on cultural values.

Fourth, this study contributes to Mexican and United States Multinationals by providing a cultural profile for engineers doing business in each other's countries or in situations where the multinational is considering placing a Mexican or United States engineer in a management position across the cultural border. This profile might also be useful to avoid difficulties when selecting an engineer for an international assignment. Moreover, this cultural profile might be helpful in the implementation of management strategies such as, personnel organization and management, planning, and administration.

Recommendations for Future Research

This research has led to some interesting findings and has also opened the door of future research into other potential areas for the study of values of international engineering managers and their organizations. The Hofstede's dimension of long-term orientation was not specifically addressed in this study. Perhaps this dimension, which seems to be so different between cultures when comparing United States values to a country like China, would provide ample research for future studies. Also, each of the dimensions of the Schwartz's model would provide areas for future research to determine convergence or divergence over time. Moreover, each of the dimensions that make up Schwartz's cultural dimensions may be deeper and broader than this study was able to measure.

Future studies should be considered to determine between the convergence-divergence of values and the success and performance of international joint ventures. It should be interesting if past values have an effect on work performance with the passage of time. The difference in values between the engineer populations in two different countries might be studied with engineer value convergence compared to performance. If a relationship is found to exist, then it might be possible to closely match an engineer's value profile to the values of an organization at a different location. The possibility and feasibility of relocating engineering managers might then be researched for effective performance.

Another avenue of research would be to use the Schwartz's Value Survey at colleges and universities to offer helpful guidance to engineering students who are not yet sure of the career path. Universal human values can probably be used for the purposes of assisting engineers in identifying whether they should serve as managers in large organizations or start their own business. Further research might uncover other possible avenues of employment as well, such as, specific industries, government, or non-profit organizations.

Engineers may benefit to find out whether they are inclined, on the basis of their experience, education, and training, to perform best in a large organization or in their own business' environment. On the one hand, this potential research might be able to accelerate and provide a greater

number of entrepreneurs in many different fields. Technological development might be greatly accelerated as these entrepreneurial engineers are motivated and funded for emerging technologies that would spur economic growth and employment. On the other hand, other engineers might be better suited and oriented to drive organizations towards more successful performance and cross-cultural management of multinational organizations.

Summary

The specific research question addressed by this study is as follows:

- To what extent do the level of technology and its corresponding level of development play a role in lessening cultural differences between engineers in Mexico and the United States?

Five hypotheses were proposed and tested using independent sample t-tests, t-tests for the quality of means, Chi-square tests on the cross-tabulation of independent demographic variables, and a correlation test on hypothesis H5 between scores on Hofstede's cultural dimensions and Schwartz's culture-level dimensions.

This study has found that technology does play a significant role in reducing the cultural differences between two engineer samples. Other key demographic variables were not found to play a significant role. Thus, national culture does

not represent the strongest and only force driving individual work values towards divergence. Technology and its corresponding level of development is a significant force acting on the convergence-divergence dimension of cultural values. The study also found a correlation between Schwartz's culture-level dimensions and Hofstede's cultural dimensions.

APPENDIX

February 18, 2005

Dear Fellow Engineer:

As an electrical engineer and management researcher, I am greatly interested in ways to find out how technology is impacting cultural values. I am presently conducting a study of Mexico and the United States to identify the cultural convergence of values between engineers across cultures. This study seeks to expand research in international management by examining the values of engineers from Mexico and the US, suggesting implications of the findings for international management and joint ventures, and examining the impact of technology on work values of an individual in an organization across cultures, via two questionnaires designed for such purpose.

I would greatly appreciate and value your participation in this study. All responses will be confidential. Please do not put your name on the questionnaires. All responses will be aggregated. As such, no individual response to a questionnaire item can be identified, only combined results will be produced. The aggregate data are essential to my doctoral dissertation research project and should be useful to other engineers and managers of international companies.

I hope that you can take a few minutes of your busy schedule to complete the survey. Please feel free to pass this survey on to other engineers in your organization. Thank you in advance for your assistance in conducting this research.

Sincerely,

Robert Nieves
Doctoral Student in International Business Administration
Nova Southeastern University
Florida, United States.

IMPORTANT: Please indicate what engineering degree you currently hold and your engineering field:
Bachelor_____ Master_____ Ph.D._____
Engineering field_____
Present or Last Title_____

VALUE SURVEY

In this questionnaire you are to ask yourself: "What values are important to ME as guiding principles in MY life, and what values are less important to me?" There are two lists of values on the following pages. These values come from different cultures. In the parentheses following each value is an explanation that may help you to understand its meaning.

Your task is to rate how important each value is for you as a guiding principle in your life. Use the rating scale below:

0--means the value is not at all important, it is not relevant as a guiding principle for you.
3--means the value is important.
6--means the value is very important.

The higher the number (0, 1, 2, 3, 4, 5, 6,7), the more important the value is as a guiding principle in YOUR life.

-1 is for rating any values opposed to the principles that guide you.
7 is for rating a value of supreme importance as a guiding principle in your life;
ordinarily there are no more than two such values.

In the space before each value, write the number (-1,0,1,2,3,4,5,6,7) that indicates the importance of that value for you, personally. Try to distinguish as much as possible between the values by using all the numbers. You will, of course, need to use numbers more than once.

AS A GUIDING PRINCIPLE IN MY LIFE, this value is:

opposed to my values	not important			important			very important	of supreme importance
-1	0	1	2	3	4	5	6	7

Before you begin, read the values in List I, choose the one that is most important to you and rate its importance. Next, choose the value that is most opposed to your values and rate it -1. If there is no such value, choose the value least important to you and rate it 0 or 1, according to its importance. Then rate the rest of the values in List I.

VALUES LIST I

1 ____EQUALITY (equal opportunity for all)

2 ____INNER HARMONY (at peace with myself)

3 ____SOCIAL POWER (control over others, dominance)

4 ____PLEASURE (gratification of desires)

5 ____FREEDOM (freedom of action and thought)

6 ____A SPIRITUAL LIFE (emphasis on spiritual not material matters)

7 ____SENSE OF BELONGING (feeling that others care about me)

8 ____SOCIAL ORDER (stability of society)

9 ____AN EXCITING LIFE (stimulating experiences)

10____MEANING IN LIFE (a purpose in life)

11____POLITENESS (courtesy, good manners)

12____WEALTH (material possessions, money)

13____ NATIONAL SECURITY (protection of my nation from enemies)

14____ SELF RESPECT (belief in one's own worth)

15____RECIPROCATION OF FAVORS (avoidance of indebtedness)

16____CREATIVITY (uniqueness, imagination)

17____A WORLD AT PEACE (free of war and conflict)

18____RESPECT FOR TRADITION (preservation of time-honored customs)

19____MATURE LOVE (deep emotional & spiritual intimacy)

20____SELF-DISCIPLINE (self-restraint, resistance to temptation)

21____PRIVACY (the right to have a private sphere)

22____FAMILY SECURITY (safety for loved ones)

23____SOCIAL RECOGNITION (respect, approval by others)

24____UNITY WITH NATURE (fitting into nature)

25____A VARIED LIFE (filled with challenge, novelty and change)

26____WISDOM (a mature understanding of life)

27____AUTHORITY (the right to lead or command)

28____TRUE FRIENDSHIP (close, supportive friends)

29____A WORLD OF BEAUTY (beauty of nature and the arts)

30____SOCIAL JUSTICE (correcting injustice, care for the weak)

* * * * *

VALUES LIST II

Now rate how important each of the following values is for you as a guiding principle in YOUR life. These values are phrased as ways of acting that may be more or less important for you. Once again, try to distinguish as much as possible between the values by using all the numbers.

Before you begin, read the values in List II, choose the one that is most important to you and rate its importance. Next, choose the value that is most opposed to your values, or--if there is no such value--choose the value least important to you, and rate it -1, 0, or 1, according to its importance. Then rate the rest of the values.

AS A GUIDING PRINCIPLE IN MY LIFE, this value is:

opposed to my values	not important			important			very important	of supreme importance
-1	0	1	2	3	4	5	6	7

31____ INDEPENDENT (self-reliant, self-sufficient)

32____ MODERATE (avoiding extremes of feeling & action)

33____LOYAL (faithful to my friends, group)

34____AMBITIOUS (hard-working, aspiring)

35____BROADMINDED (tolerant of different ideas and beliefs)

36____HUMBLE (modest, self-effacing)

37____DARING (seeking adventure, risk)

38____PROTECTING THE ENVIRONMENT (preserving nature)

39____INFLUENTIAL (having an impact on people and events)

40____HONORING OF PARENTS AND ELDERS (showing respect)

41____CHOOSING OWN GOALS (selecting own purposes)

42____HEALTHY (not being sick physically or mentally)

43____CAPABLE (competent, effective, efficient)

44____ACCEPTING MY PORTION IN LIFE (submitting to life's circumstances)

45____HONEST (genuine, sincere)

46____PRESERVING MY PUBLIC IMAGE (protecting my "face")

47____OBEDIENT (dutiful, meeting obligations)

48____INTELLIGENT (logical, thinking)

49____HELPFUL (working for the welfare of others)

50____ENJOYING LIFE (enjoying food, sex, leisure, etc.)

51____DEVOUT (holding to religious faith & belief)

52____RESPONSIBLE (dependable, reliable)

53____CURIOUS (interested in everything, exploring)

54____FORGIVING (willing to pardon others)

55____SUCCESSFUL (achieving goals)

56____CLEAN (neat, tidy)

57____SELF-INDULGENT (doing pleasant things)

V S M 9 4

VALUES SURVEY MODULE 1994 QUESTIONNAIRE

INTERNATIONAL QUESTIONNAIRE (VSM 94)

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ... (please mark one answer with a number in each line across):

1 = of utmost importance
2 = very important
3 = of moderate importance
4 = of little importance
5 = of very little or no importance

1. have sufficient time for your personal or family life____
2. have good physical working conditions (good ventilation and lighting, adequate work space, etc.)____
3. have a good working relation-ship with your direct superior_____
4. have security of employment____
5. work with people who cooperate well with one another_____
6. be consulted by your direct superior in his/her decisions_____
7. have an opportunity for advancement to higher level jobs_____
8. have an element of variety and adventure in the job_____

In your private life, how important is each of the following to you? (please mark one answer with a number in each line across):

9. Personal steadiness and stability____
10. Thrift_____
11. Persistence (perseverance)_____
12. Respect for tradition_____

13. How often do you feel nervous or tense at work? (Please mark with an x)

never_____
seldom_____
sometimes_____
usually_____
always_____

14. How frequently, in your experience, are subordinates afraid to express disagreement with their superiors? (Please mark with an x)
very seldom_____
seldom_____
sometimes_____
frequently_____
very frequently_____

To what extent do you agree or disagree with each of the following statements? (please mark one answer with a number in each line across):

1 = strongly agree
2 = agree
3 = undecided
4 = disagree
5 = strongly disagree

15. Most people can be trusted_____
16. One can be a good manager without having precise answers to most questions that subordinates may raise about their work_____
17. An organization structure in which certain subordinates have two bosses should be avoided at all costs_____
18. Competition between employees usually does more harm than good_____
19. A company's or organization's rules should not be broken - not even when the employee thinks it is in the company's best interest_____
20. When people have failed in life it is often their own fault_____

Some information about yourself (for statistical purposes). (Please mark with an x or specify):

21. Are you?
male____
female____

22. How old are you?
Under 20____
20-24____
25-29____
30-34____
35-39____
40-49____
50-59____
60 or over____

23. How many years of formal school education (or their equivalent) did you complete (starting with elementary school)? (Please mark with an x)
10 years or less____
11 years____
12 years____
13 years____
14 years____
15 years____
16 years____
17 years____
18 years or over____

24. If you have or have had a paid job, what kind of job is it / was it? (Please mark one answer with an x or specify)

1. Sales____
2. Applications_____
3. Marketing____
4. Product Support_____
5. Service_____
6. Design_____
7. Research_____
8. Finance_____
9. Engineering____
10. Production/Manufacturing_____
11. Installations_____
12. Testing____
13. Other_____

25. Do you have (or did you have) any direct reports? (please mark one answer with an x)
Yes____
No_____

26. What is your nationality? (please mark with an x or specify)
US____
Other_____

27. What was your nationality at birth (if different)?
_____

24 de Febrero del 2005

Estimado Ingeniero:

Estoy investigando de que forma la tecnología impacta los valores culturales entre países. Estoy realizando un estudio sobre Mejico y Los Estados Unidos para identificar la convergencia cultural entre ingenieros. Este estudio mide y compara los índices culturales de dos grupos de ingenieros, es decir, compara sus actitudes, creencias, y valores, con el objetivo de sugerir implicaciones que sean de interes para la gerencia internacional de empresas, acuerdos mutuos entre empresas, y para examinar el impacto de la tecnología sobre los valores de trabajo de los ingenieros en organizaciones, vía dos cuestionarios diseñados para ese propósito.

Su participación en este estudio es sumamente importante. La información suministrada por Usted en estos cuestionarios es confidencial y solo será usada en forma combinada con la información de otros ingenieros. No necesita poner su nombre en los cuestionarios. Esta data combinada es esencial para mi tesis doctoral y sera muy valiosa para otros ingenieros y gerentes de empresas internacionales.

Por favor si desea distribuya esta encuesta a otros ingenieros en su organización. Gracias por su asistencia y apoyo en la realización de este estudio.

Atentamente,

Ing. Robert Nieves
Doctorando en Administración de Empresas Internacionales,
Nova Southeastern University
Florida, Estados Unidos.

IMPORTANTE: Por favor indique cual es su nivel actual de licenciatura y campo de ingenieria:

Baccalaureate_____Master_____Doctorado_____

Campo de Ingeniería_____

Posición de Trabajo Actual o Anterior_____

CUESTIONARIO DE VALORES

INSTRUCCIONES: En este cuestionario tendrás que preguntarte : " ¿Qué valores son más importantes para MI, como principios que guían MI vida, y qué valores son los menos importantes para MI?" En las páginas siguientes encontrarás dos listas de valores. Estos valores proceden de diferentes culturas. En el paréntesis junto a cada uno de los valores se encuentra una breve explicación que puede ayudarte a entender su significado de una forma más completa.

Tu tarea consiste en evaluar la importancia que cada valor tiene para tí como principio que guía tu vida. Por favor utiliza la siguiente escala para contestar:

0 significa que el valor no es nada importante para tí.

3 significa que el valor es importante para tí.
6 significa que el valor es muy importante para tí.

Cuanto mayor es el número (-1,0,1,2,3,4,5,6,7), más importante es el valor como principio que guía TU vida.

-1 es para evaluar cualquier valor opuesto o contrario a los principios que guían TU vida.
7 es para evaluar cualquier valor de suprema importancia como principio que guía TU
vida. Por lo general, no hay más de dos valores de este tipo.

En el espacio junto a cada valor, escribe el número (-1,0,1,2,3,4,5,6,7) que indique la importancia que tiene ese valor para tí personalmente. Trata de distinguir tanto como sea posible entre los valores usando todos los números. Por supuesto, necesitarás usar los mismos números más de una vez.

Antes de empezar, lee los valores del 1 al 30. Elije el que sea más importante para tí, y asígnale el número que refleje su importancia. Luego, elije el valor que sea más opuesto o contrario a tus valores, y asígnale -1 (menos 1). Si no existe tal valor, elije el valor menos importante para tí, y asígnale 0 (cero) o 1 (uno), segun la importancia que tu le des. Luego evalúa el resto de los valores en la lista I.

<u>COMO PRINCIPIO-GUIA FUNDAMENTAL EN MI VIDA</u>, este valor es:

opuesto a mis valores	no importante			importante			muy importante	de suprema importancia
-1	0	1	2	3	4	5	6	7

LISTA I DE VALORES

1 _____ IGUALDAD (igualdad de oportunidades para todos)
2 _____ ARMONIA INTERNA (en paz conmigo mismo)
3 _____ PODER SOCIAL (control sobre otros, dominio)
4 _____ PLACER (gratificación de deseos)
5 _____ LIBERTAD (libertad de acción y pensamiento)
6 _____ UNA VIDA ESPIRITUAL (énfasis en aspectos espirituales y no materiales)
7 _____ SENTIMIENTO DE PERTENENCIA (sentir que otros cuidan de mí)
8 _____ ORDEN SOCIAL (estabilidad de la sociedad)
9 _____ UNA VIDA EXCITANTE (experiencias estimulantes)
10 _____ DAR SENTIDO A LA VIDA (una meta en la vida)
11 _____ BUENOS MODALES (cortesía, buenas maneras)
12 _____ RIQUEZA (posesiones materiales, dinero)
13 _____ SEGURIDAD NACIONAL (proteger mí nación de sus enemigos)
14 _____ AUTORESPETO (creer en me propria valía)
15 _____ RECIPROCIDAD DE FAVORES (evitar estar en deuda con los demás)
16 _____ CREATIVIDAD (originalidad, imaginación)
17 _____ UN MUNDO EN PAZ (libre de guerras y conflictos)
18 _____ RESPETO POR LA TRADICION (mantener las costumbres heredadas de los antepasados)
19 _____ AMOR MADURO (relación profunda de intimidad emocional, espiritual)
20 _____ AUTODISCIPLINA (auto-control, resistencia a las tentaciones)
21 _____ PRIVACIDAD (el derecho a tener un ámbito privado)
22 _____ SEGURIDAD FAMILIAR (seguridad para los seres queridos)
23 _____ RECONOCIMIENTO SOCIAL (respeto, aprobación por parte de los demás)
24 _____ UNIÓN CON LA NATURALEZA (integrarse con la naturaleza)
25 _____ UNA VIDA VARIADA (Una vida llena de desafíos, novedades y cambios)
26 _____ SABIDURÍA (una comprensión madura de la vida)
27 _____ AUTORIDAD (el derecho a dirigir o mandar)
28 _____ AMISTAD VERDADERA (amigos cercanos que me apoyen)
29 _____ UN MUNDO DE BELLEZA (belleza en la naturaleza y en las artes)
30 _____ JUSTICIA SOCIAL (corregir injusticias, preocuparse por los debiles)

LISTA II DE VALORES

Ahora evalúa la importancia de cada uno de los valores siguientes como principios que guían TU vida. Estos valores están formulados como formas de conducta que pueden ser más o menos importantes para tí. De nuevo trata de distinguir en todo lo posible entre los valores utilizando todos los números.

Antes de empezar, lee todos los valores del 31 al 57, elije el que sea más importante para tí y asígnale el número que refleje su importancia. A continuación, elije el valor que sea más opuesto o contrario a tus valores, y asígnale el –1 (menos uno). Si no existe tal valor, elije

el menos importante y asígnale el 0 o 1, segun la importancia que tú le des. Luego evalúa el resto de los valores.

COMO PRINCIPIO-GUIA FUNDAMENTAL EN MI VIDA, este valor es:

opuesto a mis valores	no importante			importante			muy importante	de suprema importancia
-1	0	1	2	3	4	5	6	7

31 _____ INDEPENDIENTE (confiado en mi mismo, autosuficiente)
32 _____ MODERADO (evito los extremos en sentimientos y acciones)
33 _____ LEAL (fiel a mis amigos, a mi grupo)
34 _____ AMBICIOSO (trabajador infatigable, que tiene aspiraciones)
35 _____ TOLERANTE (abierto a ideas y creencias diferentes)
36 _____ HUMILDE (modesto, pasa desapercibido)
37 _____ ATREVIDO (busca aventuras y riesgos)
38 _____ PROTECTO DEL MEDIO AMBIENTE (conserva la naturaleza)
39 _____ INFLUYENTE (que tiene impacto sobre las personas y acontecimientos)
40 _____ HONRA A LOS PADRES Y MAYORES (que les muestra respeto)
41 _____ ELIJO MIS PROPIAS METAS (selecciono mis propios objetivos)
42 _____ SANO (no estar enfermo ni física ni mentalmente)
43 _____ CAPAZ (competente, eficaz, eficiente)
44 _____ ACEPTO LO QUE ME TOCA EN LA VIDA (me someto a las circunstancias de la vida)
45 _____ HONESTO (genuino, sincero)
46 _____ CUIDO MI IMAGEN PUBLICA (protejo mi "imagen")
47 _____ OBEDIENTE (cumplo con mis deberes y obligaciones)
48 _____ INTELIGENTE (lógico, que piensa)
49 _____ AYUDA (que trabaja por el bienestar de los demás)
50 _____ DISFRUTAR DE LA VIDA (disfrutar la comida, el sexo, el ocio, etc.)
51 _____ DEVOTO (que mantiene creencias y fe religiosas)
52 _____ RESPONSABLE (digno de confianza, fiable)
53 _____ CURIOSO (interesado por todo, indagador)
54 _____ NO RENCOROSO (dispuesto a perdonar a los demás)
55 _____ TRIUNFADOR (logra sus metas)
56 _____ LIMPIO (aseado, ordenado)
57 _____ INDULGENTE CONMIGO MISMO (que me permito placeres)

V S M 9 4

MÓDULO DE ENCUESTA SOBRE VALORES 1994

CUESTIONARIO INTERNACIONAL

Piense por favor en un trabajo ideal - sin tener en cuenta su trabajo actual, si lo tiene. Al escoger un trabajo ideal, qué grado de importancia tendría para usted... ..(marque, por favor con un numero cada línea)

1 = de muchísima importancia
2 = muy importante
3 = de moderada importancia
4 = de poca importancia
5 = de muy poca o nada de importancia

1. Tener suficiente tiempo para su vida personal o familiar _____
2. Tener buenas condiciones físicas de trabajo, por ejemplo, buena ventilación, buena luz, espacio de trabajo adecuado, etc. _____
3. Tener una buena relación con su superior directo_____
4. Tener seguridad de trabajo_____
5. Trabajar con personas que colaboran bien con las otras_____
6. Ser consultado por su superior directo en sus decisiones_____
7. Tener la oportunidad para conseguir trabajos de más alto nivel_____
8. Tener un elemento de variedad y aventura en el trabajo_____

En su vida privada, ¿qué grado de importancia tiene para usted lo siguiente? (marque, por favor con un numero cada línea)

9. Estabilidad personal_____
10. El Economizar_____
11. Persistencia (perseverancia)_____
12. Respeto a la tradición_____

13.¿Con qué frecuencia se siente nervioso o tenso en el trabajo? (Por favor coloque una x en su respuesta)
Nunca____
Raras veces_____
Algunas veces_____
A menudo_____
Siempre_____

14.¿Con qué frecuencia, según su experiencia, sienten los subordinados temor a expresar su disconformidad con sus superiores?
Casi nunca_____
Raras veces_____

Algunas veces_____
Frecuentemente_____
Muy frecuentemente_____

¿En qué medida está de acuerdo o en desacuerdo con las siguientes afirmaciones? (Por favor marque con un numero cada linea)

1 = totalmente de acuerdo
2 = de acuerdo
3 = ni de acuerdo ni en desacuerdo
4 = en desacuerdo
5 = totalmente en desacuerdo

15. Se puede confiar en la mayoría de las personas_____
16. Se puede ser un buen director sin tener respuestas exactas a la mayoría de las preguntas que los subordinados puedan hacer acerca de su trabajo (de los subordinados)_____
17. Se deberia evitar a todo coste una estructura de organización en la cual ciertos subordinados tengan dos jefes_____
18. La competencia entre empleados normalmente causa más daño que bien_____
19. Las reglas de una organización o compañía no se deberían infringir (violar), incluso cuando el empleado piensa que es por el bien de la compañía_____
20. Cuando la gente fracasa en la vida, es a menudo por su propia culpa_____

Información personal (por objetivos statísticos): (Por favor marque con una x su respuesta)

21. Usted es:
hombre_____
mujer_____

22. Su edad es:
Menos de 20_____
20-24_____
25-29_____
30-34_____
35-39_____
40-49_____
50-59_____
60 o más_____

23. ¿Cuántos años de educación formal (incluye primaria, secundaria, y universitaria) tiene Usted?
10 años o menos_____
11 años_____
12 años_____

13 años_____
14 años_____
15 años_____
16 años_____
17 años_____
18 años o más_____

24. Si tiene o ha tenido un trabajo remunerado, ¿de qué tipo de trabajo se trata? (Por favor marque con una x su respuesta o especifique)

Ventas____
Servicio_____
Mercadeo_____
Administración_____
Diseño_____
Aplicaciones_____
Apoyo al Producto_____
Instalaciones_____
Mantenimiento_____
Contabilidad_____
Finanza_____
Partes_____
Gerencia Administrativa_____
Gerencia Regional_____
Investigacion y Desarrollo_____
Otro_____

25. ¿Reportan a Usted uno o mas subordinados? (Por favor marque con una x su respuesta)
Si _____
No_____

25. ¿Cual es su nacionalidad? (Por favor coloque una x o especifique)
Mejicana_____
Otra_____

26. ¿Cual es su nacionalidad de nacimiento?_____

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