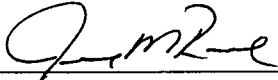
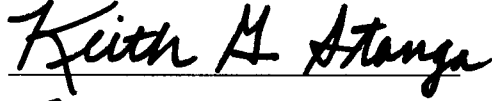
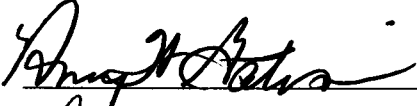
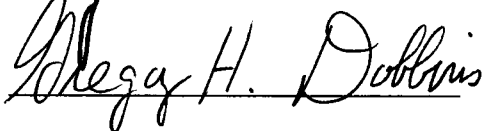


To the Graduate Council:

I am submitting herewith a dissertation written by Peter C. Brewer entitled "Implementing an Activity-Based Cost Management System: A Cross-Cultural Field Study." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirement for the degree of Doctor of Philosophy with a major in Business Administration.


James M. Reeve, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:


Associate Vice Chancellor and
Dean of the Graduate School

**IMPLEMENTING AN ACTIVITY-BASED COST MANAGEMENT SYSTEM:
A CROSS-CULTURAL FIELD STUDY**

**A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville**

Peter C. Brewer

December 1994

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ABSTRACT

This research is a cross-cultural field study of the implementation of Harris Semiconductor's (HS) Activity-Based Cost Management System (ABCMS). HS has implemented an ABCMS in plants located in Malaysia, Singapore, and the United States. Geert Hofstede's taxonomy of work-related cultural values is used as the framework for examining if ABCMS resistance levels differ among HS employees located in these three diverse cultural settings. Two culturally-related personality variables (external locus of control due to more powerful others, and concern for saving face) are incorporated into the study to help identify potential root causes of resistance to ABCMS implementations.

The three primary contributions of the study are as follows. First, this research provides evidence that ABCMS resistance levels may differ across cultures. More specifically, ABCMS resistance levels were higher in HS's U.S. plants relative their plants located in Singapore and Malaysia. Second, the study provides evidence that across cultures higher levels of concern for saving face may be associated with lower ABCMS resistance levels. Third, the study provides evidence that external locus of control due to more powerful others and concern for saving face can be reliably measured across cultures. Given the field-based nature of this study, future research is needed to determine the generalizability of these findings.

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Chapter 1

INTRODUCTION

This research is a cross-cultural field study of the implementation of Harris Semiconductor's (HS) Activity-Based Cost Management System (ABCMS). HS has implemented an ABCMS in plants located in Malaysia, Singapore and the United States. Research has shown that people from Malaysia and Singapore espouse different cultural values than people from the United States (Hofstede, 1984a); therefore, this international implementation provides a unique opportunity to address two research questions. First, do employee resistance levels to an ABCMS differ across cultures? Second, are there specific reasons why resistance levels differ across cultures? While the literature has begun to address the behavioral issues associated with ABCMSs from a parochial standpoint (Cooper et al., 1992; Argyris and Kaplan, 1993), the cross-cultural behavioral issues are virtually unexplored. This study addresses these two research questions.

The study is grounded in contingency theory. The results will help determine if the level of resistance to an ABCMS is contingent upon culture. The study will also investigate whether two personality variables can be used to help explain why resistance levels differ across cultures. Ultimately, this research could be the first step toward improving our understanding of how to design and implement cross-culturally robust ABCMSs.

This field-based research study will rely on surveys and in-depth interviews with employees of one company. The choice of research method reflects "a preference for

situational understanding over statistical significance of the findings" (Chow et. al, 1994). The research relies on analytical rather than statistical generalization. In other words, the purpose of the study is not to generalize to a larger population; rather, the purpose is to generalize a specific set of results to a broader theory. The "broader theory" in this study is contingency theory. The study will provide evidence as to whether culture and personality are contingency variables that can impact employee resistance levels to an ABCMS. If subsequent research produces comparable results in diverse organizational settings, the findings may eventually be generalizable to larger populations (Yin, 1989).

Motivation for the Study

There are six circumstances that provide the motivation for this study. First, this study was motivated by the need to improve our understanding of international management accounting system (MAS) design issues. Gray (1989) states "In a world of growing international relationships of a political, social, and especially economic nature, it has become imperative to incorporate an international perspective into accounting, not as a supplement to but as an integral part of our thinking". Second, American companies are investing increasing amounts of money in Pacific Rim countries. Therefore, this research was designed to help enrich our understanding of cultures that are of growing importance to managers of U. S. multinational corporations (MNCs). Third, this research was motivated by the need to improve our understanding of a Chinese culture that is becoming increasingly important to the world economy. Chow et al. (1994) state

"because of the recent, rapid industrial growth of the People's Republic of China, many experts predict that the Chinese culture will be one of the dominant cultures on the world stage in the 21st century".¹ Fourth, this research was designed to improve our knowledge of a cultural dimension known as collectivism. Triandis (1989) notes "Perhaps the most important dimension of cultural difference in social behavior, across the diverse cultures of the world, is the relative emphasis on individualism versus collectivism". Most of our knowledge regarding MASs has been obtained by studying subjects from individualist cultures; yet, approximately 70% of the world's population live in collectivist cultures (Triandis, 1989). Malaysia and Singapore are regarded as collectivist cultures (Hofstede, 1980). Fifth, this study was designed to advance our understanding of how culturally-related personality variables can impact the practice of management accounting. Isolating personality variables that can aid in providing more resolute explanations of similarities and differences in cross-cultural behavior will enhance our ability to design international MASs. Sixth, empirical research of ABCMSs in cross-cultural contexts is non-existent. Previous research has shown that other elements of a MAS (i.e. performance evaluation systems, budgets etc.) must be designed and implemented with regard to the existing cultural context. Whether the same holds true for ABCMSs remains unanswered.

¹Malaysia and Singapore are largely populated by Chinese as well as Malay and Indian citizens.

Overview of the Research Study

Background

Culture is a very broad term. To effectively study culture as a contingency variable, it must be "unbundled" into component parts that can be reliably measured.

Geert Hofstede (1980) has empirically unbundled culture into four dimensions:

Power distance: "a measure of the degree to which cultures prefer a more autocratic structure...A country scoring high on this construct would prefer a less participative style" (Frucot and Shearon, 1991).

Individualism/collectivism: a measure of the degree to which cultures prefer autonomy or group affiliation.

Uncertainty Avoidance: a measure of the degree to which cultures feel uncomfortable with uncertainty and ambiguity. Organizations in high uncertainty avoidance environments favor rigid rules (Hofstede, 1984a).

Masculinity: a measure of the degree to which cultures stress achievement, heroism, assertiveness and material success (Hofstede, 1984a).

Based on an analysis of data from 117,000 questionnaires, Hofstede categorized 50 nations along each of these cultural dimensions. The only substantial differences between the countries of interest in this study (i.e. Malaysia, Singapore and the United States) are found along the power distance and individualism/collectivism dimensions. A grid of all 50 nations' power distance and individualism/collectivism measurements is shown in Figure 1. Notice, Malaysia and Singapore appear in the "High Power Distance/Collectivism (HPDC) quadrant, and the United States appears in the "Low Power Distance/Individualism (LPDI) quadrant. These cultural differences form the foundation for this research study.

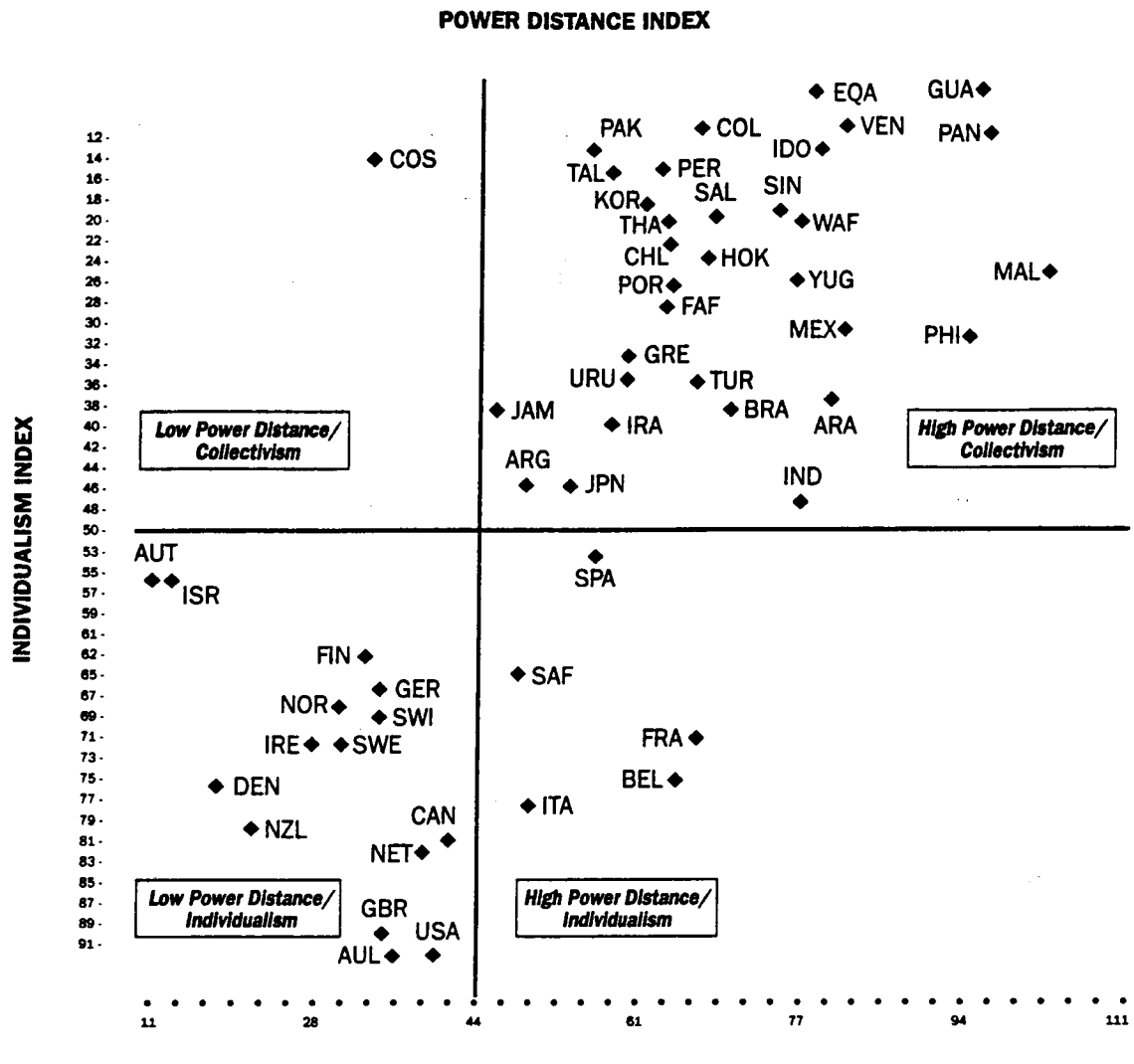


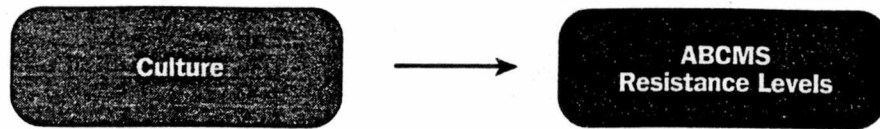
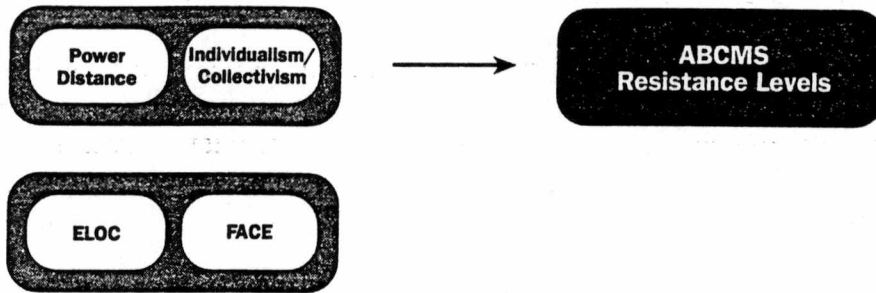
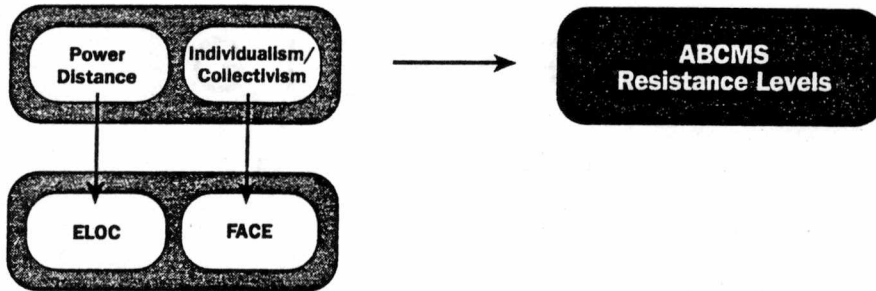
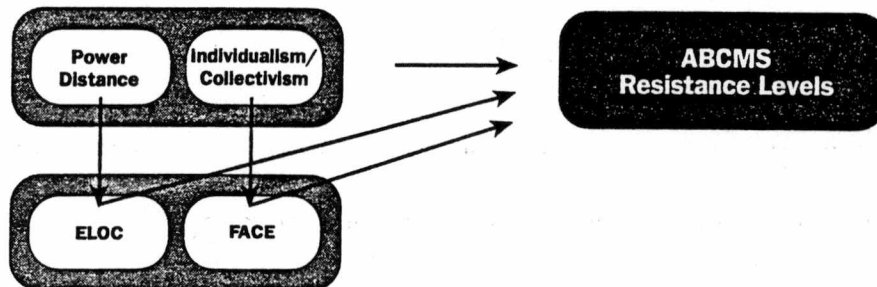
Figure 1

Plot of Power Distance and Individualism/Collectivism

Phases of the Research

This study proceeds in four phases, each of which is diagrammed in Figure 2. The first phase examines whether ABCMS resistance levels are contingent upon culture. More specifically, it examines whether HPDC and LPDI cultural contexts (the independent variable) have an impact on ABCMS resistance levels (the dependent variable). If cross-cultural differences are noted in ABCMS resistance levels, evidence will exist that international ABCMSs must be implemented with regard to a given country's cultural values. If cross-cultural differences in ABCMS resistance levels are not found, evidence will exist that resistance levels to ABCMS implementations are not contingent upon culture.

The three remaining phases of the research are designed to help identify specific root causes of cross-cultural differences in ABCMS resistance levels. Although Hofstede has successfully "unbundled" culture into four dimensions, "HPDC" and "LPDI" are still multi-faceted independent variables. In fact, from a practical, change management standpoint, they are somewhat intractable as independent variables. For example, the facets of collectivism include an emphasis on group affiliation, maintaining face, ascribed status, and long term outcomes (Triandis, 1989). Managers cannot use information about such broad differences in culture to isolate and remediate specific root causes of ABCMS resistance. In other words, the multi-faceted nature of the HPDC and LPDI constructs limits their ability to provide specific explanations of why ABCMS resistance levels differ across cultures. The challenge to cross-cultural researchers is to isolate specific culturally-related root causes of ABCMS resistance. If specific root causes of cross-

PHASE 1:**PHASE 2:****PHASE 3:****PHASE 4:**

ELOC = External Locus of Control Due to More powerful Others
 FACE = Concern for Saving Face

Figure 2
Phases of the Research

cultural differences in ABCMS resistance levels can be identified, then it is feasible that managers could initiate change management programs to help adapt an ABCMS implementation to distinct cultural contexts.

The medium used in this study for attempting to disaggregate the HPDC and LPDI culture variables into more specific "root cause components" is personality variables. Research has shown that a group's cultural values can significantly influence each individual's personality (Linton, 1945; Singh et al., 1962; Kelley et al., 1987; Frucot and Shearon, 1991; Ralston et al., 1993). Therefore, culturally-related personality variables may prove to be useful in identifying more precise explanations of why ABCMS resistance levels differ across cultures. The personality variables used in the study are external locus of control due to more powerful others and concern for saving face. External locus of control due to more powerful others refers to the extent that a person feels outcomes in their lives are controlled by other, more powerful people (Levenson, 1974). Concern for saving face refers to the extent that a person relies upon the opinions of their peers to determine their self-worth (Hofstede, 1980).

These two variables were chosen because there is a justifiable ex ante expectation that they will differ across cultures and have an impact on ABCMS resistance levels. More specifically, people from high power distance settings are expected to feel more externally controlled by powerful others (Pye, 1985; Ralston et al., 1993) and less inclined to assume the empowered role of using an ABCMS to lead the cost reduction initiative. Secondly, people from collectivist societies are expected to be more concerned with saving face (Hofstede, 1980) and less inclined to use an ABCMS because failure to

demonstrate competence with this new type of cost management system could threaten their face. If either of these personality variables can be linked to cross-cultural differences in ABCMS resistance levels it will provide preliminary evidence of a specific root cause of behavioral resistance to ABCMS implementations.

In phase two of the research (see Figure 2), the external locus of control due to more powerful others and concern for saving face personality variables must be reliably measured across cultures. If a given personality variable cannot be reliably measured across cultures it cannot be incorporated into a cross-cultural research study. In this research, reliability was assessed by performing a pre-test using students from universities in Malaysia and the United States.

The third phase of the research (see Figure 2) is designed to examine if the cultural values of power distance and individualism/collectivism (the independent variables) influence one's level of external locus of control due to more powerful others and concern for saving face (the dependent variables). If cross-cultural differences exist for the external locus of control due to more powerful others or concern for saving face variable, it will indicate that one or both of these personality variables may be useful in explaining cross-cultural differences in this study and future cross-cultural management accounting research.

The fourth phase of the research (see Figure 2) is designed to examine if either external locus of control due to more powerful others or concern for saving face (the independent variables) is associated with ABCMS resistance levels (the dependent variable). If either personality variable is associated with ABCMS resistance levels, it

will indicate that a cross-culturally robust root cause of ABCMS resistance has been identified. For example, if higher levels of external locus of control due to more powerful others is associated with higher levels of ABCMS resistance, a cross-culturally robust root cause of ABCMS resistance will have been identified. Furthermore, if phase 3 of the research indicates that the HS employees from the high power distance cultures of Malaysia and Singapore tend to be more externally controlled due to more powerful others relative their counterparts in the U.S., then a root cause of cross-cultural differences in ABCMS resistance levels will have been identified.

Contributions of the Research

This study makes four contributions to the management accounting literature. Each contribution corresponds to the four phases of the research outlined in the previous discussion.

Phase One

First, this research provides evidence that ABCMS resistance levels may differ across cultures. The ex ante expectation was that resistance levels would be lower at HS's U.S. manufacturing facilities relative to their plants in Malaysia and Singapore. Contrary to this expectation, however, the resistance levels were higher in the U.S. plants. Nonetheless, these results indicate that cross-cultural differences in resistance levels may exist when a MNC implements an ABCMS. This finding prompts two questions; (1) would similar results be found in other organizational settings located in

comparable cultures?, and (2) why are ABCMS resistance levels lower in Malaysia and Singapore than in the U.S.? These questions are new and interesting. Finding answers to the first question may help validate the existence of cross-cultural differences in ABCMS resistance levels. Finding answers to the second question may lead to more successful international ABCMS implementations. Prior to this research, these questions had not been contemplated in the management accounting literature.

Phase Two

The second contribution of the research relates to establishing the cross-cultural reliability of the external locus of control due to more powerful others and concern for saving face personality variables that were used in the study. The external locus of control due to more powerful others variable will be discussed first followed by the concern for saving face variable.

External Locus of Control Due to More Powerful Others. At the present time our international understanding of the external locus of control due to more powerful others personality variable is quite limited. Rotter's (1966) locus of control scale has been used extensively in cross-cultural research; however, his scale does not measure the external locus of control due to more powerful others dimension of locus of control. The only scale that measures this specific dimension is Hanna Levenson's (1974) Internal, Powerful Others, Chance (IPC) locus of control scale. This scale has been used quite sparingly in the cross-cultural psychology research arena, and it has not been used at all in the cross-cultural accounting research arena.

The "Powerful Others" (P) subscale from Levenson's IPC scale was pre-tested on a total of 146 students from universities in Malaysia and the United States. The coefficient alpha of the pre-test data was .80, thereby demonstrating satisfactory cross-cultural reliability. Introducing this instrument into the management accounting literature may be useful for studying not only ABCMSs, but also many other cross-cultural research topics such as empowerment and participatory budgeting. For example, consistent with the Total Quality Management philosophy, many MNCs are attempting to create empowered work forces. However, empowerment may be viewed positively or negatively by employees in different countries depending upon their cultural values and personality attributes. As cited in Chapter 3, involving subordinates in the decision making process "could be regarded as a sign of poor leadership, and hence generate anxiety, [among] employees [from] a country where submission to authority figures is ingrained in the culture" (Child, 1981). Clearly, in this example, external locus of control due to more powerful others may be an important variable in helping to understand where empowerment is appropriate or inappropriate.

Concern for Saving Face. The concept of "face" is frequently mentioned as a potential explanatory variable when Asian cultures are studied in both accounting and non-accounting contexts. However, in the accounting literature this construct has not been reliably measured and incorporated into any hypothesis testing to date. This study uses 10 items from Good and Good's (1973a) Fear of Appearing Incompetent scale to construct a concern for saving face scale. The 10-item scale was included in the pre-test

mentioned earlier and yielded a coefficient alpha of .83, thereby demonstrating satisfactory cross-cultural reliability.

Having shown itself to be reliable, the concern for saving face scale may also prove to be useful to management accounting researchers. For example, in Harrison (1993), the author proposes that a relationship should exist between peoples' level of concern for saving face and their preference for performance evaluation styles that rely on accounting measurements. Harrison argues that people with a high level of concern for saving face will prefer performance evaluation styles that rely heavily on objective and relatively certain (i.e. less threatening) accounting measurements; however, the author is unable to empirically test this proposition. In the future, this type of hypothesis may be able to be tested empirically through the use of the concern for saving face scale designed in this study.

Phase Three

The third contribution of the study relates to the linkage between the cultural dimensions of power distance and individualism/collectivism and the corresponding personality variables of external locus of control due to more powerful others and concern for saving face. The external locus of control variable will be discussed first followed by the concern for saving face variable.

External Locus of Control Due to More Powerful Others. The ex ante expectation in this study was that levels of external locus of control due to more powerful others would be higher in high power distance cultures. Therefore, the pre-test subjects from Malaysia, and the HS employees from Malaysia and Singapore were expected to

feel more externally controlled by powerful others than their U.S. counterparts. In the pre-test, the Malaysian students' mean score on the "P" subscale was 22.46 (see table 3). The U.S. students' mean score was 18.96. This "directionally correct" difference in mean values is significant at the $p=.0012$ level. Also, the 17 HS subjects from Malaysia and Singapore had a mean score on the "P" subscale of 20.29 compared to a mean score of 17.61 by their 18 HS counterparts from the U.S (see table 17). The empirical pattern of these results corresponds with the hypothesized pattern. In conjunction with the reliability figures discussed earlier, these results indicate that the "P" subscale from Levenson's IPC scale may prove useful to cross-cultural researchers interested in studying the power distance dimension of culture.

Concern for Saving Face. The ex ante expectation in this study was that levels of concern for saving face would be higher in collectivist cultures relative to individualist cultures. Therefore, the pre-test subjects from Malaysia and the HS subjects from Malaysia and Singapore were expected to be more concerned with saving face than their U.S. counterparts. In the pre-test, the Malaysian students' mean score on the concern for saving scale was 35.82 (see table 3). The U.S. students' mean score was 30.53. This "directionally correct" difference in mean values is significant at the $p=.0009$ level. Also, the 18 HS subjects from Malaysia and Singapore had a mean score on the Concern for Saving Face subscale of 26.56 compared to a mean score of 25.94 by their 18 HS counterparts from the U.S. (see table 17). The empirical pattern of these results corresponds with the hypothesized pattern. However, upon closer scrutiny the concern for saving face variable revealed some unexpected, but nonetheless interesting results.

The mean score on the Concern for Saving Face scale for the 37 Malay pre-test subjects was 38.22. The mean score for the 13 Chinese pre-test subjects was 27.69. These results indicate that within collectivist cultures Malays are much more concerned with saving face than Chinese. Furthermore, the data from the HS subjects corroborate these findings. The 5 Malay and Indian HS subjects had a mean score of 35.20. The 13 Chinese HS subjects had a mean score of 23.23. Given the growing interest in the cultures of the Pacific Rim countries, these results may prove useful to accounting researchers. If future research in other countries and organizations produces comparable results, our understanding of the differences between races of the Pacific Rim countries will be improved. Furthermore, our ability to design MASs in organizations located in those countries will improve.

Phase Four

The fourth contribution of the study relates to the association between the concern for saving face personality variable and ABCMS resistance levels. The ex ante expectation was that higher levels of concern for saving face would be associated with higher levels of ABCMS resistance. However, contrary to ex ante expectations, the results indicate that across cultures higher levels of concern for saving face are associated with lower ABCMS resistance levels. The ex ante expectation was based on the belief that the threat imposed by having to act on new and unfamiliar activity-based information (Cooper et. al, 1992) would discourage those people who are concerned with maintaining face from using the ABCMS. However, the empirical evidence does not support this hypothesis. A plausible explanation for the contradictory outcome is as follows. People

more concerned with saving face tend to be more worried about management's assessment of their competence. If employees, who are concerned with maintaining face, fail to embrace an ABCMS and use it proficiently to bring about long-term cost reduction, it may signal "failure" to their superiors and threaten their face. Although contrary to *ex ante* expectations, this explanation (which is supported by the empirical evidence) is understandable, interesting and worthy of further research.

The contributions of this research provide a good starting point for cross-cultural ABCMS research. For example, the noted association between the concern for saving face personality variable and ABCMS resistance levels provides preliminary evidence regarding the existence of a potential cross-culturally robust root cause of ABCMS resistance. Nonetheless, many questions remain unanswered. For example, the study provides preliminary evidence that ABCMS resistance levels may be lower in HPDC cultures relative to LPDI cultures. However, the two personality variables used in this study do not help explain why this difference exists. First, the evidence does not indicate that external locus of control due to more powerful others is associated with ABCMS resistance levels. Second, although the evidence shows that higher levels of concern for saving face are associated with lower levels of ABCMS resistance, the level of concern for saving face was not much higher among the HPDC subjects relative to the LPDI subjects.

Clearly, many questions remain unanswered. Future researchers can contribute to this stream in three ways. First, by helping us understand if the cross-cultural difference in ABCMS resistance levels noted in this study is generalizable. If generalizability

emerges, the second contribution will focus on helping to explain why this type of cross-cultural difference in ABCMS resistance levels exists. In addition, researchers can aid this stream of research by continuing to examine the concern for saving face variable and its potential implications for ABCMS implementations. Ultimately, concern for saving face may prove to be a generalizable source of ABCMS resistance.

Limitations of the Research

This research study has many limitations. In this section, six limitations will be discussed. First, the use of self-reported measures is a limitation because subjects will only report what they know and choose to relate about their beliefs. Furthermore, self-reported practices or beliefs do not necessarily correlate with an individual's behavior (Nunnally, 1978). Second, acquiescence response bias may have confounded the results, particularly in the recorded interview sessions. Acquiescence response bias is "the tendency to give a positive answer to any question, regardless of its content" (Hofstede, 1980). Previous research has shown that people from Southeast Asian countries tend to exhibit a high acquiescence response bias (Hofstede, 1980). A subscale from Marlowe and Crowne's (1964) Social Desirability Scale has been incorporated into the study; however, this is an admittedly imperfect control for this problem. Third, the researcher attempted to select survey instruments that are reasonably "culture neutral." However, the possibility exists that the intended meaning of certain survey questions was not be properly communicated across cultures. Fourth, the researcher who performed this study

is an American. He brought a culturally-based "lens" to the study that may have confounded the results. Fifth, an imperfect method of quantifying the interview data was used. This quantification method could not completely capture the intensity or the content of the views expressed, or not expressed by the subjects. Sixth, the field-based nature of this study implies that many extraneous variables exist that the researcher could not control. To the extent any of these variables adversely impacted the study, the results of the research are lessened.

Organization of the Research

Chapter 1 provides a brief introduction to this research and discusses the motivation for and contributions and limitations of the research. Chapter 2 provides a review of relevant prior research. The hypothesis development and research design are described in Chapter 3. Chapter 4 presents the results of the data analysis. Chapter 5 discusses the significance of the research findings and presents recommendations for future research.

Chapter 2

RELATED RESEARCH

This chapter provides an overview of previous cross-cultural management accounting research. It also will overview relevant cross-cultural psychology research. The chapter will be divided into four sections. The first section summarizes the descriptive research that has documented the existence of international similarities and differences in MAS design. The second section summarizes the empirical management accounting research that has employed culture as a contingency variable. The third section summarizes the empirical management accounting research that has used culture and personality variables as contingency variables. The fourth section summarizes related cross-cultural psychology research. In total, this body of literature demonstrates that international differences in MAS design exist, and it demonstrates that culture is a contingency variable that warrants consideration when implementing any type of international MAS. Furthermore, it demonstrates that our cross-cultural understanding of the personality variables used in this study is quite limited.

The results of this study will aid these streams of research in two ways. First, by providing preliminary evidence as to whether culture is a relevant contingency variable in international ABCMS implementations. Second, by improving our understanding of the links between culture, personality and ABCMS resistance levels.

Descriptive Research

Descriptive cross-cultural management accounting research can be categorized into studies relating to budgeting, employee performance evaluation, and operational performance measurement. Regarding budgeting, Daley et al. (1985) surveyed 303 U.S. controllers and managers and 385 Japanese controllers and managers. The major findings of the study suggest that "Japanese controllers and managers 1) prefer less participation, 2) have a more long term planning horizon, 3) view budgets as more of a communication device, and 4) prefer more budget slack than their American counterparts" (Daley et al, 1985).

Kreder and Zeller (1988) compared control systems of German and U.S. companies. They found that German companies tend to exercise decentralized, participatory, and socio-emotional, or behavioral-oriented control. U.S. firms tend to be more centralized, directive, and task-oriented indicating a system-oriented concept of control.

Horovitz (1980) interviewed approximately 180 executives from 52 firms located in England, France and Germany. He found cross-cultural differences in the financial/operational orientations of each country's control systems. He also found differences in how managers use control systems (i.e. as guiding instruments vs. surveillance instruments).

Bailes and Assada (1991) surveyed 256 Japanese companies and 80 American companies. Their results indicate that division managers participate more in the budget

process in American companies than in Japanese companies. American managers cited return on investment as the most important budget goal. Japanese managers selected sales volume as the most important budget goal. Japanese managers use budget variances to facilitate operational improvement. American managers use budget variances to monitor employee performance.

Regarding employee performance evaluation, Merchant and Riccaboni (1990) studied the performance-based management incentives used at the Fiat Group, a large Italian company. He found that Fiat's incentive program is similar to those used by most divisionalized American firms. For example, rewards are heavily based on short-term accounting measures of performance; highly achievable budget targets are used; and few adjustments are made to account for uncontrollable factors.

Vance et al. (1992) surveyed a total of 707 managers from the United States, Indonesia, Malaysia, and Thailand regarding the design of their performance appraisal systems. The survey assessed the characteristics of each country's performance appraisal system along five dimensions: (1) formality of structures and controls, (2) individual vs. team emphasis, (3) employee involvement in the appraisal process, (4) intrinsic vs. extrinsic rewards, and (5) frequency of feedback. The results of the study revealed significant differences in the performance evaluation styles used by firms in the U.S. and each of the Pacific Rim countries. In particular, this study provides evidence that in Malaysia the focus is on groups as opposed to individuals, and the decision-making process is left up to higher level managers.

Regarding operational performance measurement, Coates et al. (1992) examined the performance evaluation systems of 15 German, U.K. and U.S. multinationals. Many differences between the three countries were noted. Some of the major differences include: (1) German companies seem to put greater emphasis upon return on sales and market share, (2) British companies emphasize financial stability and earnings per share and place a lower emphasis on operating expenses, and (3) U.S. companies, much like the British, focus on profit linked performance measures, but also use more non-financial performance measures.

Daniel and Reitsperger (1991, 1992) surveyed 679 Japanese managers and 789 American managers. Their findings suggest that Japanese manufacturers have adapted their MASs to be compatible with JIT and flexibility strategies. Although many aspects of the Japanese manufacturing model have been adopted by U.S. firms, their MASs have not been adapted to support the newly implemented manufacturing strategies. In addition, both U.S. and Japanese firms appear to be altering traditional standard cost reporting practices to include cost of quality information; however, Japanese managers are twice as likely as their U.S. counterparts to receive production and quality internal failure goals.

Culture as a Contingency Variable

Birnberg and Snodgrass (1988) compared U.S. and Japanese worker's perceptions of management control systems. They selected a sample of 11 Japanese manufacturing

and construction firms; subsequently, a matched sample (based on industry and size) of 11 U.S. firms was selected. The authors draw upon Ouchi's (1981) "theory Z" framework to study the importance of "clans" and culture in the design and operation of a MAS. The findings of the study indicate that a homogeneous and cooperative culture enable a MAS to be less consumed with "enforcing" goal congruent behavior and more focused on improving communication and decision-making.

Chow et al. (1991) designed an experiment to address the following issue: is the superior performance of Asian manufacturing firms caused by their management control systems, the national culture of their employees, or the interaction of these two factors? The subjects were 192 undergraduate accounting majors. Half of the subjects came from an American university; the other half from a university in Singapore. The cultural variable used in the study was individualism/collectivism. This variable was selected because Asian and American societies are considered to be divergent on this cultural attribute (Hofstede, 1980). The two aspects of management control studied were work flow interdependence and pay interdependence. The results indicate that culture and management controls have independent, but not interactive, effects on manufacturing performance. The most important implication of this finding is that the effectiveness of Asian management control systems is not contingent upon their national culture (i.e. Asian management control systems can be used to positively effect manufacturing performance in highly diverse cultures).

Ueno and Wu (1993) studied the relationship between national culture and budget control practices. The authors surveyed managers from 70 American companies and 149

Japanese companies. The authors cite Hofstede's (1980) findings to justify their assumption that Japanese managers are from a high uncertainty avoidance/collectivist culture, and American managers are from a low uncertainty avoidance/individualist culture. The findings suggest that American managers are more inclined to: (1) use formal communication and coordination in their budget planning processes, (2) build slack into their budgets, (3) encourage controllability of their budgets, and (4) use short-term evaluation time horizons than their Japanese counterparts.

Harrison (1992) analyzed data from questionnaires received from 211 respondents; 115 and 96 of the respondents were employees of Singaporean and Australian organizations, respectively. Hofstede's cultural dimensions of power distance and individualism/collectivism are used to study the impact of culture on the relationship between budgeting practices and job-related tension and satisfaction. Harrison found evidence that higher levels of budget emphasis in conjunction with higher levels of budget participation are associated with reduced job related tension in both high power distance/collectivist (HPDC) and low power distance/individualist (LPDI) cultures. There were no associations noted in either culture between budget emphasis, participation and job satisfaction.

Chow et al. (1994) performed a field study of two firms from the United States and two firms from Taiwan matched in terms of the existence of multiple profit centers, industry, and, to some extent, size. The study explored how the U.S. and Taiwanese firms differed in terms of measuring, evaluating and rewarding profit center managers. The data from the United States firms was taken from interviews performed in

conjunction with Merchant (1989). The data from the Taiwanese firms was obtained by performing approximately 40 hours of in-depth interviews with a total of 23 employees, including 7 profit center managers. The results of the study indicate that significant cross-cultural similarities exist in all four firms' performance evaluation systems. For example:

"all the firms have an annual compensation program offering bonuses to profit center managers. All provide rewards in cash. Managers in all four firms place primary importance on financial measures of performance, but they also track a wide range of other performance measures and consider them in performance evaluations. In all four companies, the most important performance standards are those negotiated during an annual planning process" (Chow et al., 1994).

The primary cross-cultural difference noted between the firms was that the Taiwanese firms make less use of long-term (multi-year) incentives than their American counterparts.

Culture and Personality as Contingency Variables

Frucot and Shearon (1991) performed a survey of 83 managers in Mexico City from 21 different companies. The survey was designed to examine the relationship of locus of control and participative budgeting with job satisfaction and performance. Previous research in the United States has indicated that people who are internally controlled tend to perform better and are more satisfied than "externals" when the budgetary process is participatory. Since Mexico differs from the United States along the power distance, uncertainty avoidance, and individualism/collectivism dimensions of culture, Frucot and Shearon were interested in determining if the results of the

aforementioned U.S. research would generalize to Mexico. The results indicate that the Mexican "internals" tended to perform better when the budget process was participatory. This is consistent with the findings of previous research performed in the U.S. However, the results did not indicate that Mexican "internals" were more satisfied when the budget process was participatory. This finding reflects a cultural difference between the U.S. and Mexico.

Using the same data set and cultural classifications as Harrison (1992), Harrison (1993) found that high reliance on accounting performance measures and budgets in superior evaluative style is associated with lower job related tension and higher job satisfaction in a HPDC culture, such as Singapore. Conversely, low reliance on accounting performance measures and budgets is associated with lower tension and higher job satisfaction in a LPDI culture, such as Australia. Harrison also operationalized measures of two personality variables, authoritarianism (measured via the California F scale) and individualism/collectivism (measured via the INDCOL scale). These two measures were used as conceptual counterparts to Hofstede's measures of power distance and individualism/collectivism at the cultural level. Reliability measures for the INDCOL scale were unsatisfactory; therefore, the data obtained was not analyzed. The authoritarianism variable did not yield any significant results.

Related Cross-cultural Psychology Research

In this study, two personality variables are used as contingency variables; external locus of control due to more powerful others and concern for saving face. The external locus of control due to more powerful others personality variable is measured via a subscale of Levenson's "Internal, Powerful Others, Chance (IPC) multidimensional locus of control scale. The concern for saving face personality variable is measured via a subscale from Good and Good's (1973a) Fear of Appearing Incompetent Scale. Levenson's "Powerful Others" subscale has been used in three cross-cultural research studies that compare and contrast Asian and American cultures. Good and Good's Fear of Appearing Incompetent Scale has not been used in cross-cultural research.

Mahler (1974) administered the entire IPC scale to a sample of university students in Japan and the United States. The results suggest that Japanese women are more externally controlled by powerful others than Japanese men and American men and women. Japanese men, American men, and American woman did not differ significantly (Mahler, 1974). Krampen and Wieberg (1981) also administered the IPC to a sample of university students from Japan and the United States. The results from this study suggest that the two groups of students were similar with respect to the "Powerful Others" dimension of external control.

The lone study using the IPC scale to compare Chinese and American students was performed by Lao (1977). The study uses Chinese students from a university in Taiwan. The results suggest that American males and females were significantly more

externally controlled by powerful others than their respective Chinese counterparts. Also, the Chinese males were more externally controlled by powerful others than the Chinese females. All three of these studies use students. None of the studies use Chinese or Malay subjects from Malaysia or Singapore.

The next chapter describes the development of the hypotheses and the research design.

Chapter 3

METHODOLOGY AND HYPOTHESES

This chapter is divided into five sections. The first section focuses on theory development. The second section states the hypotheses. The third section provides an overview of the research design. The fourth section summarizes the results of a pre-test that used students from universities in the United States and Malaysia. The fifth section provides a descriptive analysis of the research subjects.

Theory Development

Contingency Theory

"Contingency theories dominate scholarly studies of organization behavior, design, performance, planning and management strategy" (Van de Ven and Drazin, 1985). In an accounting context, Otley (1980) provides the following definition of contingency theory:

"The contingency approach to management accounting is based on the premise that there is no universally appropriate accounting system which applies equally to all organizations in all circumstances. Rather, it is suggested that particular features of an appropriate accounting system will depend upon the specific circumstances in which an organization finds itself."

The "specific circumstances" that contingency theory-based researchers have focused on include *size* (Merchant, 1981, 1984; Ezzamel, 1990), *environment*

(Khandwalla, 1972; Hayes, 1977; Govindarajan, 1984; Gordon and Narayanan, 1984; Brownell, 1985), *technology* (Daft and MacIntosh, 1981; Merchant, 1984), *task structure* (Daft and MacIntosh, 1978; Chenhall and Morris, 1986; MacIntosh and Daft, 1987; Kaplan and Mackey, 1992), *organizational structure* (Bruns and Waterhouse, 1975; Gordon and Narayanan, 1984), *strategy* (Govindarajan and Gupta, 1985; Simons, 1987; Govindarajan, 1988; Fisher and Govindarajan, 1993), *culture* (Birnberg and Snodgrass, 1988; Chow et al, 1991, 1994; Ueno and Wu, 1993; Harrison, 1992, 1993; Frucot and Shearon, 1991), and *personality variables* (Brownell, 1981, 1982; Seiler and Bartlett, 1982; Spector, 1982; Gupta, 1984; Gupta and Govindarajan, 1984; Frucot and Shearon, 1991; Harrison, 1993). A "fit" is said to exist when the specific attributes of a MAS are appropriately matched with each of the aforementioned circumstances (Van de Ven and Drazin, 1985). Deviations from the ideal "fit" should cause lack of coordination, miscommunication, improper incentives, poor morale and ultimately poor performance (Anderson, 1993). This study uses culture and personality variables as contingency variables.

Culture

Rohner (1984) defines culture as "the totality of equivalent and complementary learned meanings maintained by a human population, or by identifiable segments of a population, and transmitted from one generation to the next." Similarly, Hofstede (1980) defines culture as "the collective programming of the mind which distinguishes the members of one human group from another." The challenge to cross-cultural researchers has been to "unbundle" broad definitions of culture, such as the above, into component

parts that can be reliably measured (Bhagat and McQuaid, 1983; Child, 1981). Given the ability to reliably measure subcomponents of culture, researchers can test ex ante hypothetical associations between the components of culture and dependent variables of interest (Harrison, 1992).

As discussed in Chapter 1, Hofstede (1980) has empirically "unbundled" culture into four dimensions:

Power distance: "a measure of the degree to which cultures prefer a more autocratic structure...A country scoring high on this construct would prefer a less participative style" (Frucot and Shearon, 1991).

Individualism/collectivism: a measure of the degree to which cultures prefer autonomy or group affiliation.

Uncertainty avoidance: a measure of the degree to which cultures feel uncomfortable with uncertainty and ambiguity. Organizations in high uncertainty avoidance environments favor rigid rules (Hofstede, 1984a).

Masculinity: a measure of the degree to which cultures stress achievement, heroism, assertiveness and material success (Hofstede, 1984a).

These dimensions were developed by analyzing the responses to a survey administered by IBM to all its employees worldwide. The IBM survey involved 117,000 questionnaires, 40 countries, 20 languages and was administered between 1968 and 1973 (Hofstede, 1980). By studying how employees within each nation responded to the survey, Hofstede ranked all 40 nations along each of the aforementioned cultural dimensions.²

²Hofstede subsequently expanded his analysis to include more than 50 nations. Two of the nations included in the expanded analysis were Malaysia and Singapore (Hofstede, 1984a).

Hofstede's dimensions of culture are conceptually similar to earlier classifications of culture developed by Parsons and Shils (1951), Inkeles and Levinson (1954), and Kluckhohn and Strodtbeck (1961). His classifications have been validated in the West using the Rokeach Value Survey (Hofstede and Bond, 1984) and the East using the Chinese Value Survey (The Chinese Culture Connection, 1987). Additional validation procedures have been performed by Ronen and Shenkar (1985). Furthermore, his dimensions of culture have been widely cited in the accounting literature (Schweikart, 1986; Harrison and McKinnon, 1986; Soeters and Schreuder, 1988; Frucot and Shearon, 1991; Pratt and Beaulieu, 1992; Chow et al., 1991, 1994; Ueno and Wu, 1993; Harrison, 1992, 1993; Cohen et al., 1993).

HS has plants in the United States, Malaysia, and Singapore. Based on a review of Hofstede's findings, each of these countries may be categorized along his four cultural dimensions as follows³:

	<u>U.S.</u>	<u>Malaysia</u>	<u>Singapore</u>
Power Distance	Low	High	High
Uncertainty Avoidance	Low	Low	Low
Individualism	High	Low ⁴	Low
Masculinity	Moderate	Moderate	Moderate

³Analysis of responses to the Chinese Value Survey (The Chinese Culture Connection, 1987) indicate that a fifth dimension of culture may exist. The dimension is called Confucian Dynamism. Although Hofstede has cited this dimension in his recent work (Hofstede, 1991, 1993), there is insufficient evidence to suggest that Confucian Dynamism is a valid dimension in Western cultures. Furthermore, only twenty countries have been scored on this cultural dimension; Malaysia has not been scored. Accordingly, this dimension is not included in the study.

⁴Low individualism equates with collectivism.

The only differences between these three countries are found along the power distance and individualism/collectivism dimensions. Malaysia and Singapore are HPDC cultures and the United States is a LPDI culture. These differences provide the foundation for the hypotheses tested in this study.

Power Distance

Power distance refers to "the extent to which the members of a society accept that power in institutions and organizations is distributed unequally" (Hofstede, 1984a). People in high power distance cultures believe that existential inequality is the norm. In organizational settings, existential inequality is institutionalized through the creation of rigid hierarchies that locate everyone in their "rightful place" (Harrison, 1993). Subordinates maintain order and harmony by accepting their lower positions. They derive a sense of security by being loyal to and dependent upon their superiors (Hofstede, 1980). In high power distance settings, involving subordinates in the decision making process "could be regarded as a sign of poor leadership, and hence generate anxiety, [among] employees [from] a country where submission to authority figures is ingrained in the culture" (Child, 1981).

Low power distance cultures believe that inequality between people should be minimized. Hierarchies, to the extent they exist, are established for convenience rather than as a means of reflecting existential inequality (Hofstede, 1980). Superiors and subordinates view each other as people who should have equal rights (Harrison, 1993). Subordinates are less afraid to disagree with their boss (Hofstede, 1980). In low power distance settings, involving subordinates in the decision making process generates a

positive feeling of empowerment among employees rather than a negative feeling of anxiety.

Individualism/Collectivism

Hofstede (1983) distinguishes between individualist and collectivist societies as follows:

"At [one end] of the scale we find societies in which the ties between individuals are very tight...Everybody is supposed to look after the interest of his or her own ingroup...At [the other] end of the scale we find societies in which the ties between individuals are very loose. Everybody is supposed to look after his or her own self-interest."

The former group of societies in this quotation would be described as collectivist. The latter group would be described as individualist. In collectivist societies, the group (rather than the individual) is seen as the basic unit of survival (Hui, 1988). The views, needs, and goals of the group take precedence over each individual's needs. Employees aspire to conformity and membership rather than uniqueness and leadership (Hofstede, 1980; Hui and Triandis, 1986). As a result of the need for group affiliation, members of collectivist societies are very concerned with maintaining "face." Ho (1976) defines "face" as follows:

"...a person's 'face' is assessed in terms of what others think of him; the assessment does not include what a person thinks of himself. ...Face may be lost when conduct or performance falls below the minimum level considered acceptable, or when certain essential requirements associated with one's social position are not satisfactorily met. ...Face is always attached to status. ...At stake is nothing less than the effective maintenance of one's standing in society."

In individualist cultures people are supposed to look after themselves. "Individual behavior is best explained by internal mechanisms rather than group norms, goals, and

values" (Triandis, 1989). Group affiliations are secondary to self-interest. An individual's self-respect can be preserved regardless of what other people think about that person's performance; therefore, maintaining face is much less important in individualist cultures (Hofstede, 1980). Although maintaining the respect of peers is important, it is secondary to obtaining "inner directed" satisfaction (Harrison, 1993).

Personality Variables

A group's cultural values can significantly influence each individual's personality (Linton, 1945; Singh et al., 1962; Kelley et al., 1987; Frucot and Shearon, 1991; Hofstede, 1991; Ralston et al., 1993). Therefore, two personality variables that are expected to be influenced by one's power distance and individualism/collectivism cultural orientations are introduced into the study. These personality variables are external locus of control due to more powerful others and concern for saving face. If culture were the lone independent variable used in the study, the first research question set forth in chapter 1 could be satisfactorily answered. It could be determined if resistance levels to an ABCMS differ across cultures. However, the second research question could not be satisfactorily addressed. Incorporating culturally-related personality variables into the study may help provide more precise explanations of why resistance levels differ across cultures.

External Locus of Control Due to More Powerful Others. People "who ascribe control of events to themselves are said to have an internal locus of control" (Spector, 1982). Those who ascribe control to outside forces are said to have an external locus of control (Rotter, 1966; Spector, 1982). External locus of control has been shown to be a

multidimensional construct (Mirels, 1970; Levenson, 1974). For example, people may feel externally controlled by luck, fate, or more powerful others. This study is concerned with the feeling of being externally controlled by more powerful others. More specifically, external locus of control due to more powerful others is expected to be related to one's power distance cultural orientation. In high power distance cultures such as Malaysia and Singapore, the Confucian social philosophy legitimates the existence of inequality and influences people to accept authority and accommodate being externally controlled (Pye, 1985; Ralston et al., 1993). Conversely, in Western cultures people are viewed as having equal rights and having an equal opportunity to control their own destiny. Therefore, it is expected that, on average,⁵ people from high power distance cultures such as Malaysia and Singapore will be more externally controlled by more powerful others than people from a low power distance culture such as the United States.

Concern for Saving Face. Concern for saving face is expected to be related to one's individualism/collectivism orientation. In collectivist cultures, people depend upon the opinions of the individuals around them to give direction to their actions. Respect is preserved by focusing almost exclusively upon meeting the expectations of peers. "Preserving face - that is, preserving the respect from one's reference groups - is the collectivist alternative to preserving self-respect in individualist cultures. Avoiding shame in the collectivist society takes the place of avoiding guilt in the individualistic one" (Hofstede, 1984b). Therefore, it is expected that people from collectivist cultures such

⁵People within any culture will possess a wide distribution of personality orientations. The term "on average" is used to imply that differences are expected to exist at the group level.

as Malaysia and Singapore will be more concerned with saving face, on average, than people from an individualist culture such as the United States.

Activity-based Cost Management Systems

"Activity-based costing is a new cost measurement approach designed to provide more accurate information to managers about the cost and profitability of their business processes, products, services and customers" (Argyris and Kaplan, 1993). ABCMSs accumulate costs by activities rather than budgeted line items (Turney, 1991). They provide a cross-functional, integrated view of how the activities that comprise a firm's business processes consume resources (Cooper and Kaplan, 1991; Copper et al., 1992). ABCMSs are focused on cost management (i.e. facilitating long-term cost reduction) rather than cost accounting (i.e. tracking historical performance) (Hronec and Hunt, 1993). They generate cost data that is "more firmly grounded in organizational processes" (Greenwood and Reeve, 1993), thereby enabling empowered production managers to use the cost system to manage the activities that cause costs and have the biggest impact on profitability.

The ABCMS project management process can be decomposed into two distinct phases. "The analysis phase includes obtaining sponsorship for the project and estimating an activity-based cost model of organizational expenses and profitability" (Argyris and Kaplan, 1993). The action phase includes identifying profit priorities, taking action and getting improvements to the bottom line (Cooper et al., 1992). Since managers often feel threatened by the idea of having to act on the new and unfamiliar information generated by an ABCMS, organizational resistances frequently impede a company's movement from

the analysis to the action phase (Cooper et al., 1992). If an organization resists acting upon the profit priorities that have been identified, the ABCMS will fail to help improve profitability.

Hypotheses

ABCMSs: (1) are designed to empower production managers to identify and initiate improvement opportunities, and (2) can threaten managers who may be embarrassed by their inability to understand the new system or may be fearful of using the new system to make inappropriate decisions.

An ABCMS is likely to be met with very strong resistance in HPDC cultures, such as Malaysia and Singapore, for the following reasons. First, production managers may not desire to assume the empowered role (that is part of the ABCMS philosophy) of leading the continuous improvement initiative. In HPDC cultures, production managers are inclined to look toward "more powerful others" for leadership. Making empowered decisions may be overstepping their bounds within the hierarchical order. Second, HPDC cultures are extremely concerned with maintaining face. The opinions of co-workers are primary; "inner-directed" satisfaction is a distant secondary consideration. If a manager is unable to understand the ABCMS or makes inappropriate decisions using the activity-based information, a "failure" signal could be sent to co-workers that severely threatens the managers face. Ho (1976) discusses the relationship between face, threatening situations and defensiveness as follows:

"Face behavior takes on a defensive quality when the individual appears to be excessively concerned with protecting his face... This is more likely to occur when at some level he senses danger signals that his face is being threatened and that he does not have the resources to protect his integrity."

Stated another way, when one's face is threatened, a defensive posture is assumed. It is unlikely that individuals would venture from their ingroup to advocate an ABCMS, given that such a system introduces a significant amount of threat to themselves and the members of their organization.

Conversely, an ABCMS is likely to be met with less resistance in a LPDI culture, such as the United States, for the following reasons. First, the idea of assuming the empowered role of leading the continuous improvement initiative (rather than deferring the initiative to "more powerful others") would not contradict the norms and values possessed by production managers. Managers would be much more willing to make empowered decisions without fear of repercussions for violating the hierarchical order. Second, the perceived level of threat introduced by an ABCMS is likely to be lower in LPDI cultures. Although, managers from LPDI cultures could be threatened by the introduction of an ABCMS because they may perceive that it could adversely affect their compensation and status levels, their entire self-worth (based on the views of their peers) would not be at stake. Accordingly, the resultant amount of defensive behavior would be lower in LPDI cultures. Higher resistance levels in HPDC cultures should lead to a lower level of "willingness to use the ABCMS"; accordingly, the following hypothesis is set forth (stated in the alternative form):

- H1: The mean level of willingness to use the ABCMS will be lower in HPDC cultures relative to LPDI cultures.

H1 addresses the first research question set forth in the study. If H1 is supported, it will provide evidence that resistance levels to an ABCMS differ across cultures. Explaining why the differences exist is the next step. H2 through H5 are designed to help address this issue. First, H2 and H3 must be tested to determine if the study's personality variables appear to be influenced by culture. The hypotheses stated in the alternative form are as follows:

- H2: The mean level of external locus of control due to more powerful others will be higher in HPDC cultures relative to LPDI cultures.
- H3: The mean level of concern for saving face will be higher in HPDC cultures relative to LPDI cultures.

H4 and H5 test if these culturally-related personality variables are associated with ABCMS resistance levels. It is hypothesized that subjects who believe they are more externally controlled by more powerful others will be less inclined to assume the empowered role of using the ABCMS to lead the cost reduction initiative. Also, subjects who are more concerned with maintaining face will be less inclined to use the ABCMS. Stated in the alternative form, the hypotheses are as follows:

- H4: Each subject's level of external locus of control due to more powerful others will be negatively correlated with the subject's willingness to use the ABCMS.
- H5: Each subject's level of concern for saving face will be negatively correlated with the subject's willingness to use the ABCMS.

Research Design

This research is a field-based study with the Harris Corporation of Melbourne, Florida. Harris Corporation is composed of four business sectors: Electronic Systems Sector, Communication Sector, Semiconductor Sector, and Lanier Worldwide products. This study focuses on the semiconductor sector which has annual revenues of approximately \$650 million. The remainder of this section is divided into four topics. First, some background information on HS and the semiconductor industry is provided. Second, is an overview of the HS manufacturing facilities. Third, is a brief overview of the subject selection process. Fourth, is a discussion of how the variables used in the study were measured.

Background Information

HS designs, manufactures and markets discrete power semiconductors and analog, digital, mixed-signal, and radiation hardened integrated circuits for signal-processing and power control applications. HS products are used for many applications including antilock braking systems, air-bag systems, computer keyboards, modems, diskdrives and cellular telephones (Harris Inc., 1993).

The manufacturing process at HS, and in the semiconductor industry in general, can be decomposed into two primary steps. The first step, called fabrication, is where the semiconductors and integrated circuits are actually manufactured. Fabrication consists of four main processing procedures; photolithography, etch, diffusion, and circuit probe. The second step is called assembly and test. This step involves packaging the product and readying it for commercial application and testing the packaged product for conformance to standards. Assembly and test consists of six main processing procedures; wafer saw, die attach, wire bond, mold, solder dip, and final inspection. The semiconductor industry and its manufacturing process is characterized by very high levels of product, technology and volume diversity. Direct labor represents less than 10% of the total cost structure and manufacturing overhead rates are extremely high; hence, the applicability or "fit" of ABC to the semiconductor industry (Mangan, 1993).

The Manufacturing Facilities

HS has fabrication plants in Findlay, Ohio; Mountaintop, Pennsylvania; Palm Bay, Florida; and Research Triangle Park, North Carolina. They have assembly and test facilities in Kuala Lumpur, Malaysia; Singapore; and Palm Bay, Florida. This study focuses on the plants in Findlay, Ohio; Mountaintop, Pennsylvania; Palm Bay, Florida; Kuala Lumpur, Malaysia; and Singapore.⁶ These plants are similar in many respects. First, cost management is critically important to each plant. The semiconductor industry is a very cost competitive industry. Second, as previously mentioned, each plant is

⁶The plant in Research Triangle Park, North Carolina was excluded from the study because their military-based product line is distinct from the other HS manufacturing facilities.

characterized by high levels of product, technology, and volume diversity. Third, each plant uses the same primary measures of operational performance. These measures are yield, throughput, and on-time delivery. Fourth, each plant has comparable organizational structures (i.e. 4-5 levels) and cross-functional channels of communication.

There are four primary differences between the plants. First, as stated earlier, the manufacturing process steps are different in a fabrication plant versus an assembly and test facility. Second, the product lines manufactured by each of the fabrication plants are different. The Mountaintop facility manufactures mostly low cost, commodity products. The Palm Bay facility manufactures mostly high cost, niche market products. The Findlay facility manufactures a combination of commodity and niche market products. Although the product lines differ across plants, the fabrication processes remain the same. Third, the plants differ in terms of size. By far, the largest facility is the Malaysia plant with approximately 4,000 employees. The Palm Bay manufacturing facility has about 1,000 employees. The Findlay, Mountaintop and Singapore sites each employ about 700, 600, and 475 people respectively. Fourth, the plants have different ownership histories. The Palm Bay facility has always been owned by HS. The Findlay, Mountaintop, and Singapore plants were acquired from General Electric Solid State (GESS) in 1988. The Malaysia plant performs assembly and test procedures on three major product lines; Hermetic, Power, and Plastic. The Hermetic assembly and test facilities at the Malaysia plant have always been owned by HS. The Power and Plastic assembly and test facilities were acquired in the GESS acquisition.

In conclusion, the HS manufacturing facilities are reasonably well matched on environment, technology, task complexity, organizational structure, and strategy variables. They are not well matched on the size variable and ownership history variables. The differences in terms of manufacturing process steps and product lines are largely negated by the presence of two industry norms. First, the entire semiconductor industry is extremely cost competitive regardless of product line. Second, all manufacturing processes are characterized by high levels of diversity.

HS initiated an ABC project in December 1991. Comparable ABC/ABM orientation and training sessions were provided to upper management level employees at each of the fabrication and assembly and test facilities. By the end of August 1992, all manufacturing costs worldwide were based on ABC rates. Since August 1992, HS has been migrating from ABC to ABM. In the ABC phase of HS's implementation, the focus was on product costing with passive involvement from production personnel. In the ABM phase of HS's implementation, the focus has begun to shift toward long-term cost reduction via active involvement from production personnel. All management level employees at each plant have equal access to activity-based information through the corporate management information system and through their respective financial accounting staffs.

The Subjects

This study focuses on the practice of ABM; therefore, the subjects in the study are HS production managers and process engineers rather than accountants. Production managers and process engineers are the employees who are most capable of using the

ABCMS to facilitate long-term cost reduction in the firm's manufacturing processes. Organizational charts were obtained from each site and used to help identify the production managers and process engineers who appeared to have the appropriate qualifications to be included in the study.⁷ These qualifications included; (1) having a general awareness of HS's ABCMS, (2) having received in-house ABC/ABM training, and (3) having participated in at least one of HS's annual ABC revaluations.⁸ Each subject who met these qualifications was asked to complete a survey and participate in an individual interview. Additional details regarding the subjects are provided in the "descriptive analysis" section of the chapter.

Variables Measurement

Figure 3 provides an overview of the relationship between the variables used in the study and the research hypotheses. The independent variable in hypothesis 1 is culture. The HPDC and LPDI independent variable classifications were selected based on Hofstede's (1980) findings.⁹ The dependent variable in the first hypothesis is

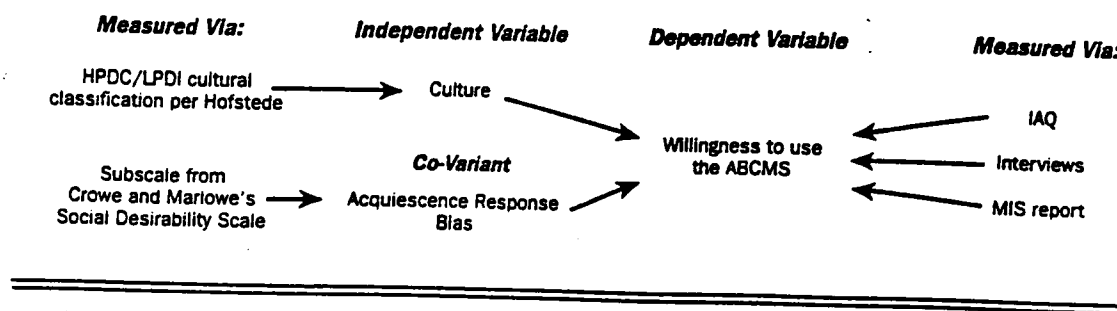
⁷An organizational chart could not be obtained for the Palm bay facility; therefore, an accounting manager at this site provided the names of the production managers and process engineers who had familiarity with the ABCMS.

⁸A revaluation is when the production personnel work in conjunction with the accountants to periodically review how the plant's resources are being allocated to activities. Over time these allocations may change; hence, an annual revaluation is performed.

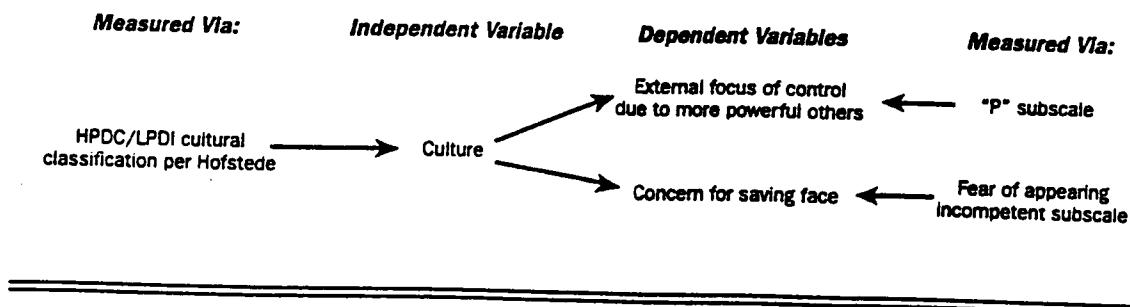
⁹Hofstede's data are now 15-20 years and were obtained from just one firm (IBM). However, there is extensive support for his taxonomy. For example, extensive prior research has identified individualism as being a predominant dimension of American management theories and life in general (Harris and Moran, 1987; Locke and Latham, 1984; Spence, 1985; Triandis et al., 1988). Conversely, the focus of Asian cultures on collectives rather than individuals has also been documented extensively (Redding, 1980; Bond et al., 1982; Leung and Bond, 1984). Regarding, the power distance dimension of culture, Asian countrys' high regard for hierarchies has been extensively documented (Bond and Hwang, 1986; King and Bond, 1985; Triandis, 1989). Previous accounting research has relied upon Hofstede's cultural classifications as a basis for hypothesis testing (Frucot and Shearon, 1991; Ueno and Wu, 1993; Chow et al., 1994)

Hypothesis 1:

The mean level of willingness to use the ABCMS will be lower in HPDC cultures relative to LPDI cultures.

**Hypotheses 2 and 3:**

The mean level of external locus of control due to more powerful others and concern for saving face will be higher in HPDC cultures relative to LPDI cultures.

**Hypotheses 4 and 5:**

Each subject's level of external locus of control due to more powerful others and concern for saving face will be negatively correlated with the subject's willingness to use the ABCMS.

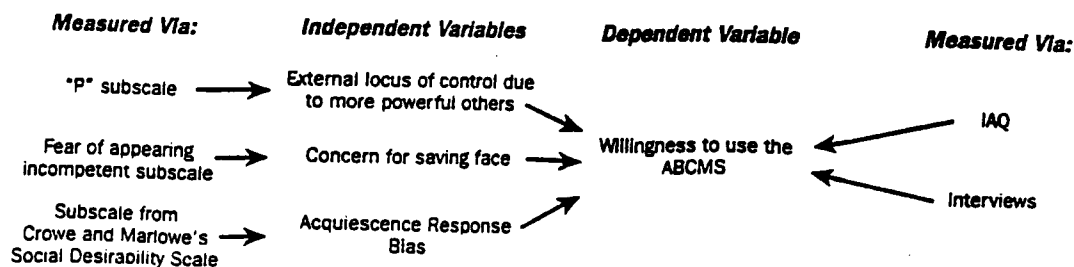


Figure 3

Overview of Hypotheses and Variables

"willingness to use the ABCMS". "Willingness to use the ABCMS" is assessed three ways. First, via Schultz and Slevins (1976) Performance subscale of the Implementation Attitudes Questionnaire (hereafter referred to as the IAQ). Second, via tabulated scores from individual interviews. Third, via a report generated by the HS MIS department that documents actual usage of the ABCMS. The covariate incorporated into the testing of hypothesis 1 is acquiescence response bias. Measuring acquiescence response bias helps control for the tendency of subjects to evaluate the ABCMS favorably simply because they believe it is polite and socially desirable. This covariate is measured via a subscale from Crowne and Marlowe's (1964) Social Desirability Scale.

The independent variable in hypotheses 2 and 3 is culture. Again, the HPDC and LPDI independent variable classifications were selected based on Hofstede's (1980) findings. The dependent variables in hypotheses 2 and 3 are external locus of control due to more powerful others and concern for saving face, respectively. External locus of control due to more powerful others is measured via the "P" subscale from Levenson's (1974) IPC scale. Concern for Saving Face is measured via a 10-item subscale from Good and Good's (1973) Fear of Appearing Incompetent scale.

The independent variables in hypotheses 4 and 5 are external locus of control due to more powerful others and concern for saving face, respectively. The "P" and Concern for Saving Face subscales were used to obtain these measurements. The dependent variable in both of these hypotheses is "willingness to use the ABCMS". The IAQ and tabulated interview scores were used as surrogates for "willingness to use the ABCMS" in hypotheses 4 and 5. The results of the MIS ABCMS usage report were not used in

testing these hypotheses because ABCMS usage could only be measured at the departmental, rather than individual level. Acquiescence response bias is also included as an independent variable in these hypotheses. This is done to isolate (i.e. control for) the impact of acquiescence response bias on ABCMS resistance levels. The method for measuring each of the aforementioned variables will now be discussed in greater detail.

The Survey

The survey used in this study was designed to measure four variables; (1) external locus of control due to more powerful others, (2) concern for saving face, (3) acquiescence response bias, and (4) willingness to use the ABCMS. A complete version of the survey is shown in Appendix A.¹⁰

Since English is an official language in Singapore (The Europa World Book, 1993), an English version of the survey was used at the Singapore plant. Although the official language of Malaysia is Bahasa Malaysia, English is also widely spoken, particularly in the city of Kuala Lumpur. Therefore, an English version of the survey was also used at the Malaysia plant. Previous cross-cultural research performed in Singapore and Malaysia has used English version surveys (Hofstede, 1980; Chow et al., 1991; Vance et al., 1992; Harrison, 1992, 1993). Being able to use a single language version of the survey helps to minimize the communication difficulties that often are present in cross-

¹⁰The only differences between the survey in Appendix A and the survey distributed to the subjects in Malaysia and Singapore are as follows. First, in question 18, the spelling of the word "favors" was changed to "favours". The other two differences are found in the demographic section. The first question which asks "What is your race?" has different choices in the Malaysia and Singapore versions. The choices are Chinese, Malay, Indian, Eurasian, and Other. The fifth question which asks "How long have you lived in the United States?" was changed to Singapore and Malaysia where appropriate.

cultural research (Chow et al., 1991).¹¹ Now, a more in-depth discussion of each of the four survey instruments will be provided.

External Locus of Control Due to More Powerful Others. External locus of control due to more powerful others was measured using the "P" subscale from Levenson's (1974) IPC scale.¹² The P subscale was designed specifically to measure the extent to which individuals feel they are externally controlled by more powerful others. The subscale is presented in a 6-point Likert scale format. In previous research, the coefficient alpha of the 8-item P subscale was .77 (Levenson, 1974). This reliability figure exceeds the conventional level of acceptability as set forth by Nunnally (1978). Furthermore, this subscale has been validated in other research studies (Garcia and Levenson, 1975; Levenson and Mahler, 1975; Levenson and Miller, 1976).

In this research, one question was deleted from the P scale's 8-item format. The question reads "Whether or not I get into a car accident depends mostly on the other driver". Based on the judgment of the researcher, this question was deemed not applicable to the research study. The 7-item version of Levenson's P scale used in this study was pre-tested using students from universities in Malaysia and the United States. The purpose of the pre-test was to establish the cross-cultural reliability of the revised 7-

¹¹The survey used in this study was reviewed by 5 students at the University of Tennessee who are natives of either Malaysia or Singapore to help ensure that all questions were written in a manner that is likely to be understood by all subjects.

¹²The specific questions from this subscale as well as the other subscales are denoted on the complete version of the survey shown in Appendix A.

item version of the P scale. The results of the pre-test will be discussed in a subsequent section of this chapter.

Concern for Saving Face. Concern for saving face was measured by using a 10-item subscale from Good and Good's (1973a) Fear of Appearing Incompetent Scale. The 10-item subscale is presented 6-point Likert scale format. "The rationale for item-construction was to think of either situations in which an individual might reasonably worry about his competence, as perceived by others, or of attributes on which he might worry about possible negative evaluations from others... for example, as not [being] intelligent enough for one's job" (Good and Good, 1973a). In previous research, the coefficient alpha of the entire 36 item scale was .89 (Good and Good, 1973a). The scale has been used in additional research (Good and Good, 1973b; Brenner and Tomkiewicz, 1982). A 10-item subscale was created by the researcher to bypass items considered inappropriate for a corporate setting and to minimize the obtrusiveness of fieldwork procedures. This 10-item subscale was also included in the pre-test to be discussed subsequently.

Acquiescence Response Bias. Acquiescence Response Bias "is the tendency to give a positive answer to any question, regardless of its content" (Hofstede, 1980). Research shows that people from collectivist societies tend to acquiesce to survey questions; therefore, a subscale from the Marlowe and Crowne (1964) Social Desirability Scale was included in the study as a covariate (Robinson and Shaver, 1973). Many of the items in this scale are inappropriate for subjects from a HPDC culture; therefore, six items that appear to be relatively "culture neutral" were selected by the researcher for

inclusion in the survey. The 6-item measure of acquiescence response bias is also included in the pre-test to be discussed shortly.

"Willingness to Use the ABCMS". "Willingness to use the ABCMS" was assessed by using the Performance subscale of Schultz and Slevin's (1975) IAQ. The IAQ was designed specifically to measure employee attitudes toward MIS implementations. The IAQ scale employed in this study uses a 6-point Likert scale format to measure the extent to which employees believe that an information system will enhance their performance capability and visibility.¹³ In previous research, the coefficient alpha of the Performance subscale was .81 (Robey, 1979). The Performance subscale has been validated by Robey and Zeller (1978). These authors validated the scale by administering it to employees of two plants, each of which implemented a quality control information system. In one plant the users rejected the system. In the other plant, the system was accepted and used. As hypothesized, scores on the Performance subscale were significantly lower for the employees at the plant that rejected the system. This study, as well as others (Lucas, 1975; Schewe, 1976; Robey, 1979) indicate that users' attitudes about the performance enhancing capability of an information system is directly related to their willingness to use and actual usage of the system. Given the findings of prior research, the Performance subscale of the IAQ is a reasonable proxy for measuring each subject's "willingness to use the ABCMS".

¹³Schultz and Slevin's (1975) Implementation Attitudes Questionnaire uses a 5-point Likert scale format. However, to maintain consistency with the other instruments used in the study a 6-point Likert scale format was employed by the researcher.

The Interviews

Individual interviews (25-45 minutes per interview) were performed with HS employees for the purpose of obtaining a second measure of "willingness to use the ABCMS". Consistent with prior management accounting research (Gosse, 1993), the results of these interviews were quantified and used for data analysis purposes. An interview protocol was created to ensure that the interview format was consistent across subjects. A complete copy of the protocol is shown in Appendix B. Interview questions were designed in an open-ended fashion to help elicit "rich" responses from the subjects. Salient comments made by each subject pertaining to the ABCMS were identified and transcribed from cassette tapes. As each interview transcript was reviewed, comments having negative and positive connotations toward the usefulness of the ABCMS were identified. Each comment was scored between -2 and +3 depending on content. A -2 was assessed for any comment that indicated a theoretical rejection of the ABCMS. A -1 was assessed for any comment that indicated the subject is currently not using the ABCMS. Notice, that comments indicating a theoretical rejection of the ABCMS were scored more severely than comments indicating the subject is not currently using the ABCMS. This is because a "theoretical rejection" is considered to be an indication that the subject is not currently using the ABCMS nor do they intend to in the future. A +1 was awarded for any comment that indicated the ABCMS provided more accurate product costs. A +2 was awarded for any comment that indicated theoretical support for the practice of ABM. A +3 was awarded for any comment that indicated the subject was currently engaged in the practice of ABM. Notice, higher scores were awarded for

comments that indicated an ABCMS should be used as a management/cost reduction tool and not just a product costing tool.

After each subject's comments were scored, their results were tabulated and added to an anchor score of +10. An anchor score of 10 was used to ensure that all data values were positive numbers, thereby facilitating subsequent data analysis. Any subject with a net score less than 10 had an overall negative opinion of the usefulness of the ABCMS, and any subject with a net score greater than 10 had an overall favorable opinion of the usefulness of the ABCMS.

The HS MIS ABCMS Usage Report

An HS MIS report that documents actual ABCMS usage was used as a third measure of "willingness to use the ABCMS". This computer generated report indicates who actually logged into the ABCMS during the five months ended February 28, 1994.¹⁴ The report also indicates how many times each of these users queried the ABCMS during that time period.

The MIS report has two weaknesses for data analysis purposes. First, employees can use data from the ABCMS without having to query the system. For example, an accountant may query the system in response to an inquiry from a production manager. The true user of the ABC data in this case is the production manager; however, the accountant would show up on the MIS report as the person who queried the ABCMS.

¹⁴The primary source of activity-based information available to users of the MIS is called an ABC front to back report. This report provides individual product costs on an activity basis. Each product is costed, on an activity basis, from the first step in the fabrication process through the final step in the assembly and test process. The MIS report provided to the researcher indicates who were the users of the ABC front to back report.

Second, even by identifying the person who queried the ABCMS or requested ABC data from the accountant, the true user may still be overlooked. For example, a member of the process engineering staff may request ABC data from the finance department. The accountant who gathered the data would show up as the user on the MIS report. The process engineering staff member would be identified by the accountant as the recipient of the ABC data. However, the process engineer who obtained the ABC data may have been acting in response to a request from his manager. Therefore, the ultimate user (the process engineering manager) would be overlooked.

Per review of the MIS report, the primary users of the ABCMS are accountants.¹⁵ A form was prepared and given to each accountant listed on the MIS report with over 20 queries to the system. A complete copy of this form is shown in Appendix C. The purpose of the form was to identify the users of the ABC data being obtained by the accountants. This form links the accountants' ABCMS inquiries to the employee who requested the data; however, it does not overcome the second weakness cited above. It does not, with certainty, link the accountants' ABCMS inquiries to the ultimate user of the activity-based information. Accordingly, the data obtained from the MIS report will be analyzed at the departmental level and not the individual level. Departmental usage of the ABCMS can be compared across cultures to provide further insight into the production and process engineering departments' "willingness to use the ABCMS."

¹⁵All management level employees (i.e. production managers and process engineers) have access to the ABCMS. However, the production managers and process engineers are not directly using the ABCMS. They prefer to let the accountants gather the data rather than having to take the time themselves to access the system.

Pre-Test

A pre-test was designed to assess the reliability and validity of the External Locus of Control Due to More Powerful Others, Concern for Saving Face, and Acquiescence Response Bias instruments used in the study.¹⁶ Since, the HS manufacturing facilities are located Malaysia, Singapore and the United States, the researcher attempted to obtain pre-test subjects from universities in each of these three countries. Pre-test subjects were obtained from the Universiti Pertanian Malaysia (UPM) and the University of Tennessee-Knoxville (UTK). Pre-test subjects could not be obtained from a university in Singapore.

A total of 93 and 110 surveys were distributed to 3rd and 4th year accounting majors at UPM and UTK respectively. Sixty-two responses were received from the students at UPM for a response rate of 67%. Fifty-seven of those responses were completed correctly and useable for pre-testing purposes. Ninety-two responses were received from the students at UTK for a response rate of 84%. Eighty-nine of those responses were completed correctly and useable for pre-testing purposes. The total number of useable surveys completed by students at both universities was 146. A demographic profile of these 146 students is provided in Table 1 of Appendix D.*

Two types of statistical tests were performed on the pre-test data; Cronbach's coefficient alpha and t-tests. The coefficient alpha provides a measure of reliability. The

* All Tables may be found in Appendix D.

¹⁶The pre-test instrument is identical to the survey shown in Appendix A with the following exceptions. First, the pre-test instrument did not include the 13 questions from the IAQ. Second, the pre-test instrument did not include questions 6-10 listed under "Additional Information".

t-tests were performed to provide evidence of validity.

Reliability

Three coefficient alphas were calculated for each of the three instruments. Separate coefficient alphas were calculated using all 146 subjects, the 57 subjects from Malaysia, and the 89 subjects from the United States. The results of these calculations are shown in Table 2. All three alpha coefficients for the External Locus of Control Due to More Powerful Others and Concern for Saving Face scales exceed conventional levels of acceptability (Nunnally, 1978). This indicates that both instruments have satisfactory cross-cultural reliability. The alpha coefficients for the acquiescence response bias scale indicate questionable overall reliability, satisfactory reliability for the U.S. students and unsatisfactory reliability for the students from Malaysia.

Validity

T-tests were performed to examine the cross-cultural validity of each instrument. Ex ante expectations were that students from a HPDC culture such as Malaysia would be more externally controlled by powerful others, concerned with saving face, and prone to exhibit an acquiescence response bias than students from a LPDI culture such as the United States. A summary of the results of these three t-tests is shown in Table 3.¹⁷ The differences between the two cultures are all directionally correct and statistically significant at conventional levels.

¹⁷All three scales were scored the same way. Each individual question was scored between 1 (strongly disagree) and 6 (strongly agree). Where appropriate, questions were reversed scored. This includes questions 5, 15, 19, and 23, all of which pertain to the concern for saving face scale and questions 18 and 22 which pertain to the acquiescence response bias scale. The individual scores for each question were then summated by instrument. Scores on the external locus of control due to more powerful others can range between 7 and 42. Scores on the concern for saving face and ARB scales can range between 10 and 60 and 6 and 36, respectively.

Additional t-tests were performed to examine the effects of gender and nationality.¹⁸ The results of the gender-related t-tests are shown in table 4. The results indicate that none of the gender differences are significant at the .05 level. The results of the nationality-related t-tests are shown in table 5. The only nationalities compared in these t-tests are Chinese versus Malay.¹⁹ The results indicate that the Malay subjects are much more concerned with saving face than the Chinese subjects ($p=.0001$). In fact, even the U.S. subjects appear to be more concerned with saving face than the Chinese subjects, although the difference is not statistically significant ($p=.3123$).

In summary, the pre-test findings make the following contributions to the research study. First, the external locus of control due to more others and concern for saving face scales have demonstrated cross-cultural reliability. Second, the external locus of control due to more powerful others scale has been validated given that the results correspond with ex ante expectations. Third, the concern for saving face scale has provided some interesting insight into the non-unidimensionality of oriental cultures. Although the results only partially correspond with ex ante expectations, it will be interesting to see if the differences between the Chinese and Malay subjects are corroborated by the data gathered from the HS subjects. If comparable results are found between the UPM students and the HS subjects it may indicate that the scale is not invalid, rather the ex ante expectation is flawed. Fourth, the acquiescence response bias scale showed

¹⁸Age was not examined as a demographic variable because 96.6% of subjects fall between the ages of 20-27.

¹⁹Since 82 of the 89 subjects from UTK were Caucasian no nationality comparisons were drawn from the UTK data.

directionally correct and statistically significant differences between students from the United States and Malaysia. Although reliability in Malaysia was not demonstrated, the significant difference in mean values indicates that the scale will still be of some use as a covariate.²⁰

The pre-test has two limitations that will be highlighted in the last section of this chapter. First, 78 of the subjects in the pre-test are women; conversely, only 2 of 39 HS subjects are women. Second, only 13 of the 57 pre-test subjects from Malaysia are Chinese while 16 of the 21 subjects from the HS plants in Malaysia and Singapore are Chinese. Had the researcher been able to control the selection of pre-test subjects, fewer female and more Chinese subjects would have been preferred.

Descriptive Analysis

Forty-seven HS employees were identified from organizational charts as potential subjects for the study.²¹ Eight of these employees were not included in the study because they had insufficient ABC awareness and training. Table 6 provides a profile, by plant and job capacity, of the remaining 39 subjects. Eighteen of the subjects come

²⁰In Chapter 4, results will be presented that indicate acquiescence response bias is significantly correlated with the HS subjects' level of "willingness to use the ABCMS". This provides evidence that, in addition to having "directionally correct" differences in mean scores, acquiescence response bias is related to reported ABCMS resistance levels. Although, cross-cultural reliability is unsatisfactory, the acquiescence response bias scores will be included in the data analysis because they offer at least some measure of control for the social desirability response phenomenon.

²¹Potential subjects could not be identified from the Palm Bay facility because an organizational chart was not available. The Palm Bay subjects were selected based on the recommendation of an accounting manager at that facility.

from the three U.S. plants. Eighteen and three of the subjects come from the Malaysia and Singapore plants, respectively. The number of subjects from the Singapore plant was less than expected by the researcher. Five of the assembly and test managers selected from the organizational chart had not received any in-house ABC/ABM training nor did they have sufficient awareness of the ABCMS. Thirty of the subjects are production managers and nine are process engineers.

Table 7 provides an overview of the types of data received from each subject. Thirty of the subjects completed a survey and participated in an individual interview. Six subjects only completed a survey. Due to time constraints, these subjects were unavailable for interviews during field work. Three subjects from Malaysia only participated in interviews. These three subjects are the only survey non-respondents.

Tables 8-11 describe the subjects in terms of gender, age, nationality, and length of tenure at current manufacturing facility. Table 8 indicates that only 2 of 39 subjects are female; hence, gender will not have a significant impact on this study. Table 9 indicates that the largest portion of each plant's subjects fall in the 41-50 age bracket. The U.S. plants have 4 subjects who fall in the 51-60 age bracket and the Malaysia and Singapore plants have zero subjects in this age bracket. Table 10 indicates that all U.S. plant subjects are caucasian. Thirteen, three and two of the subjects from Malaysia and Singapore are Chinese, Indian, and Malay, respectively. Table 11 indicates that the U.S. subjects tend to have a longer tenure at their respective manufacturing facilities. Notice, these figures do not represent the average number of years employed by HS, rather they represent the number of years employed at current facility. For all the plants except Palm

Bay, the "average number of years employed at plant" denoted in the table spans three owners (RCA, GESS and HS). The effect of experience level on "willingness to use the ABCMS" will be examined in chapter 4.

The next chapter summarizes the results of the research study.

Chapter 4

RESULTS

This chapter presents the results of the data analyses and is organized according to the hypotheses set forth in chapter 3. The first section discusses how the subjects will be grouped for data analysis purposes. The second section examines whether ABCMS resistance levels differ across cultures. The third section examines the link between cultural values and the personality variables used in the study. The fourth section examines whether the personality variables are associated with ABCMS resistance levels.

The subjects in this study were selected from one company in a non-random fashion. All HS employees, as opposed to a subsample, who met minimum requirements regarding their knowledge HS's ABCMS were included in the study. Given this subject profile, the data in this study more closely resembles a population rather than a randomly selected sample; hence, descriptive statistics will be used to test the hypotheses. Although the results are not intended to be generalizable to larger populations, the results of inferential statistical analyses will be presented, primarily in the tables and footnotes, to provide a benchmark for assessing the significance of the findings.

The Grouping of Subjects

This study is concerned with drawing comparisons between HPDC and LPDI cultures. HS's three U.S. manufacturing facilities are located in what Hofstede has identified as an LPDI culture. The Malaysia and Singapore facilities are located in what Hofstede has identified as HPDC cultures. Cross-plant comparisons within cultures must be made before these five plants can be condensed into two groups (HPDC v. LPDI). The results of the cross-plant comparisons are shown in Table 12. Using inferential statistics, none of the differences in mean values between the three U.S. plants for any of the variables used in the study are significant at the .05 level. Likewise, none of the differences between the Malaysia and Singapore plants are significant at the .05 level. This demonstrates that despite different sizes and ownership histories the three U.S. and the Malaysia and Singapore plants provide two reasonably homogenous groups of subjects for hypothesis testing purposes. Accordingly, the three U.S. plants will be combined to represent an LPDI culture and the Malaysia and Singapore plants will be combined to represent an HPDC culture.²²

²²This study uses a field study methodology known as pattern matching to provide evidence that the HPDC and LPDI cultural contexts exist as specified by Hofstede. This topic is discussed later in chapter 4.

Cross-Cultural Comparison of ABCMS Resistance Levels

The first hypothesis in the study examines whether ABCMS resistance levels differ across cultures. The independent variable in this hypothesis is culture. The dependent variable is "willingness to use the ABCMS". The two primary measures of "willingness to use the ABCMS" are the IAQ and tabulated interview scores. The measure of acquiescence response bias is provided by the 6 items from Crowne and Marlowe's (1964) Social Desirability Scale. The correlations between these three measures are summarized in Table 13. The correlation coefficient between the IAQ and interview scores (.532, $p=.0025$) provides evidence of the convergent validity of the two measures of "willingness to use the ABCMS". The correlation coefficients between the acquiescence response bias scores and the IAQ (.324, $p=.0541$) and interview scores (.364, $p=.0481$) indicate that the influence of acquiescence response bias should be considered when testing the first hypothesis.

H1 states that the mean level of "willingness to use the ABCMS" will be higher in LPDI cultures relative to HPDC cultures. The analysis of the data pertaining to this hypothesis will be presented in three steps. First, mean scores and frequency distributions of the dependent variable will be compared across cultures. Second, the effect of the covariate will be analyzed via scatter diagrams. Third, some ancillary results will be presented.

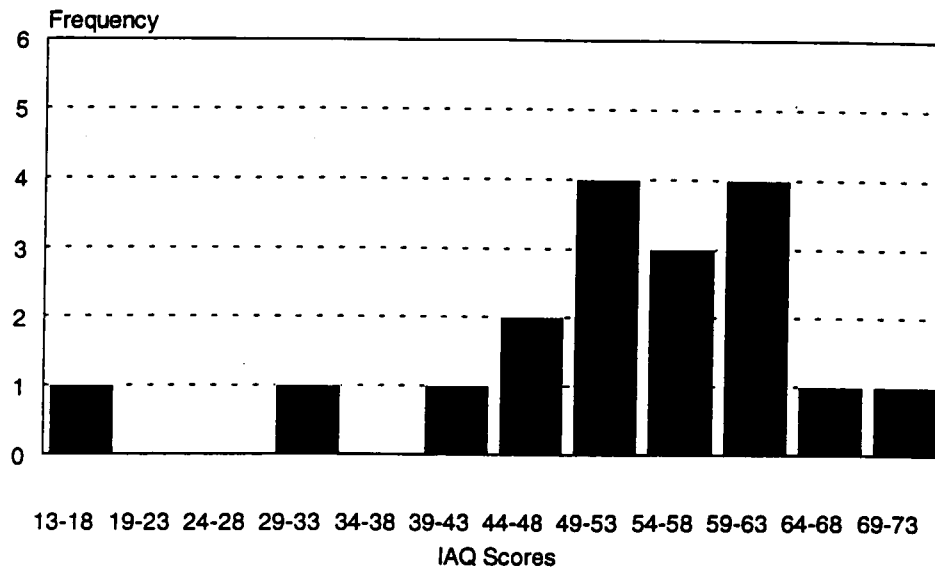
Mean Scores and Frequency Distributions

Figures 4 and 5 present frequency distributions by culture for the IAQ and interview scores. In Figure 4, the IAQ scores are plotted on the x axis. In Figure 5, the interview scores are plotted on the x axis. Mean scores for each of the plots depicted in Figures 4 and 5 are presented in Table 14. The HPDC subjects have mean scores of 52.33 and 16.95 on the IAQ and interviews, respectively. The LPDI subjects have mean scores of 43.11 and 14.57 on the IAQ and interviews, respectively. In both instances, the HPDC subjects scored higher than the LPDI subjects.²³ These findings contradict *ex ante* expectations.

The Effect of the Covariate

The scatter plots in Figures 6 and 7 are designed to show the relationships between the acquiescence response bias scores and the IAQ and interview scores. Each graph plots the acquiescence response bias scores on the y axis. In Figure 6, the IAQ scores are plotted on the x axis and in Figure 7 the interview scores are plotted on the x axis. These graphs reveal two primary findings. First, the level of acquiescence response bias tends to be higher for the HPDC subjects relative to the LPDI subjects. This is supported by the difference in mean scores shown in table 14. Second, there tends to be

²³As shown in table 14, had these subjects represented randomly selected samples, the cross-cultural difference in the survey scores would be significant at the .05 level. The difference in interview scores would not be significant at the .05 level.



LPDI Culture

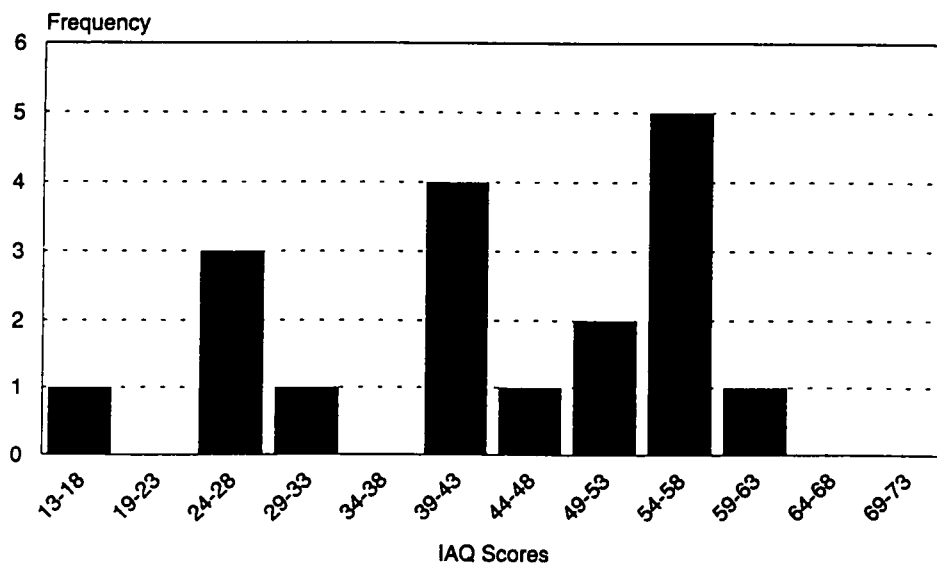
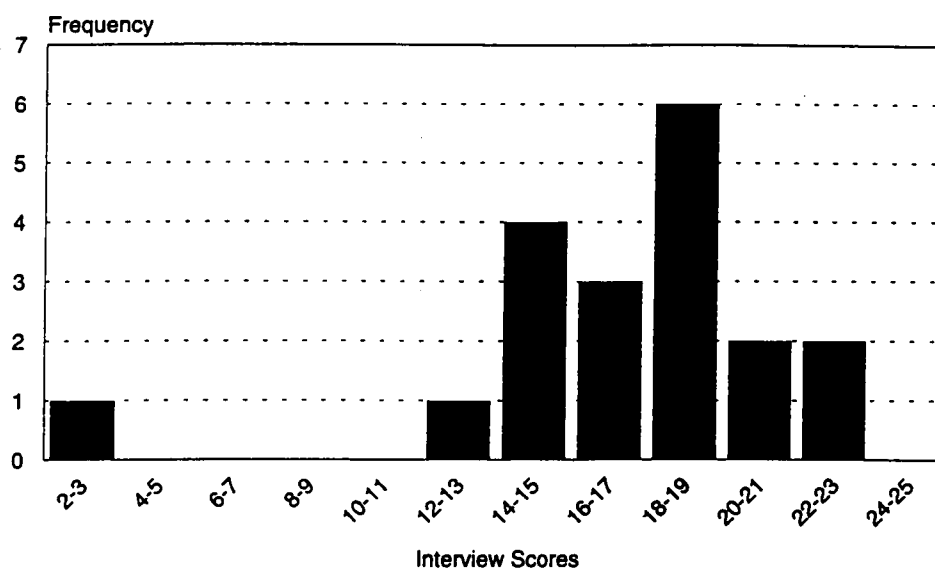


Figure 4

IAQ Scores

HPDC Culture



LPDI Culture

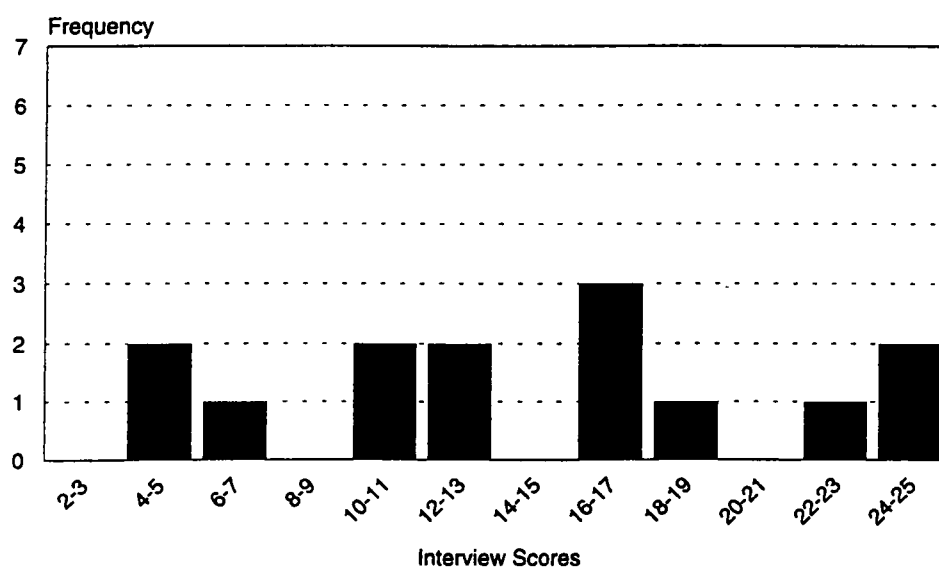
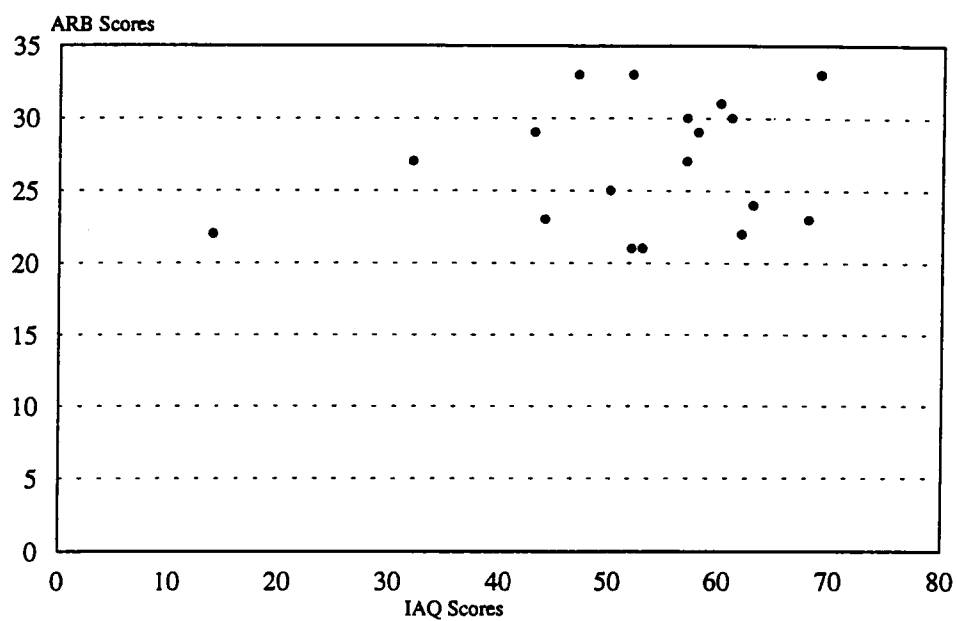


Figure 5

Interview Scores

HPDC Culture



LPDI Culture

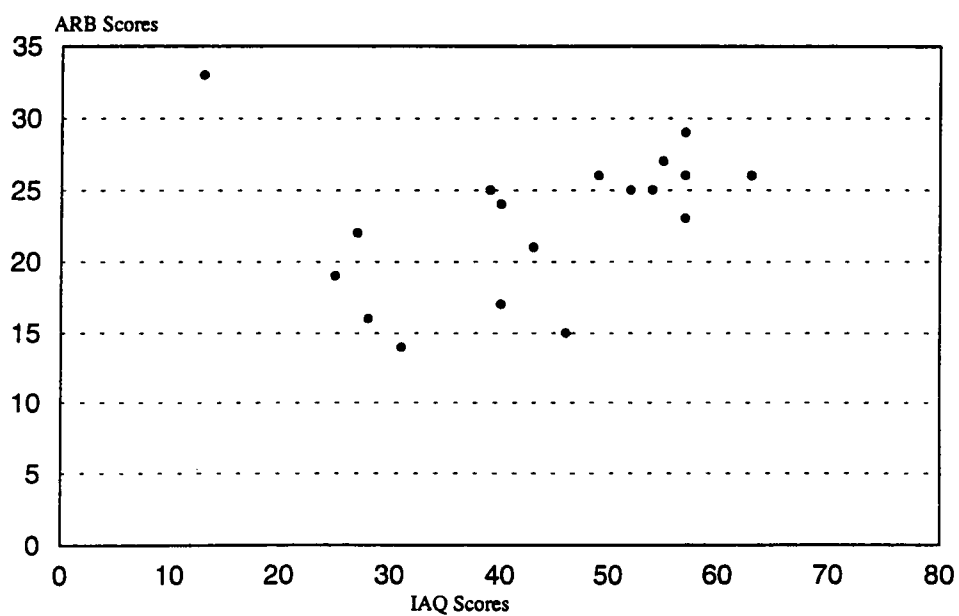
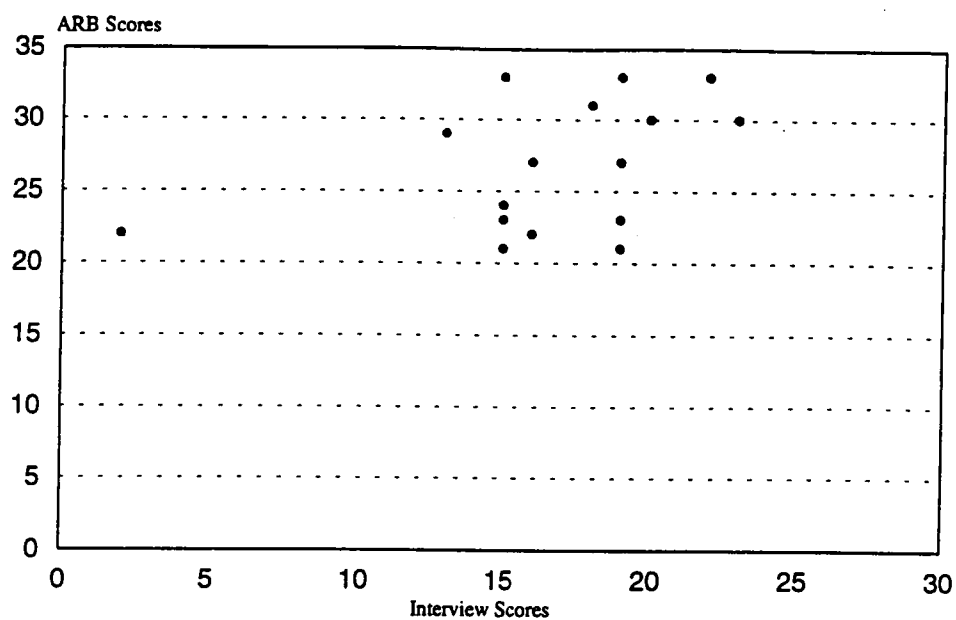


Figure 6

IAQ/ARB Scores

HPDC Culture



LPDI Culture

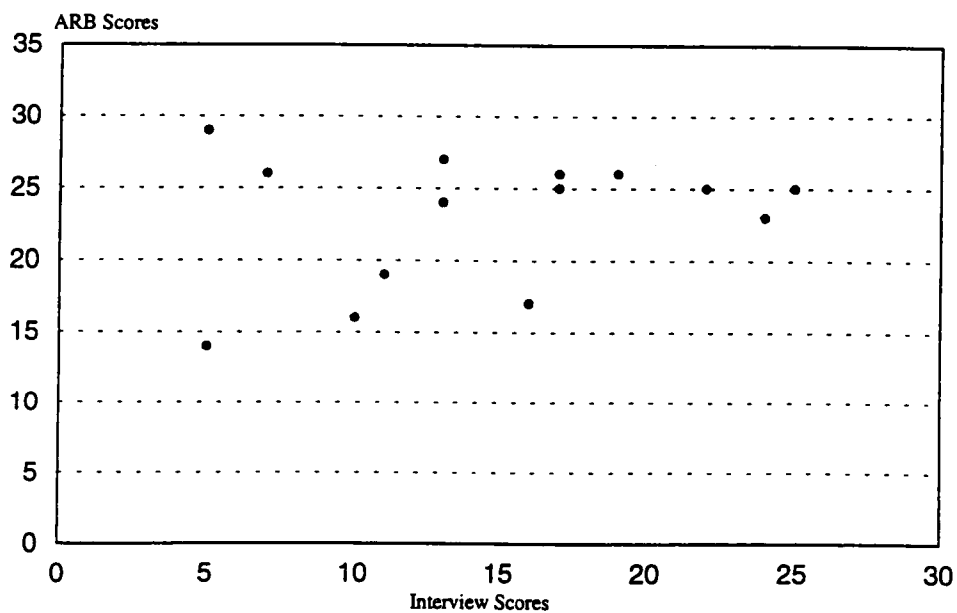


Figure 7

Interview/ARB Scores

a positive association between the acquiescence response bias scores and the IAQ and interview scores.²⁴ This is supported by the correlation coefficients shown in Table 13.

Ancillary Results

The HS MIS department produced a report that documented which HS employees used the ABCMS during the five months ended February 28, 1994. The report also indicated how many times each user queried the ABCMS during this time period. Based on a review of the report and discussions with finance and operations personnel, it was determined that production managers and process engineers do not query the ABCMS directly; rather, they rely on their respective accounting staffs to provide access to activity-based information. Per table 15, the five accountants at the three U.S. manufacturing facilities queried the ABCMS a total of 464 times during the five months ended February 28, 1994. Sixteen (or 3.4%) of these inquiries were motivated by production managers or process engineers. The 15 accountants at the Malaysia and Singapore facilities queried the ABCMS a total of 1,401 times during the five months ended February 28, 1994. A total of 106 (or 7.6%) of these inquiries were motivated by production managers or process engineers. In terms of numbers and percentages, the production managers and process engineers at the Malaysia and Singapore plants used data from the ABCMS more frequently than the comparable population of operations personnel from the three U.S. manufacturing facilities. This evidence corroborates the findings of the surveys and interviews.

²⁴The positive association appears to exist in three out of four scatter plots. The LPDI plot in Figure 4 does not appear to demonstrate a positive association between ARB scores and interview scores.

In addition to the MIS report, the survey administered to each subject contained two questions designed to provide additional evidence regarding ABCMS usage. The responses to these questions are summarized in table 16. The first question reads "Do you use activity-based information as an aid in decision making?" Twelve of the 18 subjects from Malaysia and Singapore responded "yes" to this question, and 13 of the 18 subjects from the three U.S. facilities responded "yes" to this question. The second question reads "During the last 6 months, how many times have you used information generated by Harris Semiconductor's activity-based costing system to aid in continuously improving a product or manufacturing process?" Fourteen of the subjects from each of the two groups chose a response greater than zero. Five of the subjects from Malaysia and Singapore, and 8 of the U.S. subjects said they used activity-based information 4-10 times during the past six months. The results of these self-reported measures of ABCMS usage are somewhat different from, and perhaps less reliable than, the more objective measures provided by the site accountants.

In summary, the HPDC subjects' mean IAQ and interview scores are higher than the LPDI subjects. Furthermore, actual ABCMS usage, as documented by the site accountants, is much higher in the HPDC plants relative to the LPDI plants. After considering the effect of the acquiescence response bias phenomenon, the evidence still does not appear to support the hypothesis that the mean level of "willingness to use the ABCMS" will be higher in LPDI cultures. On the contrary, the evidence indicates that the level of "willingness to use the ABCMS" is higher in the HPDC cultures.

Cultural Values vs. Personality Variables

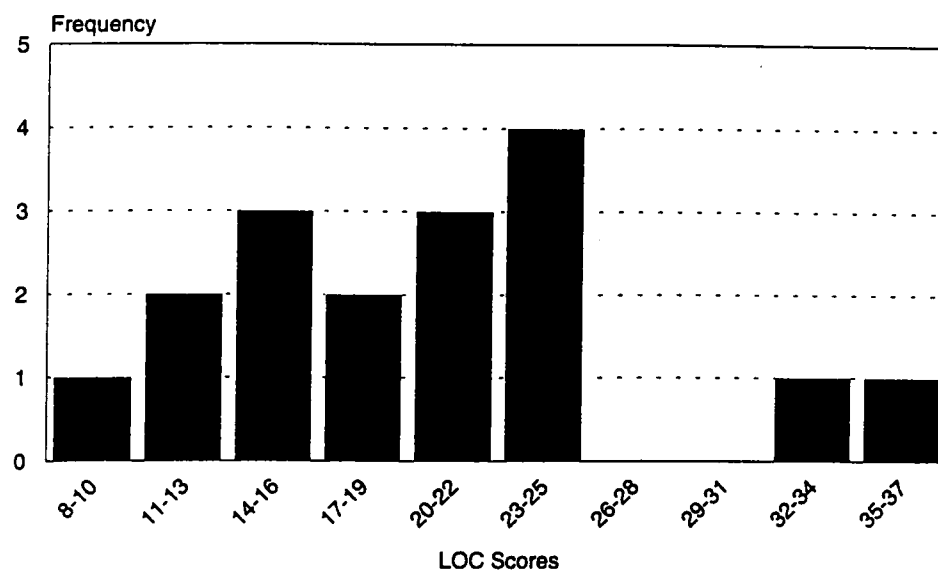
Hypotheses 2 and 3 test whether external locus of control due to more powerful others and concern for saving face are culturally-related. The independent variable in hypotheses 2 and 3 is culture. The dependent variable in hypothesis 2 is external locus of control due to more powerful others. The dependent variable in hypothesis 3 is concern for saving face. The hypotheses will be tested by comparing frequency distributions and mean scores. The ultimate purpose of these tests is to determine if either of these personality variables may be useful in explaining why cross-cultural differences in ABCMS resistance levels exist. After the hypotheses are tested, a field study methodology known as pattern matching will be discussed.

External Locus of Control Due to More Powerful Others

Hypothesis 2 states that the mean level of external locus of control due to more powerful others will be higher in HPDC cultures relative to LPDI cultures. Figure 8 contains two frequency distributions by culture of the external locus of control due to more powerful others survey scores. Mean scores for each of the plots depicted in Figure 8 are presented in table 17. The mean scores for the HPDC and LPDI subjects are 20.29 and 17.61, respectively.²⁵ These results provide support for hypothesis 2.

²⁵As shown in table 17, had these subjects represented randomly selected samples, the cross-cultural difference in the external locus of control due to more powerful others scores would not be significant at the .05 level.

HPDC Culture



LPDI Culture

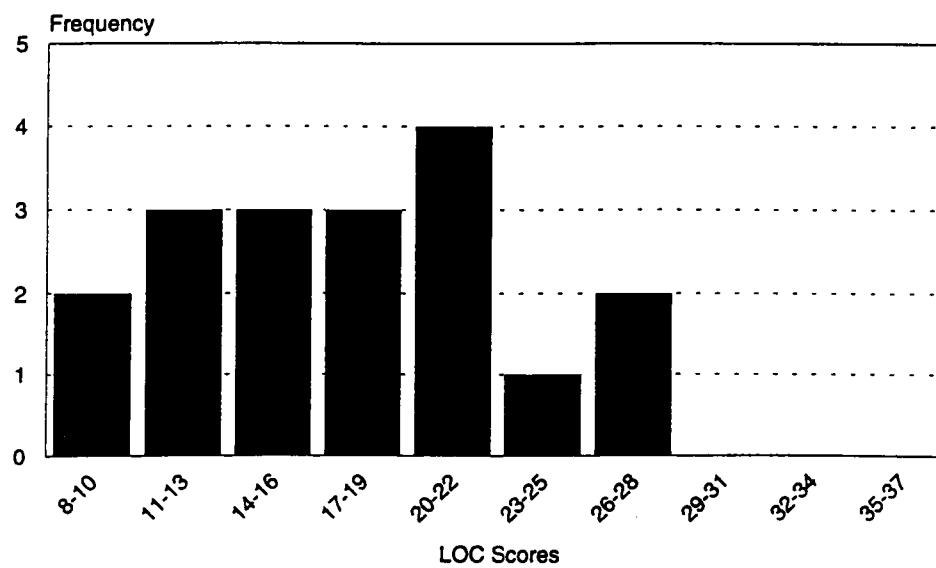


Figure 8

LOC Scores

Concern for Saving Face

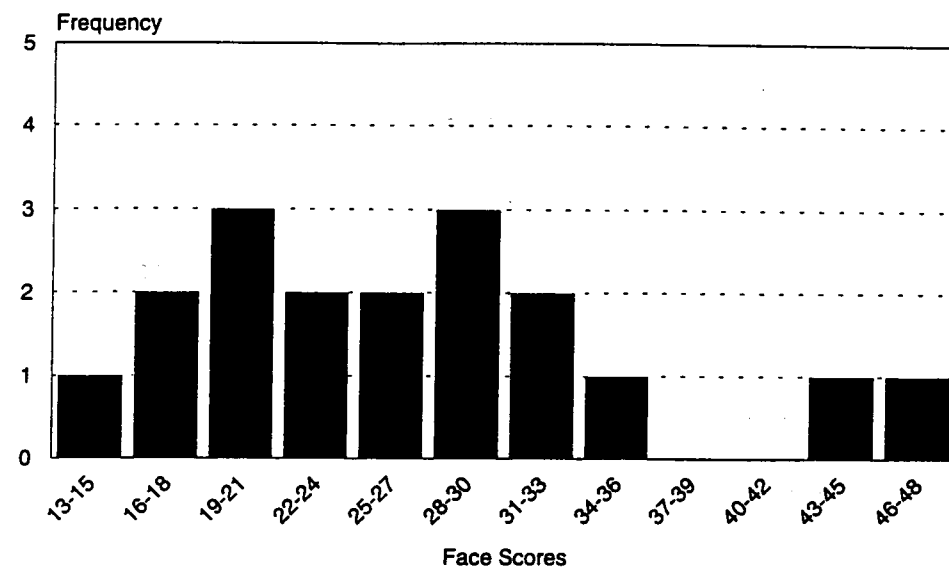
Hypothesis 3 states that the mean level of concern for saving face will be higher in HPDC cultures relative to LPDI cultures. Figure 9 contains two frequency distributions by culture of the concern for saving face survey scores. Mean scores for each of the plots depicted in Figure 9 are presented in table 17. The mean scores for the HPDC and LPDI subjects are 26.56 and 25.94, respectively.²⁶

The pre-test data indicated that Chinese subjects are less concerned with saving face than Malay subjects. Accordingly, the HPDC subjects' concern for saving face scores were analyzed by nationality. The results are shown in table 18. The mean scores for the 13 Chinese, 5 Malay and Indian, and 18 U.S. subjects are 23.23, 35.20 and 25.94, respectively.²⁷ There appears to be a difference between the Chinese subjects and the Malay and Indian subjects regarding their level of concern for saving face. As expected, the Malay and Indian subjects were much more concerned with saving face than the U.S. subjects. However, contrary to ex ante expectations, the Chinese subjects' concern for saving face was lower than the U.S. subjects. These results corroborate the pre-test findings and provide partial support for hypothesis 3.

²⁶As shown in table 17, had these subjects represented randomly selected samples, the cross cultural difference in the concern for saving face scores would not be significant at the .05 level.

²⁷As shown in table 17, had these subjects represented randomly selected samples, the Chinese and U.S. subjects' scores would be significantly lower ($\alpha=.05$) than the Malay and Indian subjects using a parametric ANOVA procedure. The differences in mean scores would not be significant at the .05 level using the non-parametric Kruskal-Wallis test.

HPDC Culture



LPDI Culture

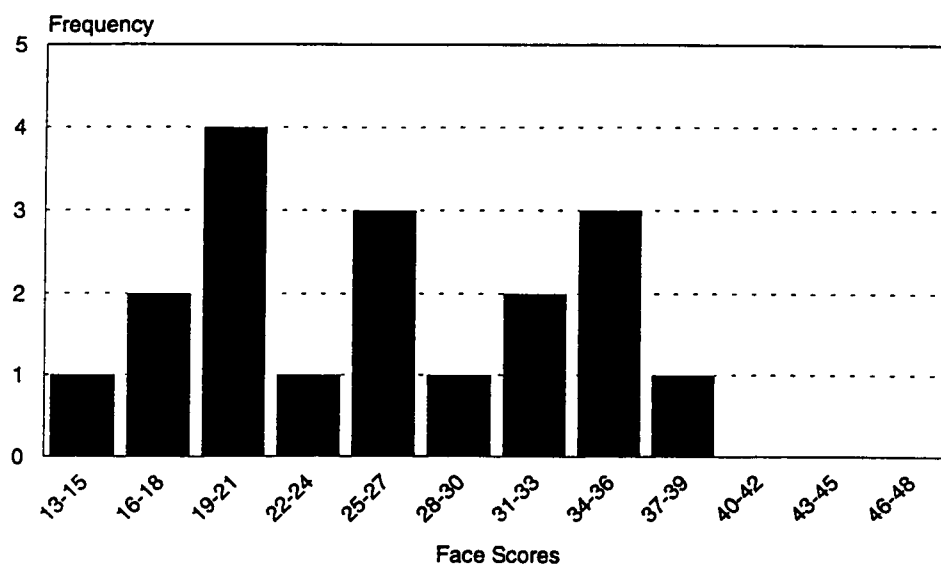


Figure 9

Face Scores

Pattern Matching

Pattern matching compares an empirically based pattern with a hypothesized pattern. If the patterns coincide, it strengthens the internal validity of the study. In this study, pattern matching can be used with three variables to help verify that the HPDC and LPDI cultural contexts exist as specified by Hofstede (1984a). The hypothesized pattern set forth by the researcher was that the mean level of external locus of control due to more powerful others, concern for saving face, and acquiescence response bias would be higher in HPDC cultures relative to LPDI cultures. The empirically based pattern shown by the results in tables 14, 17, and 18 is that external locus of control due to more powerful others and acquiescence response bias scores are higher in the HPDC cultures relative to the LPDI culture. These results coincide with the hypothesized pattern. The empirical pattern for the concern for saving face variable partially coincides with the hypothesized pattern. In total, the pattern matching results provide reasonable support that the HPDC and LPDI cultural contexts exist as specified by Hofstede.

Personality Variables vs. ABCMS Resistance Levels

Hypotheses 4 and 5 test whether there is an association between the study's two personality variables and ABCMS resistance levels. The independent variable in hypothesis 4 is external locus of control due to more powerful others. The independent variable in hypothesis 5 is concern for saving face. The dependent variables in both hypotheses are IAQ scores and interview scores. Acquiescence response bias is also

included as an independent variable in the testing of both hypotheses. This is done to control for the effect of each subject's acquiescence response bias tendency on their assessment of the ABCMS.

Hypothesis 4 was tested through the use of the following regression equations:

$$(1) \quad IAQ = \beta_1 + \beta_2 LOC + \beta_3 ARB + \epsilon$$

$$(2) \quad Interview = \beta_1 + \beta_2 LOC + \beta_3 ARB + \epsilon$$

Hypothesis 5 was tested through the use of the following regression equations:²⁸

$$(1) \quad IAQ = \beta_1 + \beta_2 Face + \beta_3 ARB + \epsilon$$

$$(2) \quad Interview = \beta_1 + \beta_2 Face + \beta_3 ARB + \epsilon$$

where:

IAQ = willingness to use the ABCMS (IAQ scores)

Interview = willingness to use the ABCMS (interview scores)

LOC = external locus of control due to more powerful others

Face = Concern for Saving Face

ARB = acquiescence response bias

The results of hypothesis 4 are shown in table 19. The adjusted R^2 for the model using IAQ scores as the dependent variable is .0952. The adjusted R^2 for the model using interview scores as the dependent variable is .0991. Hypothesis 4 states that there will be a negative correlation between external locus of control due to more powerful others and "willingness to use the ABCMS". In the regression model using IAQ scores

²⁸Separate regression equations were used to test hypotheses 4 and 5 because the external locus of control and concern for saving face variables are significantly correlated at the $p=.0187$ level.

as the dependent variable, the parameter estimate for the external locus of control due to more powerful others variable is positive. In the regression model using interview scores as the dependent variable, the parameter estimate for the external locus of control due to more powerful others variable is negative. Given that the parameter estimates are in opposite directions and neither estimate is significant, these findings do not provide support for hypothesis 4.²⁹

The results of hypothesis 5 are shown in table 20. The adjusted R^2 for the model using IAQ scores as the dependent variable is .3123. The adjusted R^2 for the model using interview scores as the dependent variable is .1204.³⁰ Hypothesis 5 states that there will be a negative correlation between concern for saving face and "willingness to use the ABCMS". In both regression equations, the parameter estimates for the concern for saving face variable are positive.³¹ These findings are contrary to expectation and therefore do not support hypothesis 5. Nonetheless, the significant association between IAQ scores and concern for saving face provides interesting preliminary evidence of a potential cross-culturally robust ABCMS implementation barrier.

²⁹As shown in table 19, had these subjects represented randomly selected samples, the parameter estimates for the external locus of control due to more powerful others variable would not be significant at the .05 level.

³⁰Based on a review of studentized residuals, Cook's D, Covariance Ratio, and Hat Diagonal Matrix statistics, no influential outliers were noted in either set of models. The Variance Inflation Factors indicate that multicollinearity is not present in either set of models. A review of partial regression residual plots indicates that the errors are normally distributed and no variable transformations appear to be necessary.

³¹As shown in table 19, had these subjects represented randomly selected samples, the concern for saving face parameter estimate would have been significant at the .05 level for the model using IAQ scores as the dependent variable. The parameter estimate would not be significant at the .05 level for the model using interview scores as the dependent variable.

In summary, the results of the hypothesis testing are as follows. First, the IAQ scores, interview scores, and ABCMS usage report all indicate that the HPDC subjects are more "willing to use the ABCMS" than the LPDI subjects. This result does not provide support for hypothesis 1. Second, the HPDC subjects appear to be more externally controlled by more powerful others than their LPDI counterparts. This result provides support for hypothesis 2. Third, the 5 Malay and Indian subjects appear to be more concerned with saving face than the LPDI subjects. However, the 13 Chinese subjects appear to be less concerned with saving face than the LPDI subjects. Together, these results provide only partial support for hypothesis 3. Fourth, the parameter estimates for the external locus of control due to more powerful others do not indicate that this variable has a significant negative correlation with "willingness to use the ABCMS". Accordingly, hypothesis 4 is not supported. Fifth, concern for saving face appears to be positively associated with the IAQ measure of "willingness to use the ABCMS". This finding, which is significant at the $p=.0016$ level and contrary to ex ante expectations as stated in hypothesis 5, provides some indication that concern for saving face may be a cross-culturally robust ABCMS implementation barrier. The implications of these findings will be discussed in more detail in chapter 5.

The next chapter presents conclusions, ideas for extending the research, and implications for the practice of management accounting.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter is organized into three sections. The first section discusses the conclusions drawn from the research. The second section presents recommendations for future research. The third section presents implications of this research for the practice of management accounting.

Conclusions

There are two major conclusions that can be drawn from this study. First, cross-cultural differences in ABCMS resistance levels may exist. Second, the concern for saving face personality variable used in the study may represent a cross-culturally robust source of ABCMS resistance. Each of these conclusions will now be discussed in greater detail.

Cross-Cultural ABCMS Resistance Levels

This study provides preliminary evidence that ABCMS resistance levels may be contingent upon culture. More specifically, ABCMS resistance levels may be lower in HPDC cultures relative to LPDI cultures. The IAQ scores, tabulated interview scores, and actual ABCMS usage data all indicate that HS employees from the HPDC cultures of Malaysia and Singapore are more willing to use the ABCMS than HS employees from the LPDI culture of the United States. This finding contradicts the ex ante expectation

as set forth in hypothesis 1. A plausible explanation for this outcome is now presented.

Power distance and individualism/collectivism are multi-faceted variables. In this study two of these facets (external locus of control due to more powerful others and concern for saving face) were studied; many others were not studied. These omitted facets, or omitted variables if you will, may be capable of explaining the contradictory findings from hypothesis 1. Two omitted variables in particular that may have a substantial impact on ABCMS resistance levels are need for autonomy/need for group affiliation and obedience. Each of these personality attributes and their potential relationship to ABCMS resistance levels will now be discussed.

Need for Autonomy/Need for Group Affiliation. This research did not examine the need for autonomy/need for group affiliation orientations of individualist and collectivist cultures. People from individualist cultures tend to have a preference for autonomy, while people from collectivist cultures tend to have a preference for group affiliation (Hofstede, 1980). An ABCMS is a cross-functional cost management tool. Employees must work together in cross-functional teams to bring about long-term, process-oriented cost reduction. Employees from individualist cultures may not be comfortable with a cross-functional, team oriented cost management system. On the contrary, employees from collectivist cultures may prefer a team-oriented cost management system. Additional support for this plausible explanation comes from Chow et al. (1994), where the authors state that "in an employment setting, people who are high in individualism tend to prefer individual-oriented, rather than group-oriented, work arrangements, performance evaluations, and compensation." This rationale, if supported

by future empirical research, would help explain why ABCMS resistance levels are lower in HPDC cultures relative to LPDI cultures.

Obedience. Another culturally-related personality variable not incorporated into this study is obedience. People from high power distance cultures tend to be more obedient toward their superiors than people from low power distance cultures (Hofstede, 1980). The HS ABCMS was implemented in top-down fashion. In other words, the implementation was initiated by high-level management personnel from corporate headquarters. Employees who are culturally predisposed to being obedient may be more inclined to adopt an ABCMS when it is implemented by their superiors. This additional plausible explanation, if supported by future research, would also help explain why ABCMS resistance levels are lower in HPDC cultures.

These are two personality variables that could potentially help explain why ABCMS resistance levels were lower in the HPDC plants of Malaysia and Singapore relative to the LPDI plants in the United States. It is also feasible that other culturally-related personality variables (in addition to need for autonomy/need for group affiliation and obedience) could help explain the noted cross-cultural difference in ABCMS resistance levels. Clearly, additional research is needed to help obtain a richer understanding of the power distance and individualism/collectivism dimensions of culture and their potential effects on ABCMS implementations.

Cross-Culturally Robust ABCMS Implementation Barriers

Although our understanding of the relationship between the dimensions of culture and ABCMS resistance levels is clearly in the beginning stages, this study does provide

preliminary evidence that concern for saving face may be a cross-culturally robust ABCMS implementation barrier. In the regression model using IAQ scores as the dependent variable, the concern for saving face parameter estimate is positive and significant at the .01 level. This indicates that HS subjects less concerned with saving face are less willing to use the ABCMS. This result is not consistent with the negative correlation hypothesized in H5.

The rationale for hypothesizing a negative correlation between concern for saving face and ABCMS resistance levels hinged upon the idea of one feeling threatened by having to act upon new and unfamiliar activity-based information. Consistent with prior research (Cooper et al., 1992; Argyris and Kaplan, 1993), it was hypothesized that individuals more concerned with saving face would be less willing to risk signaling "failure" by being unsuccessful in their attempt to use activity-based information to reduce costs.

However, another way of interpreting the relationship between concern for saving face and ABCMS resistance levels is as follows. People more concerned with saving face tend to be worried about management's assessment of their competence. If employees, who are concerned with maintaining face, fail to embrace and ABCMS and use it proficiently to bring about long-term cost reduction, it may signal "failure" to their superiors. Given this rationale, it becomes intuitive that levels of concern for saving face would be negatively associated with ABCMS resistance levels. Employees more concerned with saving face would be anxious to demonstrate their competence by

adopting the ABCMS and using it successfully to reduce costs. Future research will be needed to either corroborate or refute this plausible explanation.

In summary, this research could not possibly capture the entire essence of the power distance and individualism/collectivism dimensions of culture and incorporate it into hypothesis testing. Accordingly, two personality variables were chosen to provide a foundation for understanding the multi-faceted power distance and individualism/collectivism dimensions of culture. These personality variables did not provide an explanation of why ABCMS resistance were lower in the HPDC plants relative to the LPDI plants. However, these personality variables did demonstrate cross-cultural reliability indicating that they may be of general use to future cross-cultural management accounting researchers. Furthermore, the concern for saving face personality variable did provide preliminary evidence that it may be a cross-culturally robust ABCMS implementation barrier. A foundation has been provided for cross-cultural ABCMS research. Now, additional research is needed to expand our knowledge in this immature research stream.

Recommendations for Future Research

There are two potential outcomes of cross-cultural research. First, a cross-cultural difference can be identified. Second, a cross-cultural similarity can be identified. Identifying both differences and similarities is potentially useful to management accountants who are interested in designing effective international MASs. This research

provides preliminary evidence of cross-cultural differences and similarities regarding employees' willingness to use an ABCMS. These differences and similarities raise interesting questions worthy of further research.

Cross-Cultural Differences

The first research question set forth in this study was - do employee resistance levels to an ABCMS differ across cultures? The findings of this study provide preliminary evidence that ABCMS resistance levels may be lower in HPDC cultures relative to LPDI cultures. This result prompts numerous research questions.

First, would the same type of cross-cultural differences in ABCMS resistance levels be found in other semiconductor manufacturers with fabrication facilities in the United States and assembly and test facilities in Malaysia or Singapore? Second, would the same type of cross-cultural differences be found in different organizations within the same cultural contexts? For example, would different organizations from various industries within Malaysia, Singapore and the United States exhibit the same type of cross-cultural differences in ABCMS resistance levels? Third, would the same type of cross-cultural differences be found in comparable cultural contexts? For example, would there be comparable differences in ABCMS resistance levels between employees from other HPDC cultures such as Taiwan, Hong Kong, Indonesia, or South Korea and employees from other LPDI cultures such as Australia, Great Britain, or the Netherlands? Fourth, would cross-cultural differences be found in other cultural contexts? For example, would there be differences in ABCMS resistance levels between employees from high

power distance/individualist (HPDI) cultures such as France, Belgium, and Italy and employees from a HPDC or LPDI culture (Hofstede, 1984)?

Notice, the scope of generalizability increases with each of the aforementioned research questions. A good starting point for management accounting researchers may be to study other semiconductor manufacturers with plant locations similar to HS. As alluded to in the prior paragraph, many semiconductor manufacturers have fabrication facilities in the United States and assemble and test facilities in either Malaysia or Singapore. As research diversifies into other industries, it would also be interesting to examine any possible industry effects that impact levels of willingness to use an ABCMS. For example, the semiconductor industry is relatively new and characterized by constant change. Accordingly, the level of willingness to adopt a change such as a movement to an ABCMS may be higher in the semiconductor industry relative to other more mature and stable industries.

The second research question set forth in this study was - are there specific reasons why resistance levels differ across cultures? The results of this study indicate that the power distance and individualism/collectivism dimensions of culture may be a source of cross-cultural difference in ABCMS resistance levels. Accordingly, cross-cultural ABCMS researchers may want to focus on comparing subjects that differ on either the power distance or individualism/collectivism dimensions of culture before exploring other dimensions of culture such as uncertainty avoidance or masculinity. The way to study these dimensions of culture at a more resolute level is through the use of culturally-related personality variables.

The two personality variables incorporated into this study did not help explain why ABCMS resistance levels may be lower in HPDC cultures relative to LPDI cultures. The reasons for this failure are as follows. First, as hypothesized, the level of external locus of control due to more powerful others was higher for the HPDC subjects relative to the LPDI subjects. However, external locus of control was not associated with "willingness to use the ABCMS". Second, the 13 Chinese subjects from the HPDC cultures of Malaysia and Singapore were less concerned with saving face than the LPDI subjects. Since concern for saving face is positively correlated with "willingness to use the ABCMS", this indicates that lower levels of concern for saving face are associated with lower, rather than higher, levels of willingness to use the ABCMS".

The personality variables used in this study are just two of many that could be used in studying the power distance and individualism/collectivism dimensions of culture. For example, HPDC societies tend to emphasize hierarchies, obedience, subordination, harmony, orderliness, group welfare/affiliation, ascribed status, and long term outcomes (Triandis, 1989). In the future, researchers may want to examine some of these attributes when performing cross-cultural ABCMS studies. Perhaps employees from HPDC cultures could be shown to have a high need for obedience. Therefore, "obedient" employees may be more likely to embrace a change such as a move to an ABCMS when that change is being implemented by corporate headquarters or plant management. In addition, researchers may want to examine the need for group affiliation personality variable. Perhaps employees from HPDC cultures could be shown to have a high need for group affiliation. Therefore, group oriented employees may be more likely to embrace a cross

functional cost management tool such as an ABCMS. These are just two ideas for incorporating additional personality variables into future research studies.

Cross-Cultural Similarities

This study provides preliminary evidence that concern for saving face and external locus of control due to more powerful others can be reliably measured across cultures. Moreover, the study provides evidence that concern for saving face may be a cross-culturally robust ABCMS implementation barrier. Concern for saving face is positively associated with willingness to use the ABCMS. This indicates that subjects more concerned with saving face are more willing to use an ABCMS. This finding is interesting and worthy of further research.

The next step for researchers is to determine if the concern for saving face cross-culturally robust implementation barrier is generalizable. First, researchers should examine whether this result is generalizable to other organizations located within the HPDC cultures of Malaysia and Singapore and the LPDI culture of the United States. Second, researchers should examine whether this result generalizes to other HPDC and LPDI cultural contexts besides Malaysia, Singapore, and the United States. Finally, researchers may eventually seek to determine if this finding generalizes to non-HPDC and LPDI cultural contexts.

Summary of Recommendations

In summary, future research will either corroborate or refute the cross-cultural similarities and differences identified in this study. Future cross-cultural ABCMS researchers should consider designing their studies to help answer at least three broad

research questions. First, is the cross-cultural difference in ABCMS resistance levels noted in this study generalizable? Would similar results be found in other organizations located in comparable cultural contexts? Second, if this study's cross-cultural differences prove to be generalizable, what personality variables can be used to help explain why these differences exist? Third, is the cross-culturally robust implementation barrier noted in this study generalizable?

Three primary research designs can be used to examine these questions further. First, similar to this study, an in-depth analysis of an individual MNC can be performed. Second, a matched sample of a small number of firms can be studied. With both these methodologies, if comparable results are found across diverse organizations generalizability will emerge (Yin, 1989). Third, a broad sample of a large number of firms that use an ABCMS can be performed. This methodology forfeits depth of understanding in favor of generalizability. All three methodologies may contribute toward our understanding of the cross-cultural behavioral issues involved with ABCMS implementations.

Implications for the Practice of Management Accounting

Globalization is upon us. Most large companies employ global labor forces and compete in a fiercely competitive global economy. Survival hinges upon managing global work forces and enabling them to continuously improve the value delivered to customers. Among business managers and management accountants, there is growing interest in

ABCMSs and the role they can play in facilitating continuous improvement. Yet, these same people do not have a sufficient understanding of how to mold a culturally diverse global labor force into a unified, activity-based, cost management focused organization.

This research is the first step toward addressing this increasingly important issue. Ultimately, this stream of research should identify culturally unique and cross-culturally robust ABCMS implementation barriers. Once root causes of resistance have been identified business managers, management accountants, and researchers can begin exploring how to tailor an ABCMS to "fit" certain cultural contexts, and, vice versa, how to design cultural change programs that improve the "fit" between the people and an ABCMS.

Finally, this research may help business managers to understand where empowerment is appropriate or inappropriate. The external locus of control due to more powerful others survey can be used to help identify those cultural environments where people are more comfortable deferring decision making responsibility to their superiors. In the United States, empowerment is viewed as a positive change that will be desired by all subordinates. However, in many other countries this is not the case. Implementing an empowerment program in a culture where it serves only to generate anxiety, discomfort, and perhaps resentment would be a poor strategic decision. The external locus of control due to more powerful others instrument used in this study can help MNCs manage their empowerment programs.

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APPENDICES

Appendix A: Research Questionnaire

Research QuestionnaireInstructions

After reading each of the 36 items in this questionnaire, please provide an honest indication of the extent to which you agree or disagree with each statement. For examples of how to record your responses consider the following sample statement:

Example: I like the color red.

If you strongly disagreed with this statement, you would answer as follows:

Strongly Disagree Strongly Agree

a. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

If you moderately disagreed with this statement, you would answer as follows:

b. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

If you slightly disagreed with this statement, you would answer as follows:

c. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

If you slightly agreed with this statement, you would answer as follows:

d. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

If you moderately agreed with this statement, you would answer as follows:

e. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

If you strongly agreed with this statement, you would answer as follows:

f. I like the color red.

√
|_|_|_|_|_|_|_|_|_|_|

- | | Strongly
Disagree | Strongly
Agree |
|---|----------------------|-------------------|
| 18. (A) I am sometimes bothered by people who ask favors of me. | _____ | _____ |
| 19. (F) I would never worry about the possibility of being judged a fool in some activities. | _____ | _____ |
| 20. (P) In order to have my plans work, I make sure that they fit in with the desires of people who have power over me. | _____ | _____ |
| 21. (F) I tend to worry that others may think I am not intelligent enough for my job. | _____ | _____ |
| 22. (A) There have been occasions when I took advantage of someone. | _____ | _____ |
| 23. (F) I rarely worry about being considered by others to be misinformed or ignorant about certain things. | _____ | _____ |
- (P) = External Locus of Control Due to More Powerful Others
(F) = Concern for Saving Face
(A) = Acquiescence Response Bias

(Please turn to the next page)

Each of the next 13 items is to be read:

"As a result of being able to use Harris Semiconductor's activity-based costing system..."

	Strongly Disagree	Strongly Agree
24. My job will be more satisfying.	_____	_____
25. Others will better see the results of my efforts.	_____	_____
26. It will be easier to perform my job well.	_____	_____
27. The accuracy of information I receive will be improved.	_____	_____
28. I will have more control over my job.	_____	_____
29. I will be able to improve my performance.	_____	_____
30. Others will be more aware of what I am doing.	_____	_____
31. My job will be made easier.	_____	_____
32. I will spend less time looking for information.	_____	_____
33. I will be able to see better the results of my efforts.	_____	_____
34. The accuracy of my cost figures will improve.	_____	_____
35. My performance will be more closely monitored.	_____	_____
36. The department will perform better.	_____	_____

Additional Information

1. What is your race?

____ Caucasian	____ Chinese
____ Afro-American	____ Jewish
____ Hispanic	____ Other _____

2. What is your gender?

____ Male	____ Female
-----------	-------------

3. What is your age?

☐ 20-30 years old	☐ 51-60 years old
☐ 31-40 years old	☐ 60 or more years old
☐ 41-50 years old	

4. What country were you born in? _____

5. How long have you lived in the United States?

☐ Less than 5 years	☐ 15 to 20 years
☐ 5 to 10 years	☐ More than 20 years
☐ 10 to 15 years	

6. How many years have you worked for Harris Semiconductor? _____

7. Are you familiar with Harris Semiconductor's activity-based costing system?

☐ Yes	☐ No
------------------------------	-----------------------------

8. Have you received training in activity-based costing?

☐ Yes	☐ No
------------------------------	-----------------------------

9. Do you use activity-based information as an aid in decision making?

☐ Yes	☐ No
------------------------------	-----------------------------

10. During the last 6 months, how many times have you used information generated by Harris Semiconductor's activity-based costing system to aid in continuously improving a product or manufacturing process?

☐ 0 times	☐ 11-20 times
☐ 1-3 times	☐ 21-30 times
☐ 4-10 times	☐ more than 30 times

Appendix B: Interview Protocol

Interview Protocol

Background Information

1. Describe the layout of the manufacturing facility in terms of:
 - a) production flow patterns
 - b) major types of equipment
 - c) critical manufacturing procedures
2. Describe your job responsibilities. Have your responsibilities changes over the last 5 years? How so?
3. How are decisions made at this plant?
 - a) individual vs. group
 - b) empowered vs. autocratic
4. What are the primary communication channels in this plant (functional vs. cross functional)? Is there any cross-plant communication?
5. Describe the primary sources of information that are available to you for decision making? What is each source used for? Which sources are most and least useful? Why?

Performance Measurement

6. How do measure operational performance efficiency and effectiveness? What information sources support these measurements?
7. How do you evaluate your contribution to the company? Are opinions or peers important to you in evaluating you work? What is more important to you, the opinions of your peers or your personal views?
8. How do think managers evaluate your performance? What criteria do they put the most emphasis on? Have evaluation criteria changes since the implementation of the ABCMS?

ABC System

9. Are you familiar with Semiconductor's ABCMS?
10. What type of ABC/ABM training did you receive, if any?

11. Were you involved in the planning and implementation of the ABCMS? How so? What would you have done differently when implementing the ABCMS?
12. Have you been involved in the Revaluation process? How so?
13. Do you think it was necessary to implement the ABCMS? Would you have invested the time and money? Why?
14. Do you think the cost figures generated by the ABCMS are accurate and useful? For what?
15. How does the usefulness of the cost figures per the ABCMS compare to the usefulness of the old cost figures? Are the ABC cost figures more or less understandable to you? Why?
16. Do you use the ABCMS? For what purposes? Do you think the ABCMS improves your ability to positively affect the performance of the company? How, or why not?
17. Does the ABCMS help with continuous improvement? How, or why not?
18. Has the ABCMS had any affect on cross-functional, or cross-plant communication?
19. What do you think the future holds for the ABCMS? Could certain future developments such as the client/server platform, or forward costing capability help improve the usefulness of the ABCMS?
20. Do Production managers, Engineers, and Accountants have different views as to the purpose/usefulness of the ABCMS?
21. If you do use the ABCMS, how do you access the system?
 - a) do you access it yourself?
 - b) do others access the system for you? If so Who?
 - c) what specific information (report) do you use?

Appendix C: ABCMS Front to Back Usage Report

ABCMS Front to Back Usage Report

To: (Subject's Name)

From: Pete Brewer

Re: ABC front to back report

During the months of October 1, 1993 through February 28, 1994 you accessed various ABC front to back reports _____ times. I am interested in determining what tended to be the reasons why you accessed these front to back reports during this period. Two primary reasons exist for accessing a front to back report. First, you may access a front to back report to resolve an issue or to perform a task that relates solely to the finance department. Second, you may access a front to back report to provide information to someone outside the finance department. I am interested in determining what percentage of your front to back report accesses were motivated by finance department issues and what percentage of accesses were motivated by the needs of people outside the finance department. Could you please specify, in percentage terms, what percent of your front to back accesses were motivated by finance department issues and what percentage were motivated by inquiries from personnel outside the finance department:

	<u>Percent</u>
Finance department issues	_____
Inquiries from personnel outside finance department	_____
Total	100%
	=====

Now, I would like you to focus only on the percentage of ABC front to back accesses motivated by inquiries from personnel outside the finance department. Can you please breakdown that percentage by individuals outside the finance department. Please list individual names of people who tended to ask you for ABC information found on the front to back report. Obviously, these percentages can only represent your best guess. I do not expect any percentages that are more precise than your best guess. If there is a miscellaneous percentage left over after you have cited the primary names place it in the "other" space. **Notice, the total percentage on the next page should be the same as the percentage of "inquiries from personnel outside finance department" previously noted.** Thank you very much for your help.

<u>Name</u>	<u>Plant</u>	<u>Percentage</u>
Other		
Total		

Appendix D: Tables

Table 1
Demographic Summary of Pre-Test Subjects

	Total	(%)	UTK	(%)	UPM	(%)
Nationality:						
Caucasian	82	(56.2)	82	(92.2)	-	-
Afro-American	5	(3.4)	5	(5.6)	-	-
Malay	37	(25.3)	-	-	37	(64.9)
Chinese	13	(8.9)	-	-	13	(22.8)
Indian	2	(1.4)	-	-	2	(3.5)
Other	4	(2.7)	1	(1.1)	3	(5.3)
Did Not Report	3	(2.1)	1	(1.1)	2	(3.5)
Totals	146	(100%)	89	(100%)	57	(100%)
Gender:						
Male	66	(45.2)	52	(58.4)	14	(24.6)
Female	78	(53.4)	37	(41.6)	41	(71.9)
Did Not Report	2	(1.4)	-	-	2	(3.5)
Totals	146	(100%)	89	(100%)	57	(100%)
Average Age:	22.4 ^a		22.1		22.9	

^a 96.6% of the subjects fell between the ages of 20-27.

Table 2
Reliability Statistics

	n	LOC	Cronbach's Alpha	
			Face	ARB
All Subjects	146	.80	.83	.54
UTK	89	.79	.86	.67
UPM	57	.78	.74	.23

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

ARB = Acquiescence Response Bias

Table 3
UTK v. UPM Students' Measures of Personality Variables

	UTK		UPM		t-statistic
	n	Mean	n	Mean	
LOC	89	18.96	57	22.46	3.29 (p=.0012)
Face	89	30.53	57	35.82	3.38 (p=.0009)
ARB	89	20.13	57	21.81	1.97 (p=.0504)

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

ARB = Acquiescence Response Bias

Table 4
Gender Differences on Measures of Personality Variables

	Male		Female		
	n	Mean	n	Mean	t-statistic
All Subjects:					
LOC	66	19.67	78	20.97	1.20 (p=.2306)
Face	66	31.18	78	33.88	1.70 (p=.0918)
ARB	66	20.23	78	21.19	1.14 (p=.2566)
UTK Subjects:					
LOC	52	19.10	37	18.76	0.27 (p=.7910)
Face	52	30.31	37	30.84	0.25 (p=.8012)
ARB	52	20.06	37	20.24	0.15 (p=.8776)
UPM Subjects:					
LOC	14	21.79	41	22.98	0.56 (p=.5778)
Face	14	34.43	41	36.63	0.85 (p=.4003)
ARB	14	20.86	41	22.05	0.96 (p=.3435)

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

ARB = Acquiescence Response Bias

Table 5
Nationality Differences on Measures of Personality Variables

Malay				Chinese			UTK	
	n	Mean	t-statistic	n	Mean	t-statistic	n	Mean
LOC	37	22.70	1.06 (p=.2941)	13	20.38			
Face	37	38.22	4.60 (p=.0001)	13	27.69	1.02 (p=.3123)	89	30.53
ARB	37	21.86	0.75 (p=.4560)	13	22.77			

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

ARB = Acquiescence Response Bias

Table 6
HS Subjects by Plant Location

	Total	Production Managers	Process Engineers
Findlay	6	5	1
Mountaintop	7	6	1
Palm Bay	5	4	1
Malaysia	18	13	5
Singapore	3	2	1
Totals	39	30	9

Table 7
Data Summary

	Total	Survey & Interview	Survey Only	Interview Only
Findlay	6	5	1	-
Mountaintop	7	5	2	-
Palm Bay	5	4	1	-
Malaysia	18	14	1	3
Singapore	3	2	1	-
Totals	39	30	6	3

Table 8
HS Subjects by Plant and Gender

	Total	Male	Female
Findlay	6	5	1
Mountaintop	7	7	-
Palm Bay	5	5	-
Malaysia	18	17	1
Singapore	3	3	-
Totals	39	37	2

Table 9
HS Subjects by Age

	Total	Years of Age		
		31-40	41-50	51-60
Findlay	6	2	3	1
Mountaintop	7	2	3	2
Palm Bay	5	1	3	1
Malaysia	15 ^a	4	11	-
Singapore	<u>3</u>	<u>1</u>	<u>2</u>	<u>=</u>
Totals	36	10	22	4

^a Three subjects from Malaysia did not complete the survey.

Table 10
HS Subjects by Nationality

	Total	Caucasian	Chinese	Malay	Indian
Findlay	6	6	-	-	-
Mountaintop	7	7	-	-	-
Palm Bay	5	5	-	-	-
Malaysia	15 ^a	-	11	2	2
Singapore	3	-	2	-	1
Totals	36	18	13	2	3

^a Three subjects from Malaysia did not complete the survey.

Table 11

HS Subjects Average Years Experience by Plant

	n	Avg. Number of Years Employed at Plant
Findlay	6	18.8*
Mountaintop	7	20.3*
Palm Bay	5	15.8
Malaysia	15	16.0**
Singapore	3	<u>11.3</u> *
Totals	36	16.9

* Employees at these plants became HS employees in 1988. Prior to that they were employees of GESS and RCA.

** Five of the 15 subjects from the Malaysia plant work in the Hermetic division. They have always been employees of HS. The other 10 employees were previously employed by GESS and RCA.

Table 12
Cross-Plant Comparisons

	H ₀ : P1 = P2 = P3		H ₀ : P4 = P5	
	ANOVA	Kruskal-Wallis	ANOVA	Kruskal-Wallis
	<u>F-statistic</u>	<u>Chisq-statistic</u>	<u>F-statistic</u>	<u>Chisq-statistic</u>
LOC	0.81 (p = .4641)	2.35 (p = .3088)	0.08 (p = .7791)	0.004 (p = .9496)
FACE	0.58 (p = .5714)	1.50 (p = .4734)	0.03 (p = .8729)	0.01 (p = .9053)
ARB	0.26 (p = .7748)	0.25 (p = .8824)	0.13 (p = .7258)	0.03 (p = .8582)
IAQ	0.53 (p = .5993)	1.12 (p = .5714)	1.10 (p = .3102)	1.02 (p = .3134)
Interviews	1.49 (p = .2684)	2.23 (p = .3275)	1.91 (p = .1845)	2.81 (p = .0936)

Note: Both parametric (ANOVA) and nonparametric (Kruskal-Wallis) tests were performed on the data. Both sets of procedures reveal no significant differences at the .05 level.

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

ARB = Acquiescence Response Bias

IAQ = Willingness to use the ABCMS (IAQ Scores)

Interviews = Willingness to use the ABCMS (Interview Scores)

P1 = Mountaintop

P2 = Findlay

P3 = Palm Bay

P4 = Malaysia

P5 = Singapore

Table 13
Correlation Matrix

	IAQ	Interviews	ARB
IAQ	1.00 (0.0)	.532 (p=.0025)	.324 (p=.0541)
Interviews	.532 (p=.0025)	1.00 (0.0)	.364 (p=.0481)
ARB	.324 (p=.0541)	.364 (p=.0481)	1.00 (0.0)

IAQ = Implementation Attitudes Questionnaire Scores

ARB = Acquiescence Response Bias Scores

Table 14
Cross-Cultural Comparison of "Willingness to Use the ABCMS"

HPDC		LPDI		T-test	Kruskal-Wallis
	<u>n</u>	<u>Mean</u>	<u>n</u>	<u>Mean</u>	
IAQ	18	52.33	18	43.11	
				t-statistic	Chisq-statistic
				2.04	4.92
				(p=.0496)	(p=.0265)
Interviews	19	16.95	14	14.57	
				1.23	1.41
				(p=.2270)	(p=.2347)
ARB	18	26.83	18	22.94	
				2.47	4.06
				(p=.0188)	(p=.0437)

IAQ = Implementation Attitude Questionnaire Scores
 ARB = Acquiescence Response Bias Scores

Table 15
MIS ABCMS Usage Report

	A	B	C	D
HPDC Plants	15	1,401	106	7.6%
LPDI Plants	6	464	16	3.4%

- A = number of site accountants using ABCMS during the 5 months ended 2/28/94.
B = number of ABCMS inquiries by each group of site accountants during the 5 months ended 2/28/94.
C = number of queries identified by the site accountants as being motivated by production managers or process engineers.
D = B/C

Table 16
ABCMS Usage Questions

	Total	(%)	HPDC	(%)	LPDI	(%)
Question 1:						
"yes" responses	25	(69.4)	12	(66.7)	13	(72.2)
"no" responses	<u>11</u>	<u>(30.6)</u>	<u>6</u>	<u>(33.3)</u>	<u>5</u>	<u>(27.8)</u>
Total	36	(100%)	18	(100%)	18	(100%)
Question 2:						
0 times	8	(22.2)	4	(22.2)	4	(22.2)
1-3 times	15	(41.7)	9	(50.0)	6	(33.3)
4-10 times	<u>13</u>	<u>(36.1)</u>	<u>5</u>	<u>(27.8)</u>	<u>8</u>	<u>(44.4)</u>
Total	36	(100%)	18	(100%)	18	(100%)

Question 1: Do you use activity-based information as an aid in decision making?

Question 2: During the last 6 months, how many times have you used information generated by Harris Semiconductor's activity-based costing system to aid in continuously improving a product or manufacturing process?

Table 17
Cross-Cultural Comparison of Personality Variables

	HPDC		LPDI		T-test
	<u>n</u>	<u>Mean</u>	<u>n</u>	<u>Mean</u>	<u>t-statistic</u>
LOC	17	20.29	18	17.61	1.26 (p=.2178)
Face	18	26.56	18	25.94	0.22 (p=.8239)

Note: The HPDC/LOC cell has an n=17 because one subject failed to answer one question from this scale. The remainder of this subject's questionnaire was filled out correctly.

LOC = External Locus of Control Due to More Powerful Others

Face = Concern for Saving Face

Table 18

Cross-Nationality Comparison of Concern for Saving Face Variable

	C		M&I		Ca		ANOVA	Kruskal-Wallis
	<u>n</u>	<u>Mean</u>	<u>n</u>	<u>Mean</u>	<u>n</u>	<u>Mean</u>	<u>F-statistic</u>	<u>Chisq-statistic</u>
Face	13	23.23	5	35.20	18	25.94	4.89 (p=.0138)	5.57 (p=.0619)

C = Chinese

M&I = Malay and Indian

Ca = Caucasian

Note: A Tukey comparison procedure revealed that the Chinese and U.S. subjects' scores were both significantly lower ($\alpha=.05$) than the Malay and Indian subjects.

Table 19
Regression Analysis - LOC Variable

a) Model: $IAQ = \beta_0 + \beta_1 LOC + \beta_2 ARB + \epsilon$

	Adjusted R ²	Parameter Estimate	Test Statistic	P-value
Model	.0952		2.79	.0765
Intercept		17.492	1.36	.1822
LOC		0.424	1.17	.2528
ARB		0.874	1.94	.0619

b) Model: $Interview = \beta_0 + \beta_1 LOC + \beta_2 ARB + \epsilon$

	Adjusted R ²	Parameter Estimate	Test Statistic	P-value
Model	.0991		2.54	.0982
Intercept		7.505	1.27	.2141
LOC		-0.158	-0.99	.3319
ARB		0.445	2.12	.0442*

* significant at the .05 level

IAQ = Implementation Attitude Questionnaire scores

Interview = Tabulated Interview scores

LOC = External Locus of Control Due to More Powerful Others scores

ARB = Acquiescence Response Bias scores

Table 20

Regression Analysis - Face Variablea) Model: $IAQ = \beta_0 + \beta_1 Face + \beta_2 ARB + \epsilon$

	Adjusted R ²	Parameter Estimate	Test Statistic	P-value
Model	.3123		8.72	.0009**
Intercept		-7.457	-0.55	.5863
Face		0.882	3.45	.0016**
ARB		1.274	3.15	.0036**

b) Model: $Interview = \beta_0 + \beta_1 Face + \beta_2 ARB + \epsilon$

	Adjusted R ²	Parameter Estimate	Test Statistic	P-value
Model	.1204		2.92	.0720
Intercept		-0.661	-0.095	.9247
Face		0.167	1.28	.2130
ARB		0.477	2.26	.0324*

* significant at the .05 level

** significant at the .01 level

IAQ = Implementation Attitude Questionnaire scores

Interview = Tabulated Interview scores

Face = Concern for Saving Face scores

ARB = Acquiescence Response Bias scores

VITA

Peter C. Brewer was born on March 25, 1964, in Meshoppen, Pennsylvania. After graduating from Tunkhannock High School in Tunkhannock, Pennsylvania in 1982, Pete enrolled at Penn State University in State College, Pennsylvania. He received a Bachelor of Science degree in Accounting in 1986. After graduation, he worked as an auditor in the Philadelphia office of the accounting firm Touche Ross. He also worked for one year as an internal audit manager for The Board of Pensions of the Presbyterian Church (U.S.A.). In July 1990, Pete enrolled in the Masters of Accountancy program at the University of Virginia. He graduated with his Master of Science in Accounting in May 1991. In August 1991, Pete enrolled in the University of Tennessee Ph.D. program in accounting. In August 1994, Pete accepted a tenure track position in the Department of Accountancy at Miami University in Oxford, Ohio.