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THE INFLUENCE OF INTERORGANIZATIONAL TRUST, INDIVIDUALISM
AND COLLECTIVISM, AND SUPERORDINATE GOAL OF JIT/TQM ON
INTERORGANIZATIONAL COOPERATION: AN
EXPLORATORY ANALYSIS OF
INSTITUTIONS IN MEXICO

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements
For the Degree of
DOCTOR OF PHILOSOPHY

By

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Denton, Texas

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Since their introduction to the United States from Japan in the 1980s, interorganizational cooperation practices between buyers and suppliers have provided lower costs, shorter development and production cycles, and higher levels of quality and productivity. Many studies of interorganizational cooperation have relied on transaction cost economics frameworks, which ignore cultural differences. Few studies have analyzed interorganizational cooperation in Mexico, a less-developed country (LDC) with a cultural and industrial environment different from the U.S. This study is concerned with the influence of interorganizational trust, individualism and collectivism (indcol), and the superordinate goal of just-in-time/total quality management (JIT/TQM) on interorganizational cooperation.

The study was conducted in the Mexican automotive parts industry. Data were collected from 73 managers responsible for purchasing in these organizations. Hierarchical regression was the primary tool for analysis.

Findings of this study indicate that interorganizational trust is not related to interorganizational cooperation. The managers trust their principal suppliers, from whom they have purchased for over 16 years and who have provided over 55 percent of their

materials. Future research may explain interorganizational trust to be a necessary but insufficient predictor of interorganizational cooperation.

Indcol was found to be related to interorganizational cooperation but in a direction opposite to that hypothesized. Collectivism is positively related to interorganizational cooperation. JIT/TQM is also positively related to interorganizational cooperation. Finally, JIT/TQM explained variance with interorganizational cooperation better than did interorganizational trust or indcol.

Overall, this study affirms the role of institutions on interorganizational cooperation. An analysis of institutions approach provides a more robust explanation of interorganizational cooperation than transaction cost economics.

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CHAPTER I

INTRODUCTION

Since the 1980s, researchers have contributed to the body of knowledge concerning interorganizational cooperation between industrial buyers and suppliers. Interorganizational cooperation provides lower costs, shorter development and production cycles, higher quality, and other interorganizational synergies (e.g., Ansari & Modarress, 1986, 1990; Burt, 1989; Schonberger, 1982). Hendrick and Ellram (1993), Nishiguchi (1994), and Womack, Jones, and Roos (1990) have identified the transition from adversarial supplier relations to interorganizational cooperation in the industrialized nations as a major improvement for organizational competitiveness. Articles in *Business Week* (Kelly, Port, Treece, De George, & Schiller, 1992), *The Wall Street Journal* (Templin & Cole, 1994), and *Harvard Business Review* (Moss-Kanter, 1994) also indicated a widespread interest in the change of purchasing philosophies among managers and organizations. The principal purchasing philosophy changes consist of more cooperative, interdependent, and long-term relationships.

Interorganizational cooperation may also serve as a potential vehicle for economic development in less-developed countries (LDCs) (Unger & Saldaña, 1992). According to Hirschman (1958), key industries support a nation's or region's economic development by forging links between suppliers and buyers. As an example, the automobile industry

requires many suppliers for its complex variety of components and functions as a backward linkage industry. In a backward linkage industry, the final producer requires suppliers to provide subassemblies. The subassemblers, in turn, require that other suppliers provide lower level subassemblies, and so on. In a backward linkage industry, many small suppliers provide for several large final assemblers, thereby promoting regional development.

Current development strategists in Mexico echo Hirschman's (1958) call from an earlier era for the need to integrate small and medium organizations into the national supply chain. Borrowing from trends in purchasing management, these strategists view interorganizational cooperation as a means to develop small and medium suppliers (Contreras-Martínez et al., 1993; Rogozinski, 1994; Sánchez-Ugarte, Fernández-Pérez, and Pérez-Motta, 1994). Lamming (1989), Nishiguchi (1994), and Womack et al. (1990) have indicated the existence of interorganizational cooperation in the Mexican automobile industry. The interorganizational cooperation relationships they cited, however, largely involve foreign firms that buy from large Mexico-based suppliers. Little is known of material sourcing practices by Mexican owned and managed firms. Managers of foreign firms tend to introduce world-class management techniques to their Mexican operations earlier and to a greater degree than do managers of Mexican owned and managed firms (Blomstrom, 1988). Thus, interorganizational cooperation may be practiced in Mexico largely by foreign firms only, and the expected synergies from a multilevel supply chain among Mexican firms may not exist (Husted, 1994).

Some of the resistance to introducing interorganizational cooperation in developing countries such as Mexico may be due to cultural factors. Nishiguchi (1994) contended that Japanese culture had a major effect on the formation of interorganizational cooperation in Japan during the mid-1960s. Prior to this period, Japanese firms generally did not act as cooperatively with their suppliers. In the aftermath of WWII, however, networks of related firms having common ownership and reciprocal ties emerged in Japanese industry. This type of network is known as a *keiretsu* (Lincoln, Gerlach, & Takahashi, 1992). Within the *keiretsu*, Japanese firms worked more closely with their principal suppliers. Lewis (1995) stated that the evidence of a widespread interorganizational cooperation philosophy in Japan, however, might be illusory, because partnerships may be practiced exclusively among members of the same *keiretsu* and traditional adversarial relationships practiced with non-*keiretsu* members. Lewis further affirmed that cultural factors in the United States and Europe might be more conducive to the formation of interorganizational cooperation than in Japan. He observed that Western managers cooperate with others to a greater degree than do the Japanese.

As organizational and development strategists in Mexico attempt to introduce interorganizational cooperation relationships, the question concerning their causal factors arises. The causal factors of interorganizational trust, culture, and the need for reliable, high-quality, and low-cost suppliers provide partial answers. Research on these causal factors in less-developed countries, however, is limited. The principal question of this

study, therefore, is to determine the principal causal factors leading to the formation of interorganizational cooperation in Mexico.

Statement of the Problem

In the search for the causal forces leading to interorganizational cooperation, a major quandary arises in the choice of the underlying theoretical framework. A framework that ignores social factors, such as interorganizational trust and national culture, provides an inadequate explanation for interorganizational cooperation.

Shortcomings of Transaction Cost Economics Theory

Transaction cost economics (TCE) theory (Coase, 1937; Williamson, 1981, 1993c), a research framework used to study the interorganizational cooperation phenomenon (Heide, 1994), ignores the social factors leading to interorganizational cooperation. TCE theory deals with the relationship between transaction costs, governance structures, and exchange factors. Transaction costs refer to the costs assigned to the exchange of a good or a service between two parties. Governance structures relate to the principal modes of material acquisition, known as hierarchical and market structures. These structures correspond to the make and buy decisions, respectively.

Exchange factors relate to the frequency, level of uncertainty, and asset specificity inherent in a transaction. Generally, increased frequency of exchange and dedication of organizational assets between two parties, coupled with decreased uncertainty, lead to more cooperative market exchanges (Williamson 1981, 1993c). High-quality materials,

for example, reduce transaction costs as the buyer's quality inspection costs decrease.

Based on these premises, interorganizational cooperation is characterized as a cooperative market structure in which frequent exchanges lead to higher asset specificity and subsequently to lower transaction costs.

The major theoretical problem with TCE lies in its omission of social factors to explain interorganizational cooperation. To partially accommodate social factors, TCE operates within a set of boundary assumptions concerning human nature. A major assumption underlying the Williamson (1981, 1993c) thesis portrays all humans as untrustworthy. Untrustworthiness creates uncertainty, which leads transactors to avoid dealings with others, when possible. Trust among individuals and organizations, on the other hand, reduces uncertainty and increases the level and quality of transactions. According to Williamson (1993b), what may appear to be trust is merely calculative; people and organizations may cooperate with each other based solely on selfish motivations and the expectation of future return. TCE ignores the trusting nature of individuals and the shaping role that a society's environment exerts on trust. Moreover, TCE is also based on other neoclassical economic assumptions wherein all economic actors are considered self-interested, rational, and opportunistic.

TCE is criticized for ignoring the role of social factors in interaction among individuals and organizations that researchers, consultants, and managers have observed in the real world (Arrow, 1975; Collard, 1978; Elster, 1990a, 1990b; Mansbridge, 1990; Sabel, 1993; Sen, 1978; Tversky & Kahneman, 1990; Tyler, 1990). In other words, TCE,

as a theory, performs an incomplete job of explaining interorganizational cooperation (Ghoshal & Moran, 1996; Moran & Ghoshal, 1996). In defense of TCE, Craswell (1993) and Williamson (1993a, 1996) defended the parsimoniousness of its framework and asserted that TCE's theoretical linkages correspond well with real-world observation.

An Analysis of Social Institutions Approach

A more systematic approach to study interorganizational cooperation should include social forces (Fukuyama, 1995). Economic theory is incomplete without a social systems component (Parsons & Shils, 1951), and institutional economics provides a more complete view of economic and organizational phenomena (Sjöstrand, 1993). An analysis of institutions approach removes the assumption that individuals are solely calculative and motivated by a static level of self-interest and opportunism.

Theoretical Foundation

In the theoretical foundation of this research, institutional economics is used to explain interorganizational cooperation. Institutional economics is based on the understanding of human motivation and behavior. Moreover, institutional economics is considered an evolutionary science because motivation and behavior undergo cultural changes over time (Rima, 1991). According to North (1990), informal institutions, consisting of social values and behaviors, influence a society's organizational structures and their economic performance. In this section, institutions, institutional change, and institutional constructs are explained.

Institutions and Institutional Change

North's (1990) treatise on institutions and institutional change attempted to explain how institutions profoundly influence the structure of organizations. The components of North's work are discussed in the following section.

Institutions

Institutions are analogous to the rules of a game. They provide the standards, constraints, and boundaries for human interaction (Sjöstrand, 1993). Institutions may be informal or formal. Informal institutions consist of the values, beliefs, rituals, customs, and paradigms held by a group of people. These informal institutions are not codified but are taught and learned in informal situations. They are commonly held conventions, but specific measurements and enforcement rules are avoided (North, 1990). For example, the hiring of multiple family members in one organization may be considered appropriate in a society that values close extended family relationships. In societies in which the nuclear family is the family unit of reference and the equal treatment of all individuals is more important than favoring members of the extended family, the hiring of family members is often discouraged.

Informal institutions used frequently over time eventually become codified as formal institutions. Frequent use by a large segment of a society leads to an awareness of their existence, leading to their formalization. Formal institutions consist of systematic laws and procedures used to facilitate economic exchange. Formal institutions often deal with compliance costs and increase certainty in exchange outcomes. For example, an

organization in a society that encourages the development of underdeveloped social groups may institute policies to attract more minority workers and include sanctions for managers who do not follow minority-hiring policies.

Kiser and Ostrom (1982) posited that institutions, formal and informal, are most suited to controlling recurring behaviors. The purchase of components used in the assembly of an automobile, for example, may be considered a recurring behavior. Making a major capital purchase, such as a motor assembly factory, on the other hand, is not considered a common and recurring behavior.

Informal institutions represent social factors that are often unnoticed yet have a pervasive influence on exchange between humans. The focus of this study deals with the unwritten but commonly held values and behaviors in a society. For the remainder of this study, any discussion of institutions refers to informal institutions unless otherwise noted.

Institutional Change

Institutions determine the structure and performance of organizations found in a society. It is within and among organizations that people interact. These organizations are created and maintained according to a society's institutions. For example, collectivism facilitates the creation of cooperative work teams within an organization.

An organizational structure developed under one institutional framework or society may not be as efficient in the way it transforms its resources when transferred to a dissimilar society; for example, cooperative work teams developed in Japan have required modification when transferred to the United States.

Institutional Constructs

North (1990) does not elaborate on any specific institutional constructs in his framework. Kiser and Ostrom (1982) criticized institutionalism for failing to be more specific about institutions and the particular role an institution exerts on organizational structure. Coleman (1990) elaborated that institutionalism's framework requires a microlevel explanation of how institutions actually work. Considering institutionalism's macroview as one of its principal limitations, this study proposes a confined focus in which the specific constructs of interorganizational trust, individualism and collectivism, and JIT/TQM's superordinating effect are used to predict interorganizational cooperation.

Interorganizational Trust

Interorganizational cooperation depends on interorganizational trust (Ansari & Modarress, 1986; Bhote, 1987; Heide & Miner, 1992; Lewis, 1995; Ring & Van de Ven, 1992; Smeltzer, 1997). Trust serves as a facilitator, while mistrust acts as a barrier to close relationships (Friedlander, 1970). Trust has been described from various disciplines, such as psychology (e.g., Deutsch, 1958), political science (e.g., Dunn, 1988), and social theory (e.g., Coleman, 1990; Etzioni, 1988). From these disciplines, trust is generally defined as the positive expectation of outcomes when people and organizations interact with others under conditions of risk (Boon & Holmes, 1991).

Cummings and Bromiley (1996) more specifically defined interorganizational trust based on the relationships between organizations and individuals as a function of commitment to honor agreements, honesty in negotiations, and the abstention from overly

opportunistic behaviors. For a buyer to engage in a close trade relationship with a supplier requires commitment beyond traditional contractual terms. The terms of agreement required in a close relationship cannot be listed in their entirety in a contract, and the desired relationship should be based on a high level of trustworthiness.

Individualism and Collectivism

A cultural approach focuses on how societal factors influence the formation of organizational culture, structure, and practices (Doktor, Tung, & Von Glinow, 1991; R. Moore, 1974; Tung, 1993). Individualism and collectivism (indcol) is one construct used to compare cross-cultural differences. Indcol is a social-level construct in which societies may be classified according to their relative ratio of individualist and collectivist tendencies. In an individualistic society, individuals tend to belong to several groups at once. These in-groups exhibit less cohesiveness and are prone to frequent change. Individualists exhibit less loyalty to any one group, base their association on positive cost-benefit outcomes, and tend to be independent. In a collectivistic society, individuals tend to cooperate with in-group members and to avoid contact and even compete with out-groups.

According to Triandis (1994), in-groups are defined as “sets of individuals with whom a person feels similar” (p. 43). Turner (1982) defined in-groups as two or more individuals who share a common perceived social identity. Membership in collectivist in-groups is generally by ascription, such as familial, tribal, and racial ties. Individualistic membership is awarded through achievement and common values, such as found in

professional organizations and religious and political groups. Out-groups are sets of individuals to which a person does not belong. Further, out-groups may compete for resources or supremacy of ideology with an individual's in-group.

Although the transfer of Japanese manufacturing practices from Japan to the United States has been discussed in general cultural terms (Baldwin & Gagnon, 1993; Cusamano & Takeishi, 1991; Nishiguchi, 1994; Womack et al., 1990; Young, 1992), few researchers have tested the role of indcol on interorganizational cooperation. The testing of this relationship in an LDC such as Mexico, having a cultural and developmental context dissimilar to that of the industrialized countries, has received little emphasis in the literature.

Superordinate Goals

Superordinate goals serve to lessen the effect of ethnocentrism and increase cooperation (Sherif, Harvey, White, Hood, & Sherif, 1961; Tajfel, 1982; Wichman, 1970). Sherif et al. reported their findings to illustrate the dynamics of cooperation, ethnocentrism, and superordinate goals. In their field experiment, they randomly assigned 24 boys about the age of 12 of lower middle-class protestant background into two summer-camp groups. These groups carried out similar activities in isolation to develop in-group identity, values, and behaviors.

Each group developed its own leadership, value, and penalty systems. Once in-group identity was established, the experimenters introduced the two groups to each other in competitive activities. These activities reinforced in-group solidarity and out-group

competitiveness. The inter-group activities consisted of competitive play and extended into arguing and fighting.

To conclude the experiment, the researchers introduced a superordinate goal to induce cooperation. Superordinate goals refer to objectives requiring cooperative activity such that (a) the combined efforts of the involved groups are required to reach the goal and (b) the goal is of such value that group members are motivated to reach the goal. The initial attempt to reach the goal in the Sherif et al. (1961) experiment was unsuccessful. The researchers subsequently replaced competitive leaders with ones who exhibited tendencies that were more cooperative. Thereafter, the two groups began to behave cooperatively, reached the superordinate goals, and were referred to as a superordinated group.

Ethnocentrism is considered a universal phenomenon that explains the creation and comparison of social groups (Brewer, 1981). Ethnocentrism consists of the attitudes, ideologies, and behaviors that foster in-group cooperation and out-group competition. Strong ethnocentrism promotes the perception among in-group members that their group is virtuous and superior to the out-groups, which are often considered contemptible, immoral, and inferior. Strong ethnocentrism fosters blame on the out-group for in-group troubles (LeVine & Campbell, 1972; Tajfel, 1970, 1982). Simple ethnocentrism may be based on a single common identity, such as religion, whereas complex ethnocentrism combines a wide array of social identities to categorize in-groups and out-groups.

Interorganizational trust and indcol are related to ethnocentrism. Ethnocentrism serves to decrease trust between competing organizations and individuals. Indcol measures the degree of familial and in-group ethnocentrism in a society. Individualist societies generally exhibit low levels of ethnocentrism, while collectivist societies demonstrate higher levels of ethnocentrism.

Superordinate goals also lead to greater communication, which further encourages cooperation. Key individuals who communicate between organizations are referred to as *boundary spanners*. The increased presence of boundary spanners increases communication and subsequent cooperation (Friedman & Podolny, 1992; Keller & Holland, 1975; Keller, Szilagyi, & Holland, 1976). Due to its symbolic nature, communication may also be considered as an element of cooperation (Sherif et al., 1961) and may be used as a surrogate for cooperation in research (Dailey, 1979).

Contact and communication between organizations in the absence of superordinate goals, however, may not be sufficient to achieve cooperation. Factors such as equal status encounters among members of different organizations, intimate rather than casual exchanges, pleasurable exchange experiences, and interaction according to superordinate goals are required for interorganizational cooperation (Amir, 1969). The presence of a superordinate goal is necessary to induce cooperation among groups (Dawes & Thaler, 1988; Kramer & Brewer, 1984). Feger (1991) qualified the importance of a superordinate goal, which includes perceived interdependence, as the most important factor leading to cooperation.

In the context of this study, JIT/TQM functions as the superordinating goal to foster interorganizational cooperation among buyer and supplier organizations. Smith, Carroll, and Ashford (1995), in a special research forum on intra- and interorganizational cooperation, stated that “a new market ethos, sometimes oriented toward new total quality management (TQM) philosophies, also underscores the need for cooperation throughout organizations” (p. 9). Ring and Van de Ven (1992) declared that organizations pursuing a group of diverse objectives require cooperation due to the reciprocal dependencies involved between firms. Singh (1997) posited that interorganizational cooperation brings organizations together to reduce the risk of failure in complex production.

Thus, buyer organizations faced with changing quality, delivery time, and cost performance requirements may demand that their suppliers cooperate more closely, such that they become an extension of the buyer’s JIT/TQM capabilities. JIT/TQM refers here to a selection of organizational philosophies and practices consisting of just-in-time (JIT), total quality management (TQM), and their common infrastructure practices (CIP) for JIT/TQM (Flynn, Sakakibara, & Schroeder, 1995).

Just-in-time (JIT) is considered as both a philosophy and set of techniques to improve productivity by reducing waste and simplifying a firm’s processes (Goyal & Deshmukh, 1992). JIT is made up of several subdimensions. These subdimensions are *kanban*, which signals the order and release of shop floor materials; (b) lot-size reduction practices, which reduce incoming and work-in-progress inventory; (c) setup time

reduction, which reduces costs of machine setups for new parts; and (d) JIT scheduling, which balances shop production to match demand.

Total quality management (TQM) functions as a philosophy and system of practices to improve process and product quality. TQM is also composed of several subdimensions. These subdimensions are (a) customer focus, which uses customer's needs as quality parameter levels; (b) product design, which decrees that quality is designed prior to production; and (c) statistical process control, which uses feedback for employees to monitor quality.

The common infrastructure practices (CIP) are associated with and support JIT and TQM. These practices are (a) information feedback, which provides information to facilitate production; (b) management support, which validates management's commitment to JIT/TQM; (c) plant environment, which measures the importance of a clean and safe work environment; and (d) workforce management, which involves workers in the organization's continuous improvement efforts. Flynn et al. (1995) included supplier partnership as a CIP. It is not included here due to its relationship to interorganizational cooperation. Supplier partnership incorporates several subdimensions, which are also found under interorganizational cooperation: early supplier involvement, evaluation and certification, and long-term relationship. Interorganizational cooperation, with supplier relationship as its subset, is the focus of this study. Interorganizational cooperation is an organizational practice in its own right (Bhote, 1987; Sakakibara,

Flynn, & Schroeder, 1993). An in-depth discussion concerning the relationship of supplier relationship and interorganizational cooperation is presented in chapter 2.

This study attempts to fill the gap in empirical research by incorporating an analysis of institutions approach in which the causal influences of interorganizational trust, indcol, and superordinate goal of JIT/TQM are tested as predictors of interorganizational cooperation.

Purpose of the Research

The purpose of this research is to examine the role of interorganizational trust, indcol, and JIT/TQM as predictors of interorganizational cooperation. This research attempts to answer the following research questions:

1. Is interorganizational trust a significant predictor of interorganizational cooperation?
2. Is indcol a significant predictor of interorganizational cooperation?
3. Is the superordinate goal of JIT/TQM, composed of just-in-time, total quality management, and their CIP for JIT/TQM, a significant predictor of interorganizational cooperation?
4. Is the superordinate goal effect of JIT/TQM greater than the effect of interorganizational trust and indcol on the formation of interorganizational cooperation?

Significance of the Research

This study provides significant insight for social science and practitioner audiences. The study provides empirical evidence of a scientific nature, which is currently absent in the literature. The applied findings also provide a direction for the appropriate use of interorganizational cooperation in environments similar to Mexico.

Significance to Social Science Audience

Research on supplier-buyer partnerships provides empirical evidence to support the notion of an analysis-of-institutions approach. The principal fields concerned with this study include organizational theory, development economics, and purchasing management.

Organizational Theory

This study adds institutions, such as interorganizational trust and indcol, to the list of factors which influence organizational structure and form (North, 1990). According to Morgan (1986), organizations are ultimately the responsibility of humans. Understanding the shared meaning and experience found among humans will lead to an explanation of how organizations cooperate.

Development Economics

The field of development economics is in need of behavioral explanations of growth (Stern, 1991), such as the institutional explanation provided by North (1990). Examining the roles of interorganizational trust, indcol, and superordinate goal effect of

JIT/TQM fills a void in development economics by better explaining Hirschman's (1958) linkage model through the combination of structuralism and institutionalism.

In the field of development economics, Dietz and Street (1987) have observed that structuralism, a Latin American framework closely allied to dependency theory, is an endeavor to develop theory and policy fitted to less-developed countries in a world economic system. Dependency theory generally proposes that industrialized nations maintain less-developed nations in dependent roles through political and economic hegemony. Structuralism attempts to break the economic circle of dependency through the creation of an entire industrial structure encompassing raw material production to the marketing of a finished product. Hence, the Hirschman (1958) linkage model of development may be construed as a response to structuralism.

Dietz and Street (1987) stated that structuralism is a natural complement to institutional theory, a framework of the industrialized world. A structuralist/institutional framework "examines the tension between economic growth and development and the retarding, 'past binding' institutions" (Dietz & Street, 1987, p. 11).

Purchasing Management

Finally, this study contributes to the academic field of international purchasing by introducing social and cultural explanations to this discipline's literature base. Beyond anecdotal experiences, little empirical evidence exists to explain purchasing phenomena among national firms in a less-developed country such as Mexico.

Significance to Practitioner Audience

In addition to its contributions to science, this study serves the practical need to understand interorganizational cooperation in Mexico from national and North American purchasing perspectives.

Industrial and Government Planning in Mexico

A need exists to understand the buyer-supplier relationships between supplier organizations and the buyers they serve in Mexico. Generally, large private organizations in Mexico have world-class levels of quality and productivity (Guadarrama, 1993). Medium and small organizations, however, are not competitive at world-class levels. Low productivity has caused a crisis among small and medium suppliers in Mexico as these companies compete with world-class organizations in an increasingly competitive home market. Understanding the supply link between the large and small organizations will provide industrial and government planners with a view of potential alternatives for improved competitiveness.

North American Purchasing

Mexican industry, as a supplier to industry in North America, is relatively unknown. Much research has been conducted in the United States and Canada on supply chain topics; however, little is known of Mexican supplier-buyer activities. Knowledge of the Mexican supply chain greatly assists United States and Canadian industrial planners in better assessing the risks and opportunities of sourcing to and from the Mexican industrial market.

Definition of Terms

The ensuing definitions encompass the fundamental constructs included in this investigation.

Dependent Variable

Interorganizational cooperation serves as this study's unique dependent variable. Interorganizational cooperation is defined here as a long-term cooperative and interdependent organizational structure between two distinct organizations to exchange complementary resources. The cooperative mode assumes that limited resources may be shared in a systematic manner (Tannenbaum & Davis, 1969). Interorganizational cooperation, as synthesized from the literature (e.g., Ansari & Modarress, 1986; Bhote, 1987; Hendrick & Ellram, 1993; Schonberger, 1982) and operationalized for this study, consists of the following sub-elements:

1. **Supplier development:** The buyer organization provides financial, managerial, and technical assistance to improve the supplier's performance.
2. **Early supplier involvement:** The buyer organization involves the supplier in design issues at an early stage of product development.
3. **Evaluation and certification:** Buyers work with a reduced number of qualified suppliers based on mutually agreed criteria.
4. **Total cost management:** A supplier's total production, administrative, and service costs are evaluated over the entire life of the supply period.

5. Long-term relations: Buyers and suppliers reduce uncertainty associated with short-term contractual periods.

Independent Variables

This study uses three principal independent variables: (a) interorganizational trust, (b) indcol, and (c) JIT/TQM.

Interorganizational Trust

Interorganizational trust is defined as the positive expectation of outcomes when people and organizations interact with others under conditions of risk (Boon & Holmes, 1991). Interorganizational trust is based on affective and cognitive components and is a function of commitment to honor agreements, honesty in negotiations, and the abstention from overly opportunistic behaviors (Cummings & Bromiley, 1996).

Indcol

Indcol is concerned with the welfare of the group versus that of the individual. In an individualistic setting, the individual takes precedence over the group. Individualists tend to ignore the group and to consider their own personal welfare. In a collectivistic social environment, individuals tend to sacrifice their own needs and desires if they are not in accordance with the needs and desires of the group. (Erez & Earley, 1987; Triandis et al., 1986; Wagner & Moch, 1986).

JIT/TQM

JIT/TQM functions as a superordinate goal to evoke cooperation. JIT/TQM refers to the manufacturing practices developed by Japanese manufacturers and subsequently

adopted and developed in most industrialized societies. The principal JIT/TQM variables identified here are just-in-time (JIT), total quality management (TQM), and their common infrastructure practices (CIP) (Flynn et al., 1995). JIT refers to waste reduction through manufacturing process simplification and is composed principally of (a) *kanban*, (b) lot-size reduction practices, (c) set-up time reduction, and (d) JIT scheduling.

TQM refers to the company-wide effort to improve quality on a continuous basis and is composed principally of (a) customer focus, (b) product design, and (c) statistical process control. Finally, CIP refers to the organizational support practices that support TQM and JIT and is comprised of (a) information feedback, (b) management support, (c) plant environment, and (d) workforce management.

Organization of the Study

This study is divided into five sections. This chapter furnishes a brief preview of the investigation. Included in this chapter are the statement of the problem and theoretical foundation, purpose, and significance of the research, followed by a definition of terms.

Chapter 2 is an in-depth review of the literature on interorganizational cooperation from its development in Japan to its subsequent use in the United States and Europe. The review of the literature also presents research on interorganizational trust, individualism and collectivism, and JIT/TQM as independent variables for this research. To conclude the chapter, the theoretical model and hypotheses that were tested are presented.

Chapter 3 presents the research design and methodology used in this research project. Information pertaining to the level of analysis, number and characteristics of

subjects, survey instruments, language translation issues, procedures for data gathering, and data analysis methods are covered.

Chapter 4 presents the data analyses results. Included are descriptive statistics and hierarchical regression analyses. In addition, a summary of the findings for each of the test hypotheses is given.

Chapter 5 presents the discussion of the findings of chapter 4. Interorganizational trust, indcol, and JIT/TQM and the comparison of these variables are presented separately. Also included is a discussion of this study's limitations. The chapter concludes with a discussion of issues to be resolved in future research.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the literature is provided here to establish a model of the forces that lead to interorganizational cooperation. First, an introduction to interorganizational cooperation is furnished as the focal point of the research. Next, an in-depth analysis of the variables used to predict interorganizational cooperation is presented. These variables consist of interorganizational trust, individualism and collectivism (indcol), and JIT/TQM, consisting of just-in-time (JIT), total quality manufacturing (TQM), and their common infrastructure practices (CIP). Finally, the research model and hypotheses are presented.

Interorganizational Cooperation

An increasingly large number of manufacturers throughout the world, in order to gain certain performance benefits, are requiring interorganizational cooperation relationships with their suppliers. The benefits of interorganizational cooperation consist of lower material costs, higher incoming quality, reduced design and delivery cycle times, increased administrative efficiency, and reduced capital requirements for inventory (Ansari & Modarress, 1986; Bhote, 1987; Burt, 1989; Ellram, 1991c; Heide & Miner, 1992; Lascelles & Dale, 1990; Lewis, 1995; Ring & Van de Ven, 1992; Womack et al., 1990). Interorganizational cooperation is a recent phenomenon in the industrialized

world. The following section is a historical review and description of the elements of interorganizational cooperation.

History of Interorganizational Cooperation

Cooperation has been described by a variety of theorists. Generally, these writers have described cooperation as the complement to competition. It represents the union of two or more entities, leading to a more complex combination which has a greater chance of surviving environmental forces than as separate entities. Kropotkin (1902) extended Darwin's theory of natural selection to include cooperation among living and social systems. Mead (1937), in studies of living primitive societies, found that cooperative social organization leads to higher affluence than does competition. In a political-historical analysis of civilizations, Eisler (1988) found variations between the social dominator model, in which societal exchange is carried out in hierarchical and competitive relationships, and the social partnership model, in which exchanges are made through cooperative relationships. Proponents of sociobiology view cooperation as a genetic survival trait. Cooperation is found among relatives because these extended family groups survived over individuals who did not cooperate with family and tribal members (Bateson, 1988). In sociobiology, cooperation is also considered an evolved trait among humans and other life forms (Nowak, May, & Sigmund, 1995).

These approaches to cooperation are varied; they place cooperation in historical and ahistorical contexts, at macro- and microsocial settings, and as genetic and learned behaviors. This study relies on what Campbell (1975) termed as a sociocultural

explanation for cooperation. His framework rests on variation, selection, and retention of behaviors over time. In essence, variation provides the mutations or trials of behavior that provide for the adaptation of groups to new situations. Selection involves the process of evaluating one variation over another and selecting the better version. Retention involves the process of accumulating behaviors and values in a social system. Campbell's theory functions at the social system level because individuals eventually die, but institutions and conduct are retained within social systems. Campbell further argued that urban social complexity has come about through social evolution rather than through sociobiological evolution. According to this argument, sociobiological evolution favors selfish inclinations resulting from genetic competition. Campbell's sociocultural framework is used in this study as the basis for understanding interorganizational cooperation.

Interorganizational cooperation has been scrutinized largely over the last two decades. Schonberger (1982) first described to an English-speaking audience a Japanese interorganizational cooperation relationship linking buyers and suppliers. This new interorganizational form was a radical departure from the traditional adversarial form of industrial purchasing. The change to interorganizational cooperation is a fundamental shift, because the underlying philosophies of the traditional model of purchasing and interorganizational cooperation are diametrically opposed. Adversarial supplier relations are based on the notion that suppliers should be treated as competitors.

Explanatory Approaches to Interorganizational Cooperation

Interorganizational cooperation is referred to by many terms, such as *coalitions* (Ring & Van De Ven, 1992), *co-maker relations* (Raffa, 1994), *customer-firm relationships* (Goodman, Fichman, Lerch, & Snyder, 1995), *customer-supplier relationships* (Burnes & New, 1997), *interfirm relationships* (Cavinato, 1991), *JIT purchasing* (Golhar & Stamm, 1993), *marketing partnerships* (Aulakh, Kotabe, & Sahay, 1996), *network organizations* (Ring & Van De Ven, 1992), *strategic alliances* (Ring & Van De Ven, 1992; Stuart, 1993), *supplier management* (Sakakibara et al., 1993), and *supplier partnerships* (Stuart, 1993). Consensus on a common term is unavailable in the literature.

Interorganizational cooperation is also explained from several approaches. Bhote (1987) and Hutchins (1992), for example, described interorganizational cooperation from a practitioner orientation, while others, such as Ansari and Modarress (1986), approached interorganizational cooperation from an academic viewpoint. In another vein, most of the writers considered interorganizational cooperation from a strategic operations management viewpoint, while some, such as Leenders and Blenkhorn (1988), considered interorganizational cooperation from a marketing approach. In addition, research indicates that interorganizational cooperation exists in other industrialized countries (Esposito & Raffa, 1994; Lascelles & Dale, 1989; Lorenz, 1988; Semlinger, 1991). The introduction of interorganizational cooperation into the industrialized countries indicates

transferability across borders. Despite the difference in terminology and taxonomy, these writers coincided in their discussion of the interorganizational cooperation phenomenon.

Elements of Interorganizational Cooperation

Interorganizational cooperation, as used in this study, consists of supplier development, early supplier involvement, evaluation and certification, total cost approach, and long-term relationships. These elements were synthesized from pertinent literature and are presented in Table 1.

Supplier Development

Supplier development programs serve primarily to bring existing suppliers into a closer relationship with the buyer organization. These programs provide ongoing assistance in transferring technology and elements of organizational culture from the buyer to the supplier.

Supplier development improves incoming material quality and upgrades the supplier's delivery performance, service, cost reduction, and technical abilities (Watts & Hahn, 1993). The technology transfer process may include assistance in the form of loaned equipment, buyer provision of the supplier's input materials, and financial assistance (Nishiguchi, 1994). Schonberger (1982) found that supplier development programs also act to indoctrinate or educate the supplier according to the buyer's needs. He likens it to corporate apprenticeship and missionary teaching, in which the buyer organization socializes the supplier to attitudes, practices, and values held by the buyer.

Table 1

Elements of Interorganizational Cooperation

Source	Elements				
	Supplier development	Early supplier involvement	Evaluation and certification	Total cost management	Long-term relationship
Ansari & Modarress (1986, 1990)	√	√	√	√	√
Bhote (1987)	√	√	√	√	√
Burnes & New (1997)		√	√	√	√
Burt (1989)	√	√	√	√	√
Dobler, Burt, & Lee (1990)		√	√	√	√
Burton (1988)	√	√	√	√	√
Fawcett & Birou (1993)	√	√	√	√	√
Flynn et al. (1995)		√	√		√
Giunipero & Keiser (1987)			√	√	√
Giunipero & Law (1990)					
Golhar & Stamm (1993)	√	√	√		√
Hahn, Kim, & Kim (1986); Hahn, Watts, & Kim (1990); Watts & Hahn (1993) Watts, Kim, & Hahn (1992)	√			√	√
Hendrick & Ellram (1993); Ellram (1990, 1991a, 1991b, 1991c)	√	√	√		√
Hutchins (1992)	√	√	√	√	√
Landeros & Monczka (1989)	√	√	√	√	√
Lascelles & Dale (1989, 1990)	√	√	√		√
Lewis (1995)	√	√	√	√	√
Leenders & Blenkhorn, (1988)	√	√	√	√	√
Leenders & Fearon (1993)					
Nishiguchi (1994)	√	√	√	√	√
O'Neal (1989)	√	√		√	√
O'Neal & Bertrand (1990)					
Saraph et al. (1989)	√	√	√	√	
Schonberger (1982); Schonberger & Ansari (1984)	√	√	√	√	√
Stuart (1993)		√	√		√
White (1993)	√	√	√	√	√
White & Pearson (1994)					
Womack et al. (1990)	√	√	√	√	√
√ = Discussed					

Early Supplier Involvement

Using early supplier involvement (ESI), suppliers participate with the buyer at an early stage in the design process. Potential ESI outcomes include lower design costs, shorter cycle time, and access to the supplier's latest technology (Dobler, Burt, & Lee,

1990). With adversarial supplier relations, on the other hand, buyers usually assign strict generic specifications that may add needless costs and delays.

Early supplier involvement provides a framework in which suppliers work interactively with buyers based on performance specifications. Performance specifications provide the parameters under which the product or material will be used and allow the supplier to suggest designs to improve quality, processes, and materials. Performance specifications also lower the buyer's costs by using the supplier's expertise to reduce post-design revisions and shorter cycle times. ESI also places the buyer and supplier in a dependent arrangement. To reduce uncertainty caused by interdependency, buyers usually practice ESI with trusted suppliers (Hendrick & Ellram, 1993).

Evaluation and Certification

Interorganizational cooperation involves working with a select group of certified suppliers. Using adversarial supplier relations, to the contrary, the buyer works with a larger number of competing suppliers to avoid dependence on a single source of supply.

As with supplier development and ESI, a reduced supplier base creates a higher degree of interdependency between the supplier and the buyer. Hutchins (1992) suggested a subjective rule of thumb in which the risk associated with a reduced supply source is balanced with its associated potential gains to determine an appropriate supplier base size. Nishiguchi (1994) reported that the number of suppliers a buyer sources from and the number of buyers a supplier provides to decrease in an interorganizational cooperation setting.

The selection and maintenance of a reduced supplier base require an ongoing supplier evaluation process. The evaluation process involves the development of mutually agreeable criteria that promote growth and improvement rather than punishment (Nishiguchi, 1994). The evaluation should reflect tangible and intangible criteria. Tangible criteria refer to objective supplier performance measures such as process quality and on-time deliveries. Intangible measures generally refer to subjective qualities and may include quality of communication, trust, and sharing of information. Evaluation models based on tangible and intangible criteria provide an overall measure of the vendor's ability to work with the buyer. Moreover, the supplier should also evaluate the buyer's ability to maintain an equal partnership.

Total Cost Management

Under interorganizational cooperation, lower production costs are achieved through an emphasis on total cost management. By contrast, using adversarial supplier relations, the buyer negotiates contracts based on the lowest price possible. In this context, the supplier attempts to hide his cost structure to maintain current profitability.

The total cost management approach focuses on reducing traditional costs such as factory overhead, direct labor, and direct materials costs as well as nontraditional measures such as selling and administrative costs (Hahn, Kim, & Kim, 1986). In essence, the total cost management approach attempts to examine all of the supplier's relevant cost drivers and suggest a holistic cost-saving strategy. An exposed cost structure requires an appropriate profit margin and good-faith bargaining to insure the supplier's viability.

Long-Term Relationships

A long-term relationship between a buyer and supplier also stands out as a principal characteristic of interorganizational cooperation. The adversarial relations model, in contrast, works with short contractual periods to achieve flexibility at the expense of the supplier.

Benefits from long-term relationships come about by continuous improvements through longer learning curve periods. In addition, interorganizational cooperation requires a long-term orientation to recoup invested costs. Essentially, fixed costs are spread over a longer time frame. Long-term relationships facilitate increased supplier involvement in research and development, as well as technically current, cost-effective, and quality solutions (Dobler et al., 1990). Suppliers, however, may increase their short-term startup costs associated with the acquisition of technology and thus increase their dependence on a specific buyer (Leenders & Fearon, 1993).

JIT Delivery and Interorganizational Cooperation

JIT delivery is associated by some researchers with interorganizational cooperation (e.g., Sakakibara et al., 1993). While associated with interorganizational cooperation, JIT delivery is not included in this study as one of its elements due to JIT delivery's nature as a performance input to the buyer's *kanban* system. JIT delivery consists of frequent small and containerized deliveries by the supplier to the buyer. Often the supplier is located proximally to the buyer with dedicated communication and delivery systems.

The elements of interorganizational cooperation differ from JIT delivery in a fundamental manner. The elements are characterized by their underlying management practices that develop cooperation between organizations. For example, evaluation and certification judge the worth of the supplier based on objective criteria in order to reduce the supplier base. A reduced supplier base allows personnel in the buyer and supplier organizations to spend more time together. In addition, the supplier supplies a larger share of the buyer's material needs. Often the buyer and supplier provide each other with performance evaluations to mutually improve cooperation. JIT delivery, on the other hand, does not serve as a practice to develop cooperation. Product quality, as an analogy to JIT delivery, is a result of evaluation and certification and some of the other elements of interorganizational cooperation and serves as a performance input to the buyer's JIT/TQM system (Davy, White, Merritt, & Gritzmacher, 1992).

Interorganizational cooperation exists as a long-term interdependent resource-sharing venture between a buyer and a supplier. Interorganizational cooperation is found in the developed world in a variety of industries. This model of interorganizational cooperation is comprised of supplier development, early supplier involvement, evaluation and certification, total cost management, and long-term relationships.

Interorganizational Trust

Trust is regarded as a major determinant of interorganizational cooperation. Trust is a broad construct and exists at a variety of levels (Worchel, 1979). This section

provides a discussion of individual and social trust, trust in Mexico, and a review of the empirical research on the influence of interorganizational trust on cooperation.

Individual Trust

Individual trust is often portrayed in terms of personality theory and social psychology (Worchel, 1979). In personality theory, trust is viewed as a socialized individual trait conditioned by the environment. Luhman (1979) provided a detailed view of the environmental forces that act on the personality. He stated that trust exists in an abstract state of infinite boundaries, complexity, and time. Certainty exists only in the present, and trust reduces complexity by viewing the future as an extension of the present. Although trust is illusory, because it lacks complete knowledge, it still requires a degree of foreknowledge to exist.

Luhman (1979) continued by defining the absence of trust as chaos. Mistrust and distrust are not opposites. Mistrust reduces chaos by delimiting relationships proven untrustworthy. Thus, chaos acts at odds with trust and mistrust. Humans, as the basic units of a social system, generate trust by extending to other humans under a state of uncertainty and by not extending to those whom they know and feel they cannot trust. Trust is based on reciprocal relationships. People trust those who have proven themselves trustworthy.

From a social psychology approach, individual trust is based on interpersonal exchanges that foment or eradicate trust (Worchel, 1979). Barber (1983) added that trust

reduces social complexity and chaos if safeguards are used to avoid the misuse of power and if people practice prosocial behaviors.

Lewis and Weigert (1985b) included cognitive, affective, and behavioral trust in a social psychology context. These dimensions do not exist exclusively of each other. Cognitive trust refers to the knowledge that other individuals and organizations are trustworthy based on their actions. Cognitive trust is an acknowledgment that an individual or organization is capable of fulfilling an expectation. It acts as the basic core of trust. Affective trust encompasses the deeper shared involvement of individuals within and between groups. Affective trust follows cognitive trust as a social reality that binds individuals as group members. It is here that relationships emerge and become evident. Finally, behavioral trust involves the acting out of cognitive and affective states of trust. Trust implies the same behavioral expectations from others that one would expect from oneself.

Social Trust

Understanding the influence of trust among organizations in other societies requires a higher level explanation of trust, referred to here as *social trust*. Social trust is considered as the accumulation of trust at a macrosocial level (Dasgupta, 1988; Dwivedi, 1983). Social trust has no liquid value, but it permits value-added activities (Coleman, 1990) and is recognized throughout history as a major factor of social order (Gellner, 1988; Shapin, 1994). Social trust facilitates the realization of objectives that, in its

absence, are impossible. Social trust is created when human relationships are aligned to expedite performance.

Social level trust rests on several elements. These elements are comprised of the level of trustworthiness of the social system, the obligations held between individuals and groups in that society (Coleman, 1990), and the presence of a densely linked network of individuals and organizations (Marsden, 1992). Social level trust serves as a resource to arrange transactions in the future that cannot be enforced by law or formal sanctions alone. Social level trust is an institution that facilitates economic exchange and runs counter to the self-interested, rational, and utility-maximizing assumptions of neoclassical economics (Coleman, 1990).

Social level trust, like individual trust, can be reduced and even destroyed. Lewis and Weigert (1985a) referred to the reduction of social trust as regression from social holism to social atomism. In their discussion, social holism refers to an active network of individuals, organizations, and in-groups, whereas social atomism refers to a societal condition in which individuals belong, largely, to few in-groups. Some of the factors that lead to the destruction of social trust are social instability, ideologies that exclude other social members, forced dependency of social members (Coleman, 1990), and the pervasive and unwarranted distrust of others (Barnes, 1981).

Historical evidence provides an excellent example to demonstrate that the reduction of social trust can be effected on a society and that the ensuing condition can last for centuries (Gambetta, 1988b; Pagden, 1988; Putnam, 1993).

Trust in Mexico

Trust in others is a concept with different meanings and implications for individuals on both sides of the U.S.-Mexico border. Octavio Paz (1960), in the Nobel Prize-winning *The Labyrinth of Solitude*, wrote of trust in comparative North American-Mexican terms:

The North Americans are credulous and we are believers; they love fairy tales and detective stories and we love myths and legends. The Mexican tells lies because he delights in fantasy, or because he is desperate, or because he wants to rise above the sordid facts of his life; the North American does not tell lies, but he substitutes social truth for the real truth, which is always disagreeable. . . . We are suspicious and they are trusting. . . . Our relationships with other men are always tinged with suspicion. (pp. 23, 30)

Samuel Ramos (1962) wrote of the manner in which Mexicans approach trust:

The most striking aspect of Mexican character, at first sight, is distrust. This attitude underlies all contact with men and things. It is present whether or not there is motivation for it. . . . It is rather a matter of irrational distrust that emanates from the depths of his being. It is almost his primordial sense of life. Whether or not circumstances justify it, there is nothing in the universe which the Mexican does not see and evaluate through his distrust. It is like an a priori form of his oversensitivity. The Mexican does not distrust any man or woman in particular; he distrusts all men and all women. (p.64)

Distrust is also expressed in Mexican maxims, as repositories of popular sentiment, such that *sobre la desconfianza vivirá la seguridad* (security will survive based on distrust) reflects a need for individuals to distrust others in order to survive; *músico pagado toca mal son* (prepaid musicians play poor music) warns against trusting in prepaid services; and *más vale malo por conocido, que bueno por conocer* (the known, however negative, is preferable to the unknown, however positive) echoes a reluctance to

extend to others under conditions of risk. These proverbs reinforce a view of distrust in Mexico.

In a business environment, distrust in Mexico is quite evident, particularly at the small-firm level. The small family-owned organizations exhibit an aversion to risk taking and innovation. This risk aversion leads to the problem of overdependence on family members for managerial support and financial investment (Aguilar-Gómez, 1993). The history of *tandas*, which are informal credit cooperatives among neighborhood residents in Mexico dating to the mid-19th century, however, offers a contrast to the view that distrust among nonfamily members in Mexico is the norm (Rojas-Coria, 1982; Vélez-Ibáñez, 1983).

According to Camp (1993), trust will necessarily play a role in Mexican development. Aspe-Armella (1993) added more specifically that Mexico's development depends on the establishment of trust among public and industrial sectors.

Empirical Studies of the Influence of Trust on Cooperation

A sound understanding of the role of trust in cooperation requires a review of the empirical research. A review of the empirical research of the influence of trust on cooperation is presented in this section and summarized in Table 2.

Deutsch's (1960) seminal work presented the relationship of trust and trustworthiness as a personality variable in a laboratory experiment of 55 students. In the experiment, participants were paired with an unknown fictional counterpart. In the first trial, participants were given the choice of acting in either a trustworthy or a suspicious

Table 2

Empirical Studies of the Influence of Trust on Cooperation

Researcher(s)	Sample	Methodology	Results
Deutsch (1960)	N = 55 students	Lab experiment	Trusting subjects expect trustworthiness and trusting from others, while suspicious Ss expect untrustworthiness and distrust.
Schlenker et al. (1973)	N = 40 psychology students	Lab experiment	Trusting subjects cooperate more than distrusting subjects.
Zand (1972)	N = 123 managers	Field experiment	Trust leads to interdependent in-group activities.
Boss (1978)	N = 242 students & managers	Field experiment	Groups exhibiting high trust are more effective problem solvers.
Mellinger (1956)	N = 330 scientists	Survey, new scale	Interpersonal trust improves communication and cooperation within an organization.
Friedman & Podolny (1992)	N = 16 union reps and negotiators	Field experiment	Positive boundary spanning communication reduces competition.
Brann & Foddy (1987)	N = 169 students	Lab experiment	Trusting subjects given ample feedback tend to deplete common resources less than low trusting subjects with low feedback.
Kramer & Brewer (1984)	N = 58 and N = 48 students	Lab experiments	Members of groups created under superordinate goals trust other group members to a greater extent than out-group members.

(table continues)

Researcher(s)	Sample	Measures	Results
Gulati (1995)	N = 2400 firms	Archival	Trust explains interorganizational cooperation to a greater degree than transaction cost economic explanations.
Moorman et al. (1993)	N = 779 managers and employees	Survey, new scale	Interpersonal trust leads to higher cooperation between individuals and organizations.
Heide & Miner (1992)	N = 60 industrial buyers and sellers	Survey, new scale	Anticipation of interaction and contact frequency increase cooperation, and poor performance reduces cooperation between organizations.
Fawcett & Birou (1993)	N = 73 industrial buyers	Survey, new scale	Trust building serves as the most important antecedent to establishing interorganizational cooperation in a JIT production environment.
Moore (1998)	N = 339	Survey, scales not mentioned	Trust and conflict avoidance are predictors of interorganizational cooperation. Conflict avoidance, however, is a stronger predictor.
Browning et al. (1995)	N = 54 managers	Case	Trust activities develop moral community leading to interorganizational cooperation.
Dodgson (1993)	N = 1 firm	Case	Interorganizational trust leads to interorganizational cooperation.
Husted (1994)	N = 46 managers	Case	High trust and rich ties lead to cooperation between buyers and sellers, and trust between Mexican firms is extremely low.

manner with their fictional partners. In the second trial, the participants then engaged in reversed roles and reacted to trustworthy or suspicious trials from their partners. Deutsch found that trustworthy participants expected trustworthy behaviors from their fictional partners, whereas suspicious participants expected untrustworthy behaviors from their fictional partners.

In an experiment at the interpersonal level, Schlenker, Helm, and Tedeschi (1973) reported on the influence of trust on a cooperative task. The experiment was conducted as a prisoner's dilemma laboratory experiment with 40 female psychology students. The researchers discovered a positive relationship between trust and cooperation and between the interacting effects of communication and trust on cooperation.

Similarly, Zand (1972) reported on the effect of trust, information flow, influence of peers, and interdependent activities on in-group problem-solving activities. This field experiment was conducted on 64 participant and 59 observer upper-middle managers divided into 16 groups. Trust, and the other independent variables, were treated as manipulations in a 30-minute trial. Zand stated that high-trust groups cooperate more than low-trust groups, in which some group members may antagonize fellow group members. In a direct replication, Boss (1978) found similar results among a larger and more varied sample of 242 MBA and Ph.D. students and managers. Boss stated, "Under conditions of high degrees of trust, problem solving tends to be more creative and productive" (1978, p. 342).

Contemporary to Deutsch (1960), Mellinger (1956) surveyed 330 scientists working for the U.S. government to compare self-perceptions of trust, communication, and in-group cooperation. He ascertained a positive relationship among the three variables. The trust variable was operationalized with a three-item scale with no construct validity measures given. The study makes no mention of efforts to determine content validity, unidimensionality, internal reliability, or other aspects of construct validity.

Adding an interorganizational perspective to the preceding studies, Friedman and Podolny (1992) studied the role of boundary-spanning activities on intergroup cooperation and conflict. Their study was based on a field experiment involving two groups composed of eight union and eight university administration negotiators over a 12-week period. They found that boundary-spanning activities between the two groups were not contained in a specific individual from each team; rather, all members contributed to intergroup boundary spanning. Further, cooperation and trust are correlated with boundary-spanning activity.

Brann and Foddy (1987) posited a negative relationship between trust and common resource depletion. Common resource depletion is a construct usually found in environmental research and is used here as a form of cooperation. The results from their lab experiment of 169 students indicated that high-trust individuals are less likely to deplete a common resource than low-trust individuals. Similarly, in two lab experiments of 58 and 48 students in which the joining of competing groups via a superordinate goal into larger superordinated groups served as the experimental manipulation, Kramer and

Brewer (1984) found that subjects in the superordinated groups rated other in-group members as more trustworthy than the subjects in the separate or non-aligned condition.

The research cited up to this point consists of basic research involving the influence of trust at the group level. The remaining research more closely describes the influence of interorganizational trust on interorganizational cooperation. In an archival study of 2,400 firms from a database of all U.S., European, and Japanese interorganizational relationships, Gulati (1995) found that interorganizational trust explains interfirm cooperation to a greater degree than variables operationalized under transaction cost economics theory. His operationalization of trust, however, is based on a reciprocal ties approach to trust. The reciprocal ties approach defines trust solely as the reciprocation of a cooperative act. This approach is considered as a limited conceptualization of the trust construct (Gambetta, 1988a; Hewstone & Brown, 1986).

Moorman, Deshpandé, and Zaltman (1993) presented a study of trust on interpersonal and interorganizational cooperation among 779 market research users. Among the many findings, the most salient and germane indicate that trust is positively related to the perceived attributes of the researchers and to the complexity of the product/service provided to the user. Trust also exhibits a negative relationship with high perceived organizational formalization and hierarchical culture. The most significant finding of the study leads to the conclusion that trust is highly correlated to interdependence among individuals and organizations.

Heide and Miner (1992), in a survey of 60 organizational dyads consisting of buyer and supplier representatives, used a multiple iteration of the prisoner's dilemma framework. They determined that anticipated interaction and frequency of interaction between organizations relates to cooperation. Despite Heide and Miner's contention that they did not study the role of trust, anticipation and frequency of interaction have been shown to be partial predictors of trust and have been used previously as operationalizations of trust (Axelrod, 1984). Therefore, these constructs are recognized here as surrogates of trust.

Corroborating Heide and Miner (1992), Fawcett and Birou (1993), from a survey response of 48 managers from organizations using JIT, found that organizations must develop a trusting relationship prior to entering an interorganizational cooperation. Their operationalization of trust was based on one scale item. K. Moore (1998), in a study of 339 organizational members of the Council of Logistics Management, found that trust is an important factor in the development cooperation. He found, in addition, that conflict avoidance is a stronger predictor of interorganizational cooperation.

In a case study of a research and development consortium drawing on the resources of 14 member organizations in the semiconductor industry, Browning, Beyer, and Shetler (1995) provided an in-depth analysis of the antecedents, actors, processes, and outcomes of an interorganizational relationship. They indicated that the initial organizational culture was disorganized and unsystematic. In response, the leaders of the consortium created a sense of community through decentralized and participatory decision

making, open communication, promotion of altruistic and cooperative behaviors, and through a near-religious faith in the consortium's expected outcome. The development of ties among consortium members was preceded by trust-building activities.

In another case study, Dodgson (1993) found that the development of trust facilitates adaptation to change, which he termed "learning." Interorganizational trust leads to interorganizational cooperation. Cooperation and trust are not isolated one-time events. Trust leads to cooperation. Depending on the quality of the cooperative act, the actor is then left to decide whether to increase, maintain, or decrease his/her trust. This is the act of learning.

Finally, Husted (1994) offered a case study comparing institutional and transaction cost economic explanations for the buyer-supplier relations of two U.S. and two Mexican companies and their respective suppliers. Husted encountered evidence of trust leading to cooperation among the U.S. firms and their suppliers. By contrast, among the Mexican firms he discovered an extremely low trust of suppliers. Husted stated that Mexican suppliers, as described by their Mexican customers, are crafty and deceitful, their transactions are constrained by distrust, and opportunism is more the rule than the exception. Husted suggested further study of institutions and norms to explain the low trust and cooperation among Mexican organizations

The discussion of trust is relevant to a study of cooperation among individuals and organizations. From an individual level, it is people who transact with others. At the organizational level, the organization provides the context for transactions among

individuals. Finally, the notion of social trust further enhances the understanding of how individuals are socialized to use trusting attitudes, values, and behaviors. High social trust societies tend to socialize their members to expect and realize trust with other members. Similarly, high social trust organizations socialize their members to develop closer relationships with other organizations (Kegan & Rubinstein, 1973).

The empirical research illustrated a variety of methodologies. The research methodologies reflected case, field experiment, lab experiment, and survey designs. At the interpersonal level of research, laboratory experiments appeared prominently and provided insight into the personality aspects of trust and cooperation. Some of the experimental research, however, may be faulted for several reasons. Prisoner's dilemma scenarios often involve a predicament with few iterations, pose the experiment in isolation, and often reflect a self-interest definition of trust (Hardin, 1982). Moreover, lab experiments sometimes make little distinction between cooperation and trust (Gambetta, 1988a; Luhman, 1979).

The case research studies provided a fertile environment in which a plethora of predictive factors, some significant and others less significant, were presented. The study of interorganizational cooperation is quite new, and theory building is still in the developmental stage. Considering the recent nature of the field, Browning et al. (1995) and Husted (1994) cited and followed Eisenhardt's (1989) suggestions for rigorous case study.

Individualism and Collectivism

Individualism and collectivism, a cross-cultural institution, is acknowledged as a factor in the manner in which people cooperate or compete with one another. A central purpose of this study is to discern whether cultural forces influence the way an industrial buyer cooperates or competes with a supplier. Transaction cost economics (TCE), on the other hand, has been criticized for assuming that all transactors behave equally unaffected by cultural institutions. It is assumed in TCE that all transactors are concerned solely for their own immediate welfare. These transactors have been described as rational, self-centered, and opportunistic. These same attributes are used to describe some aspects of individualism, which is a cultural dimension found principally in the United States and some industrialized countries (Hofstede, 1980). Thus, TCE's underlying assumptions may parallel the culture wherein this theory was formulated.

Sampson (1978) emphasized that the history of modern social science parallels the emergence and development of individualism. Social scientists working in an ahistorical nomothetic approach to theory have had little understanding of theory outside of the individualist historical context (Dore, 1983; Lee, 1994; Sampson, 1988). Parsons and Shils (1951) added that individualism is considered axiomatic by theorists immersed in their own industrialized cultures.

A more inclusive social science framework that involves a cultural perspective has been proposed (Bennett & Sharpe, 1985; Bhagat & McQuaid, 1982; DeForest, 1994; Doktor et al., 1991; R. Moore, 1974). These authors proposed adding a cultural facet to

organizational theory and empirical research to complement and extend current understanding. Sampson (1977, 1978) advocated to a stronger degree that current understanding ignores theoretical applications in less-developed countries. This study employs a cultural perspective based on individualism and collectivism. In this section the elements of individualism and collectivism (indcol), the presence of indcol in Mexico, and a review of the empirical research of the influence of indcol on cooperation are presented.

Attributes of Individualism and Collectivism

The seminal work by Hofstede (1980) on various etic dimensions of culture provides an introduction to the indcol construct. The etic approach measures between-culture differences in universal traits and relies on quantitative methodologies. The emic approach, in contrast, relies on case methodologies and is used in within-population studies of culture (Adler, 1983). Other studies of the indcol construct have been conducted to refine and support its cross-cultural validity. The attributes of individualism and collectivism are discussed in detail in this section (see Table 3).

Individualism

Individualism is based on the notion of personal rights, pursuit of pleasure, and self-definition. Among individualists, there is less in-group attachment, and in-group members have less influence in moderating the individual's behavior, beliefs, and values. Individualists observe and expect universalistic rather than particularistic treatment from others. Universalism refers to the notion that individuals should be accorded equal

Table 3

Attributes of Individualism and Collectivism

Individualism	Collectivism
Individuals as the basic units of social perception.	Groups as the basic unit of social perception.
Self-defined as an independent entity. Achievement for self-glory, competition, exhibition, power.	Self-defined in terms of in-groups, relationships. Achievement for the groups sake, cooperation, endurance, and order.
Goals: Personal goals have primacy over in-group goals.	In-group goals have primacy or overlap personal goals.
Cognitions: What makes me different, distinguished? My rights, capacity (obligations, contracts).	What makes me the same as my group? Needs of in-group.
Attitudes: Favor beliefs that reflect independence.	Favor beliefs that reflect interdependence
Norms: Favor independence from in-groups.	Favor embeddedness in in-groups
Values: Pleasure, achievement, competition, freedom, autonomy, fair exchange.	Security, obedience, duty, in-group harmony, hierarchy, personalized relationships.
In-groups and out-groups: Many, relationships are casual, little emotional involvement; less willingness to self-sacrifice for the in-group. In-group perceived as more heterogeneous than out-groups. Debate and confrontation acceptable. Defined by similarity in achieved attributes (e.g., beliefs, occupation).	Few, but relationship to them is close, with much concern for their integrity. In-group perceived as more harmonious than out-groups. Harmony required. In-group deeply influences many behaviors. Defined by similarity in ascribed attributes (e.g., kinship, caste, race, village, tribe).
Accepted structure: Egalitarian- Horizontal relations more important than vertical.	Hierarchical- Vertical relations more important than horizontal.
Social behavior: Only somewhat different when the other person is an in-group versus an out-group member. Easy entry and exit from groups, but relationships are mostly non-intimate. People appear very sociable but relationships are superficial and depend on social exchanges and contracts.	Very different than when the other belongs to an in-group versus an out-group. Difficult to get to be friendly, but relationships are intimate after they are established. Cooperation with in-group members; communal exchanges.

Note. Adapted from Triandis, H. C. (1994). Theoretical and methodological approaches to the study of collectivism and individualism. In U. Kim, H. Triandis, Ç. Kagitçibasi, S. Choi, G. Yoon (Eds.), *Individualism and Collectivism: Theory, Method, and Applications* (pp. 41-51). Thousand Oaks, CA: Sage.

treatment based on internalized and universally held norms and standards, with no regard for the individual's quality or classification in society (Parson & Shils, 1951).

Particularism refers to the idea that individuals should be treated differently, based on each individual's quality or classification. Individualists tend to practice universalistic behaviors with both in-groups and out-groups. Hence, individualists are more likely to work with people from a variety of groups despite the superficial nature of their relationships. Triandis (1991) declared, as an example, that the cocktail party is an invention of individualism.

Extending the effect of individualism on organizations provides relationships important to this study. The entrepreneurial organization is credited as a central factor in capitalistic development. Entrepreneurship is defined here simply as the set of risk-taking and cooperative skills required to bring resources together for economic activity. Hirschman (1958) recognized the role of entrepreneurial behaviors and the need for cooperation to develop backward linkage industries in developing countries. Fukuyama (1995) posited that collectivistic societies are unable to develop large, complex, and cooperative relationships among organizations. Individualism has been cited as a prerequisite for cooperative entrepreneurial activity (Durkheim, 1933; Kerr & Dunlop, 1964; Schumpeter, 1934; Weber, 1983). Some authors have suggested that an optimal combination of individualism and collectivism is a necessary prerequisite for entrepreneurial activity and subsequent interorganizational cooperation, more so than

extreme individualism and, certainly, than extreme collectivism (Coleman, 1990; Hirschman, 1971; Moss-Kanter, 1994).

Tiessen (1997) stated that collectivism is related to entrepreneurship. Past literature, to the contrary, lists individualism as a factor leading to entrepreneurship. This definition of entrepreneurship refers largely to generating a variety of innovations. The entrepreneur is cast here as the inventor-businessman. A more recent portion of the literature includes the ability to leverage resources as a dimension of entrepreneurship. This view casts the entrepreneur as the networking businessman.

Hirschman (1958) cited various shortcomings of highly collectivist societies in regard to economic development. He stated that the lack of interdependence and linkage among entrepreneurs and managers is the most typical distinction of collectivist countries. These distinctions are due to several factors: (a) Collectivists often prefer to maintain a static family business rather than bring in nonfamily professional managers, (b) organizations exhibit centralized decision making, (c) managers provide for employee participation, and (d) few opportunities for initiative exist for subordinates. Thus, economic development and individualism are closely related.

Collectivism

Collectivists are more responsive to in-group members than to out-group members (Marin & Triandis, 1984). Collectivists stress in-group loyalty and cooperation. In a family context, collectivists favor large cohesive familial relations; children stay at home until they marry; group members depend on each other; nepotism is common in the

workplace; and business is conducted with friends and family (Triandis, McCusker, & Hui, 1990). Nonfamily members are accorded group membership through fictive kinship relationships, such as *compradazgo* (godparents) (Carlos, 1973; Nutini & White, 1977)

Transferring membership beyond family and fictive kinship relationships is more difficult and requires the context of an in-group (Boyd & Richerson, 1991). These relationships are characterized by a high degree of attachment and loyalty, based on informal and noncontractual arrangements and consisting of vertical power-asymmetry dyads. These relationships are found largely in the workplace and other organizations.

At the organizational level, hierarchy among group members is the norm, and harmony is valued over competitiveness. Leaders consider employees from a benevolent and paternalistic relationship. The in-group sets normative values for group members. Behaviors with out-group members are characterized as competitive and distrustful. Out-groups are made up of individuals who do not share a common fate with members of an in-group (Eisenstadt & Roniger, 1984).

At the social level, Hart (1988) posed three forms of voluntary cooperation as influenced by collectivism: (a) kinship, based on extended family; (b) association, established on affection and shared experiences among friends; and (c) contract, based on the modern state and society. It is the transition from kinship and association to contract cooperation that characterizes the shift from collectivist to individualist cultures.

Banfield (1958) offered a comprehensive set of propositions regarding cooperation and trust in a collectivist, or what he termed an “amoral familistic,” society.

The essential tenet of these propositions reflects a tendency of in-group members to maximize short-term utility gain because out-group members are expected to do the same.

Banfield proposed the following in a collectivistic society:

1. Organization, comprised of voluntary and united action, is difficult to accomplish and sustain. The incentives leading to organization with nonfamily members require trust and loyalty.

2. The law will be disregarded when there is no sanction for unlawful behavior. Therefore, individuals do not enter into agreements unless the costs of enforcing them are less than the potential for profit.

3. Officeholders will take bribes if they can get away with them. Whether the officeholder takes or does not take the bribe, people will still assume it was taken.

Individualism and Collectivism in Mexico

The role of individualism and collectivism (indcol) is an important cultural force in Mexico, from the individual to the social level. Mexico is considered generally as a collectivist society (Hofstede, 1980; Marín & Triandis, 1984). The issues associated with collectivism in Mexico are presented in this section.

Individual Level

At the individual level, the roles of the *caudillo*, the *persona de confianza*, *compradazgo*, and the *camarilla* exemplify the influence of collectivism at the individual level in Mexico. The *caudillo* is a leader figure who relies principally on the extended family and close friends, belongs to few groups (should he otherwise endanger the

relationship with his own group), and values friendship above ideology (Dealy, 1977). The *caudillo* typically functions in authoritarian political and older-style private sector organizations. The *caudillo* is a throwback to an earlier period in Mexican history. For the *caudillo*, association is framed in terms of particularistic and authoritative relationships.

In a business environment, trust is extended to nonfamily members who have demonstrated trustworthy behavior through the *persona de confianza* (trustworthy person), who is a close friend chosen through personalistic and nonprofessional criteria (Cardoso, 1967). The *persona de confianza* relationship can also be formalized through religious ceremony through the concept of fictive kinship or *compradazgo* (Carlos, 1973; Nutini & White, 1977). According to Carlos (1973), “*Compradazgo* ties are sought with trusted, reputable, and respected citizens with whom an individual has some friendship, previous consanguineal or affinal kinship ties, economic dependence or interdependence, and professional association” (p. 77). In a business setting, *compradazgo* may also be used to receive favored consideration and propel the individual to management level.

The role of the *caudillo* in political circles and the *persona de confianza* and *compradazgo* manager in the business arena provides close relationships at the individual level. The *caudillo* may work through a *camarilla*, which is a personal clique rooted in reciprocal loyalties for affective and practical reasons. Political and business leaders rely largely on *camarillas*, composed of friends and contacts, to achieve their goals (Camp, 1980). Regardless of the arena of influence, whether in politics or in business, the collectivist environment contributes to a particularistic approach to

leadership (Diaz-Guerrero, 1967). In such a context, the preferred qualities of leaders are cast as liberally religious, dutiful, adaptable, idealistic, and gracious. The preferred self-attributes of the Mexican subordinate are framed as sensitive, loyal, respectful, likable, and conforming (Marín & Triandis, 1984).

Social Level

The use of organizational networks to reduce uncertainty in governmental and business arenas is a social manifestation of collectivism. The two principal manifestations described in this section are corporatism and the *grupos industriales*. Reyna (1977) defined corporatism as “the nuclearization of politically significant groups through a complex network of political organizations relating these groups to the decision making process” (p.155). Further, corporatism reduces competition for power and brings the various social entities together through a subordinated relationship to the state.

Corporatism influences the course of business and government to a great extent. For example, the creation of the chambers of industrial organizations (*Cámaras de Transformación*) and the required membership of all industrial firms in these chambers were mandated by federal law to represent the interests of industrialists in government affairs to a more formal degree than that of lobbies in the United States. Additionally, under Mexican federal law, all work sites are unionized, and the principal union, the Confederation of Mexican Workers (*Confederación de Trabajadores Mexicanos*) serves as an unofficial government organ (Lehmann, 1990).

The influence of collectivism on industrial organization in Mexico is demonstrated in the structure and management of the *grupos industriales*, reminiscent of the pre-WWII Japanese *Zaibatsu*, which are family-owned vertically integrated conglomerates. The *grupos* and other Mexican firms are characterized as vertical management structures with highly concentrated decision making in the firm's top management (Aguilar-Gómez, 1993). These firms tend to draw capital and top management talent from a single extended family and from *persona de confianza* managers (Leff, 1978). Leff suggested that these *grupos* exist as family-oriented structures in response to recurring market failure conditions.

Traditional Mexican organizations and management styles differ greatly from those found in the United States (Kras, 1990). To transform Mexican businesses into internationally competitive organizations requires changes in management culture and organizational structure (Schwedhelm-Beick, 1993). To reach world-class competitiveness, some Mexican firms consider the reorientation of management to more open and participative leadership styles and with less particularism to be a prime objective in leadership development (Kras, 1991; Llano-Cifuentes, 1994).

Empirical Studies of the Influence of Individualism and Collectivism on Cooperation

A review of the empirical research on indcol should provide more evidence that indcol is associated with the way people cooperate in and between groups. The following review of research concerns the relationship of indcol and cooperation (see Table 4).

Table 4

Empirical Studies of the Influence of Individualism and Collectivism on Cooperation

Researcher(s)	Sample	Methodology	Results
Leung & Bond (1984)	N = 96 Chinese & 96 U.S. & N = 144 Chinese & 128 U.S. students	Lab experiments	Collectivists pursue egalitarian behaviors with in-group members and act competitively with out-groups.
Espinoza & Garza (1985)	N = 48 Hispanic and Anglo students	Lab experiment	Collectivists act cooperatively with in-group members and act competitively with out-group members.
Brewer & Kramer (1986)	N = 88 U.S. students	Lab experiment	Collectivists took less from a commons situation than did individualists. In a public goods experiment, collectivists contributed less to the group's needs than individualists.
Triandis et al. (1990)	N = 34 Chinese, 99 U.S. collectivists, and 106 individualists	Survey, Stevens (1966)	On measures of association/dissociation and superordination/subordination, collectivists treat out-group and in-group members differently to a greater extent than individualists.
Cox et al. (1991)	N = 136 U.S. students from diverse populations	Lab experiment	In a prisoner's dilemma scenario, collectivists cooperate with in-group to a greater extent than individualists.
Earley (1993)	N = 165 U.S., Chinese, and Israeli managers	Field experiment, Erez & Earley (1987)	Collectivists perform at higher levels with in-group than with out-groups or alone. Individualists perform at higher levels alone than with out-groups or in-group.

(table continues)

Researcher(s)	Sample	Measures	Results
Morris et al. (1993)	N = 252 U.S. managers	Survey, IC-Killman & Saxton (1983), Hofstede (1980), & Earley (1989).	Indcol shares an inverted U-shaped relationship with entrepreneurial values. Extremes of both collectivism and individualism are related to low entrepreneurial values. A combination or midrange of IC leads to high entrepreneurial values.
Morris et al. (1994)	N = 252 U.S., 225 S. African, & 25 Portuguese managers	Survey, IC Killman & Saxton (1983), Hofstede (1980), & Earley (1989).	Replication of Morris, Avila, & Allen (1993). Similar results with an international group of respondents providing greater etic validity.
Wagner (1995)	N = 541 U.S. students	Survey, IC Wagner & Moch (1986), Erez & Earley (1987), Triandis et al. (1988)	Collectivists cooperate with in-groups to a greater extent than individualists. Indcol also exerts a moderating effect on relationship of size of group and cooperation.
Sullivan et al. (1981)	N = 48 U.S. and 72 Japanese managers	Field experiment with survey, new scale,	Individualists perceive greater future trust in managers of other firms than collectivists.
Dickson & Weaver (1997)	N = 433 Norwegian managers	Survey, Erez & Earley (1987)	Under economic uncertainty, collectivists tend to use interorganizational cooperation to greater degree than individualists.

In a lab experiment made up of Chinese and U.S. students, Leung and Bond (1984) found that collectivists reward in-group members more than out-group members, whereas individualists treat out-group and in-group members with less discrimination. Similarly, in a lab experiment manipulating cooperative conditions with 48 Hispanic and Anglo students, Espinoza and Garza (1985) ascertained that collectivists tend to act competitively with out-group members and to act cooperatively with in-group members to a larger degree than found with individualists.

Brewer and Kramer (1986), also in a lab experiment, studied the effects of in-group identity on the sharing of a common resource and contributing to a public good. In contrast to the previous lab experiments, Brewer and Kramer framed in-group identity as a manipulated treatment in two cooperative conditions. The first cooperative condition identified an individual's inclination to restrain consumption of a common resource under various conditions of depletion. The second condition distinguished the individual's tendency to contribute to a common pool for sharing among the group. Although both of these conditions constitute cooperative prosocial behaviors, they reflect two distinct acts, restraint and contribution. In their experiment, it was found that in the common resource scenario, with both large and small groups, collectivists deplete resources to a lesser degree than do individualists. In the large-group, public goods dilemma, collectivists contribute less to the common pool than do the individualists. These findings suggest that, when in small groups, collectivists act more cooperatively than in larger groups, wherein group identity begins to fragment.

In a study of indcol with 34 People's Republic of China (ROC) and 205 U.S. students, Triandis et al. (1990) found that ROC students have high association (positive feelings) and low social distance with fellow in-group members. With out-groups, however, they experience high dissociation (negative feelings) and high social distance. By contrast, U.S. subjects experience less variation on the dimensions of association/dissociation and social distance between in-groups and in-groups. Cox, Lobel, and McLeod (1991), in a prisoner's dilemma lab experiment with 136 Asian, African American, Hispanic, and Anglo students, found that U.S. minority students tend to be collectivists and to cooperate to a higher degree when in-groups are composed of collectivists other than Anglo students.

In a field experiment of 165 U.S., Chinese, and Israeli managers, Earley (1993) detected a moderating effect of indcol on individual task performance. Earley found that individualists perform at significantly better when working alone than when working with in-groups or out-groups; however, the performance difference when working with in-groups is minimally superior to that of working with an out-group. Collectivists perform at significantly better when working with in-groups than when laboring with out-groups or when alone. Further, collectivists achieve higher performance when working alone than when working in an out-group.

In a survey design of 252 U.S. managers to determine the relationship between indcol and entrepreneurial values, Morris, Avila, and Allen (1993) found an inverted U-shaped relationship between indcol and corporate entrepreneurial values. Extreme

collectivism and individualism are associated with low entrepreneurial values, while moderate indcol leads to high entrepreneurial values. In a replication of the Morris et al. study in an international setting, Morris, Davis, and Allen (1994) encountered the same results in a study of 252 U.S., 225 South African, and 25 Portuguese managers.

Wagner (1995) reported that indcol influences cooperation and also moderates the influence of situational variables such as group size, identifiability, and shared responsibility on cooperation. In a study of 541 U.S. students, Wagner noted that indcol predicts in-group cooperation and acts as a moderator in the relationship between group size and group cooperation. Specifically, collectivism is related to higher in-group cooperation, and small groups lead to increased cooperation. Otherwise, collectivists lose sight of the shared common fate of fellow group members.

Sullivan, Peterson, Kameda, and Shimada (1981) also examined the relationship between indcol and cooperation. In a field experiment of 48 U.S. and 72 Japanese managers comparing cultural differences in conflict resolution, Sullivan et al. found that Japanese managers do not use binding arbitration with other Japanese managers because they consider this method to be extremely confrontational. When dealing with American managers, however, the Japanese managers designate binding arbitration as a contractual imperative, suggesting that the Japanese attempt to save face when dealing with other Japanese and exhibit less cooperation with members of an out-culture. Sullivan et al. also noted that U.S. managers, in all the scenarios presented, expected future cooperation of others, both Japanese and U.S., more so than did the Japanese managers. Recognizing the

Japanese managers as moderately collectivist and the U.S. managers as highly individualist (Hofstede, 1980), this finding poses a relationship between individualism and cooperation.

Dickson and Weaver (1997) found that under conditions of environmental uncertainty, collectivists tend to use interorganizational cooperation strategies to a greater degree than individualists. They based their research, however, on top managers of Norwegian businesses. According to Hofstede (1980), Norwegians are considered to be moderately individualistic. Moreover, by using top managers who tend to be highly individualistic in comparison to other members of their society, Dickson and Weaver (1997) increased the likelihood that the depths of strong collectivism were not reached in this study.

The validation effort of various researchers supports the notion of a bipolar collectivist and individualist construct at the individual and social level of theory. Empirical research of indcol illustrates its influence on cooperation among individuals based on their status as in-group or out-group members; however, the influence of indcol on interorganizational cooperation has not been established in the literature. Given that the size of a group moderates the influence of indcol on cooperation, some of the findings using small groups as the reference for in-group versus out-group discrimination may have little relevance here.

Lewis (1995) stated that interorganizational cooperation is practiced more in the U.S., a highly individualist country, than in Japan, a moderately collectivist nation. His

assertion indicates that interorganizational cooperation may best be suited to individualist societies than to collectivist societies.

Research findings in Morris et al. (1993, 1994) supported a somewhat different view. They found that cooperation and entrepreneurship are best suited to a moderately individualist and collectivist society. This position supports the thesis proposed by Hirschman (1971). Overall, the research findings presented here suggest a positive relationship between individualism and interorganizational cooperation.

JIT/TQM

Organizations use JIT/TQM to gain performance benefits by reducing waste and improving quality and productivity on a continuous basis. To gain additional benefits from JIT/TQM, many organizations require increased interorganizational cooperation with their suppliers. The benefits from interorganizational cooperation include higher incoming product quality, more reliable delivery (Watts, Kim , & Hahn, 1992), access to supplier's technology (Raffa, 1994), and reduced cycle-time (Bhote, 1987). The need for these benefits has "forced greater interdependence between customer and supplier" (Hutchins, 1992, p.6). Thus, JIT/TQM acts as a superordinate goal to establish interorganizational cooperation relationships. Presented in this section are the history and elements of JIT/TQM, the role of JIT/TQM in Mexico, and a review of the influence of JIT/TQM on interorganizational cooperation.

History of JIT/TQM

JIT/TQM evolved from the introduction of various practices designed to reduce waste and provide for the needs of workers in Japan (Sugimori, Kusunoki, Cho, & Uchikawa, 1977). Toyota is credited with first developing JIT/TQM (Monden, 1983) (see Table 5). Various writers described the JIT/TQM system as first developed at Toyota, transferred to other Japanese manufacturers, and subsequently introduced to the U.S. and Europe. Early studies consisted of case studies. Schonberger (1982) referred to JIT/TQM as a “multifaceted manufacturing system” (p. 3) and a “symbiosis” (p. 42).

Table 5

Timeline of JIT/TQM Implementation at Toyota

1940s	Statistical process control and other quality tools were introduced at Toyota and other organizations in Japan by W. Edwards Deming and Joseph Juran
1949	Toyota introduced mutimachine handling by one worker.
1950	First andon board was introduced to assembly area. Andon boards controlled assembly line rate. Any worker could now stop the assembly line if a defect was found.
1950s-1960s	Toyota experimented with and developed specific tooling (e.g., transfer lines to accommodate cellular production).
1959	Operations initiated at Motomachi plant, which was a large-scale experimental facility. Suppliers were asked to relocate there and provide dedicated supply capabilities. The nearby city's name was changed from Koromo to Toyota City.
1961-1964	Total quality management, as a management system philosophy, was introduced.
1962	Labor/Management Declaration was signed giving workers lifetime employment and other rights.
1963	JIT/TQM practices were implemented at all facilities
1965	Toyota received the Deming award.
1970	JIT/TQM practices were formally termed as the Toyota Production System
(Toyota Jidosha Kogyo Kabushiki Kaisha, 1988)	

Elements of JIT/TQM

By the late 1980s, the elements making up JIT/TQM were described consistently in the literature as the *Toyota production system* (Ohno, 1988; Shingo, 1989), *JIT/TQC* (Schonberger, 1982), and *world-class manufacturing* (Schonberger, 1986). The latter term is an overarching framework that includes other organizational practices (Giffi, Roth, & Seal, 1990).

Subsequent empirical research has utilized these terms with mixed support for the world-class manufacturing framework. Sakakibara et al. (1993) stated that “JIT practices overlap with dimensions of other manufacturing practices, such as MRP, TQM, FMS, and CIM” (p. 181). Flynn et al. (1994, 1995) more directly referred to JIT and TQM as two overlapping elements of world-class manufacturing in addition to top management support, manufacturing strategy, human resource/organization characteristics, and technology management. Other researchers studying the relationships between JIT, TQM, and advanced manufacturing technology (Snell & Dean, 1992) and the underlying constructs of JIT (Davy et al., 1992), however, did not refer to the world-class manufacturing framework in their research.

Sakakibara et al. (1997) referred to JIT as the principal organizational phenomenon and included TQM, as well as workforce management, manufacturing strategy, organizational characteristics, and product design, as infrastructure activities to JIT. Further, workforce management and product design, one-time subdimensions of TQM (Flynn et al., 1994, 1995; Saraph, Benson, & Schroeder, 1989), were now

considered as independent practices from TQM (Sakakibara, Flynn, Schroeder, & Morris, 1997). Sakakibara et al. did not refer to world-class manufacturing in this research. In summary, the elements making up JIT/TQM are consistent, but the nomological net among these elements is not fully established.

For this study, JIT/TQM is defined as a system of complementary manufacturing practices comprised of JIT, TQM, and their common infrastructure practices (CIP) used to meet the customer's production cost, quality, time, and volume requirements (Flynn et al., 1995). The elements of JIT/TQM are further defined in this section.

JIT

JIT is considered as both a philosophy and a set of techniques to improve productivity by simplifying a firm's processes. JIT's benefits consist of decreased scrap, inventory, and design response time and increased quality and productivity (Goyal & Deshmukh, 1992). Goyal and Deshmukh further stated that functional definitions of JIT by various authors do not agree. The primary reason for disagreement appears to be the multifaceted aspect of this organizational construct. JIT is a recent phenomenon developed in Japan. In the United States and Europe, JIT has been adapted and implemented in a piecemeal fashion due to cultural and situational constraints (i.e., workers' welfare and participation are often ignored). Further, JIT is expanding beyond the assembly line and moving into other manufacturing environments. Therefore, the construct that researchers found to be the rule in Japan may be different in the United States and Europe.

Additional confusion is created because functional descriptions of JIT overlap in the way it is operationalized. For example, Sugimori et al. (1977) portrayed JIT in two major dimensions; (a) cost reduction through waste elimination and (b) concern and use of workers as a problem-solving resource. Goyal and Deshmukh (1992) listed production smoothing, multifunction workers, work standardization, and the *kanban* system as the major components of JIT. White (1993), using terms common to U.S. managers, listed quality circles, total quality control, focused factories, total productive maintenance, reduced setup times, group technology, uniform workload, multifunction employees, and *kanban* as JIT's essential elements. For purposes of this research, JIT is comprised of *kanban*, reduction of lot sizes, just-in-time scheduling, and reduction of setup times. These elements were presented and operationalized in Flynn et al. (1995).

Kanban. *Kanban* is an inventory management tool that controls the gateway release of materials into the manufacturing process (White & Ruch, 1990). Sakakibara et al. (1993) defined *kanban* as, "the integration of plant and suppliers in production, in terms of using *kanban* cards and containers" (p. 184). *Kanban* is the element that makes JIT a pull system as opposed to a centralized materials requirement planning (MRP) system that proactively pushes material into the manufacturing system by anticipating production needs. As a pull system, *kanban* cards or containers signal the requisition of material from an internal store or, in some cases, directly signal a supplier for production and delivery. The total number of available cards and containers controls the amount of material found in the manufacturing system at any given time (Flynn et al., 1995).

Reduction of lot sizes. Reduced lot sizes improve production flexibility and reduce costs. Flexibility is attained by making shorter production runs or by ordering smaller lot sizes from suppliers to replenish inventory sooner than with large lot sizes. In this way, production schedules can respond to customer demands in less cycle time and allow a manufacturer to route mixed model production runs in the same production area (Sugimori et al., 1977). Lot size reduction also reduces costs by having less work-in-process inventory at any given time (Flynn et al., 1995). Unlike the traditional static economic order quantity (EOQ) used to determine a fixed lot size, JIT's reduced lot size principle, coupled with its continuous improvement philosophy, strives to produce in increasingly smaller lot sizes.

Just-in-time scheduling. JIT scheduling facilitates production leveling by allowing schedulers to fill production gaps more easily with smaller production runs than with larger runs. White and Ruch (1990) referred to this JIT component as *uniform workload*, in which schedule changes reduce the fluctuation of daily production schedules and the master production schedule. JIT scheduling lowers waste by using available resources at a constant rate. In traditional manufacturing, schedules are less efficient and use extra resources, such as overtime, to stay on schedule.

As with reduced lot sizes, JIT scheduling also allows mixed model production. Smaller lot sizes, each consisting of a differing model, can be inserted into the daily production schedule (Flynn et al., 1994; Sugimori et al., 1977). In addition to *kanban* and

reduced lot sizes, JIT scheduling also controls the amount of work-in-process material in the manufacturing system at any given time.

Reduction of setup times. Setup time refers to the non-value-added time used to change a transformation process from one model to another. Setup time consists of internal and external components. Internal setup time refers to the changes that an operator can accomplish while a particular piece of equipment or process is operational. External setup time pertains to the time used to change over to a different process during which the equipment remains idle.

Setup time is considered a fixed cost for a production run. A longer production run spreads the costs of the setup time over a larger number of units produced (Sugimori et al., 1977). Reduced setup times decrease costs by cutting the fixed cost component of each part. Shingo (1985) advocated the eventual goal of a single minute exchange of die, termed *SMED*. Reduced setup times also enhance lot-size reduction practices and *kanban* (White & Ruch, 1990).

Total Quality Management

Total quality management (TQM) functions as a philosophy and system of practices to improve process and product quality. In contrast to traditional quality control, TQM provides an integrated approach to a firm's quality improvement efforts. The traditional approach to quality is reactive and nonsystematic. Consequently, quality improvements are rarely achieved.

In an attempt to set the boundaries for TQM, various writers have proposed definitions to explain the new approach to quality improvement (Reeves & Bednar, 1994). These definitions possess both strengths and weaknesses. To render a more inclusive definition, Reeves and Bednar proposed a multidefinitonal approach to quality involving excellence, value, conformance to specifications, and meeting and/or exceeding expectations.

Based on the preceding criteria, the following definition, proposed by Flynn, Schroeder, and Sakakibara (1994), is used for this study:

TQM is an integrated approach to achieving and sustaining high quality output, focusing on the maintenance and continuous improvement of processes and defect prevention at all levels and in all functions of the organization, in order to meet or exceed customer expectations. (p. 342)

Discussed in this section are TQM's elements, comprised of focus on end customers, process quality management, and design for quality. These elements were presented and operationalized in Flynn et al. (1995).

Focus on end customers. End customers dictate what they consider a quality product. Reeves and Bednar (1994) and Feigenbaum (1991) stated that meeting customers' expectations is the most pervasive of the quality definitions. Quality management researchers tend also to define quality from a production viewpoint in which intermediate customers are as valued as the final customer (Feigenbaum, 1991; Juran & Gryna, 1988). The intermediate customers include buyers in the supply chain and production units within an organization. Focusing on customers at all levels of the supply

chain provides a firm with valuable feedback to guide quality improvement efforts (Flynn et al., 1994).

Process quality management. Under the traditional quality control paradigm, process quality management is nearly nonexistent. Workers make products without much direction other than the specifications provided by engineers. This traditional quality focus is on the end-inspection of products and acceptable levels of quality. The transition to TQM, to the contrary, involves workers in the feedback process to continually improve production through process quality management.

A central aspect of process management is the use of various statistical process control (SPC) tools such as Ishikawa fishbone charts, Pareto analysis, histograms, scatter charts, and control charts (Ebrahimpour, 1985). Saraph et al. (1989) further added selective automation, foolproof process design, and automated testing to improve process management. Moreover, Flynn et al. (1994) proposed equipment, process, and maintenance improvement, standardized instructions, and improved cleanliness of the work area as methods to augment process quality management.

Design for quality. Quality managers have long stated that many quality problems emanate from poor design. These managers contend that poor designs result in high assembly costs when components use less than optimum materials and processes and are responsible for many field reliability problems. Design for quality proactively includes quality into products and processes (Ebrahimpour, 1985). Design for quality has been termed as *product/service design* (Saraph et al., 1989) and *design for manufacturability*

(Flynn et al., 1994). Design for quality involves multidisciplinary teams, increased contact with customers and suppliers, design reviews by all affected functional areas, emphasis on reproducibility, clarity of specifications, and emphasis on product quality over product roll-out.

Common Infrastructure Practices

Many of the practices originally considered exclusively as forming part of TQM or JIT were found to support both manufacturing practices. In this study, they are considered common infrastructure practices (CIP). These practices are comprised of information feedback, management support, plant environment, and workforce management; they are presented in this section. These elements were presented and operationalized in Flynn et al. (1995).

Feedback system. The increased decentralization of decision making and increased reliance on production workers to improve quality and productivity requires the use of timely, accurate and relevant reporting systems. These systems are maintained by operators. Without reporting systems, the coordination of JIT/TQM programs becomes difficult. Saraph et al. (1989) suggested providing timely quality feedback to employees for problem solving. These feedback systems provide vertical and horizontal organizational information flows.

Flynn et al. (1994) further suggested an information system using verbal feedback and performance, posted graphic feedback, process feedback, customer satisfaction

feedback, and general information on plant performance. Under their approach, feedback provides an environment in which to learn and improve JIT/TQM practices.

Management support. JIT/TQM requires top management's support. Only top management can provide the resources and marshal company policy to make JIT/TQM a long-term success (Garvin, 1986; Leonard & Sasser, 1982). The transition to JIT/TQM, as practiced by the Japanese, however, has not been easy for U.S. managers. According to Garvin, U.S. managers tend to place a lower emphasis on efficient, high-quality, and low-cost production than do Japanese managers. Besides the inertia found in inefficient and poor quality production, cultural barriers contribute to management's slow adoption and adaptation of JIT/TQM (Young, 1992).

To accommodate the transition to JIT/TQM, Flynn et al. (1995) listed the following mandates that top management should provide for JIT/TQM: (a) designate continuous improvement as a central element of competitive strategy, (b) provide all employees with opportunities for active involvement in the organization's quality and waste reduction efforts, (c) develop a corporate culture that focuses on quality and productivity, (d) establish an environment that rewards performance, and (e) communicate top management's commitment to quality and productivity throughout the organization.

Plant environment. A clean, well-maintained plant environment is an essential element of the common infrastructure for JIT/TQM. A clean workplace is consistent with

the principles of consideration of the worker. In addition, a clean workplace tends to be a safer workplace (Sugimori et al., 1977).

From a JIT standpoint, a well-maintained work environment averts production downtime. Averting production downtime eliminates waste associated with emergency repairs and the lost opportunity cost of unplanned idle workers and machinery. Moreover, consistent and well-adjusted production facilitates balanced scheduling (Sakakibara et al., 1993).

From a TQM perspective, well-maintained equipment is less likely to introduce production variance beyond defined production parameters. Well-maintained equipment will more likely remain around the mean of a process parameter than move toward the extremes of the normal distribution (Flynn et al., 1994; Saraph et al., 1989).

Workforce management. Under traditional manufacturing practices, employees are excluded from the quality and productivity improvement process. Under JIT/TQM, however, employee participation and responsibility stand out as an integral element. Flynn et al. (1994) found that employee participation is based on the following human resource management practices: continuous training, stable employment, production incentives, an organization centered around flexible self-managed work teams, and egalitarian management. Saraph et al. (1989) stated that TQM relies heavily on employee participation in empowered quality circles. Ebrahimpour (1985) posited that management should provide continuous formal and informal training, considered a long-term investment, for employees who are responsible for solving quality and productivity

problems. Thus, employee participation involves team participation, decentralized decision making, continuous training, and consideration of the worker.

JIT/TQM in Mexico

The literature provides contradictory findings on the use of JIT/TQM in Mexican industry. The controversy arises from the samples used to generalize to Mexican industry. The following section provides a discussion of the opposing views on JIT/TQM in Mexico.

Nonsupport for JIT/TQM in Mexico

A larger portion of the literature reviewed indicated a lack of support for JIT/TQM in Mexico. In general, Mexico's overall industrial sector is underdeveloped. According to James (1991), Mexican capital goods manufacturers tend to employ vertical integration strategies more than organizations in other Latin American nations. He observed that Mexican capital goods manufacturers do not reap the benefits of subcontracting, which should lead to *learning linkages*. Learning linkages promote quality and productivity. Further, James posited that Mexico's industrial sector is too broad to take advantage of economies of scale. This assessment concurs with Truett and Truett (1989), who stated that Mexico should benefit from further economies of scale. Mexican organizations also suffer from high rates of attrition among suppliers, low productivity, poorly educated workers, and low process quality when compared to their counterparts in industrialized countries (CONACYT, 1997).

In the automotive parts industry, Lamming (1989) found that single sourcing is practiced due more to a lack of world-class suppliers than to choice. Furthermore, these manufacturers lack world-class research and development capabilities. These findings were corroborated by a study by the CONACYT (1997). Finally, Lawrence and Lewis (1993) described an infrequent use of JIT throughout the supply chain in Mexico. These points indicate a generally poor conditions for JIT/TQM.

Support for JIT/TQM in Mexico

Ebrahimpour and Schonberger (1984) theorized, in contrast, that JIT/TQM can be adapted and used in a less-developed country such as Mexico. According to Nishiguchi (1994) and Womack et al. (1990), the Mexican automotive parts industry currently employs elements of JIT/TQM to a significant degree; however, closer inspection of their work requires a qualified interpretation. First, some of the firms they referred to are *maquiladoras*, which do not buy from Mexican suppliers. The term *maquiladora* is used for Mexican assembly plants, generally found in the northern border region with the United States. The plants import materials duty free, assemble them into semifinished products, and export these products where usually only a value-added import tariff is assessed. The *maquiladora* industry imports most of its input materials from foreign sources (Palacio-Flores, 1991; Vargas & Johnson, 1993), sourcing less than 2 percent of input materials from Mexican suppliers (Instituto Nacional de Estadística, Geografía, e Informática, 1991). Moreover, proximity to the U.S. and the availability of low-cost labor

serve as much more important location decision factors than the availability of competent suppliers (Fawcett, 1993).

Second, *maquiladoras* are typically foreign owned and managed. They do not represent the typical Mexican owned and managed industrial firm. Management decisions tend to be made by expatriate managers. The local purchasing staff tends to be relatively inexperienced and sources only maintenance, repair, and operation (MRO) items on a limited basis (Fawcett, 1993). Thus, support for JIT/TQM in Mexico is not substantial.

The advent of trade agreements, however, may increase the conditions for JIT/TQM and associated competitiveness. Rubio (1993) commented, "Industrial consumers, with more leverage, can now demand from their suppliers concessions of quality, price, and service that would have been inconceivable in the past" (p. 39).

Empirical Studies of the Influence of JIT/TQM on Cooperation

The empirical literature on the influence of JIT/TQM on interorganizational cooperation is presented in Table 6 and described in this section. O'Neal (1989), in a study of 46 purchasing managers, each representing a British automotive parts firm, revealed several findings.

Firms using JIT practices require the use of long-term contracts, a reduced number of suppliers, and interorganizational cooperation at various levels of the organization. These levels refer to marketing, customer service, design engineering, quality assurance, materials management, and production. Interorganizational

Table 6

Empirical Studies of the Influence of JIT/TQM on Cooperation

Researcher(s)	Sample	Methodology	Results
O'Neal (1989)	N = 46 automotive OEMs with 46 managers	Survey, new scale	OEMs using JIT require long-term contracts, reduce supplier base, and have closer supplier relations with various organizational functions to realize interdependent benefits.
Msimangira (1993)	N= 50 firms, no mention of number of key informants	Survey, new scale, and interviews	In a study of potential JIT use in textile industry in Tanzania, a LDC, 30% of firms cite supply inadequacies as reasons not to employ JIT
Lascelles & Dale (1989)	N = 300 firms with 300 managers	Survey, new scale	Suppliers serve as an essential extension of the buyer's quality program, which is driven by globalization and changes in market.
Saraph et al. (1989)	N = 20 firms, 162 managers	Survey, new scale	TQM is highly correlated with Interorganizational Cooperation (IC). IC is considered an element of TQM.
Sakakibara et al. (1993)	N = 42 firms, 716 managers	Survey, new scale	IC is considered an element of JIT
Flynn et al. (1994)	N = 42 firms, 716 managers	Survey, new scale, based on Saraph et al. (1989), Sakakibara et al. (1993)	IC is considered an element of TQM.

(table continues)

Researcher(s)	Sample	Measures	Results
Hendrick & Ellram (1993)	N = 192 firms, no mention of key informants	Survey, new scale, and interviews	Descriptive statistics provided for a practitioner audience. JIT is ranked low as a reason to enter into IC. Buyers list reliable and low-cost supply as reason to begin IC.
Stuart (1993)	N = 240 managers	Survey, new scale	Reduced downtime, rework, inventory cycle time, inventory levels, product cost, and improved quality are significant outcomes of IC
Esposito & Raffa (1994)	N = 61 managers	Survey, new scale, and interviews	IC is implemented with principal suppliers based on buyer's demanding quality requirements.
Song et al. (1997)	N = 300 firms	Survey, new scale	Reward structures and management expectations influence interfunctional cooperation in Mexican high-tech firms.
Husted (1994)	N = 4 firms, 46 managers	Case, interviews	Asset specificity is considered a posteriori occurrence, not an a priori condition of IC implementation
Nishiguchi (1994)	N = 394 institutions, 813 respondents	Case, interviews	IC is unexplainable by one factor alone. National culture, business environment, and flexibility and quality requirements explain IC. Asset specificity is an a posteriori development to IC.
Flynn et al. (1995)	N = 42 firms, no number of key informants	Survey, Saraph et al. (1989), Sakakibara et al. (1993), and Flynn et al. (1994)	Agile manufacturing practices require IC. TQM is a more significant predictor of IC use than JIT. IC interact significantly with JIT scheduling and good product design to predict high perceived quality.

cooperation practices are used to gain interdependent benefits consisting of increased product-design quality and standardization.

Msimangira (1993), using a survey and interview research design, examined the response of managers from 50 Tanzanian firms. The survey was based on the possibility of future, not actual JIT implementation. Speculation of future implementation may have given managers an opportunity to provide less than accurate findings. Despite this methodological shortcoming, information gleaned from their study shows that Tanzanian textile firms depend on low-cost labor to the point of overdependence. Overdependence on low-cost labor may indicate that managers have not internalized the philosophy of waste minimization and optimal use of human capital. Further, 30 percent of the respondents cited supply problems as the major constraint to JIT implementation.

In a study of British manufacturing, Lascelles and Dale (1989) examined the relationship of TQM to interorganizational cooperation. Based on a survey of 300 suppliers, they found that suppliers serve as an extension of the buyer's quality program. They also observed that buyers need to communicate their quality needs with suppliers more effectively. Moreover, a buyer's credibility suffers when cost takes precedence over quality in a time of crisis. These points indicate the need for buyers to exercise closer communication and nonopportunistic behaviors.

In a study to develop a valid and reliable questionnaire to measure TQM, Saraph et al. (1989) queried 162 managers at 20 firms. An interorganizational cooperation scale, made up of items corresponding to supplier development, early supplier involvement,

evaluation and certification, and long-term relationship, was labeled as supplier quality management and was listed as an element of TQM. They found that interorganizational cooperation is related with the TQM subdimensions of top management leadership, role of the quality department, role of training, product design, process management, quality feedback, and employee relations.

Sakakibara et al. (1993) provided a survey study of JIT practices in 42 U.S. and Japanese plants. The interorganizational cooperation construct, as measured by variable scale items relating to early supplier involvement, evaluation and certification, and long-term relationship, was referred to as supplier management. They found that interorganizational cooperation is considered one of JIT's three elements.

Flynn et al. (1994) remedied what they consider to be shortcomings of the Saraph, et al. (1989) TQM construct validation study. Flynn et al. surveyed 716 respondents at 42 United States and Japanese plants in a variety of industrial environments. To address methodological shortcomings in past research, they changed the level of analysis from the corporate level to the plant level, surveyed a wider constituency of respondents, and based the scale's content validity on empirical data. In addition, the interorganizational cooperation construct, as defined by early supplier involvement, evaluation and certification, and long-term relationship scale items, was placed under TQM and was termed *supplier involvement*. As with the earlier effort by Saraph et al. (1989), interorganizational cooperation and TQM share a relationship. In this study, they found

that interorganizational cooperation is related to a firm's process control and new product quality efforts.

Hendrick and Ellram (1993), in a survey of managers from 192 *Fortune 500* firms, established that a buyer's preference for a low-cost and reliable supply serves as a more important reason to enter into interorganizational cooperation. This study, however, suffers from several methodological limitations. First, despite the use of a large sample, the authors omitted tests statistical significance to determine the strength of the findings. Second, as a study intended for practitioners, many important findings were presented with little or no causal inference. The lack of clear hypotheses limits the study's findings for scientific use. Finally, the study's level of analysis at the corporate level is suspect.

In a survey study of 240 senior purchasing managers of manufacturers in the United States, Stuart (1993) determined that competitive pressure, importance of purchased inputs, and purchasing philosophy lead to interorganizational cooperation. Although the results are noteworthy, they require a closer inspection of the scale items, which may lead to inconclusive findings. The wording of the scales indicates poor content validity. For example, two of the variables, purchasing philosophy and interorganizational cooperation, share a correlation coefficient of 0.72, which indicates multicollinearity. Given the omission of advanced construct validation procedures, the relationship may be considered suspect.

Esposito and Raffa (1994), in a survey and interview study of 61 Italian automotive and aircraft parts industry buyers, discovered that these firms use

interorganizational cooperation primarily to satisfy their high quality needs. They also found that these firms initiate interorganizational cooperation with their principal suppliers more than with their second and third most important suppliers. In addition, interorganizational cooperation becomes a more visible *modus operandi* if the sourced part is complex.

In a survey study of 300 high-tech firms in Mexico, Song, Montoya-Weiss, and Schmidt (1997) found that reward structures and management expectations function as factors to facilitate interfunctional cooperation in the new-product design process. Reward structures and management expectations roughly fit as partial surrogates of JIT/TQM, and cooperation between functions (e.g., design and manufacturing) is the intermediate step between small group and interorganizational cooperation.

In a case study of 46 interviews from two Mexican and two United States buyers, Husted (1994) found little support for the asset-specificity argument as posed in TCE theory (Williamson, 1981, 1993c). Asset specificity refers to the level of resources a supplier possesses that makes it difficult for a buyer to defect to another supplier. Husted (1994) stated that asset specificity occurs *a posteriori* to the establishment of interorganizational cooperation. In the Mexican industrial environment, Husted also wrote that interorganizational cooperation exists, but that it is initiated largely by foreign firms. In contrast, Mexican owned and managed firms do not practice interorganizational cooperation.

Nishiguchi based his case study on 813 interviews with managers, government officials, academics, and other interested parties from 394 institutions related to the automotive industry around the world. Nishiguchi (1994) found a strong relationship between the use of interorganizational cooperation and a firm's JIT/TQM efforts. Nishiguchi concurred with Husted's (1994) assertion that asset specificity occurs after the establishment of an interorganizational cooperation. Nishiguchi also contended that many factors, particularly national culture, influence the establishment of interorganizational cooperation. Of the causal factors that are within a firm's control, the need to establish manufacturing flexibility and improve incoming quality influences the implementation of interorganizational cooperation.

Finally, the Flynn et al. (1995) work stands as a capstone piece of research on JIT/TQM. In their study of 42 plants in the United States and Japan, Flynn et al. (1995) integrated an JIT/TQM framework, consisting of TQM, JIT, and CIP, based on prior validation efforts and empirical findings from Saraph et al.(1989), Sakakibara et al. (1993), and Flynn et al. (1994). With the Flynn et al. (1995) framework, interorganizational cooperation, as graded by scale items relating to early supplier involvement, evaluation and certification, and long-term relationship, and termed *supplier relationship*, was included as a common infrastructure practice to support JIT/TQM. Flynn et al. (1995) indicated that the TQM aspects of JIT/TQM exhibit a more significant relationship with interorganizational cooperation than do the JIT practices.

The influence of JIT/TQM as a superordinate goal on the establishment of interorganizational cooperation in industrialized countries is established in empirical research. Within JIT/TQM, the delivery of high-quality materials and a closer integration with the buyer's scheduling system provide the principal explanations of why a buying firm attempts to enter a closer relationship with its supplier. Interorganizational cooperation is also established with principal suppliers that provide complex components. Finally, JIT/TQM and interorganizational cooperation are not found to as great an extent in less-developed countries (LDCs) as in industrialized countries. Ebrahimpour and Schonberger (1984) explained that JIT/TQM offers a potential tool to improve industrial development in the LDCs. JIT/TQM is practiced more in mature industrial communities, especially within their repetitive manufacturing sectors.

Some of the studies lack a theoretical framework on which to base their research. One of the problems encountered in the literature is the paucity of research using a common and valid definition of interorganizational cooperation. Flynn et al. (1994) described the need to develop a better pencil-and-paper type construct measure for interorganizational cooperation. In addition, many authors omitted or used an incomplete discussion of construct validation procedures. Much of the literature exhibits research designs lacking overall validity. These issues reflect a larger problem as the field of operations management demonstrates a lack of research methodology maturity (Barman, Tersine, & Buckley, 1991; Flynn, Sakakibara, Schroeder, Bates, & Flynn, 1990; Meredith, Raturi, Amoako-Gyampah, & Kaplan, 1989).

Individual and Organizational Demographics

Research concerning the influence of interorganizational trust, individualism and collectivism (indcol), and JIT/TQM on interorganizational cooperation in Mexico is affected by various exogenous variables, which may introduce spurious effects. These variables relate to both individual and organizational attributes and are listed in this section.

Individual Demographics

Individual demographic factors, including an individual's age, educational level, and gender, act as exogenous variables in studies of trust and indcol (Sodowsky, Lai, & Plake, 1991; Wagner, 1995).

Age

Age influences the degree to which an individual represents previous or more recent social values. Hofstede (1980) stated that an individual's cultural norms may change slowly over time. Despite the glacial-like movement, cultural differences can be found between generations in any society.

Educational Level

Educational level also affects an individual's indcol orientation because learning experiences tend to emphasize the individual over the group. A person's educational level is also related to economic status, which also tends to increase the level of individualism (Triandis et al., 1990). Higher levels of education also lead to higher levels of trust in others (Farris, Senner, & Butterfield, 1973). Moreover, higher levels of education may

expose an individual to world-class management, especially if one is employed by leading firms that concentrate on promoting graduate studies for their top management.

Gender

Gender plays an interesting part as an exogenous role in studies employing individualism as a construct. In an individualist society, there is less difference between male and female roles. In a more collectivist society, however, females are expected to be nurturers and cooperators and to act less aggressively than males (Lykes, 1985).

Organizational Demographics

Organizational demographic factors may influence the use of interorganizational cooperation in a less-developed country (LDC) such as Mexico. Organizational size has been identified as a significant variable for this study. Organizational size may affect the implementation of interorganizational cooperation due to management's disposition to introduce new technology and the power asymmetry differences found between buyers and suppliers. Management's disposition to introduce world-class practices differs between the large firms and the small and medium national businesses. Small and medium national organizations in Mexico tend to utilize new technologies less than the larger national and multinational organizations (Blomstrom, 1988). Organizational size is an important factor in the use of interorganizational cooperation, both in an LDC and, to a lesser extent, in an industrialized nation.

Research Model and Hypotheses

The following section contains the chapter conclusion, in which the research model and hypotheses are presented. The hypotheses and their interrelationships are depicted in the research model.

Research Model

Based on the literature reviewed in this chapter, the research model in Figure 1 was used in this study. The model is based on an analysis of institutions (North, 1990). Institutionalism is a response to and substitute for transaction cost economics (TCE). TCE is a theoretical framework proposed by Coase (1937) and Williamson (1981) to explain cooperation between organizations. The criticism of TCE aims directly at its underlying assumptions. Principally, critics have contended that economic actors should not be considered as equally self-interested, calculative, opportunistic, rational, and utility-maximizing beings (Arrow, 1975; Collard, 1978; Elster, 1990a, 1990b; Ghoshal & Moran, 1996; Moran & Ghoshal, 1996; Sen, 1978; Tversky & Kahneman, 1990; Tyler, 1990). The analysis of institutions approach, by contrast, relies on cultural norms and behaviors, which vary from individual to individual and from society to society, as factors leading to interorganizational cooperation.

As seen in Figure 1, the model reflects the roles of trust, indcol, and JIT/TQM and CIP and their association with interorganizational cooperation.

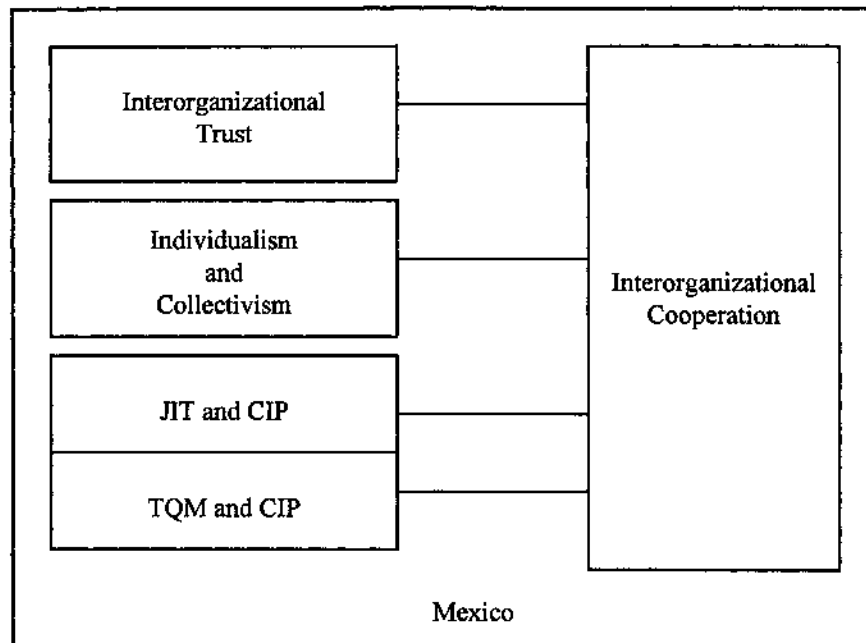


Figure 1. Research model.

Hypotheses

The hypotheses presented here reflect the elements of the research model as illustrated in Figure 1. These hypotheses specify the relationship of interorganizational trust, indcol, and JIT/TQM with interorganizational cooperation. The relationship of trust on cooperation within groups has been tested in a number of studies (e.g., Friedman & Podolny, 1992) with significantly positive results. The relationship between interorganizational trust and interorganizational cooperation, however, has received little testing despite the consensus among theoreticians (e.g., Ansari & Modarress, 1986; Lewis, 1995).

Hypothesis 1: Interorganizational trust is positively associated with interorganizational cooperation.

Collectivism has been tested to extend a positive relationship with cooperation within groups and a negative influence with cooperation between groups. Conversely, individualism is associated with moderate competition among group members and increased cooperation between groups (e.g., Leung & Bond, 1984; Triandis et al., 1990). A combination of individualism and collectivism, however, provides a superior explanation of interorganizational cooperation (Morris et al., 1993, 1994). The specific relationship of individualism and interorganizational cooperation at the organizational level in a collectivist country, however, has received little attention.

Hypothesis 2: Individualism is positively associated with interorganizational cooperation.

JIT/TQM, comprised of TQM, JIT, and their CIP, improves an organization's performance. To gain synergies in the supply chain, buyers use interorganizational cooperation to gain further performance benefits.

Hypothesis 3a: TQM practices (statistical process control, product design, and customer focus) and their CIP (information feedback, management support, plant environment, and workforce management) are positively associated with interorganizational cooperation.

Hypothesis 3b: JIT practices (*kanban*, lot-size reduction, setup time reduction, and JIT scheduling) and their CIP (information feedback, management support, plant environment, and workforce management) are positively associated with interorganizational cooperation.

Sherif et al. (1961) and Tajfel (1982) explained that the introduction of a superordinate goal reduces the ethnocentric effects of collectivism and the lack of interorganizational trust.

Hypothesis 4a: The superordinate goal effect of TQM practices (statistical process control, product design, and customer focus) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than interorganizational trust.

Hypothesis 4b: The superordinate effect of TQM practices (statistical process control, product design, and customer focus) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than indcol.

Hypothesis 5a: The superordinate goal effect of JIT practices (*kanban*, lot-size reduction, setup time reduction, and JIT scheduling) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than interorganizational trust.

Hypothesis 5b: The superordinate goal effect of JIT practices (*kanban*, lot-size reduction, setup time reduction, and JIT scheduling) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than indcol.

Chapter Summary

A complete overview of the literature involving the influence of institutional forces on interorganizational cooperation is provided in this chapter. Interorganizational cooperation is conceptually defined as a cooperative and interdependent resource-sharing relationship between a buyer and supplier. Operationally, interorganizational cooperation consists of supplier development, early supplier involvement, evaluation and certification, total cost analysis, and long-term relationships.

Interorganizational trust serves as an argument to explain interorganizational cooperation. Although many studies provide a causal relationship between trust and interpersonal cooperation, limited attention has been given to interorganizational trust and its relationship with interorganizational cooperation.

Indcol functions as a second explanation of interorganizational cooperation. Collectivist cultures tend to promote cooperation with members of in-groups and competition with members of out-groups. Again, much of the literature deals with cooperation at the small-group level, with little research conducted among organizations.

JIT/TQM performs a superordinating role to bring organizations together under interorganizational cooperation. Organizations employing TQM, JIT, and CIP attempt to achieve further benefits from reduced design and production cycle times and increased incoming product quality, as well as other benefits from greater coordination with vendors through interorganizational cooperation.

The role of interorganizational trust, indcol, and JIT/TQM may be quite different in a less-developed country such as Mexico. A study of interorganizational cooperation in a less-developed country requires an understanding of the country's industrial and managerial context, which has been provided in detail in this chapter.

Finally, the relationship between interorganizational trust, indcol, and JIT/TQM and interorganizational cooperation is presented in a research model derived from North's (1990) institutional framework. In total, five main hypotheses were tested in this study. The research methodology is described in detail in the following chapter.

CHAPTER III

RESEARCH METHODOLOGY

This chapter describes the research methodology used in this study. The chapter narrative discusses the number and characteristics of subjects, measures, procedures, and the data analysis tools used to test the study's hypotheses.

Subjects

The selection of subjects for this study involved several issues concerning the appropriate characteristics and number of respondents. These issues are discussed in this section.

Characteristics of Subjects

As a starting point, Sackett and Larson (1990) have advised researchers to record the level of analysis as part of the research design. In doing so, researchers should describe the level of theory, which is the target of the research, and the level of measurement, which is the actual source of the data (Klein, Dansereau, & Hall, 1994). The level of analysis used in this study exists at the plant level.

The choice of industry was based on the need to examine an industrial community in which interorganizational cooperation practices are found. The automotive parts

industry was examined in this study due to its historical application of new technology and the influence of global competition (Nishiguchi, 1994; Womack et al., 1990).

During the 1960s, Mexico embarked on an ambitious import substitution program in the automotive industry to develop national suppliers. The Mexican government legislated the growth of national content per vehicle from 25 percent in 1962 to 70 percent by the end of that decade. Many of the suppliers in this nascent industry were Mexican owned and managed firms (Wionczek, Bueno, & Navarrete, 1988).

The majority of the automotive parts suppliers are concentrated in the Monterrey, Saltillo, Mexico City, Puebla, and Toluca urban areas. Lamming (1989) provided detailed information on the concentration and capabilities of the Mexican automotive parts supply industry. An examination of industrial census data on the automotive parts industry further indicates a sizeable presence (Instituto Nacional de Estadística, Geografía, e Informática, 1986). The automotive parts organizations for this study were identified through a list provided by the BANCOMEXT, the Mexican government export development bank. The list contains 474 automotive parts manufacturers operating throughout Mexico.

While the level of theory for this study is based at plant level, individual managers who acted as key informants provided the data. The key informant was defined as the individual responsible for the implementation of purchasing policy and procedure. These subjects were asked to provide information on their cultural values as represented by *indcol*, the JIT/TQM practices in their organization, their trust of their principal supplier,

and their interorganizational cooperation practices with their principal suppliers. The status of principal supplier was defined as the supplier providing the highest monetary volume (pesos) of production materials. Most interorganizational cooperation relationships are conducted between the buyer and the principal supplier (Esposito & Raffa, 1994; Hendrick & Ellram, 1993).

The Flynn et al. (1995) scale used single and multiple respondents at various levels of their respective organizations for construct validity purposes. These respondents answered specific questions about which they had knowledge. For example, the quality assurance manager answered sections of the questionnaire dealing with quality, such as using SPC (see survey Item 11 in section 3A of Appendix A). In many cases, single respondents were used.

Sample Size

An a priori power analysis, as suggested by Cohen (1988), was used here as the method to select an appropriate sample size. The power analysis helps to avoid committing a Type II error, which represents the probability error of failing to reject a true null hypothesis (Mazen, Hemmasi, & Lewis, 1987). The power analysis is a function of the following parameters: (a) alpha (α), which is the significance level of avoiding a Type I error; (b) effect size, which is the significance of the results (i.e., to what extent does “X lead to Y?”); and (c) sample size.

Convention suggests a power of the test ($1 - \beta$) level of 80 percent and alpha (α) set at 5 percent (Cohen, 1988). Cohen listed a possible range of effect sizes from small

(2%), medium (15%), to large (35%) for multivariate statistical methodology. The effect size is positively related to statistics such as the coefficient of determination (R^2) and the coefficient of correlation (r) in multivariate analysis, and it is inversely related to sample size.

Based on a large effect size from studies using the same or related constructs, methodology, and theoretical base (Flynn et al., 1995; Wagner, 1995), a sample size of approximately 60 organizations was calculated. The calculation was made using NCSS/PASS software, and the results are presented in Appendix B (Hintze, 1993). To improve the statistical conclusion validity, a larger sample was used. Questionnaires were obtained from a random sample of 30 manufacturers in Monterrey, 2 in Saltillo, and 46 in Mexico City. Of this sample, 73 respondents provided useful questionnaires. Entire sections of data were missing from five questionnaires, and these were not used. Nonresponse was limited to six organizations that declined to participate.

Measures

The operationalization of the variables used in this study is described in this section. The independent variables include measures representing interorganizational trust, indcol, and JIT/TQM. These measures have been validated in research documented by their respective developers. The dependent variable, interorganizational cooperation, is a composite of items adapted from Flynn et al. (1995), Hendrick and Ellram (1993), and this study's researcher. The survey instruments representing the independent and dependent variables and demographic data are summarized in Table 7 and are presented

Table 7

Independent and Dependent Variables

Variable	Subdimension	Survey section	Survey items	Source	Reliability
Interorganizational Trust		1	1-12	Cummings & Bromiley (1996)	.93
Indcol	Independence & Self-Reliance	2	2, 4, 14, 16, 18	Wagner (1995)	.72
	Work Alone Ethic	2	8, 11, 12	Wagner (1995)	.83
	Subordination of Individual Needs to Group Interests	2	3, 5, 15, 17	Wagner (1995)	.80
	Effect of Individualism on Group Productivity	2	1, 7, 19	Wagner (1995)	.76
TQM	Customer Focus	3A	1 - 3	Flynn et al. (1995)	.76
	Product Design	3A	4 - 10	Flynn et al. (1995)	.83
	SPC	3A	11 - 13	Flynn et al. (1995)	.69
JIT	Kanban	3B	1 - 4	Flynn et al. (1995)	.90
	Lot Size Reduction	3B	5 - 7	Flynn et al. (1995)	.78
	Setup Time Reduction	3B	8 - 10	Flynn et al. (1995)	.64
	JIT Scheduling	3B	11 - 13	Flynn et al. (1995)	.69
CIP	Information Feedback	3C	1, 2	Flynn et al. (1995)	.87
	Top Management Support	3C	3, 4	Flynn et al. (1995)	.79
	Plant Environment	3C	5 - 8	Flynn et al. (1995)	.82
	Workforce Management	3C	9 - 17	Flynn et al. (1995)	.87
Interorganizational Cooperation		4	1*, 2†, 3†, 5+, 9*, 10*, 11*, 12+, 13+, 14+, 15*, 16*, 17*, 19+	+ Flynn et al. (1995) † Hendrick & Ellram (1993) * Original Items by author	.75 N/A N/A

in English and Spanish in Appendix A. The English version presented in Appendix A is the backtranslated version of the Spanish survey. The translation procedure is discussed in a later section of this chapter. A discussion of the reliability and validity issues for each variable is described in the following section.

Independent Variables

This study utilizes three major independent variables. These variables operationalize interorganizational trust, indcol, and JIT/TQM (see Table 7).

Interorganizational Trust

Interorganizational trust is operationalized using the Organizational Trust Inventory, Short Form (OTI-SF) developed by Cummings and Bromiley (1996). The OTI-SF contains 12 items that were extracted from the organizational trust inventory long form used in the same construct validation study. This scale is found in section 1 of the questionnaire in Appendix A.

Cummings and Bromiley (1996) employed a variety of measures to determine the internal consistency of the scale. Based on the responses from 323 MBA students with organizational experience, the item-to-factor correlations register above a .70 (r) value, and the internal reliabilities, based on Cronbach's alpha α (1951), are more than adequate for research purposes (Nunnally, 1967).

Individualism and Collectivism

Hofstede (1980) was one of the first researchers to use the indcol variable based on a Likert-type scale. Several authors have refined and improved indcol's construct

validity over the last 15 years (Erez & Earley, 1987; Hui, 1984, 1988; Hui & Triandis, 1983; Triandis, Leung, Villarreal, & Clack, 1985; Triandis et al., 1986, 1990; Wagner & Moch, 1986).

The indcol variable used in this study is based on a scale synthesized from the construct validation efforts listed above (Wagner, 1995). This scale is found in section 2 of the questionnaire in Appendix A. The 20-item scale originally included 43 items from various questionnaires: 10 items are from Wagner and Moch (1986); 4 are from Erez and Earley (1987); and 29 are from efforts by Triandis and colleagues (Hui, 1988). The scale items use a Likert 7-point scale (1=*strongly disagree* and 7=*strongly agree*) and are coded to indicate individualism for responses in agreement. Wagner's (1995) analysis, using Varimax rotation, revealed five factors with associated reliabilities (Cronbach, 1951) as (a) personal independence and self-reliance (.72), (b) importance of competitive success (.79), (c) work-alone ethic (.83), (d) subordination of individual needs to group interests (.80), and (e) effect of individualism on group productivity (.76). A confirmatory factor analysis on a second group of data indicated the same underlying factors with concomitant factor loadings (Wagner, 1995). All of these factors, with the exception of importance of competitive success, were used in this study. The coefficient of determination (R^2) from Wagner (1995) was considered here in the a priori power of the test to determine sample size.

JIT/TQM

JIT/TQM refers to the variety of manufacturing practices first used by Japanese manufacturers and subsequently adopted to varying degrees in most industrialized societies. The variables identified here refer to just-in-time (JIT), total quality management (TQM), and their common infrastructure practices (CIP) for JIT/TQM (Flynn et al., 1995). These scales are found in sections 3A, 3B, and 3C of the questionnaire in Appendix A. Flynn et al. (1995) described the procedures they used to establish the construct validity of the JIT, TQM, and the CIP for JIT/TQM scales. The underlying dimensions for JIT consist of *kanban*, lot-size reduction, setup time reduction, and JIT scheduling practices. The TQM practices are comprised of customer focus, product design, and statistical process control practices. The common infrastructure practices (CIP) variable for JIT/TQM is made up of information feedback, management support, plant environment, and workforce management. Flynn et al. (1995) included supplier relationship as a CIP in their study. In this study, the supplier relationship variable was not considered as an infrastructure variable. Instead, it was considered as part of the interorganizational cooperation variable. The items used in the Flynn et al. (1995) supplier relationship variable correspond to the long-term relations, early supplier involvement, and supplier evaluation and certification subdimensions of interorganizational cooperation.

Moreover, placement of the supplier relationship variable as a CIP to JIT/TQM has not been fully established in the empirical research literature. In Sakakibara et al.

(1993), supplier management, consisting of long-term relations, early supplier involvement, and supplier evaluation and certification as well as JIT delivery, serves as one of three dimensions making up JIT. In Flynn et al. (1994), the supplier relationship variable is one of seven dimensions of quality management. The supplier relationship variable is comprised of the same four out of five items found in Flynn et al. (1995), where the supplier relationship variable is used as a CIP for JIT/TQM. More recently, in Sakakibara et al. (1997), the JIT supplier relationship variable is included as a JIT practice, while supplier quality involvement is a subdimension of quality management.

In the selection of these dimensions, Flynn et al. (1995) considered content validity from expert opinion, unidimensionality through factor analysis, and construct convergence. They also described tests of internal consistency for each of the subscales. Flynn et al. used an alpha of .60 as the minimum acceptable level for these scales. For this study, the coefficient of determination (R^2) from Flynn et al. was used in the a priori power of the test.

To accommodate differences between the research intent and population used in Flynn et al. (1995) and this study, several items were dropped from the scales. Two items were dropped from the information feedback scale, one item was dropped from management support, and one item was dropped from plant environment. The items dropped from information feedback were removed because these items are directed toward the operator- and first-level supervisory employees (Flynn et al., 1995). Their inclusion would have created confusion and would not have provided useful data. The

item dropped from management support referred to “management outside the plant” (p. 1359). This item could have introduced confusion as to whether it referred to the supplier or to a member of the same organization. Finally, an item was removed from the plant environment scale because it repeated nearly the same wording as other questions. Mexican respondents to the pilot study suggested removing the scale item.

Removing scale items to improve content validity may introduce threats to construct validity. In this case, working with two-item scales is not an optimal choice. Although Venkatraman and Grant (1986) stressed moving away from single item scales, they provided no minimum number of items for scales. Flynn and colleagues (Flynn et al., 1994, 1995; Sakakibara et al., 1993) suggested three items as a minimum for scale construction. Others, such as Choi and Hartley (1996) and Hartley, Zirger, and Kamath (1997), used several scales consisting of two items. In this case, the threat to construct validity by including the scale items was considered greater than removing the items.

Dependent Variable

The focus of this study tests the influence of institutional factors on the formation of interorganizational cooperation. The interorganizational cooperation construct consists of supplier development, early supplier involvement, supplier evaluation and certification, total cost management, and long-term relations.

Flynn and colleagues (Flynn et al., 1994, 1995; Sakakibara et al., 1993) provided validated scale items for their supplier relationship variable. The items provided in their scale correspond to this study’s long-term relations, early supplier involvement, and

supplier evaluation and certification subdimensions of interorganizational cooperation. Hendrick and Ellram (1993) also provided scale items, which were developed from a review of the literature, evaluated by a focus group of purchasing management professional, and found to exist among an international assortment of firms. Hendrick and Ellram, though, did not provide any statistical results (e.g., internal consistency reliability). The items used in Hendrick and Ellram (1993) correspond to this study's supplier development subdimension of interorganizational cooperation.

A multi-item scale based on work by Flynn and colleagues (Flynn et al., 1994, 1995; Sakakibara et al., 1993; Saraph et al., 1989), Hendrick and Ellram (1993), and this study's researcher was used in this study and is presented in section 4 of the questionnaire in Appendix A. The items provided here measure the interorganizational cooperation construct and complement items not found in Flynn et al. (1995) and Hendrick and Ellram (1993).

Translation

Using a questionnaire developed in one language and cultural setting for use in another setting requires a translation of both language and cultural meanings. Members of a target research group may not have the same frame of reference as the group in which the measure was originally developed and validated. For example, members of the target research group may score Likert-type scales differently. A neutral response, scaled as a 3 and midpoint on a 1 to 5 Likert-type scale, may be labeled and understood literally as neutral in the United States. In other societies, especially those in which face-saving

cultural traits are considered an essential social grace, such as Mexico and many Asian countries, a 3 may be interpreted as “agree just a little” (Riordan & Vandenburg, 1994). M. Roman (personal communication, January 15, 1997) further described Mexico as a nonstatistical society in which the citizenry is not well acquainted with research-related items common to statistical societies, such as opinion surveys and reports with statistical findings. According to M. Roman, Managers in Mexico are rarely subjected to surveys. Survey taking in Mexico is novel and requires that respondents organize their thoughts in *agree* and *do not agree* frameworks. Moreover, the novelty of the survey format in which questions about their organizations are posed makes respondents somewhat curious and suspicious of the researcher’s intent. These examples illustrate just some of the problems that arise when one attempts to convey concepts and conduct research on them across cultures (Waldman, 1994).

To ensure conceptual equivalence and validity of the scales, an a priori backtranslation technique was used (Brislin, Lonner, & Thorndike, 1973; Riordan & Vandenburg, 1994). The a priori translation technique relies on translation from the original language to the target language by a translator with language dominance and content knowledge in the target language. This is followed by a backtranslation from the target language into the original language conducted by an individual dominant in the original language under concealed or blind conditions. That is, the backtranslator has no specific knowledge of the intent of the research. Otherwise, a possibility exists to

introduce the “good” subject bias, which means that the translator attempts to decipher and confirm what he or she perceives to be the intent of the scale (Orne, 1962).

The backtranslation procedure removed idioms and phrases having little cultural or industrial practice significance in Spanish. In addition, the backtranslated questionnaire was compared to the original questionnaire for content validity. Any inconsistencies between the original and target questionnaires were worked out between the researcher and the first translator. The English version of the scale in Appendix A is the backtranslated version of the Spanish scale, also found in Appendix A.

The translation process introduced differences between the original and the backtranslated English versions. For example, the Spanish-language translator, as well as a focus group of purchasing managers from the Mexican automotive parts industry, suggested the insertion of the word “production” to “master schedule” in Item 6 of section 3B in the questionnaire in Appendix A. The differences between the English and Spanish versions of the survey are largely due to development and industrial experience. Much of the terminology used in the United States has been harmonized over the years through a variety of publications and through efforts of organizations such as the *American Production and Inventory Control Society* (APICS). This is not the case in Mexico, where industrial development has been recent. B. Flynn (personal communication, May 28, 1998) found a difference in manufacturing concepts and terminology when transferring instruments developed in the U.S. to Europe. Flynn deleted some scale items due largely to cultural and language issues.

The backtranslated English version also differs from the original English version in word order and word use. For example, scale Item 1 in section 3A of Appendix A begins “We are frequently in contact . . .” The original version was worded as “we frequently are in contact . . .” The difference lies in the Spanish *Estamos*, which is the equivalent of “we are.” The intent was to produce a conceptually equivalent, not literally exact, version of this scale.

Following the administration of the questionnaire in Spanish, an a posteriori statistical analysis for construct validation, as described by Flynn et al. (1995), was employed to determine the unidimensionality and internal consistency reliabilities of the scales. Riordan and Vandenburg (1994) suggested that, despite these procedures, imprecision would be found in any translation effort. This statistical procedure is described in more detail under the data analysis section of this chapter.

Procedure

The procedure to gather data for this study involved field tests of the survey followed by an on-site administration. These procedures are described in the following section.

Field Tests

The field tests included a preliminary content validation test in English followed by a language and cultural validation in Spanish. For the first field test, the survey was presented to a focus group of experienced U.S. purchasing managers. These managers

provided expert opinion on the wording of purchasing and organizational practices and on ease of use. To improve the content validity and ease of use in Spanish, including issues of professional jargon and organizational culture specific to Mexico, a focus group of purchasing managers from the Mexican automotive parts industry provided further input.

On-Site Survey Administration

The data collection procedure consisted of an on-site survey administration. Survey data collection in a developing country such as Mexico requires the application of an on-site rather than a mail-delivered survey for various reasons (Casley & Lury, 1981). First, the mail system in Mexico is slow and unreliable. It is the researcher's experience for mail delivery to take 3 weeks from Mexico City to one of its suburbs. Correspondence is often lost. Second, managers in Mexico generally do not respond to mail surveys, as in the United States. Mexicans, in general, value personal relations over task, which is the opposite of U.S. managers. In essence, a Mexican manager would prefer to meet the researcher in person and get to know that person better prior to filling out a survey or conducting an interview. A U.S. manager, on the other hand, prefers the anonymous survey due to its efficiency, rather than the in-person meeting, which reduces his/her work time. As an example, Song et al. (1997) listed the experience of facsimiles, telephone calls, and personal visits required to gather data in a study of functional managers in 300 firms in Mexico.

Prior to the initial visit, the organizational respondent was contacted to determine an appropriate meeting time and place. Contact was then made with the respondent, and

the questionnaire was delivered. The survey delivery and collection were handled by a research firm in Mexico City, by researchers at the Universidad de Monterrey, and by the researcher in Saltillo. The researcher also attended several meetings with both research groups in Mexico City and Monterrey to train the data collectors. In some cases, up to four visits were made to retrieve the collected survey, which made the data collection a relatively slow process. After receiving a survey, the respondent was called by telephone to verify its authenticity. Figure 2 provides a data collection procedure for this study.

Data Analysis

The data in this study were analyzed to determine an a posteriori construct validity across language and culture and to test the study's hypotheses. The following section briefly describes the data analysis methodology.

A Posteriori Validation of Scales

An a posteriori statistical analysis of the scales as described by Riordan and Vandenburg (1994) was used to improve construct validity. Their principal suggestions included removing items due to low factor loadings and low scale internal consistency reliabilities (Cronbach's alpha α). Some scales did not load on factors as expected, and reliability measures were not as high as in the original English version.

Test of Hypotheses

Hierarchical regression analysis was used to test the hypotheses concerning the relationship of interorganizational trust, indcol, and JIT/TQM with interorganizational

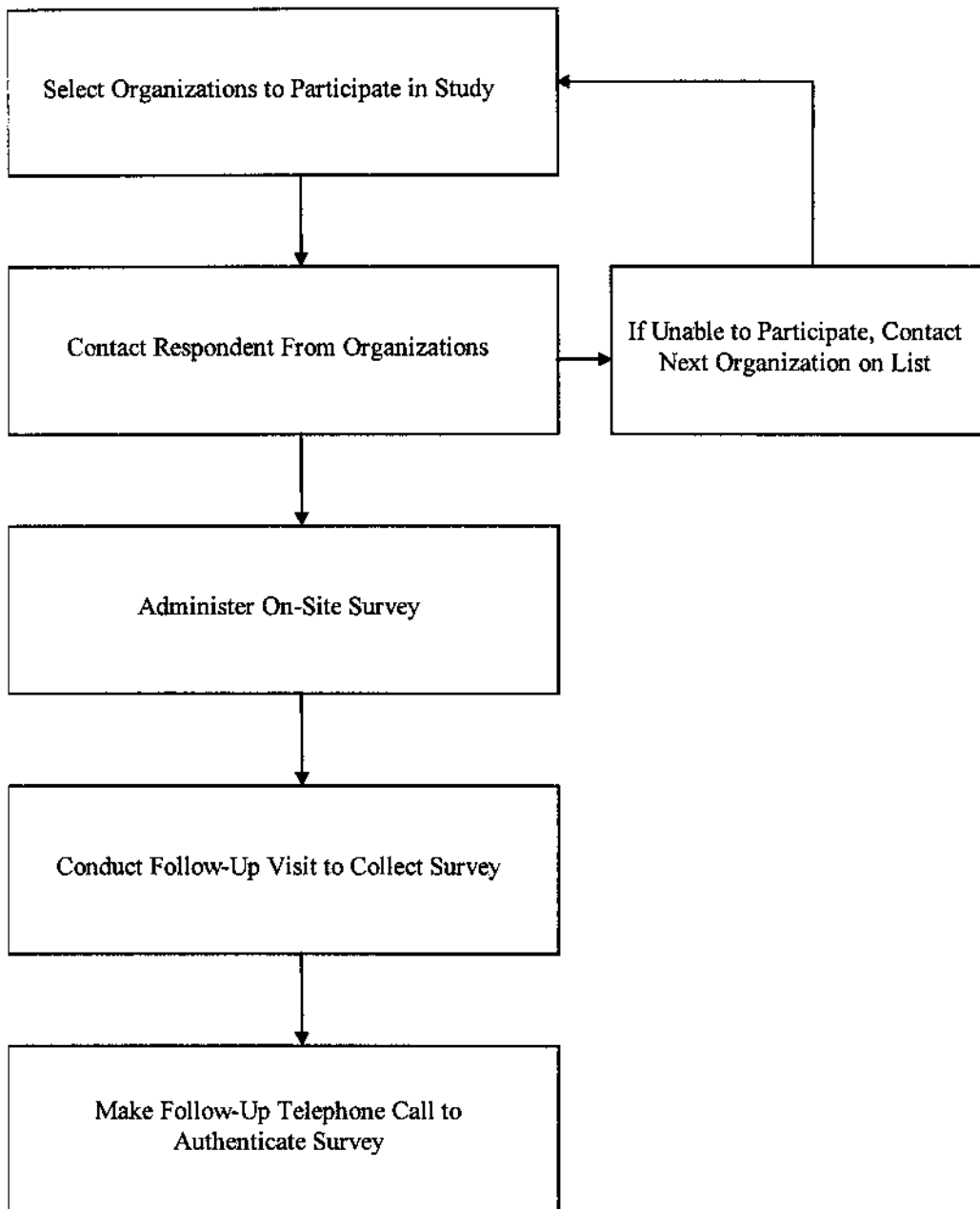


Figure 2. Data collection procedure.

cooperation. Hierarchical regression is a multivariate analysis method to measure the relationship of independent variables with a dependent variable (Cohen & Cohen, 1983). In this study, interorganizational cooperation was treated as one dependent variable. A series of step regression models was developed to test the hypotheses based on an a priori theoretical framework consonant with a thorough search of the literature. The first step model contained individual and organizational demographic data.

The second step models each introduced the independent variables consisting of interorganizational trust, indcol, JIT/TQM, and its subdimensions. Finally, the last series of models contrasted the variance explained by interorganizational trust, indcol, and JIT/TQM. The statistical test at each step consisted of the coefficient of determination (R^2) and F-value to determine the significance of each model. To determine the variables having a statistically significant relationship within a set, the t-value was used.

Chapter Summary

This chapter outlines the research methodology to test hypotheses presented in chapter 2. The method for selecting a random sample of purchasing professionals from a group of Mexican automotive parts suppliers was described. The number of participating organizations was determined by a power analysis. Purchasing professionals in Mexico City, Saltillo, and Monterrey were asked to voluntarily complete a survey administered on-site.

The survey is made up of five sections, which include interorganizational cooperation as a dependent variable; interorganizational trust, indcol, and JIT/TQM as

independent variables; and a section on individual and organizational demographic data. All of the measures were selected based on their high levels of validity and reliability, as provided by support documentation. A translation was performed as an a priori control for construct validity when a measure developed in one culture was used in another. Moreover, statistical techniques were used as an a posteriori method to analyze construct validity of the translated measures. Finally, hierarchical regression was used as the analytical methodology for this study.

CHAPTER IV

RESULTS

Presented in this chapter are the data analysis procedures used in this study. The first data analysis procedure consisted of data checking to test for assumptions of normality, linearity, and to detect outliers in the sample population. The second procedure involved measures of the sample population's demographic attributes. The third procedure was composed of an a posteriori construct validation adjustments based on factor analyses and internal reliabilities. The fourth procedure provided measures of descriptive statistics including means and correlations. The fifth procedure consisted of hierarchical regression analysis for model testing, and the last procedure entailed an a posteriori power analysis.

Data Checking

Before conducting the analysis, the data were checked for missing data. Due to the low incidence and nonsystematic pattern of missing data, the mean substitution procedure was used. This procedure is valid if less than 10 percent of a variable's data are missing. It replaces a missing data point with the mean for that variable's case. The mean substitution procedure allows for the use of all cases while enhancing statistical power (Roth, 1994). In this study, few scales were missing data and, where missing, the incidence did not involve more than 4 data points out of 73 cases (less than 5.5%).

The next data-checking procedure consisted of testing for the assumptions of multivariate analysis. The underlying assumptions include normality, linearity, and lack of outliers (Berry, 1993; Hair, Tatham, & Black, 1992). Visual examination of the assumptions through residual analysis provides an opportunity to determine if the data are within convention. In studies of JIT/TQM, for example, non-linear relationships between JIT/TQM and interorganizational cooperation practices may exist due to learning improvements, also referred to as *marginally increasing returns* (Zangwill, 1987). This relationship was found in mathematical models among some of the JIT/TQM subdimensions (Porteus, 1985, 1986; Zangwill, 1987). Residual analysis was used in this study with empirical data to investigate this potential assumption violation.

Residual analysis is based on the error term (ϵ) of the regression model and is commonly converted to a standardized score. Standardizing the residuals permits the observance of outliers as measured by their standard deviation. Once the residuals have been calculated, the most common residual graphs involve mapping the residuals against predicted y' and residuals against the independent variable (Mendenhall & Sincich, 1989; Pedhazur & Pedhazur-Schmelkin, 1991). These scattergrams are presented in Appendix C. The conventions for observing violations of the assumptions of regression are the following:

1. Outliers are those residual values that range beyond ± 3 standard deviations (Cohen & Cohen, 1983). If outliers are few (<3%), they should not be

removed. Outliers decrease the regression model's coefficient of determination (R^2) (Mendenhall & Sincich, 1989).

2. A random pattern of the residuals about the midpoint is an indication of model validity, because patterns on a residual plot indicate assumption violations. Violations of assumptions appear as distinct patterns on these plots. For example, curvilinearity is observed as values that originate as either positive or negative values on one side of the midpoint, move to the other side with an opposite sign, and then return to the original side of the midpoint (Hair et al., 1992). As with outliers, curvilinearity reduces the regression model R^2 .

The conventions for detection of linearity and outliers appeared within reason except for *kanban*. *Kanban* was the only variable that hinted of violating the assumptions. A second order correlation (r) was conducted on this variable in relation to interorganizational cooperation. The r for first order relationship between *kanban* and interorganizational cooperation was .349 ($p < .002$), while the r for the second order relationship between *kanban* and interorganizational cooperation resulted in .350 ($p < .002$). The improvement in r was not considered substantive enough to change the *kanban* variable in the analysis.

Separate graphs involving each of the independent variables and the dependent variable were also conducted, but were not included in Appendix C. These graphs, as with the residual scattergrams, did not demonstrate deviations from the assumptions.

Tests of kurtosis and skewness were used as numerical checks of normality (Hair et al., 1992). Although skewness was found in some of the variables, it was determined that logarithmic correction was not needed.

Demographic Attributes

In this procedure, demographic attributes of the sample population were measured and are exhibited in Table 8. The general attributes of the 73 individuals and the organizations they represent are presented here. The average respondent was a 44-year-old male (89%) with an undergraduate degree (60.4%). Although largely responsible for the whole plant (60.3%), or at least responsible for procuring and managing materials for production purposes at the plant (32.9%), few of these individuals had taken a purchasing course in their undergraduate course collegiate studies (8.2%). These managers had had relatively long tenures of employment (12.9 years) with their organizations.

From an organizational viewpoint, the average firm employed approximately 215 employees. These organizations depended on their principal supplier for 55.1 percent of their material needs and had dealt with this principal supplier for over 16 years. The buying organization's principal actor is divided among various plant personnel. The owner (11%), plant level manager (37.0%), purchasing/materials/logistics manager (21.9%), or some other personnel (30.1%) functioned as the purchaser's principal actor.

For the supplier organizations, the owner (72.6%) functioned as the principal actor in the interorganizational relationship. The respondents identified their relationship as a business relationship (75.3%).

Table 8

Demographic Attributes

Attribute	Average	Percent
Individual		
Age (Years)	44.4	
Gender		
Male		89.0
Female		11.0
Educational Level		
<i>Secundaria</i> (U.S. Junior High School Equivalent)		9.6
<i>Preparatoria</i> (U.S. High School Equivalent)		6.8
Some University		9.6
Undergraduate Degree		60.4
Graduate Degree		6.8
Not Listed		6.8
Purchasing Course in University Curriculum		8.2
Position in Organization		
Owner		5.5
General/Production/Plant Manager		60.3
Director of Purchasing/Materials/Logistics		32.9
Other		1.3
Tenure with Organization (Years)	12.9	
Organizational		
Number of Employees at Location Surveyed	214.9	
Tenure with Principal Supplier (Years)	16.5	
Percent of Material Supplied by Principal Supplier	55.1	
Interorganizational Relationship		
Purchasing Organization's Principal Actor		
Owner		11.0
General/Production/Plant Manager		37.0
Director of Purchasing/Materials/Logistics		21.9
Other		30.1
Supplier Organization's Principal Actor		
Owner		72.6
General/Production/Plant Manager		9.6
Sales Manager/Agent		16.4
Other		1.4
Relationship Between Actors		
Birth (e.g., Father-Son)		5.5
Marriage (e.g., Father-in-law, Son-in-law)		1.4
Affinal (e.g., godparents)		0.0
Close Friend		12.3
Friend		5.5
Business Associate or Acquaintance		75.3
Other		0.0

A Posteriori Construct Validity

An a posteriori construct validity procedure, based on factor analysis and internal reliability, was conducted on the independent and dependent variables. This methodology is a requirement to maintain validity when using scales developed in one culture and transferred to another. Flynn et al. (1994) further elaborated in terms of their TQM instrument: “The instrument has been tested in the U.S. and Japanese-owned plants operating in the U.S., however, further measurement analysis would be required to determine its appropriateness for other countries and cultures” (p. 361).

The principal reason for measuring the scales is due to the inevitable possibility that members of different cultures may not use the same frame of reference. The target sample's perceptions and values and corresponding interpretation of scale items are based on their unique cultural and industrial experience. The issue of differing perception leads to a measurement problem (Riordan & Vandenburg, 1994). That is, respondents in this study may have calibrated intervals differently than the respondents in the U.S. Moreover, concepts found in the U.S. may not have an equivalent in Mexico.

Construct validation is a required, ongoing process in all research. Factor and internal reliability analyses were used to improve construct unidimensionality and reliability (Venkatraman & Grant, 1986). The findings are presented in Table 9.

Table 9

Revised Independent and Dependent Variables

Interorg. trust		Indcol Indep. & sel-reliance		JIT Kanban		TQM SPC		CIP Information feedback		Interorg. cooperation	
Item	Loading	Item	Loading	Item	Loading	Item	Loading	Item	Loading	Item	Loading
1	.51	2	.78	1	.57	11	.85	1	.95	1	.90
2	.59	4*	-.06	2	.55	12	.87	2	.95	2	.87
3	.53	14	.62	3	.72	13	.86	Eigenvalue	1.91	3	.68
4	.50	16	.81	4	.76	Eigenvalue	2.58	α	.94	5	.49
5	.58	18	.66	Eigenvalue	2.60	α	.93	Management support		9*	.15
6	.45	Eigenvalue	2.20	α	.81	Product design		Item	Loading	10	.53
7	.55	α	.70	Item	Loading	4	.81	3	.80	11	.48
8	.61	Work alone ethic		5	.67	5	.66	4	.80	12*	-.10
9*	.13	Item	Loading	6	.67	6**†	-.10	Eigenvalue	1.61	13*	.22
10	.50	8	.72	7*	-.01	7**†	.17	α	.82	14*	.05
11	.48	11	.64	Eigenvalue	1.36	8**‡	.22	Plant environment		15*	.19
12	.57	12*	.34	α	.49	9	.61	Item	Loading	16*	.22
Eigenvalue	5.98	Eigenvalue	1.70	Set-up time reduction		10**‡	.36	5	.44	17	.62
α	.91	α	.70	Item	Loading	Eigenvalue	1.85	6	.75	19*	.64
		Subord. of ind. to grp		8	.81	α	.55	7	.79	Eigenvalue	4.61
		Item	Loading	9	.87	Customer focus		8	.70	α	.86
		3	.41	10	.66	Item	Loading	Eigenvalue	2.66		
		5	.40	Eigenvalue	2.34	1	.64	α	.86		
		15	.49	α	.84	2*	.09	Workforce mgmt.			
		17	.49	JIT scheduling		3	.69	Item	Loading		
		Eigenvalue	1.79	Item	Loading	Eigenvalue	1.41	9*	.25		
		α	.59	11	.53	α	.58	10	.42		
		Effect of ind. on prod.		12	.87			11	.69		
		Item	Loading	13*	.11			12**†	.23		
		1	.63	Eigenvalue	1.17			13	.61		
		7	.73	α	.27			14	.65		
		19	.49					15	.61		
		Eigenvalue	1.89					16	.76		
		α	.65					17**†	.32		
								Eigenvalue	4.54		
								α	.90		

* Items removed from scale due to low factor loading or reliability (α).

† These items loaded on a second factor and had an interitem correlation of $r = .54$.

** These items loaded on a second factor and had an interitem correlation of $r = .50$.

‡ These items loaded on a third factor and had an interitem correlation of $r = -.23$.

In this study, ordinal scales, which were used to measure the independent and dependent variables, were evaluated in a manner similar to interval scales using parametric statistics. This was done despite the view found in Stevens (1951), in which he advised against measuring means and standard deviations for ordinal scales. The works of Labovitz (1967), Lord (1953), and Wolins (1982), in contrast, explained the adequacy of using parametric statistics for ordinal scales. In a later rapprochement, Stevens (1968) extended a pragmatic solution to his earlier enunciation. In this solution, he conceded that parametric statistics are permissible with ordinal scales.

In the first part of the procedure, each scale was rotated with within-scale factor analysis. Factor analyses measured the underlying dimensions. In this case, the intent was to isolate and measure a singular dimension for each scale. Scale items were retained if they loaded at a $\pm .40$ or greater value on a unique factor with an eigenvalue greater than 1.0. In the case of a nuisance factor, the items were retained if the loadings on the second factor were below $\pm .40$ (Flynn et al., 1995; Hair et al., 1992; Sakakibara et al., 1997).

In the second part of the procedure, the internal reliabilities of the remaining scale items were evaluated using Cronbach's alpha (α), which measures the interrelationship of scale items. Cronbach's alpha does not measure underlying dimensions. A minimum alpha of .50 was used as convention for internal reliability (Nunnally, 1967). Scale items were removed if the original scale alpha was less than 0.50 and the remaining items resulted in a higher alpha. According to Nunnally (1967),

In the early stages of research on predictor tests or hypothesized measures of a construct, one saves time and energy by working with instruments that have only

modest reliability for which purposes reliabilities of .60 or .50 will suffice. (p. 226)

While several of the scales have been refined in various studies (e.g., Flynn et al. 1995), the use of these scales in another language, culture, and industrial setting regresses their status to that of the early stage of research. Moreover, precedent in the literature for using a minimum alpha of greater than .50 is provided in Triandis et al. (1985) and Choi and Hartley (1996).

Using conventional cut-off values for reliability estimates, however, may prove problematic. Work by Lord and Novick (1968) and Cortina (1993) revealed that a standard cut-off for reliability is not appropriate. According to their calculations, a scale with many items will exhibit a higher reliability than a shorter scale, although the longer scale may be multidimensional, given equal scale-item correlations in both scales. That is, a scale of 3 items with an alpha of .55 could reach an alpha above .90 if sufficient scale items with equal intercorrelations were added. Alpha is a function of interrelationship and the number of scale items. Based on the factor analyses and internal reliability procedures, scales for lot size reduction and JIT scheduling were removed from further analyses. Product design and workforce management were found to be multidimensional. The principal dimension was retained in each.

Descriptive Statistics

Descriptive statistics consisting of means, standard deviations, and correlation coefficients are presented in Table 10. A cursory reading of the means of Likert-type

Table 10

Descriptive Statistics, Scale Reliabilities, and Correlations

Variable names	Mean	Std. dev.	Alpha α	Age	Ed. lvl.	Gen.	Org. size	Trust	IC1	IC2	IC3	IC4
Age	44.38	12.23										
Educational level (Ed. lvl.)	3.52	1.09		-20								
Gender (Gen.)	.11	.32		-22	-06							
Organizational size (Org. size)	214.90	448.75		.00	.25*	-07						
Independent variables												
Interorganizational trust	5.84	1.01	.91	.15	-.11	.03	.16					
Individualism and collectivism												
Independence and self-reliance (IC1)	2.94	1.32	.70	.25*	-.39	.11	-.16	-.10				
Work alone ethic (IC2)	2.27	1.32	.70	-.09	.06	.05	-.03	-.06	.35**			
Subordination of individual to group (IC3)	2.34	1.03	.59	-.27*	.23	.07	.03	-.27*	-.09	.11		
Effect of indiv. on group productivity (IC4)	3.84	.82	.65	.22	-.31*	-.22	-.11	-.03	-.25*	-.12	-.47**	
JIT/TQM												
Total quality manufacturing												
Customer focus (TQM1)	5.78	1.38	.58	.12	-.03	-.04	.10	.06	-.24*	-.28*	-.22	.15
Product design (TQM2)	5.89	.91	.55	.05	.24*	-.25*	.20	.04	-.43**	-.42**	-.16	.00
Statistical process control (TQM3)	6.32	.84	.93	.12	.01	-.13	.23	.11	-.21	-.23*	-.15	.00
Just-in-time												
Kanban (JIT1)	3.35	1.65	.81	.04	.15	-.07	-.05	-.21	-.02	-.02	.19	-.09
Lot-size reduction (JIT2)	4.34	1.67	.50	-.08	-.22	-.08	-.12	.02	-.16	.04	.05	-.08
Setup time reduction (JIT3)	5.52	1.42	.84	.00	-.06	-.12	.17	.13	-.09	.00	.03	-.06
JIT scheduling (JIT4)	4.81	1.1	.27	.08	.31*	-.04	.21	.13	-.32**	.08	.21	-.24*
Common infrastructure practices												
Information feedback (CIP1)	5.78	1.41	.94	.18	.10	-.29*	.17	-.03	.05	.17	-.16	.15
Management support (CIP2)	6.23	1.02	.82	.29*	-.17	-.05	.20	.13	.05	-.06	-.13	.07
Plant environment (CIP3)	6.08	1.03	.86	.11	-.13	.04	.07	.06	.01	-.02	-.11	-.00
Workforce management (CIP4)	5.88	1.01	.90	.31*	-.25*	.00	.16	.15	-.05	-.14	-.23*	.04
Dependent variable												
Interorganizational cooperation	4.48	1.50	.86	.07	.14	.03	.26*	.05	-.33**	-.15	.12	-.35**

(table continues)

Variable names	TQM1	TQM2	TQM3	JIT1	JIT2	JIT3	JIT4	CIP1	CIP2	CIP3	CIP4
Age											
Educational level (Ed. Lvl.)											
Gender (Gen.) †											
Organizational size (Org. size)											
Independent variables											
Interorganizational trust											
Individualism and collectivism											
Independence and self-reliance(IC1)											
Work alone ethic (IC2)											
Subordination of individual to group (IC3)											
Effect of indiv. on group productivity (IC4)											
JIT/TQM											
Total quality manufacturing											
Customer focus (TQM1)											
Product design (TQM2)	.35**										
Statistical process control (TQM3)	.26*	.43**									
Just-in-time											
Kanban (JIT1)	.04	.11	.39**								
Lot-size reduction (JIT2)	-.06	.11	.04	.08							
Setup time reduction (JIT3)	.39**	.12	.46**	.27*	.18						
JIT scheduling (JIT4)	.19	.20	.18	.28*	.02	-.01					
Common infrastructure practices											
Information feedback (CIP1)	.37**	.38**	.37**	.34**	-.08	.38**	-.01				
Management support (CIP2)	.39**	.15	.24*	-.01	-.12	.42**	.03	.54**			
Plant environment (CIP3)	.37**	.24*	.34**	.08	.01	.46**	.02	.53**	.74**		
Workforce management (CIP4)	.41**	.31**	.47**	.17	-.03	.59**	-.04	.55**	.64**	.74**	
Dependent variable											
Interorganizational cooperation	.07	.29*	.50**	.35**	-.15	.25*	.43**	.32**	.21	.35**	.36**

† Spearman correlations calculated for nominal data. All other data calculated with Pearson correlations. 1 = female, 0 = male.

* $p \leq |.05|$.

** $p \leq |.01|$.

scales (1 = *strongly disagree* and 7 = *strongly agree*) indicates that respondents agreed with interorganizational trust scale items concerning their principal suppliers and disagreed with scale items of their individualistic orientation. That is, they agreed with the inverse of the scale items concerning collectivistic values. They also responded in agreement with scale items for TQM and CIP. Responses for JIT and interorganizational cooperation practices, however, ranged from *slightly disagree* to *agree*. See Table 10 for a comparison of the means and standard deviations.

A review of the intercorrelations provided preliminary findings concerning the study's hypotheses. Interorganizational trust did not exhibit a statistically significant relationship with the dependent variable. Indcol exhibited a statistically significant relationship with interorganizational cooperation, although in the opposite direction as hypothesized. Several of the TQM, JIT, and CIP variables exhibited statistically significant relationships with interorganizational cooperation, as hypothesized. For example, SPC exhibited a correlation (r) of .50 ($p < .01$) with interorganizational cooperation.

High intercorrelations among the CIP scales indicated a potential problem of multicollinearity. Multicollinearity is a critical consideration because a large number of related independent variables increases the value of the semipartial coefficient of determination (R^2). These variables should be retained for analysis if they are theoretically relevant. Furthermore, hierarchical analysis of sets isolates the added R^2 at its specific step of analysis in the regression model (Cohen & Cohen, 1983). Sakakibara

et al. (1993) indicated similarly high intercorrelations of JIT scales used in their study. They surmised that, although many JIT practices are identifiable as separate dimensions, JIT practices are often implemented jointly to acquire synergies and appear to overlap.

To further test the acceptability of the CIP variable set, variance inflation factor (VIF) and tolerance value analyses were conducted. If the VIF score is less than 10 and the tolerance value is greater than .10, the variable is valid for research purposes (Hair et al., 1992). The CIP variables registered VIF values less than 4.5, and tolerance values were greater than .23. As an added measure, scale unidimensionality, as indicated by factor loadings and eigenvalues in Table 9, provided a measure of convergent validity. The item-to-scale correlations, as seen in Table 11, point to the CIP scales' discriminant validity. In this table, the scale items, in bold type, bear a higher correlation to their respective variable than to the others. Based on theory, VIF and tolerance analysis, and convergent and discriminant validity, the CIP variables were retained for this study despite their high intercorrelations.

Hierarchical Regression

Hierarchical regression analysis was used to test the effect and rank of the independent variables on interorganizational cooperation. Hierarchical regression is a method in which independent variables are entered by sets in incremental steps, based on hypothesized relationships, to analyze the cumulative effect of the independent variables on the dependent variable. At each step, the semipartial coefficient of determination

Table 11

CIP Scale-Item to Subdimension Correlations

Scale item	CIP scale subdimensions*			
	CIP-1	CIP-2	CIP-3	CIP-4
CIP-1-01	.97	.58	.56	.59
CIP-1-02	.97	.46	.48	.49
CIP-1-03	.59	.94	.66	.61
CIP-2-04	.37	.91	.73	.58
CIP-3-05	.43	.65	.69	.48
CIP-3-06	.36	.63	.89	.73
CIP-3-07	.57	.69	.94	.74
CIP-3-08	.43	.54	.83	.51
CIP-4-10	.31	.35	.41	.65
CIP-4-11	.53	.60	.65	.85
CIP-4-13	.45	.48	.65	.82
CIP-4-14	.45	.47	.65	.88
CIP-4-15	.44	.54	.59	.84
CIP-4-16	.50	.60	.70	.87

* All correlations were significant at $p < .01$.

(R^2) is measured to determine the effect of the independent variable. The independent variables are made up of sets, which contain that variable's subdimensions. The value of hierarchical regression analysis of sets lies in its ability to compare the effect of one set of variables on the dependent variable over another. This is not possible under simultaneous multiple regression, in which all variables are entered at once and regressed on the dependent variable (Cohen & Cohen, 1983).

Indcol, TQM, JIT, and CIP each contain several variables and function as sets in this study. Interorganizational trust contains no subdimensions and is treated as a set with one element. Moreover, the superordinate goal relationship of JIT/TQM with interorganizational cooperation compared with the relationship of trust or indcol, as interpreted by a comparison of variance, can be assessed with hierarchical regression of

sets. This methodology allows one to operationalize the hypothesized relationships as formulated in Hypotheses 4a through 5b.

The results of the testing for effect of the independent variables are shown in Tables 12 through 19. These tables correspond to Hypotheses 1 through 3b. The results of the cumulative hierarchies of the independent variable sets are shown in Tables 20 through 35. These tables correspond to Hypotheses 4a through 5b. Rating the effect of one variable set over another was accomplished through a comparison of the change (Δ) of R^2 . For each independent variable set comparison, two regression models were performed, in which the order of entry of the independent variable sets was reversed. Reversing the order of entry facilitated the ΔR^2 comparison between two variables sets, X and Z. That is, the reader may view the ΔR^2 of variable set X in the first step of a hierarchical regression model in relation to variable set Z in the second step and compare this to the ΔR^2 for the same two variables in the reversed order (Cohen & Cohen, 1983).

Table 12

Results of Hierarchical Regression for Effect of Control Variables and Interorganizational Trust on Interorganizational Cooperation

Variable	R^2	ΔR^2	F	T
Step 1	.0826		1.396	
Control variables				
Age				1.293
Gender				-.103
Educational level				-.659
Organizational size				1.888
Step 2				
Independent variables				
Interorganizational Trust	.0838	.0012	1.11	-.285

Table 13

Results of Hierarchical Regression for Effect of Interorganizational Trust on Interorganizational Cooperation

Variable	R ²	F	T
Step 1	.0026	.1814	
Independent variables			
Interorganizational Trust			.426

Table 14

Results of Hierarchical Regression for Effect of Control Variables and Indcol on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0826		1.396	
Control variables				
Age				1.293
Gender				-.103
Educational level				-.659
Organizational size				1.888
Step 2	.2603	.1777	2.5508*	
Independent variables				
Individualism/collectivism				
Independence and self reliance				-1.456
Work alone ethic				-.550
Subordination of indiv. needs to group interests				.494
Effect of individualism on group productivity				-2.408*

* $p < .05$.

For each of the regression models, an additional version was performed. In the first version, the demographic variable set was included. In the second model, these variables were removed. The demographic control variables were entered in the first model for theoretical reasons. Based on the literature review, these variables were determined to have an exogenous relationship on the dependent variable that required controlling. Based on the correlation analysis, however, it was determined that the statistical significance of the tests was low and provided an empirical explanation to remove them. Removing the control variables in the alternate hierarchical regression

model allowed a closer focus of the independent variables. This focus increased the significance (F) and reduced the effect size (R^2) in each regression model.

Table 15

Results of Hierarchical Regression for Effect of Indcol on Interorganizational Cooperation

Variable	R^2	F	T
Step 1	.1975	4.1829†	
Independent variables			
Individualism/collectivism			
Independence and self reliance			-1.759
Work alone ethic			-.907
Subordination of indiv. needs to group interests			-.330
Effect of individualism on group productivity			-2.542*

* $p < .05$ | ** $p < .01$ | † $p < .005$ |

The results indicate mixed support of Hypotheses 1 through 3b. In Hypothesis 1, interorganizational trust did not demonstrate a statistically significant relationship with interorganizational cooperation (see Tables 12 and 13).

For Hypothesis 2, indcol's relationship with interorganizational cooperation was statistically significant with control variables ($R^2 = .2603, p < .05$) and without control variables ($R^2 = .1975, p < .005$). It was, however, in the direction opposite to that originally hypothesized (see Tables 14 and 15). Effect of individualism on group productivity, as seen in Table 15, exhibited a negative relationship with interorganizational cooperation ($t = -2.542, p < .05$).

For Hypothesis 3a, TQM with CIP held a statistically significant relationship with interorganizational cooperation. This relationship was measured with control variables ($R^2 = .3657, p < .01$) and without control variables ($R^2 = .3473, p < .001$) (see Tables 16

and 17). Within the TQM variable set, SPC, as seen in Table 17, exerted a statistically significant relationship with interorganizational cooperation ($t = 2.838, p < .01$).

Table 16

Results of Hierarchical Regression for Effect of Control Variables and TQM on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0777		1.284	
Control variables				
Age				-.057
Gender				-.046
Educational level				.068
Organizational size				1.313
Step 2	.3657	.2880	2.8302**	
Independent variables				
Common infrastructure practices				
Information feedback				.995
Management support				-.860
Plant environment				1.326
Workforce management				.351
TQM				
Statistical process control				2.591*
Product design				.128
Customer focus				-1.281

* $p < |.05|$ ** $p < |.01|$

Table 17

Results of Hierarchical Regression for Effect of TQM on Interorganizational Cooperation

Variable	R ²	F	T
Step 1	.3473	4.8639††	
Independent variables			
Common infrastructure practices			
Information feedback			.985
Management support			-.539
Plant environment			1.423
Workforce management			.457
TQM			
Statistical process control			2.838**
Product design			.873
Customer focus			-1.388

* $p < |.05|$ ** $p < |.01|$ † $p < |.005|$ †† $p < |.001|$

Analyses of data for Hypothesis 3b found that the JIT and CIP sets with control variables ($R^2 = .3000, p < .01$) and without control variables ($R^2 = .2399, p < .005$)

provided a statistically significant relationship with interorganizational cooperation (see Tables 18 and 19). As an element of the JIT set, *kanban* was also found to be related to interorganizational cooperation ($t = 2.348$, $p < .05$), as seen in Table 19.

Table 18

Results of Hierarchical Regression for Effect of Control Variables and JIT on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0826		1.396	
Control variables				
Age				.206
Gender				.171
Educational level				.560
Organizational size				1.767
Step 2	.3000	.2174	2.830**	
Independent variables				
Common infrastructure practices				
Information feedback				.176
Management support				-.894
Plant environment				1.402
Workforce management				.339
JIT				
<i>Kanban</i>				2.165*
Setup time reduction				.379

* $p < .05$ | ** $p < .01$ |

Table 19

Results of Hierarchical Regression for Effect of JIT on Interorganizational Cooperation

Variable	R ²	F	T
Step 1	.2399	3.4725†	
Independent variables			
Common infrastructure practices			
Information feedback			.428
Management support			-.591
Plant environment			1.408
Workforce management			.868
JIT			
<i>Kanban</i>			2.348*
Setup time reduction			-.155

* $p < .05$ | ** $p < .01$ | † $p < .005$ |

The ΔR^2 comparisons provided support for Hypotheses 4a through 5b. The hypothesized superordinate goal effect of JIT/TQM and their CIP explained variance with interorganizational cooperation better than trust or indcol.

Table 20

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between Interorganizational Trust and TQM on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0777		1.284	
Control variables				
Age				.203
Gender				.034
Educational level				-.079
Organizational size				1.456
Step 2	.0919	.0142	1.214	
Independent variables				
Interorganizational Trust				-.826
Step 3	.3737	.3595	2.636**	
Common infrastructure practices				
Information feedback				.859
Management support				-.800
Plant environment				1.352
Workforce management				.314
TQM				
Statistical process control				2.563*
Product design				.204
Customer focus				-1.236

* p < [.05] ** p < [.01].

Table 21

Results of Hierarchical Regression for Comparison of Effect Between Interorganizational Trust and TQM on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0002		.012	
Independent variable				
Interorganizational trust				-.642
Step 2	.3515	.3513	4.268††	
Common infrastructure practices				
Information feedback				.871
Management support				-.445
Plant environment				1.346
Workforce management				.541
TQM				
Statistical process control				2.854**
Product design				.885
Customer focus				-1.371

* p < [.05] ** p < [.01] † p < [.005] †† p < [.001].

In Tables 20 and 22, the ΔR^2 comparison of .3595 and .0080 explained a sizable difference in variance between TQM and interorganizational cooperation than with interorganizational trust. These analyses correspond to Hypothesis 4a with control

Table 22

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between TQM and Interorganizational Trust on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0777		1.284	
Control variables				
Age				.203
Gender				.034
Educational level				-.079
Organizational size				1.456
Step 2	.3657	.2883	2.830†	
Independent variables				
Common infrastructure practices				
Information feedback				.859
Management support				-.800
Plant environment				1.352
Workforce management				.314
TQM				
Statistical process control				2.563*
Product design				.204
Customer focus				-1.236
Step 3	.3737	.0080	2.636**	
Interorganizational trust				-.826

* p < .05 | ** p < .01 | † p < .005 |

Table 23

Results of Hierarchical Regression for Comparison of Effect Between TQM and Interorganizational Trust on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.3473		4.864††	
Independent variables				
Common infrastructure practices				
Information feedback				.871
Management support				-.445
Plant environment				1.346
Workforce management				.541
TQM				
Statistical process control				2.854**
Product design				.8885
Customer focus				-1.371
Step 2	.3515	.0042	4.2684††	
Interorganizational trust				-.642

* p < .05 | ** p < .01 | † p < .005 | †† p < .001 |

Table 24

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between Indcol and TQM on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0777		1.284	
Control variables				
Age				1.280
Gender				.348
Educational level				-1.339
Organizational size				1.449
Step 2	.2135	.1358	1.935	
Independent variables				
Individualism/collectivism				
Independence and self reliance				-2.040*
Work alone ethic				.374
Subordination of indiv. needs to group interests				.776
Effect of individualism on group productivity				-1.969
Step 3	.4921	.2786	3.230†	
Common infrastructure practices				
Information feedback				2.119*
Management support				-1.246
Plant environment				1.520
Workforce management				-333
TQM				
Statistical process control				2.567*
Product design				-.245
Customer focus				-1.306

* p < .05 | ** p < .01 | † p < .005 |

Table 25

Results of Hierarchical Regression for Comparison of Effect Between Indcol and TQM on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.1435		2.806†	
Independent variables				
Individualism/collectivism				
Independence and self reliance				-1.720*
Work alone ethic				-.346
Subordination of indiv. needs to group interests				.449
Effect of individualism on group productivity				-1.958*
Step 2	.4521	.3086	4.501††	
Common infrastructure practices				
Information feedback				1.758*
Management support				-.440
Plant environment				1.254
Workforce management				.470
TQM				
Statistical process control				2.859**
Product design				-.163
Customer focus				-1.511

* p < .05 | ** p < .01 | † p < .005 | †† p < .001 |

Table 26

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between TQM and Indcol on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0777		1.284	
Control variables				
Age				1.280
Gender				.348
Educational level				-1.339
Organizational size				1.449
Step 2	.3657	.2888	2.830**	
Independent variables				
Common infrastructure practices				
Information feedback				2.119*
Management support				-1.246
Plant environment				1.520
Workforce management				-.333
TQM				
Statistical process control				2.567*
Product design				-.245
Customer focus				-1.306
Step 3	.4921	.1264	3.230†	
Individualism/collectivism				
Independence and self reliance				-2.040*
Work alone ethic				.374
Subordination of indiv. needs to group interests				.776
Effect of individualism on group productivity				-1.969

* p < .05 | ** p < .01 | † p < .005 |

Table 27

Results of Hierarchical Regression for Comparison of Effect Between TQM and Indcol on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.3473		4.864††	
Independent variables				
Common infrastructure practices				
Information feedback				1.758
Management support				-.440
Plant environment				1.254
Workforce management				.470
TQM				
Statistical process control				2.859**
Product design				-.163
Customer focus				-1.511
Step 2	.4521	.1048	4.501††	
Individualism/collectivism				
Independence and self reliance				-1.720
Work alone ethic				-.346
Subordination of indiv. needs to group interests				.449
Effect of individualism on group productivity				-1.958

* p < .05 | ** p < .01 | † p < .005 | †† p < .001 |

variables. By excluding the control variables, the ΔR^2 comparison of .3513 and .0042 posited a similar result (see Tables 21 and 23).

The data analyses presented in Tables 24 through 27 provide support for Hypothesis 4b. The ΔR^2 comparison of .2786 and .1264 with control variables explained the larger amount of variance to TQM in its association with interorganizational cooperation than to indcol (see Tables 24 and 26). By removing the control variables, the ΔR^2 comparison changed to .3086 and .1048 (see Tables 25 and 27).

In Hypothesis 5a, JIT explained variance with interorganizational cooperation better than interorganizational trust. This result is based on the ΔR^2 comparison of .2185 and .0023 (see Tables 28 and 30). This process was repeated without control variables, providing a ΔR^2 comparison of .2461 and .0087 (see Tables 29 and 31).

Table 28

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between Interorganizational Trust and JIT on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0826		1.396	
Control variables				
Age				.116
Gender				.130
Educational level				.586
Organizational size				1.628
Step 2	.0838	.0012	1.116	
Independent variable				
Interorganizational trust				.428
Step 3	.3023	.2185	2.167*	
Common infrastructure practices				
Information feedback				.212
Management support				-.893
Plant environment				1.378
Workforce management				.378
JIT				
Kanban				2.181*
Setup time reduction				.256

* $p < |.05|$.

Table 29

Results of Hierarchical Regression for Comparison of Effect Between Interorganizational Trust and JIT on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0025		.181	
Independent variable				
Interorganizational trust				.867
Step 2	.2846	.2461	3.072***†	
Common infrastructure practices				
Information feedback				.480
Management support				-.648
Plant environment				1.489
Workforce management				.743
JIT				
Kanban				2.477*
Setup time reduction				-.250

* p < [.05] ** p < [.01].

Table 30

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between JIT and Interorganizational Trust on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0826		1.396	
Control variables				
Age				.116
Gender				.130
Educational level				.586
Organizational size				1.628
Step 2	.3000	.2174	2.400*	
Independent variables				
Common infrastructure practices				
Information feedback				.212
Management support				-.893
Plant environment				1.378
Workforce management				.378
JIT				
Kanban				2.181*
Setup time reduction				.256
Step 3	.3023	.0023	2.167*	
Interorganizational trust				.428

* p < [.05].

In Hypothesis 5b, JIT and CIP explained variance with interorganizational cooperation better than indcol (ΔR^2 of .2070 and .1676) (see Tables 32 and 34). A

replication without control variables produced a ΔR^2 comparison of .2252 and .1828 (see Tables 33 and 35).

Table 31

Results of Hierarchical Regression for Comparison of Effect Between JIT and Interorganizational Trust on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.2399		4.4725†	
Independent variables				
Common infrastructure practices				
Information feedback				.480
Management support				-.648
Plant environment				1.489
Workforce management				.743
JIT				
Kanban				2.476*
Setup time reduction				-.250
Step 2	.2486	.0087	3.0728**	
Interorganizational trust				.867

* p < .05 | ** p < .01 | † p < .005 |.

Table 32

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between Indcol and JIT on Interorganizational Cooperation

Variable	R ²	ΔR^2	F	T
Step 1	.0826		1.396	
Control variables				
Age				1.524
Gender				.764
Educational level				-1.382
Organizational size				1.957
Step 2	.2603	.1777	2.551*	
Independent variables				
Individualism/collectivism				
Independence and self reliance				-2.220*
Work alone ethic				.116
Subordination of indiv. needs to group interests				.156
Effect of individualism on group productivity				-2.616*
Step 3	.4673	.2070	3.263†	
Common infrastructure practices				
Information feedback				1.556
Management support				-1.351
Plant environment				1.701
Workforce management				-.334
JIT				
Kanban				2.012*
Setup time reduction				-.105

* p < .05 | ** p < .01 | † p < .005 |.

Table 33

Results of Hierarchical Regression for Comparison of Effect Between Indcol and JIT on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.1975		4.183†	
Independent variables				
Individualism/collectivism				
Independence and self reliance				-2.173*
Work alone ethic				-.424
Subordination of indiv. needs to group interests				-.098
Effect of individualism on group productivity				-2.652
Step 2	.4227	.2252	4.539††	
Common infrastructure practices				
Information feedback				1.126
Management support				-.370
Plant environment				1.302
Workforce management				.790
JIT				
Kanban				2.151*
Setup time reduction				-.556

* p < .05 | ** p < .01 | † p < .005 | †† p < .001 |

Table 34

Results of Hierarchical Regression for Comparison of Effect With Control Variables Between JIT and Indcol on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.0826		1.396	
Control variables				
Age				1.524
Gender				.764
Educational level				-1.382
Organizational size				1.957
Step 2	.3000	.2888	2.400*	
Independent variables				
Common infrastructure practices				
Information feedback				1.556
Management support				-1.351
Plant environment				1.701
Workforce management				-.334
JIT				
Kanban				2.012*
Setup time reduction				-.105
Step 3	.4676	.1676	3.263†	
Individualism/collectivism				
Independence and self reliance				-2.220*
Work alone ethic				.116
Subordination of individual needs to group interests				.156
Effect of individualism on group productivity				-2.616*

* p < .05 | ** p < .01 | † p < .005 | †† p < .001 |

Table 35

Results of Hierarchical Regression for Comparison of Effect Between JIT and Indcol on Interorganizational Cooperation

Variable	R ²	ΔR ²	F	T
Step 1	.2171		4.713†	
Independent variables				
Common infrastructure practices				
Information feedback				1.126
Management support				-.307
Plant environment				1.302
Workforce management				.790
JIT				
Kanban				2.151*
Setup time reduction				-.556
Step 2	.4227	.1828	5.539††	
Individualism/collectivism				
Independence and self reliance				-2.173*
Work alone ethic				-.424
Subordination of indiv. needs to group interests				-.098
Effect of individualism on group productivity				-2.652*

* $p < .05$ | ** $p < .01$ | † $p < .005$ | †† $p < .001$ |

Overall, the results provided support for the research model. A reduced regression model using stepwise backward regression and made up only of statistically significant variables provided $R^2 = .3815$, $F = 13.984$, and $p < .0000$ (see Table 36).

Table 36

Results of Backward Stepwise Hierarchical Regression for Independent Variables Having Significant Effect on Interorganizational Cooperation

Variable	R ²	F	T
Step 1	.3815	13.984††	
Independent variables- subdimensions			
Effect of individualism on group productivity			-3.198†
Information feedback			2.423*
Statistical process control			3.966‡

* $p < .05$ |
 ** $p < .01$ |
 † $p < .005$ |
 †† $p < .001$ |
 ‡ $p < .0005$ |
 ††† $p < .0000$ |

A Posteriori Power Analysis

Presented in this section are the results of the a posteriori power analysis procedure. This procedure was used to substantiate the statistical validity of the regression models. In addition, the minimum required sample size was presented for a power level below the recommended 0.80, given an alpha of 0.5 (Cohen, 1988). The regression models include demographic variables, in addition to the independent variables. These results are displayed in Table 37.

Table 37

Power Analysis of Regression Models

Independent variables in regression models	Power when $\alpha = .05$	Sample size for power = .80, $\alpha = .05$
H1: Age, sex, educational level, organizational size, interorganizational trust	.44	146
H2: Age, sex, educational level, organizational size, individualism/collectivism	.96	
H3a: Age, sex, educational level, organizational size, CIP, TQM	>.99	
H3b: Age, sex, educational level, organizational size, CIP, JIT	.97	
H4a: Age, sex, educational level, organizational size, CIP, TQM, interorganizational trust	>.99	
H4b: Age, sex, educational level, organizational size, CIP, TQM, individualism/collectivism	>.99	
H5a: Age, sex, educational level, organizational size, CIP, JIT, interorganizational trust	.97	
H5b: Age, sex, educational level, organizational size, CIP, JIT, individualism/collectivism	>.99	

All models exhibited adequate power levels above 0.80 except for interorganizational trust. Given its low effect size, a minimum sample size of 146 would have been necessary to reach a power of 0.80. Otherwise, the remaining models exceeded the 0.80 threshold.

Chapter Summary

This chapter presented the data analysis procedures used in this study. The first data analysis procedure consisted of data checking. Variable means were substituted for missing data. In addition, the data satisfied the assumptions required for multivariate analysis. The second procedure involved measures of the sample population's demographic attributes. The average respondent was a college-educated male manager responsible for purchasing. The average firm had had over a 16-year relationship with its principal supplier, who provided 55 percent of materials.

The third procedure involved an a posteriori construct validation. Scale items were removed from several of the scales due to low item factor loadings or low scale internal reliabilities. The fourth procedure provided measures of descriptive statistics. The variable means indicated agreement with scale items concerning interorganizational trust, collectivism, and TQM with its CIP. JIT and interorganizational cooperation, to the contrary, received responses ranging from slight disagreement to agreement. Intercorrelations among the variables presented a basic view of the relationships between the independent and dependent variables. These variables were analyzed in a more sophisticated manner in the following procedure.

The fifth procedure consisted of hierarchical regression analysis. Results from the hierarchical regression procedure indicated a nonsignificant relationship for interorganizational trust, a significant relationship in the opposite direction as hypothesized for indcol, and a significant relationship for TQM and JIT, in the presence of their CIP. Moreover, TQM was found to explain a larger share of variance with

interorganizational cooperation than interorganizational trust or indcol. JIT also exerted a stronger relationship over interorganizational cooperation than interorganizational trust and indcol. A summary of the hypotheses results is presented in Table 38. A discussion of these results is presented in the final chapter.

Table 38

Summary of Results

Hypothesis	Results
H1: Interorganizational trust is positively associated with interorganizational cooperation.	NS
H2: Individualism is positively associated with interorganizational cooperation.	NS†
H3a: TQM practices (statistical process control, product design, and customer focus) and CIP (information feedback, management support, plant environment, and workforce management) are positively associated with interorganizational cooperation.	S
H3b: JIT practices (<i>kanban</i> , lot-size reduction, setup time reduction, and JIT scheduling) and its CIP (information feedback, management support, plant environment, and workforce management) are positively associated with interorganizational cooperation.	S
H4a: The superordinate goal effect of TQM practices (statistical process control, product design, and customer focus) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than interorganizational trust.	S
H4b: The superordinate effect of TQM practices (statistical process control, product design, and customer focus) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than indcol.	S
H5a: The superordinate goal effect of JIT practices (<i>kanban</i> , lot-size reduction, setup time reduction, and JIT scheduling) and their CIP (information feedback, management support, plant environment, and workforce management) explain variance with interorganizational cooperation better than interorganizational trust.	S
H5b: The superordinate goal effect of JIT practices (<i>kanban</i> , lot-size reduction, setup time reduction, and JIT scheduling) and their CIP explain variance with interorganizational cooperation better than indcol.	S

S = Support for hypothesis.

NS = Nonsupport for hypothesis.

† = Significance of results in opposite direction.

CHAPTER V

DISCUSSION

An in-depth discussion of the results is presented in this chapter. Analyses for each of the five principal hypotheses are discussed. These findings pose implications for academicians and practitioners alike. The limitations of these findings, based on the principal validity threats they pose, are then presented. Finally, future directions for research on interorganizational cooperation are presented

Analysis and Implications

The findings are discussed here in the order in which the hypotheses were presented in chapter 2. The first three findings deal with interorganizational trust, indcol, just-in-time (JIT), total quality management (TQM), and their common infrastructure practices (CIP). The ensuing findings deal with the superordinate goal effect of the JIT/TQM variables over interorganizational trust and indcol on interorganizational cooperation.

Interorganizational Trust

In Hypothesis 1, it was stated that interorganizational trust is associated with interorganizational cooperation. No relationship was found, however, between interorganizational trust and interorganizational cooperation, based on regression analysis ($R^2 = .0026, p > 0.05$), as seen in Table 13. A discussion of the literature, nonetheless,

provides a strong theoretical base for this hypothesized relationship (Smeltzer, 1997). The most plausible reason for the lack of support may hinge on the role of interorganizational trust as a necessary but insufficient causal factor for interorganizational cooperation.

The necessary but insufficient designation is supported by several pieces of evidence. First, the mean response of 5.84 expressed agreement with statements of interorganizational trust of their principal supplier, based on a Likert-type scale (1 = *strongly disagree* and 7 = *strongly agree*). Contrary to the literature on Mexico (e.g., Husted, 1994), these suppliers trust their principal suppliers.

Second, the reference to the buyers' principal supplier may have provided low variance between interorganizational trust and interorganizational cooperation to uncover a significant relationship. The choice of the principal supplier as the reference point was based on common practice from the literature (Esposito & Raffa, 1994; Hendrick & Ellram, 1993). It is with the principal supplier that buyers practice interorganizational cooperation. The average buyer in this study received 55 percent of its production materials from this principal supplier, from whom it had purchased for over 16 years. From these findings, it may be understood that interorganizational trust serves as a necessary but insufficient ingredient for interorganizational cooperation.

Individualism and Collectivism

In Hypothesis 2, it was stated that individualism was positively associated with interorganizational cooperation. According to the literature, individualists generally do not develop strong ties with members of their group and are inclined to cooperate with

members of their own and other groups, given a positive cost-benefit return. Collectivists, by contrast, cooperate and extend to members of their own group and behave competitively with members of other organizations (Triandis et al., 1994).

The finding for the relationship of the individualism and collectivism (indcol) set with interorganizational cooperation without control variables was statistically significant, but in the opposite direction from that hypothesized ($R^2 = .1975, p < .005$), as seen in Table 15. This finding depends on what constitutes the reference group. The hypothesis in question was based on the buyer and supplier each behaving as a distinct group. The high quantity of material supplied and the long duration of the relationship may have contributed to the formation of a virtual or supra-organization in which the members of the supplier and buyer organizations now view a common destiny. This would constitute a larger collective than that envisioned in the original formulation of the hypothesis.

Notwithstanding the direction of the relationship, a significant finding was discovered. This finding supports the overall notion that institutions such as indcol are related to organizational structure (North, 1990). Indcol is related to the manner in which organizations cooperate or compete with each other. In this case, buyers view their fate as tied to that of their suppliers.

The nomological support for an indcol and interorganizational cooperation relationship validates the analysis of institutions approach. This finding casts doubt on the neoclassical assumptions of rationality, opportunism, and self-interest when

researching organizational questions of cooperation (Arrow, 1975; Collard, 1978; Elster 1990a, 1990b; Mansbridge, 1990; Sabel, 1993; Sen, 1978; Tversky & Kahneman, 1990; Tyler, 1990).

JIT/TQM

Hypotheses 3a and 3b stated the existence of a positive relationship between JIT/TQM and interorganizational cooperation. JIT and TQM were both found to possess a statistically significant relationship with interorganizational cooperation. The relationship provided by these manufacturing practices is discussed in this section.

JIT

JIT is a set of practices to reduce waste and improve the flow of materials in a manufacturing system. As used in this study, JIT consists of *kanban*, lot size reduction, setup time reduction, and JIT scheduling. Due to construct validity issues, lot size reduction and JIT scheduling were removed from further data analyses. The remaining aspects of JIT, as with TQM, rely on CIP (Flynn et al., 1995).

The JIT set of the research model was also found to have a statistically significant relationship with interorganizational cooperation, as seen in Table 19 ($R^2 = .2399$, $p < .005$). *Kanban* was the only JIT variable, however, to provide a statistically significant t-relationship ($t = 2.348$, $p < .05$) with interorganizational cooperation. Based on a Likert-type scale (1 = *strongly disagree* and 7 = *strongly agree*), the means for *kanban* (3.35), lot-size reduction (4.34), setup time reduction (5.52), and JIT scheduling (4.81) are lower than the mean responses for the TQM variable statements. *Kanban*, in particular, exhibits

a low mean in comparison to other JIT elements. Some of the respondents in the study provided comments concerning JIT in Mexico. These managers generally expressed curiosity about JIT as a practice and had a rudimentary knowledge of some of JIT's practices, but they did not see their organization or others in their industry practicing JIT. Although it was hypothesized that JIT is related to interorganizational cooperation, the relative ignorance concerning JIT may hide the true estimation of the relationship between JIT and interorganizational cooperation. This means that low scale reliabilities and low factor analytical scale item loadings may obstruct the actual relationship between JIT and interorganizational cooperation.

TQM

TQM emphasizes the quality improvement role in an organization. TQM, as used in this study, is comprised of customer focus, product design, and statistical process control. It is used in conjunction with CIP. The relationship between TQM and CIP on interorganizational cooperation in an industrialized country is established in the literature (Flynn et al., 1995).

The findings in this study support the notion that TQM is associated with interorganizational cooperation. The overall model involving all TQM and CIP elements without control variables was statistically significant ($R^2 = .3473, p < .001$), as seen in Table 17. SPC, however, was the only TQM subdimension that achieved a statistically significant t -value ($t = 2.838, p < .01$) in its association with interorganizational cooperation. The mean response to scale items on SPC (6.32), as seen in Table 10,

indicates strong agreement. This may be interpreted to mean that, if an organization is concerned with improving product quality through process control, it may also extend that concern to its suppliers.

Consumer focus did not exhibit a statistically significant relationship with interorganizational cooperation. While not a hypothesized relationship, it could be expected that an organization that is engaged in interorganizational cooperation practices would promote customer focus practices with its customers. Supportive of this complementary relationship, the mean response to scale items on consumer focus (5.78) indicates agreement. Whereas SPC is concerned with the application of quality tools, which can be used independently of TQM, customer focus is in line with the systematic and philosophical aspects of TQM.

Product design, as with consumer focus, did not provide a statistically significant relationship with interorganizational cooperation. The mean response to product design (5.89), however, indicates agreement with this set of scale items. This is interpreted to mean that product design is practiced among the respondents. The construct validation procedures, however, required the elimination of several of the scale items due to their nonrelationship. The resulting set of questions is a subset of the original group. The most compelling explanation is provided by Lamming (1989), who stated that Mexican automotive parts suppliers lack design capabilities. Mexican automotive parts suppliers may work from strict design parameters; design capability is not required by buyers; and the final assembler maintains design control.

As seen above, the mean responses to subdimensions of TQM are not equal. This may be interpreted to mean that product quality may have a higher priority than a consumer focus program and possessing design capabilities. Since the opening of the Mexican economy in the mid-1980s, the quality of Mexican export products has been an ongoing concern. Lamming (1989) found that Mexican auto assemblers “consider that only 5% to 30% of their Mexican suppliers are capable of working to export specifications” (p. 1). It is expected that organizations with incipient TQM programs will increasingly implement other TQM practices in the future.

Superordinate Goal Effect of JIT/TQM

According to social identity theory, a superordinate goal will unite distinct social groups when institutions may work against cooperation. When institutions act to support cooperation, the superordinate goal will still provide a larger explanatory role for cooperation (Sherif et al., 1961). JIT/TQM requires cooperation between buyers and suppliers. This requirement is used to achieve lower costs, shorter development and production cycles, higher quality, and other interorganizational synergies (Ansari & Modarress, 1986; Burt, 1989; Nishiguchi, 1994; Womack et al., 1990).

JIT/TQM served as the superordinate goal, while interorganizational trust and indcol functioned as institutions in this study. Findings on the superordinate goal relationship of JIT/TQM and their CIP with interorganizational cooperation are presented in this section.

Comparison of Variance between JIT/TQM and Interorganizational Cooperation versus Interorganizational Trust and Interorganizational Cooperation

In Hypotheses 4a and 5a it was hypothesized that the superordinate goal effect of JIT/TQM explained variance with interorganizational cooperation better than interorganizational trust. These hypotheses were tested by comparing the difference (Δ) between the semipartial coefficient of correlation (R^2) values of hierarchical regression models in which the order of entry of variables for TQM or JIT and interorganizational trust was reversed (Cohen & Cohen, 1983). The ΔR^2 comparison of .3513 and .0042 for TQM and interorganizational trust, respectively, is large (see Tables 21 and 23). Similarly, the ΔR^2 comparison of .2461 and .0087 for JIT and interorganizational trust, respectively, was also large (see Tables 29 and 31). JIT/TQM clearly explains variance with interorganizational cooperation better than interorganizational trust. JIT/TQM functions as a superordinate goal to explain interorganizational cooperation.

Comparison of Variance between JIT/TQM and Interorganizational Cooperation versus Indcol and Interorganizational Cooperation

In Hypotheses 4b and 5b it was hypothesized that the superordinate goal effect of JIT/TQM explained variance with interorganizational cooperation better than indcol. No consideration was given here to the direction of influence for indcol, either as individualism or collectivism. The premise of these hypotheses was to rank the absolute effect of JIT/TQM and indcol on interorganizational cooperation.

As with Hypotheses 4a and 5a, these hypotheses were tested by comparing the difference (Δ) between the semipartial coefficient of determination (R^2) of the hierarchical regression models. The order of entry of variables for JIT/TQM and indcol was reversed to make the comparison. The comparison for TQM and indcol resulted in ΔR^2 comparison of .3086 and .1048, respectively (see Tables 25 and 27). The comparison of influence for JIT and indcol provided ΔR^2 values of .2252 and .1828 (see Tables 33 and 35). As with the previous comparison with interorganizational trust, JIT/TQM clearly explains variance with interorganizational cooperation better than does indcol. Again, JIT/TQM functions as a superordinate goal to explain interorganizational cooperation.

Revised Research Model

Based on the analysis discussed in this chapter, the revised research model is presented in Figure 3. The model supports the institutional premise that institutions influence organizational structure (North, 1990). This analysis of institutions provided a social explanation of interorganizational cooperation that is absent in transaction cost economics (Coase, 1937; Williamson, 1981). Interorganizational trust and indcol were used as institutional constructs in this study. Interorganizational trust did not provide a significant relationship to interorganizational cooperation. Perhaps, in a replication with the most recently chosen supplier, as opposed to this study's most important supplier, interorganizational trust would provide an explanatory role for interorganizational cooperation. For this reason, interorganizational trust is treated as a necessary but

insufficient factor to explain interorganizational cooperation. This relationship is represented as a dashed line.

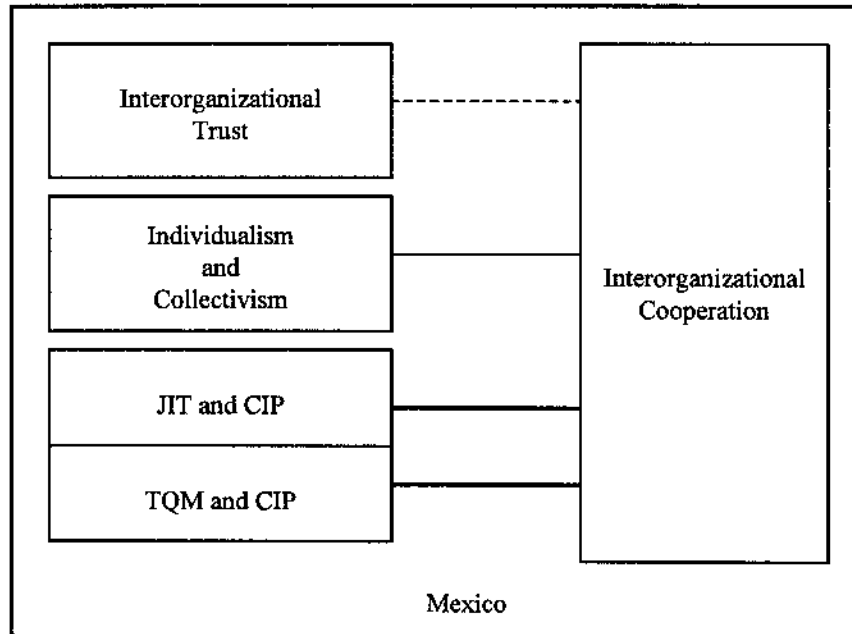


Figure 3. Revised research model.

Indcol was found to provide a statistically significant relationship with interorganizational cooperation. The direction of the relationship, however, was in the opposite direction as hypothesized. Collectivism was positively associated with interorganizational cooperation. Conceivably, in future research using the most recently chosen supplier as the reference point, individualism would exhibit a positive relationship as originally proposed in Hypothesis 2. Nonetheless, the relationship between indcol and interorganizational cooperation is presented as a solid line with no mention of positive or negative relationship.

JIT and TQM with their CIP provided a statistically significant relationship with interorganizational cooperation consistent with Hypotheses 3a and 3b. JIT, as a superordinate goal in its relationship with interorganizational cooperation, explained variance better than interorganizational trust or indcol. The superordinate goal effect was measured as a comparison of variance. TQM explained variance with interorganizational cooperation better than did interorganizational trust and indcol. These findings support Hypotheses 4a through 5b and contribute to the notion that the superordinate goal effect of JIT/TQM provides a stronger influence to cooperate than do interorganizational trust or indcol.

Limitations of the Study

Behavioral survey research involves serious questions relating to inherent limitations when dealing with people and the organizations with which they are associated. Despite improvements in methodology and computation, behavioral survey research is an inexact science (Mitchell, 1985). Serious inquiry requires a listing of the limitations posed by the nature of the research to qualify its contribution to the field of behavioral science. Although research limitations interact, they are listed in this section according to the threats they pose to statistical conclusion, internal, construct, and external validities (T. D. Cook, Campbell, & Peracchio, 1990).

Statistical Conclusion Validity

Statistical conclusion validity deals primarily with the sources of covariance error and the use of appropriate tests to deal with this error. Statistical tests function primarily as gatekeepers when drawing inferences about relationships. Due to the gatekeeper function, statistical conclusion validity is discussed first. The principal threats to statistical conclusion validity identified in this study deal with statistical power, errors associated with the number of tests, and reliability of measures.

Statistical Power

To reduce the probability of nonsignificant findings, an a priori power of the test was conducted. During the analysis of the hypotheses, the power of all tests, except for the single-effect model using interorganizational trust, reached acceptable power levels. To increase the power for interorganizational trust to an acceptable level ($> .80$) a sample greater than 146 respondents would be required (see Table 37). For the remaining variables, statistical power is not considered a threat to statistical conclusion validity.

Number of Tests

A large number of tests for each of the variables may lead to chance correlations (Mitchell, 1985). Using a small number of tests, on the other hand, decreases the opportunity to validate a relationship from a variety of approaches. This study uses a relatively large number of tests. To reduce the problem associated with a large number of tests, variables were tested in sets, and irrelevant control variables were removed from advanced testing. In addition, the intercorrelations were reviewed to avert overlapping

relationships. A review of the variable inflation factor (VIF) and tolerance scores, however, did not reveal problems of multicollinearity with the CIP scales (Hair et al., 1992).

Reliability of Measures

Despite the rigorous a priori translation efforts, a posteriori confirmatory factor analysis, and internal consistency statistical tests, several of the variables did not provide adequate levels of reliability. Low internal consistency reliability decreases the validity of the statistical tests. As mentioned earlier, some of the threats to validity overlap. This discussion of reliability overlaps with threats to construct validity. A broader and integrated discussion of the issues of low internal consistency reliability for some of the variables is provided later in this chapter under the heading Construct Validity.

Internal Validity

According to Mitchell (1985), internal validity refers to the certainty with which a causal relationship between two variables can be inferred. The threats to internal validity in correlation research are quite different from those posed to experiments. The principal threats discussed here deal with the spurious situational events and third variables that may be related to the independent or independent variables.

To control for spurious situational events, the process for identifying the respondent and delivering and collecting the survey was implemented in a standard procedure. After the data were collected, any questions the respondent had about the

research were answered. To control for effects from spurious third variables, the salient control variables identified in a thorough search of the literature were used in this study.

To further control for spurious third variables, the principal individual and organizational demographic control variables were collected and used in statistical analyses. Despite the rigorous controls used in this study, however, the inherently low level of control in survey research may introduce unknown threats to internal validity.

Construct Validity

The main thrust of construct validity hinges on whether the variables actually measure what they purport to measure (Kerlinger, 1986). This section addresses the principal threats to construct validity, consisting of translation issues and common method variance.

Translation Issues

Construct validity is a constant and recurring endeavor in social research (Carmines & Zeller, 1979). When crossing language, cultural, and industrial development barriers, assuaging threats to construct validity assumes a prominent role (Riordan & Vandenburg, 1994). The variables used in this study were rigorously designed and were tested using a variety of procedures generally considered to be standard methods of construct validation. These procedures strengthen the content validity, unidimensionality, internal reliability, convergent and discriminant validity, and nomological validity of the variables (Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993; Venkatraman & Grant, 1986). An a priori translation procedure was used to strengthen content validity.

These methods are described in chapter 3. Finally, an a posteriori procedure involving confirmatory factor analysis to improve unidimensionality and measures of Cronbach's alpha (α) for internal reliability was used (Riordan & Vandenburg, 1994).

The results from these procedures provided less than desirable but not unexpected validity problems. The confirmatory factor analysis and test of internal reliability eliminated scale items from the variables. In the case of interorganizational trust and indcol, these problems were not highly problematic. The interorganizational trust scale was reduced from 12 to 11 items. Considering the similar content of the questions, little validity was lost. Indcol was measured using four scales. Although each scale lost one or two items, the use of four scales, each containing multiple items to measure one construct, mitigated this loss.

The loss in construct validity occurred more with the JIT/TQM elements. In particular, the reliabilities for product design ($\alpha = .55$), customer focus ($\alpha = .58$), lot size reduction ($\alpha = .49$), and JIT scheduling ($\alpha = .27$) were low. The latter two were dropped from regression analysis based on a minimum $\alpha = .50$ (Nunnally, 1967). In addition to low internal reliability, the JIT/TQM scales decreased in content validity. For example, three items concerning part minimization were deleted from the product design scale, and items relating to incentives for quality improvement and incentives for learning new skills were removed from the workforce management variable.

The net effect of low internal consistency reliability and a reduction of content validity was to render these variables as a less reliable and less inclusive measure of the

multifaceted JIT/TQM construct. From another vantage point, however, the elements of JIT/TQM as practiced in the U.S. may be different from the same construct as practiced in Mexico. The loss of content validity is then transformed into a discussion of a new variation of the JIT/TQM construct in another setting. The implications from this approach provide a fertile field for discussion of issues in international operations management.

Common Method Variance

Common method variance refers to the potentially erroneous relationship between two variables when no relationship exists. The error is generally attributed to a biased response facilitated by a common method of data collection (Podsakoff & Organ, 1986). A number of factors may contribute to common method variance. These factors include a subject's transitory frame-of-mind, systematic response style, bias for social desirability, and overlap in the content of the variables used. Single source bias, a special form of common method variance, is attributed to the collection of data from the same source (Avolio, Yammarino, & Bass, 1991).

To minimize common method variance, Podsakoff and Organ (1986) suggested post hoc remedies and a priori procedural methods. Two procedural methods were not considered expedient for this study due to the data collection constraints. These procedures involve escalating the unit of analysis and separating the method of collection. Escalating the unit analysis consists of grouping the responses and conducting data analysis from a subgroup level rather than as individuals. Escalation was not considered

feasible because it reduces the statistical validity of the results and consequently requires a larger response. Separating the method of data collection can be accomplished by splitting the method of data collection, by dividing the timing of the data collection into two or more sessions, and by collecting from several respondents (Podsakoff & Organ, 1986). Splitting the data collection into two or more sessions would have increased data collection time and costs. Using multiple respondents would have been counterproductive because the manager in charge of purchasing is the most indicated individual to study.

The procedural methods used to circumvent common method variance were the use of multi-item scales and placement of the dependent variable at the end of the questionnaire. Multi-item scales reduce common method variance by using several questions to address a single construct. When summing the items for each variable, common method variance is reduced (Spector, 1987). As discussed in chapter 3, all of the scales are made up of several items and do not depend on single item variables. Moreover, each of the scales has undergone vigorous testing. Finally, placing the dependent variable at the end of the instrument guides the respondent to answer more objectively, with less guessing as to the real nature of the study (Podsakoff & Organ, 1986).

The use of survey methodology is valid for the intent of this study. Mexico is a fertile field for research in light of the growing commercial ties and its rise as an industrial power. Much of the research in Mexico currently relies on case research. Nomothetic research involving large numbers of respondents, on the other hand, is clearly

lacking. Moreover, self-reports are perhaps the most appropriate method for gathering psychometric, demographic, and organizational practices data (Podsakoff & Organ, 1986).

External Validity

External validity refers to the extent by which a study's findings can be generalized across different populations and settings. Generalizing from a study's sample to the target population is specifically referred to as population validity, while generalizing to other environmental factors (settings, tests, etc.) is referred to as ecological validity (Bracht & Glass, 1968).

In reference to population validity, a sample of Mexican managers responsible for purchasing for their respective organizations in the Mexican automotive parts industry in the Mexico City and the Monterrey industrial areas was used in this study. The sample was randomly chosen from a directory obtained from the Banco de Comercio Exterior (BANCOMEXT). Nonresponse was limited to six organizations that declined to participate. Thus, the results from this study generalize well to the Mexican automotive parts industry.

The Mexican automotive parts industry is subject to a high global competitiveness and is perhaps the most advanced user of JIT/TQM in Mexico. These findings may serve as the upper benchmark of industrial practices for Mexican owned and managed organizations.

From a cultural viewpoint, the inclusion of northern and southern Mexico respondents provides the two poles of Mexican managerial cultures. Mexico also shares common cultural, linguistic, developmental, and historical roots with the rest of Latin America. While a topic for future research, the findings from this research may also be tentatively generalized to the emerging industrial societies of Brazil, Argentina, and Chile.

In reference to ecological validity, the Hawthorne effect stands out as the principal threat to ecological validity. The Hawthorne effect refers to the perception that a subject should respond in some unknown manner to the research stimuli. Most Mexican managers are not subject to the research intrusion found in the United States and other industrialized countries. Having participated in little or no prior research may have caused respondents to question the intent of the research. Research-experienced respondents, on the other hand, would be expected to more readily answer a survey questions. It is not known to what degree the Hawthorne effect introduced error. Due to the exploratory nature of the present study, this validity threat must be taken into account.

Recommendations for Future Study

Research on interorganizational cooperation in an industrial context is a relatively new and fertile field of research. Many theoretical and empirical gaps exist in the literature. To fill these gaps, the following recommendations for future study are provided. These recommendations are principal themes that extend from this study and should not be considered as an inclusive list of all directions for future research. The

principal recommendations for future research consist of using the most recently chosen supplier as the reference point for interorganizational cooperation, extending this research model to other parts of Latin America, and improving the construct validity of the interorganizational cooperation variable.

Most Recently Chosen Supplier as Reference

The use of the principal supplier as the reference point for interorganizational trust and interorganizational cooperation provided insufficient variance to report a statistically significant relationship between the two variables. The nonsignificance of the relationship is due to the duration and magnitude of trade relations between the buyer and principal supplier. Using the most recently chosen supplier as a reference point, in addition to the principal supplier, may provide an alternative amount of trust with wider variance.

The most recently chosen supplier is defined as the supplier with the shortest association with the buyer. This supplier would most likely share a transitory relationship with the buyer, with little history to warrant a larger supply role. The most recently chosen supplier may also represent a supplier in a probationary status. It is expected that the most recently chosen supplier would be accorded less trust than would the principal supplier. Even if this relationship were to provide a narrow amount of variance, the most recently chosen and principal supplier relationships could be used as treatment levels to use the interorganizational trust variable in a quasiexperimental design.

The theoretical implications of using the most recently chosen supplier as the reference point may further support the necessary but insufficient role for

interorganizational trust. If a statistically significant and substantively positive relationship is found between interorganizational trust and interorganizational cooperation, using the most recently chosen supplier condition in conjunction with the nonsignificant relationship found with the principal supplier, then the necessary but insufficient role would be supported. This relationship has not been reported in the theoretical or empirical studies in the literature.

Emerging Industrial Societies in Latin America

Mexico was used as the setting for this research in order to study the cultural and industrial environments that influence interorganizational cooperation, which are unavailable in the United States. Mexico shares this cultural and developmental stage to varying degrees with other regions in Latin America. One of the principal cultural and developmental arguments to explain Latin America's retarded industrial growth has been provided by dependency theory (Dietz & Street, 1987). According to dependency theory, the countries of Latin America and other less-developed countries are held in hegemonistic and dependent roles created by industrialized countries, such as the United States. Others suggest that dependency was not created by the industrialized countries; rather, the cultural factors for dependency were inherited from the Iberian colonizers. Regardless of the source of dependency, the cultural factors of low trust and collectivism are also present in other Latin American countries and may also influence interorganizational cooperation in other parts of Latin America. While limited in scope, research on interpersonal trust in Latin America shows low trust among individuals

(Inglehart, 1988). Latin American countries also demonstrate collectivistic values (Hofstede, 1980; Marin & Triandis, 1984). Besides Mexico, the principal countries in Latin America having an emerging industrial sector are Argentina, Brazil, and Chile. These countries each possess a sizable automotive parts industry. Further, these three countries are active trade partners under the Mercosur free trade agreement. Extending this study to other parts of Latin America would increase the knowledge of cultural and industrial environment influences on interorganizational cooperation.

Construct Validation of Interorganizational Cooperation

The interorganizational cooperation variable used in this study is based on scale items from Flynn et al. (1995), Hendrick and Ellram (1993) and from items created by the researcher. In the two studies cited above, interorganizational cooperation was treated as a unidimensional construct. In the analysis of the literature presented in chapter 2, however, interorganizational cooperation was presented in five distinct subdimensions. These subdimensions consist of supplier development, early supplier involvement, evaluation and certification, total cost management, and long-term relationship. Due to statistical constraints posed by a small sample of 73 respondents, the variable was considered as a unidimensional variable.

For future empirical research, construct validation procedures should be applied to the interorganizational cooperation subdimensions. The methodology proposed by Venkatraman and Grant (1986) incorporates conventional procedures from a variety of sources for construct validation. The sampling frame for this construct validation research

should cover a variety of industries in the industrialized, as well as less-developed countries. Prior research in operations management has tended to concentrate on industrialized countries due to the ease of gathering data; however, this approach ignores the incipient areas of development and potential exceptions to theory.

Chapter Summary

These findings provide empirical evidence for academicians and practitioners. New light has been shed on the role of interorganizational trust, indcol, and JIT/TQM in interorganizational cooperation in an industrial setting quite different from that found in the U.S. and other industrialized countries. Interorganizational trust did not exhibit a statistically significant relationship with interorganizational cooperation. Indcol provided a statistically significant relationship with interorganizational cooperation. Indcol is related to cooperation in interorganizational settings much as it is in small-group settings. Cooperation is high when collectivists perceive a common destiny with other group members. JIT and TQM and their CIP is related in a statistically significant manner to interorganizational cooperation. Moreover, JIT/TQM provides a superordinate goal effect with interorganizational cooperation better than do interorganizational trust and indcol.

Despite the use of safeguards when designing survey research, the use of humans and the organizations they belong to introduces limitations to the validity of the study. In its gatekeeper role, statistical conclusion validity was deemed adequate. Except for Hypothesis 1, the hierarchical regression tests were found to exhibit sufficient power.

Regarding the potential threats to internal validity, several steps were taken to improve the ability to portray accurate relationships among the study's variables. To avoid the introduction of spurious treatment effects, data collection followed a structured procedure. Further, a thorough search of the literature enhanced the role of independent variables.

The threats to construct validity in this study were treated through a priori and a posteriori procedures. Due to the application of these procedures, some of the variables exhibited low internal consistency reliabilities. The subsequent removal of some of the scale items resulted in a reduction of content validity; however, this reduction should be tempered with the view that construct validity of some of the JIT/TQM variables may be different in Mexico from those in the United States. Common method variance is another potential threat to construct validity. To reduce the validity threats from common method variance, multi-item scales were employed, and the dependent variable was placed at the end of the instrument.

The threats to external validity concern the extent to which the results can be generalized to a target population and to other settings. The use of a random sample of purchasing managers from automotive parts manufacturers from the Mexico City and Monterrey industrial areas provides a high amount of generalizability to similar businesses in Mexico. Moreover, conditions may be appropriate to generalize, albeit with less certainty, to other parts of industrialized Latin America.

The findings from this study provide several avenues for future research. The research directions discussed here concern the use of the most recently chosen supplier as reference, extending this research model and design into other parts of Latin America and improving the interorganizational cooperation construct.

APPENDIX A
QUESTIONNAIRE

October 2, 1997

To Whom It May Concern:

Attached you will find a questionnaire composed of questions concerning your opinions and attitudes toward your suppliers. The data from this survey will be used in my doctoral dissertation on supplier partnerships in Mexico. The understanding gained from this study will provide a perspective with which managers will be able to improve the efficiency of transactions between organizations.

The information obtained from this study will be used exclusively for scientific research purposes and your participation, as a respondent to this study, is voluntary. Later, a meeting will be held for all respondents will be held on supplier partnerships and the study's findings.

Please take a few minutes to fill out the survey. If you need more information, you may reach me in the USA at (214) 754 5819 or by fax at (214) 754 5672. Thanks you for your attention.

This project has been reviewed and approved by the University Of North Texas Committee For The Protection Of Human Subjects (817) 565 3940.

Establishing the Identities of the Principal Actors in Each Organization.

Who is the most important person in each organization for the establishment and maintenance of the relationship between your organization and your principal supplier? [Principal supplier refers to the plant level supplier who provides your highest volume in pesos].

Your organization:

Mark one only (√)

- Owner
 Plant manager
 Purchasing director
 Purchasing agent or buyer
 Other. Describe: _____

Your supplier

Mark one only (√)

- Owner
 Plant manager
 Sales manager or salesperson
 Other. Describe: _____

Mark the term that best describes the relationship between these two individuals. Mark one only (√):

- Relative by birth (Father - son, brothers,)
 Relative by marriage (In-laws).
 Affinal ties (i.e., Godparents)
 Close friends
 Friends
 Business associate or acquaintance
 Other. Describe: _____

Section 1. Your opinion about your principal supplier.

Please circle the number beside each statement that most closely describes the opinion of members of the purchasing department at your organization toward your principal supplier. Principal supplier refers to the plant level supplier who provides your highest volume in pesos. Interpret the blank lines as referring to your principal supplier about which you are commenting.

Strongly Disagree	=	1
Disagree	=	2
Slightly Disagree	=	3
Neither Agree nor Disagree	=	4
Slightly Agree	=	5
Agree	=	6
Strongly Agree	=	7

1. We think the people in _____ tell the truth. 1 2 3 4 5 6 7
2. We think that _____ meets its negotiated obligations. 1 2 3 4 5 6 7
3. In our opinion, _____ is reliable. 1 2 3 4 5 6 7
4. We think people in _____ succeed by stepping on other people. 1 2 3 4 5 6 7
5. We feel that _____ tries to get the upper hand. 1 2 3 4 5 6 7
6. We think that _____ takes advantage of our problems. 1 2 3 4 5 6 7
7. We feel that _____ negotiates with us honestly. 1 2 3 4 5 6 7
8. We feel that _____ will keep its word. 1 2 3 4 5 6 7
9. We think that _____ does not mislead us. 1 2 3 4 5 6 7
10. We feel that _____ tries to get out of its commitments. 1 2 3 4 5 6 7
11. We feel that _____ negotiates joint expectations fairly. 1 2 3 4 5 6 7
12. We feel that _____ takes advantage of people who are vulnerable. 1 2 3 4 5 6 7

Section 2. Your opinion about groups and individuals.

Please circle the number beside each statement that most closely describes your opinion.

Strongly Disagree	=	1
Disagree	=	2
Slightly Disagree	=	3
Neither Agree nor Disagree	=	4
Slightly Agree	=	5
Agree	=	6
Strongly Agree	=	7

1. A group is more productive when its members do what they want rather than what the group wants them to do. 1 2 3 4 5 6 7
2. To be superior a person must stand alone. 1 2 3 4 5 6 7
3. People who belong to a group should realize that they are sometimes going to make sacrifices for the sake of the group as a whole. 1 2 3 4 5 6 7
4. What happens to me is my own doing. 1 2 3 4 5 6 7
5. People should be made aware that if they are going to be part of a group they are sometimes going to have to do things they don't want to do. . . 1 2 3 4 5 6 7
6. Winning is everything. 1 2 3 4 5 6 7
7. A group is more productive when its members follow their own interests and concerns. 1 2 3 4 5 6 7
8. Working with a group is better than working alone 1 2 3 4 5 6 7
9. It annoys me when other people perform better than I do. 1 2 3 4 5 6 7
10. Doing your best isn't enough; it is important to win 1 2 3 4 5 6 7
11. I prefer to work with others in a group rather than working alone. 1 2 3 4 5 6 7
12. Given the choice, I would rather do a job where I can work alone rather than doing a job where I have to work with others in a group 1 2 3 4 5 6 7
13. Success is the most important thing in life. 1 2 3 4 5 6 7
14. In the long run, the only person you can count on is yourself. 1 2 3 4 5 6 7
15. People who belong to a group should realize that they're not always going to get what they personally want. 1 2 3 4 5 6 7
16. If you want something done right, you've got to do it yourself. 1 2 3 4 5 6 7
17. People in a group should be willing to make sacrifices for the sake of the group's well being. 1 2 3 4 5 6 7
18. Only those who depend on themselves get ahead in life. 1 2 3 4 5 6 7
19. A group is most efficient when its members do what they think is best rather than doing what the group wants them to do. 1 2 3 4 5 6 7
20. I feel that winning is important in both work and games. 1 2 3 4 5 6 7

Section 3. Your opinion about your organization's practices.

Part A

Please circle the number beside each statement that most closely describes the situation at your plant.

Strongly Disagree	=	1
Disagree	=	2
Slightly Disagree	=	3
Neither Agree nor Disagree	=	4
Slightly Agree	=	5
Agree	=	6
Strongly Agree	=	7

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 1. We are frequently in close contact with our customers. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Our customers seldom visit our plant. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Our customers give us performance feedback on quality and delivery. . . . | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. There is little involvement of people from manufacturing and quality
in the early design of products, before products reach the plant. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. We design for ease of production | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. We make an effort, in the design process, to list only the
specifications which are clearly needed. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. The emphasis in part design is on minimizing the part count. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. We are not concerned about the number of parts in an end item. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. New product designs are thoroughly reviewed before the
product is produced and sold. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Manufacturing engineers are involved to a great extent before
the introduction of new products. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. A large number of the equipment or processes on the shop floor
are currently under statistical process control. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. We make extensive use of statistical techniques
to reduce variance in processes. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. Charts showing defect rates are posted on the shop floor. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Section 3- Continued. Your opinion about your organization's practices.

Part B

Please circle the number beside each statement that most closely describes the situation at your plant.

- Strongly Disagree = 1
- Disagree = 2
- Slightly Disagree = 3
- Neither Agree nor Disagree = 4
- Slightly Agree = 5
- Agree = 6
- Strongly Agree = 7

1. Vendors fill our kanban containers, rather than filling purchase orders. . . 1 2 3 4 5 6 7
2. Our suppliers deliver to us in kanban containers, without the use of separate packaging. 1 2 3 4 5 6 7
3. We use a kanban pull system for production control. 1 2 3 4 5 6 7
4. We use kanban squares, containers of signals for production control. . . . 1 2 3 4 5 6 7
5. We have large lot sizes in our plant. 1 2 3 4 5 6 7
6. We tend to have large lot sizes in our master production schedule. 1 2 3 4 5 6 7
7. We are aggressively working to lower lot sizes in our plant. 1 2 3 4 5 6 7
8. Our crews practice setups to reduce the time required. 1 2 3 4 5 6 7
9. We are aggressively working to lower setup times in our plant. 1 2 3 4 5 6 7
10. We have low setup times of equipment in our plant. 1 2 3 4 5 6 7
11. We usually meet the production schedule each day. 1 2 3 4 5 6 7
12. There is no time in the schedule for machine breakdowns or production stoppages. 1 2 3 4 5 6 7
13. Our schedule is designed to allow time for catching up, due to production stoppages for quality problems. 1 2 3 4 5 6 7

**Section 3- Continued. Your opinion about your organization's practices.
Part C**

Please circle the number beside each statement that most closely describes situations at your plant.

- | | | | | | | | | | | |
|----------------------------|--|---|---|---|---|---|---|---|--|--|
| Strongly Disagree | = | 1 | | | | | | | | |
| Disagree | = | 2 | | | | | | | | |
| Slightly Disagree | = | 3 | | | | | | | | |
| Neither Agree nor Disagree | = | 4 | | | | | | | | |
| Slightly Agree | = | 5 | | | | | | | | |
| Agree | = | 6 | | | | | | | | |
| Strongly Agree | = | 7 | | | | | | | | |
| | | | | | | | | | | |
| 1. | Information on quality performance is readily available to employees. . . | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2. | Information on productivity is readily available to employees. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 3. | All major department heads within our plant accept their
responsibility for quality. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 4. | Plant management provides personal leadership for quality
products and quality improvement. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 5. | Our equipment is in a state of readiness for production at all times | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 6. | Our plant emphasizes putting all tools and fixtures in their place. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 7. | We take pride in keeping our plant neat and clean at all times | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 8. | Our plant is disorganized and dirty. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 9. | Managers in this plant believe in using a lot of face to face contact | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 10. | Direct labor competence is high in this plant. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 11. | Supervisors encourage the persons who work for them to work as a team | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 12. | We pay a group incentive for quality improvement ideas. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 13. | Supervisors encourage people who work for them to
exchange opinions and ideas. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 14. | Direct labor undergoes training to perform multiple tasks in
the production process. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 15. | Our plant is organized into permanent production teams. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 16. | Supervisors frequently hold group meetings where the people who
work for them can really discuss things together. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 17. | Plant employees are rewarded for learning new skills. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |

Section 4. Describe your level of cooperation with your principal supplier.

Part C

Please circle the number beside each statement that most closely describes your relationship with your principal supplier. Principal supplier refers to the plant level supplier who provides your highest volume in pesos.

- Strongly Disagree = 1
- Disagree = 2
- Slightly Disagree = 3
- Neither Agree nor Disagree = 4
- Slightly Agree = 5
- Agree = 6
- Strongly Agree = 7

1. We provide our supplier with training on quality. 1 2 3 4 5 6 7
2. We provide our supplier with technical support when they
experience a production/quality problem. 1 2 3 4 5 6 7
3. We share proprietary information with our supplier in order
to facilitate the efficient flow of material. 1 2 3 4 5 6 7
4. We avoid helping our supplier with their quality problems. 1 2 3 4 5 6 7
5. Our supplier is actively engaged in our new product design process. . . . 1 2 3 4 5 6 7
6. We encourage our suppliers to work from design parameters
rather than strict specifications. 1 2 3 4 5 6 7
7. Our supplier has little to do except follow the specifications we develop. 1 2 3 4 5 6 7
8. We evaluate our supplier solely on product cost. 1 2 3 4 5 6 7
9. We evaluate our supplier on mutually agreed terms. 1 2 3 4 5 6 7
10. We meet with our supplier's senior management on a regular basis. . . . 1 2 3 4 5 6 7
11. We ask our supplier their opinion of our performance. 1 2 3 4 5 6 7
12. Quality was our number one criterion in selecting our supplier. 1 2 3 4 5 6 7
13. We rely on a small number of highly qualified suppliers. 1 2 3 4 5 6 7
14. Our supplier is certified, or qualified, for quality. 1 2 3 4 5 6 7
15. Our supplier provides us with confidential information. 1 2 3 4 5 6 7
16. We provide our supplier with confidential information. 1 2 3 4 5 6 7
17. We work with our supplier to help identify and reduce their overall costs 1 2 3 4 5 6 7

18. Our contract with our supplier is detailed to cover all possible risks. . . . 1 2 3 4 5 6 7
19. We strive to establish a long-term relationship with our supplier. 1 2 3 4 5 6 7
20. Our contract with our supplier is a simple document. 1 2 3 4 5 6 7
21. We prefer to offer our supplier short contractual periods. 1 2 3 4 5 6 7

Training Practices at your Organization

Please circle the number beside each statement that most closely describes your organization's training practices.

Strongly Disagree	=	1
Disagree	=	2
Slightly Disagree	=	3
Neither Agree nor Disagree	=	4
Slightly Agree	=	5
Agree	=	6
Strongly Agree	=	7

1. Most production workers are capable of quality production. 1 2 3 4 5 6 7
2. Workers receive over 40 hours of training a year. 1 2 3 4 5 6 7
3. Our management believes that worker training pays
for itself through better products. 1 2 3 4 5 6 7
4. Most workers in this plant know the company's mission statement. 1 2 3 4 5 6 7
5. Our worker training programs attempt to instill a sense of ownership. . . . 1 2 3 4 5 6 7
6. Our plant management believes that workers should know they
are the key to this organization's success. 1 2 3 4 5 6 7
7. Most managers and workers communicate freely with each other. 1 2 3 4 5 6 7
8. This company provides training to improve
worker-management communication. 1 2 3 4 5 6 7
9. This company provides training to improve communication
with customers and suppliers. 1 2 3 4 5 6 7
10. This company believes success depends on clear communication
between this organization and other organizations. 1 2 3 4 5 6 7

Section 5. Demographic Information.

Please fill in each blank or check the appropriate category.

1. Number of years with current organization: _____ years.
2. Title of your current position: _____
3. Your highest level of education:
 - _____ Secondary
 - _____ High school or equivalent
 - _____ Some college
 - _____ College degree
4. If you completed a university degree, please indicate your degree:
 - _____ Engineering in _____ (indicate discipline).
 - _____ Bachelor of Business Administration in _____ (indicate discipline).
 - _____ Master of Business Administration in _____ (indicate discipline).
 - _____ Other. Describe _____

Please write the name of the university of the last degree you received

In your university studies, did you take a specific course in purchasing management?

_____ yes _____ no

5. Sex _____ Masculine _____ Feminine
6. Number of employees (List only the number of employees at your plant location): _____
7. Describe the product made at your plant:

8. Describe the product or process purchased from your principal supplier:

9. How long has your organization worked with your principal supplier? _____ years
10. What percentage of your total material purchases does your principal supplier provide?

_____ %
11. Has your organization provided you, and other personnel in your organization, with training and support designed to improve relations with your principal supplier?

_____ yes _____ no

If yes, describe the type of training and support:

Octubre 2, 1997

A Quien Corresponda

Anexo encontrará una encuesta integrada por preguntas concerniendo sus opiniones y actitudes hacia su proveedores. Los datos de esta encuesta se usarán para mi tesis de doctorado sobre las alianzas proveedor-comprador en México. El conocimiento ganado de este estudio proveerá una perspectiva por la cual los gerentes podrán hacer más eficientes las transacciones entre empresas.

La información obtenida de este estudio será usada exclusivamente para propósitos de investigación científica y su participación, como respondiente en este estudio, es voluntaria. Más adelante se presentará un seminario para todos los respondientes sobre el tema de las alianzas comprador-proveedor, administración de compras, y de los resultados de este estudio.

Por favor tome unos minutos para llenar esta encuesta. Si requiere más información, me puede contactar en EEUU al teléfono (214) 754 5819 o por fax (214) 754 5672. Gracias de antemano por su atención.

This project has been reviewed and approved by the University Of North Texas Committee For The Protection Of Human Subjects (817) 565 3940.

Este proyecto fue revisado y aprobado por el Comité para la Protección de los Sujetos Humanos de la University of North Texas (817) 565 3940.

Establecer Los Actores Principales Entre Empresas.

¿Quiénes son las personas principalmente responsables, de cada empresa, en establecer y mantener la relación entre su empresa y la de su proveedor principal? [El proveedor principal se considera como el proveedor *establecido en México* que le provee el volumen más alto en pesos].

Su empresa:

Marque (✓) solo uno

_____ Dueño

_____ Gerente de planta

_____ Director de Compras

_____ Agente de Compras

_____ Otro. Describa: _____

Su proveedor:

Marque (✓) solo uno

_____ Dueño

_____ Gerente de planta

_____ Director o agente de Ventas

_____ Otro. Describa: _____

Marque el termino que mejor describe la relación entre estas dos personas.

Marque (✓) solo uno:

_____ Pariente consanguíneo (Padre e hijo, hermanos, tío y primo, etc.)

_____ Pariente Político (Suegro, Yerno, Cuñados, Concuñado, etc.)

_____ Compadrazgo

_____ Amistad de mucha confianza

_____ "Cuate", Amigo

_____ Socio de negocio, conocido

_____ Otra. ¿Cuál? _____

SECCIÓN 1. SU OPINIÓN ACERCA DE SU PROVEEDOR PRINCIPAL

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LO QUE MEJOR DESCRIBE LA OPINIÓN DE LOS MIEMBROS DEL DEPARTAMENTO DE COMPRAS DE SU COMPAÑÍA CON RESPECTO A SU PROVEEDOR PRINCIPAL, LLAMANDO ASÍ AL PROVEEDOR DE PLANTA ESTABLECIDO EN MEXICO QUE PROVEE EL MÁS ALTO VOLUMEN EN PESOS. IDENTIFIQUE AL PROVEEDOR PRINCIPAL EN LOS ESPACIOS EN BLANCO.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

1. *Pensamos que la gente de _____ dice la verdad.* 1 2 3 4 5 6 7
2. *Pensamos que _____ respeta los términos acordados.* 1 2 3 4 5 6 7
3. *En nuestra opinión _____ es confiable.* 1 2 3 4 5 6 7
4. *Pensamos que la gente de _____ basa su éxito en abusar a los demás.* 1 2 3 4 5 6 7
5. *Sentimos que _____ trata de llevar ventaja.* 1 2 3 4 5 6 7
6. *Pensamos que _____ se aprovecha de nuestros problemas ...* 1 2 3 4 5 6 7
7. *Sentimos que _____ es honesto al negociar con nosotros.* 1 2 3 4 5 6 7
8. *Sentimos que _____ siempre mantiene su palabra.* 1 2 3 4 5 6 7
9. *Pensamos que _____ no trata de confundirnos.* 1 2 3 4 5 6 7
10. *Sentimos que _____ trata de evadir sus compromisos.* 1 2 3 4 5 6 7
11. *Sentimos que _____ negocia las expectativas mutuas con honestidad.* 1 2 3 4 5 6 7
12. *Sentimos que _____ se aprovecha de la gente vulnerable.* 1 2 3 4 5 6 7

SECCIÓN 2. SU OPINIÓN SOBRE GRUPOS E INDIVIDUOS

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE SU OPINIÓN SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 1. | Un grupo es más productivo cuando cada uno de sus miembros hacen lo que quieren en vez de lo que el grupo quiere hacer. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | Para ser superior una persona debe estar sola. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | La gente que pertenece a un grupo debe aceptar que a veces debe sacrificarse por el beneficio del grupo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | Lo que me pasa es resultado de mis propias acciones. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | La gente debe aceptar que, si van a ser parte de un grupo, a veces van a tener que hacer cosas que no quieren hacer. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | Ganar es todo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | Un grupo es más productivo cuando sus miembros siguen sus propios intereses y preocupaciones. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | Trabajar en un grupo es mejor que trabajar solo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | Me molesta cuando otra gente tiene mejor rendimiento que yo | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | Hacer lo mejor que se puede no es suficiente; lo importante es ganar | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | Prefiero trabajar con otros en un grupo en vez de trabajar solo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. | Dada la alternativa, prefiero trabajar sólo en vez de hacerlo en grupo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. | El éxito es lo más importante en la vida. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. | A la larga, la única persona en la que se puede contar es uno mismo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. | La gente que pertenece a un grupo debe darse cuenta de que no siempre se obtiene lo que se quiere en forma personal. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. | Para que las cosas estén bien hechas, las tiene que hacer uno mismo | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. | La gente en un grupo debe sacrificarse por el bienestar del resto del grupo. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. | Sólo los que dependen de sí mismos van para adelante en la vida | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. | Un grupo es más eficiente cuando sus miembros hacen lo que piensan que es mejor, en vez de hacer lo que el grupo quiere que hagan. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. | Pienso que ganar es importante tanto en el trabajo como en el juego. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

SECCIÓN 3. SU OPINIÓN SOBRE LOS MÉTODOS DE OPERACIÓN DE SU EMPRESA.

Parte A

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE LA SITUACIÓN EN SU PLANTA SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Estamos frecuentemente en contacto cercano con nuestros clientes. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Es poco común que nuestros clientes visiten nuestra planta | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Nuestros clientes nos retroalimentan (<i>feedback</i>) en relación a nuestro desempeño en cuanto a la calidad y tiempo de respuesta. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. La gente de manufactura y calidad tiene poca participación en el diseño original de los productos, antes de que éstos lleguen a la planta. . | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Nuestros diseños tienen en cuenta la facilidad de la producción. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Hacemos un esfuerzo, en el proceso de diseño, de listar solamente las especificaciones que claramente se necesitan | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. El énfasis en el diseño de partes es la minimización del total del número de partes. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. No nos preocupa el número de partes en un artículo terminado. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. Los diseños de nuevos productos se revisan minuciosamente antes de producirlos y venderlos. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Los ingenieros de manufactura participan en gran medida antes de la introducción de nuevos productos. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. Un gran número de equipos y procesos en el área de taller están en la actualidad bajo control de procesos estadísticos. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. Hacemos uso extensivo de técnicas estadísticas para reducir la variación entre procesos. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. Los gráficos y tablas que muestran la frecuencia de los defectos están a la vista de los operarios. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

SECCIÓN 3- CONTINUACIÓN. SU OPINIÓN SOBRE LOS MÉTODOS DE OPERACIÓN DE SU EMPRESA.

Parte B

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE LA SITUACION EN SU PLANTA SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

1. Los proveedores llenan nuestros contenedores kanban, en vez de llenar órdenes de compra. 1 2 3 4 5 6 7
2. Nuestros proveedores nos hacen las entregas en contenedores kanban sin hacer uso de empaquetamiento separado. 1 2 3 4 5 6 7
3. Usamos un sistema *pull* kanban (arrastre) para el control de la producción. 1 2 3 4 5 6 7
4. Usamos contenedores de señales kanban para el control de la producción. 1 2 3 4 5 6 7
5. En nuestra planta tenemos partidas de gran tamaño. 1 2 3 4 5 6 7
6. Tenemos la tendencia a mantener lotes de gran tamaño (*lot size*) en nuestro programa maestro de producción. 1 2 3 4 5 6 7
7. Trabajamos arduamente para reducir los tamaños de los lotes en nuestra planta. 1 2 3 4 5 6 7
8. Nuestro personal lleva a cabo prácticas de preparación de equipos para reducir los tiempos necesarios. 1 2 3 4 5 6 7
9. Trabajamos arduamente para reducir los tiempos de preparación en nuestra planta. 1 2 3 4 5 6 7
10. En nuestra planta tenemos tiempos cortos de preparación de equipos. 1 2 3 4 5 6 7
11. Normalmente alcanzamos a cumplir el programa diario de producción. 1 2 3 4 5 6 7
12. No hay tiempo en nuestra programación para roturas de máquinas ni interrupciones de la producción. 1 2 3 4 5 6 7
13. Nuestra programación está diseñada de manera de disponer de tiempo para ponerse al día debido a interrupciones de la producción por problemas de calidad. 1 2 3 4 5 6 7

SECCIÓN 3- SU OPINIÓN SOBRE LOS MÉTODOS DE OPERACIÓN DE SU EMPRESA.

Parte C

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE SU PLANTA SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

1. Los empleados siempre tienen fácil acceso a información sobre el desempeño de calidad (de la empresa) 1 2 3 4 5 6 7
2. Los empleados siempre tienen fácil acceso a información sobre la productividad (de la empresa) 1 2 3 4 5 6 7
3. Los principales jefes de departamento en nuestra planta aceptan su responsabilidad por la calidad. 1 2 3 4 5 6 7
4. La gerencia de planta brinda un liderazgo personal para la obtención de productos de calidad, y mejoras de la calidad. 1 2 3 4 5 6 7
5. Nuestro equipamiento está siempre listo y en alto grado de disposición para la producción en todo momento. 1 2 3 4 5 6 7
6. Nuestra planta enfatiza el poner cada herramienta y dispositivo en su propio lugar. 1 2 3 4 5 6 7
7. Estamos orgullosos de mantener nuestra planta ordenada y limpia en todo momento. 1 2 3 4 5 6 7
8. Nuestra planta es desorganizada y sucia. 1 2 3 4 5 6 7
9. Los gerentes de esta planta creen en las relaciones personales directas. . 1 2 3 4 5 6 7
10. El grado de eficiencia de la mano de obra directa es alto en esta planta. 1 2 3 4 5 6 7
11. Los supervisores alientan a sus subordinados a trabajar en equipo. . . . 1 2 3 4 5 6 7
12. Pagamos un incentivo de grupo por ideas para la mejora de la calidad . 1 2 3 4 5 6 7
13. Los supervisores alientan a sus subordinados a intercambiar opiniones e ideas. 1 2 3 4 5 6 7
14. La mano de obra directa se somete a entrenamiento para llevar a cabo múltiples tareas en el proceso de producción. 1 2 3 4 5 6 7
15. Nuestra planta está organizada en equipos de producción permanentes . 1 2 3 4 5 6 7
16. Los supervisores frecuentemente llevan a cabo reuniones de grupo en las que sus subordinados realmente pueden discutir sus tareas en conjunto. 1 2 3 4 5 6 7
17. Los empleados de la planta reciben premios por aprender nuevas técnicas. 1 2 3 4 5 6 7

SECCIÓN 4- SU OPINIÓN SOBRE EL NIVEL DE COOPERACIÓN CON SU PROVEEDOR PRINCIPAL.

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE LA RELACION CON SU PROVEEDOR PRINCIPAL, (EL PROVEEDOR DE PLANTA ESTABLECIDO EN MEXICO QUE PROVEE EL MAS ALTO VOLUMAN EN PESOS) SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

1.	A nuestro proveedor le damos entrenamiento sobre calidad	1	2	3	4	5	6	7
2.	A nuestro proveedor le damos apoyo técnico cuando experimenta un problema de producción y/o calidad.	1	2	3	4	5	6	7
3.	Compartimos información propietaria con nuestro proveedor de manera de facilitar el flujo de material.	1	2	3	4	5	6	7
4.	Evitamos tener que ayudar a nuestro proveedor en sus problemas de calidad y/o producción.	1	2	3	4	5	6	7
5.	Nuestro proveedor participa activamente en nuestro proceso de diseño de nuevos productos.	1	2	3	4	5	6	7
6.	Alentamos a nuestros proveedores a que trabajen a partir de parámetros de diseño en lugar de especificaciones estrictas.	1	2	3	4	5	6	7
7.	Es poco lo que nuestro proveedor debe hacer aparte de seguir las especificaciones que desarrollamos.	1	2	3	4	5	6	7
8.	Evaluamos a nuestro proveedor basados solamente en el costo de los productos.	1	2	3	4	5	6	7
9.	Evaluamos a nuestro proveedor en términos mutuamente convenidos . .	1	2	3	4	5	6	7
10.	Nos reunimos con la gerencia superior de nuestro proveedor a intervalos regulares.	1	2	3	4	5	6	7
11.	Le pedimos a nuestro proveedor su opinión acerca de nuestro desempeño.	1	2	3	4	5	6	7
12.	La calidad fue el criterio número uno en la selección de nuestro proveedor.	1	2	3	4	5	6	7
13.	Confiamos en un pequeño número de proveedores altamente calificados	1	2	3	4	5	6	7
14.	Nuestro proveedor tiene certificaciones en calidad.	1	2	3	4	5	6	7
15.	Nuestro proveedor nos suministra información confidencial	1	2	3	4	5	6	7
16.	Suministramos información confidencial a nuestro proveedor.	1	2	3	4	5	6	7

17. Trabajamos con nuestro proveedor para ayudarlo a identificar y reducir sus costos totales. 1 2 3 4 5 6 7
18. El contrato con nuestro proveedor es detallado de manera de cubrir todo riesgo posible. 1 2 3 4 5 6 7
19. Hacemos lo posible por establecer una relación duradera a largo plazo con nuestro proveedor. 1 2 3 4 5 6 7
20. El contrato con nuestro proveedor es un simple documento 1 2 3 4 5 6 7
21. Preferimos ofrecer a nuestro proveedor períodos cortos de contrato. . . . 1 2 3 4 5 6 7

Sección 5. PRACTICAS DE ENTRENAMIENTO EN SU ORGANIZACIÓN

POR FAVOR MARQUE UN CÍRCULO EN CADA PREGUNTA O DECLARACIÓN PARA CALIFICAR LA RESPUESTA QUE MEJOR DESCRIBE LAS PRACTICAS DE ENTRENAMIENTO DE SU ORGANIZACION SEGUN LA SIGUIENTE ESCALA.

Totalmente en desacuerdo	=	1
En desacuerdo	=	2
Relativamente en desacuerdo	=	3
Indiferente	=	4
Relativamente de acuerdo	=	5
De acuerdo	=	6
Totalmente de acuerdo	=	7

1. Nuestros trabajadores son capaces de producción de alta calidad. 1 2 3 4 5 6 7
2. Nuestros trabajadores reciben mas entrenamiento que en otras empresas. 1 2 3 4 5 6 7
3. Los administradores de esta organización creen que el entrenamiento se paga por si mismo por medio de mejores productos. 1 2 3 4 5 6 7
4. La mayoría de nuestros trabajadores conocen la misión de esta empresa 1 2 3 4 5 6 7
5. Proveemos un alto nivel de entrenamiento a nuestros empleados. 1 2 3 4 5 6 7
6. Los programas de entrenamiento fomentan la creencia en los trabajadores que ellos son personas claves de esta organización. 1 2 3 4 5 6 7
7. Hay comunicación abierta entre los trabajadores y los administradores. . 1 2 3 4 5 6 7
8. Esta empresa provee entrenamiento para mejorar la comunicación entre trabajadores y la administración. 1 2 3 4 5 6 7
9. Esta empresa provee entrenamiento para mejorar la comunicación con los clientes y los proveedores. 1 2 3 4 5 6 7
10. En esta empresa hay la creencia que el éxito depende en la clara (efectiva) comunicación entre esta empresa y otras empresas 1 2 3 4 5 6 7

Sección 5. Información Demográfica

LENE LOS ESPACIOS EN BLANCO O MARQUE LA CATEGORÍA APROPIADA.

1. Número de años trabajando en la empresa actual: _____ años.
2. Nivel más alto de escolaridad alcanzado:
 - _____ Secundaria
 - _____ Preparatoria o equivalente
 - _____ Universitaria, parcial
 - _____ Universitaria completa

4. Si obtuvo un título universitario, favor de especificarlo:

_____ Ingeniería en _____ (indique la disciplina).

_____ Licenciatura en Administración de Negocios en _____ (indique la disciplina).

_____ Maestría en Administración de Negocios en _____ (indique la disciplina).

_____ Otro. Describa _____

Por favor anote el nombre de la universidad donde obtuvo su último título y año

_____ 19 _____

Durante sus estudios universitarios, ¿tomó algún curso específico de administración de compras?

_____ sí _____ no

Si la respuesta fue sí, apunte el nombre del curso:

5. Número de empleados (Solo el número de empleados en esta planta):

6. Describa el (los) producto(s) que se fabrica(n) en esta planta:

7. Describa el (los) producto(s) o proceso(s) comprado(s) a su proveedor principal:

9. ¿Cuántos años hace que la compañía viene trabajando con su proveedor principal? _____ años

10. ¿Qué porcentaje del total de sus compras está cubierto por su proveedor principal? _____ %

11. ¿Su empresa le ha dado entrenamiento y apoyo, a usted y otros miembros de la empresa, con el objeto de mejorar las relaciones con su proveedor principal?

_____ sí _____ no

Si la respuesta fue sí, describa el tipo de entrenamiento y apoyo:

Gracias por su atención

APPENDIX B
POWER ANALYSIS

-----Multiple Regression-----
 B=all var A=demo

Power Report

b- 4 A= 4 C= 0 R»b=0.400 R»a=0.200 R»c=0.000 f»= 1.0000 df1=

N	Lambda	df2	Alpha	Beta	Power
40	36.0000	31	0.0100	0.0191877	0.9808123
40	36.0000	31	0.0500	0.0023340	0.9976660
45	41.0000	36	0.0100	0.0061380	0.9938620
45	41.0000	36	0.0500	0.0005755	0.9994245
50	46.0000	41	0.0100	0.0018203	0.9981797
50	46.0000	41	0.0500	0.0001339	0.9998661
55	51.0000	46	0.0100	0.0005062	0.9994938
55	51.0000	46	0.0500	0.0000296	0.9999704
60	56.0000	51	0.0100	0.0001331	0.9998669
60	56.0000	51	0.0500	0.0000063	0.9999937
65	61.0000	56	0.0100	0.0000333	0.9999667
65	61.0000	56	0.0500	0.0000013	0.9999987
70	66.0000	61	0.0100	0.0000080	0.9999920
70	66.0000	61	0.0500	0.0000002	0.9999998
75	71.0000	66	0.0100	0.0000018	0.9999982
75	71.0000	66	0.0500	0.0000000	1.0000000

-----Multiple Regression-----
 E=colind A=demo

Power Report

b= 1 A= 4 C= 0 R>b=0.120 R>a=0.160 R>c=0.000 f>= 0.1667 df1=

N	Lambda	df2	Alpha	Beta	Power
40	6.0000	34	0.0100	0.5968907	0.4031093
40	6.0000	34	0.0500	0.3372732	0.6627268
45	6.8333	39	0.0100	0.5289887	0.4710113
45	6.8333	39	0.0500	0.2778337	0.7221663
50	7.6667	44	0.0100	0.4646690	0.5353310
50	7.6667	44	0.0500	0.2272198	0.7727802
55	8.5000	49	0.0100	0.4048422	0.5951578
55	8.5000	49	0.0500	0.1846096	0.8153904
60	9.3333	54	0.0100	0.3500576	0.6499424
60	9.3333	54	0.0500	0.1490934	0.8509066
65	10.1667	59	0.0100	0.3005663	0.6994337
65	10.1667	59	0.0500	0.1197483	0.8802517
70	11.0000	64	0.0100	0.2563899	0.7436101
70	11.0000	64	0.0500	0.0956919	0.9043081
75	11.8333	69	0.0100	0.2173760	0.7826240
75	11.8333	69	0.0500	0.0761095	0.9238905

-----Multiple Regression-----
 R=colind A=demo

Power Report

b= 1 A= 4 C= 0 R>b=0.160 R>a=0.160 R>c=0.000 f>= 0.2353 df1=

N	Lambda	df2	Alpha	Beta	Power
40	8.4706	34	0.0100	0.4236861	0.5763139
40	8.4706	34	0.0500	0.1928663	0.8071337
45	9.6471	39	0.0100	0.3454525	0.6545475
45	9.6471	39	0.0500	0.1426063	0.8573937
50	10.8235	44	0.0100	0.2777698	0.7222302
50	10.8235	44	0.0500	0.1043152	0.8956848
55	12.0000	49	0.0100	0.2205531	0.7794469
55	12.0000	49	0.0500	0.0755748	0.9244252
60	13.1765	54	0.0100	0.1731296	0.8268704
60	13.1765	54	0.0500	0.0542801	0.9457199
65	14.3529	59	0.0100	0.1344902	0.8655098
65	14.3529	59	0.0500	0.0386806	0.9613194
70	15.5294	64	0.0100	0.1034780	0.8965220
70	15.5294	64	0.0500	0.0273669	0.9726331
75	16.7059	69	0.0100	0.0789166	0.9210834
75	16.7059	69	0.0500	0.0192353	0.9807647

-----Multiple Regression-----
 B=colind A=demo

Power Report

b= 1 A= 4 C= 0 R>b=0.200 R>a=0.160 R>c=0.000 f>= 0.3125 df1= 1

N	Lambda	df2	Alpha	Beta	Power
40	11.2500	34	0.0100	0.2697299	0.7302701
40	11.2500	34	0.0500	0.0971437	0.9028563
45	12.8125	39	0.0100	0.1976162	0.8023838
45	12.8125	39	0.0500	0.0630037	0.9369963
50	14.3750	44	0.0100	0.1420063	0.8579937
50	14.3750	44	0.0500	0.0402758	0.9597242
55	15.9375	49	0.0100	0.1003022	0.8996978
55	15.9375	49	0.0500	0.0254202	0.9745798
60	17.5000	54	0.0100	0.0697601	0.9302399
60	17.5000	54	0.0500	0.0158624	0.9841376
65	19.0625	59	0.0100	0.0478466	0.9521534
65	19.0625	59	0.0500	0.0097973	0.9902027
70	20.6250	64	0.0100	0.0324046	0.9675954
70	20.6250	64	0.0500	0.0059954	0.9940046
75	22.1875	69	0.0100	0.0216942	0.9783058
75	22.1875	69	0.0500	0.0036380	0.9963620

-----Multiple Regression-----
 B=all var A=demo

Power Report

B= 4 A= 4 C= 0 R»b=0.250 R»a=0.200 R»c=0.000 f»= 0.4545 df1=

N	Lambda	df2	Alpha	Beta	Power
40	16.3636	31	0.0100	0.3411784	0.6588216
40	16.3636	31	0.0500	0.1323599	0.8676401
45	18.6364	36	0.0100	0.2441373	0.7558627
45	18.6364	36	0.0500	0.0820917	0.9179083
50	20.9091	41	0.0100	0.1689752	0.8310248
50	20.9091	41	0.0500	0.0495190	0.9504810
55	23.1818	46	0.0100	0.1135203	0.8864797
55	23.1818	46	0.0500	0.0291463	0.9708537
60	25.4545	51	0.0100	0.0742507	0.9257493
60	25.4545	51	0.0500	0.0167839	0.9832161
65	27.7273	56	0.0100	0.0474049	0.9525951
65	27.7273	56	0.0500	0.0094773	0.9905227
70	30.0000	61	0.0100	0.0296080	0.9703920
70	30.0000	61	0.0500	0.0052571	0.9947429
75	32.2727	66	0.0100	0.0181261	0.9818739
75	32.2727	66	0.0500	0.0028693	0.9971307

-----Multiple Regression-----

B=all var A=demo

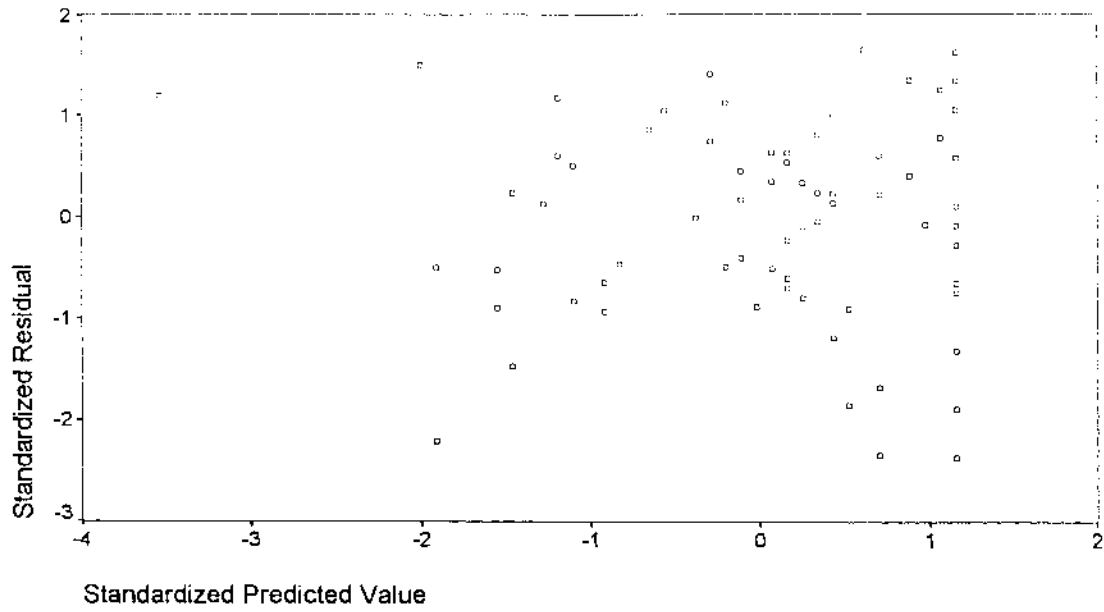
Power Report

B= 4 A= 4 C= 0 R>b=0.300 R>a=0.200 R>c=0.000 f>= 0.6000 df1=

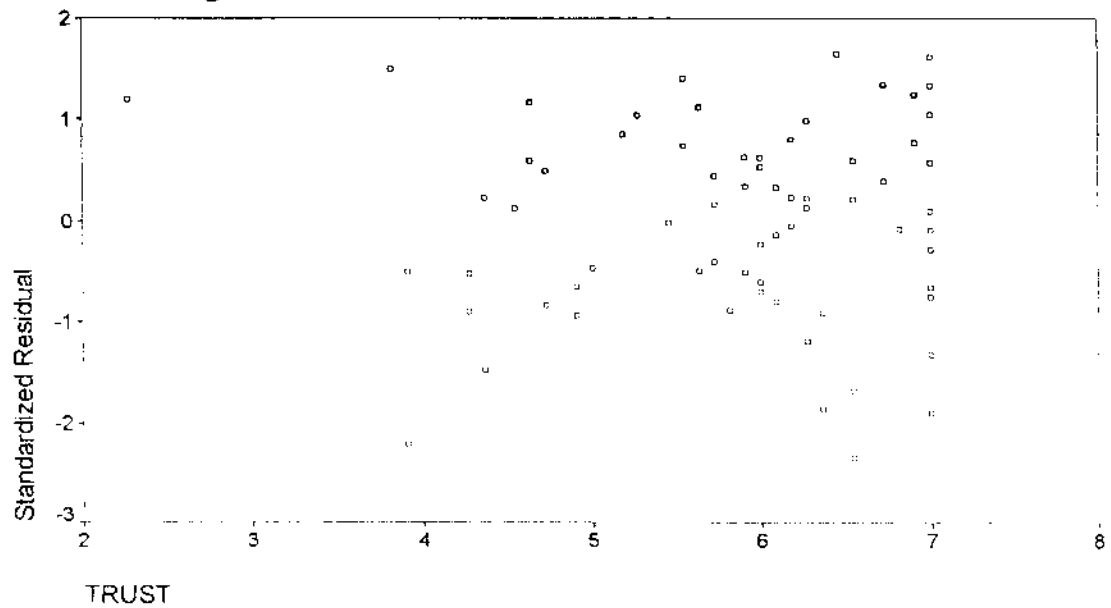
N	Lambda	df2	Alpha	Beta	Power
40	21.6000	31	0.0100	0.1793570	0.8206430
40	21.6000	31	0.0500	0.0506155	0.9493845
45	24.6000	36	0.0100	0.1060813	0.8939187
45	24.6000	36	0.0500	0.0250172	0.9749828
50	27.6000	41	0.0100	0.0599198	0.9400802
50	27.6000	41	0.0500	0.0119170	0.9880830
55	30.6000	46	0.0100	0.0325085	0.9674915
55	30.6000	46	0.0500	0.0054974	0.9945026
60	33.6000	51	0.0100	0.0170204	0.9829796
60	33.6000	51	0.0500	0.0024652	0.9975348
65	36.6000	56	0.0100	0.0086331	0.9913669
65	36.6000	56	0.0500	0.0010779	0.9989221
70	39.6000	61	0.0100	0.0042560	0.9957440
70	39.6000	61	0.0500	0.0004608	0.9995392
75	42.6000	66	0.0100	0.0020449	0.9979551
75	42.6000	66	0.0500	0.0001930	0.9998070

APPENDIX C
RESIDUAL ANALYSIS

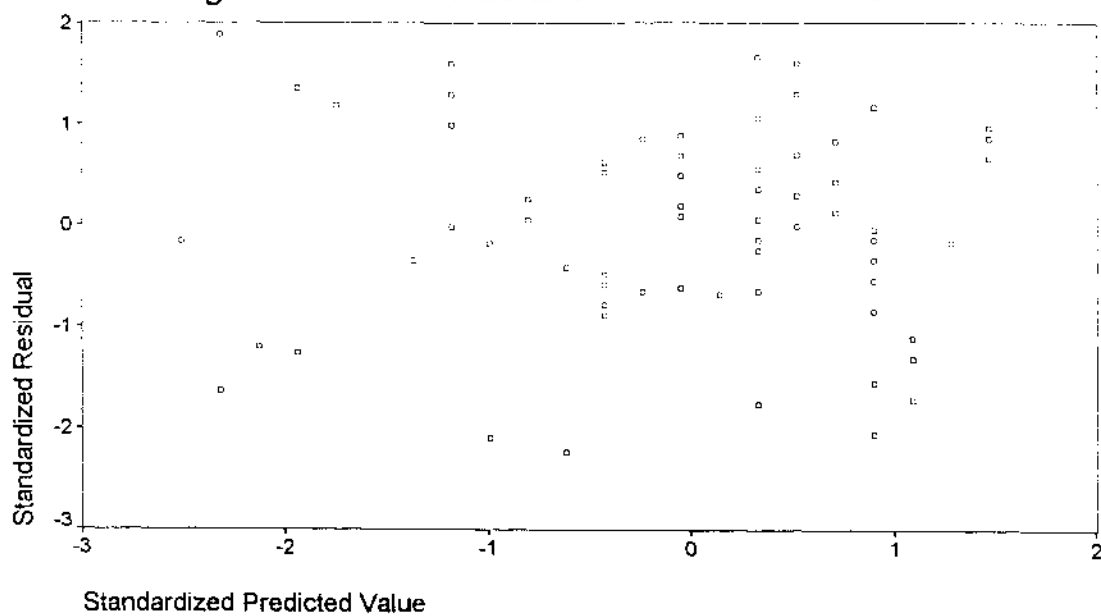
Scattergram of Residuals and Pred Y' for ITrust



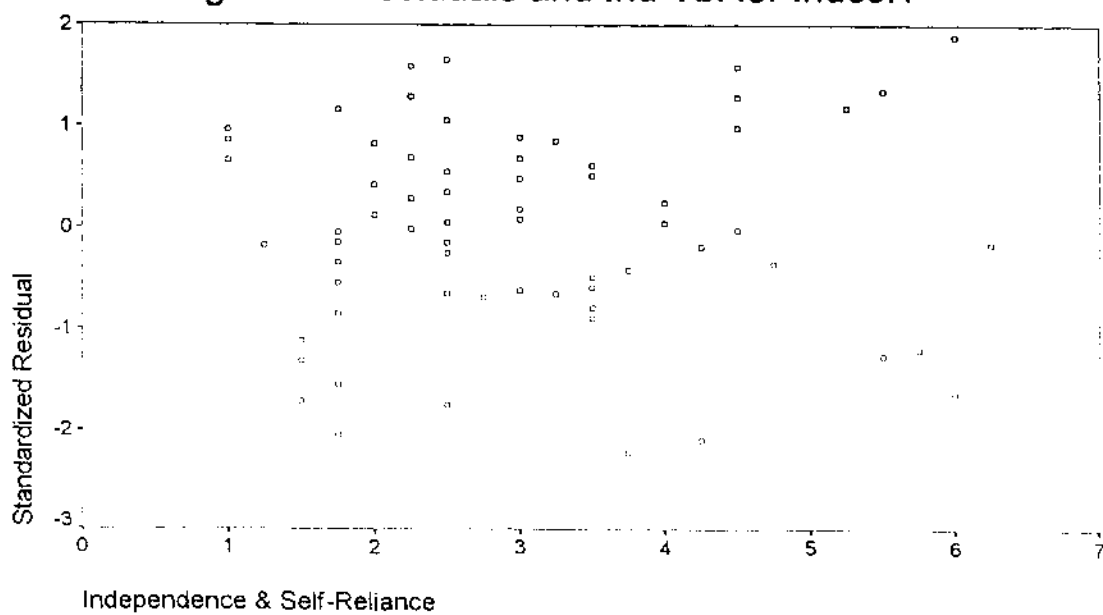
Scattergram of Residuals and Ind. Vbl. ITrust



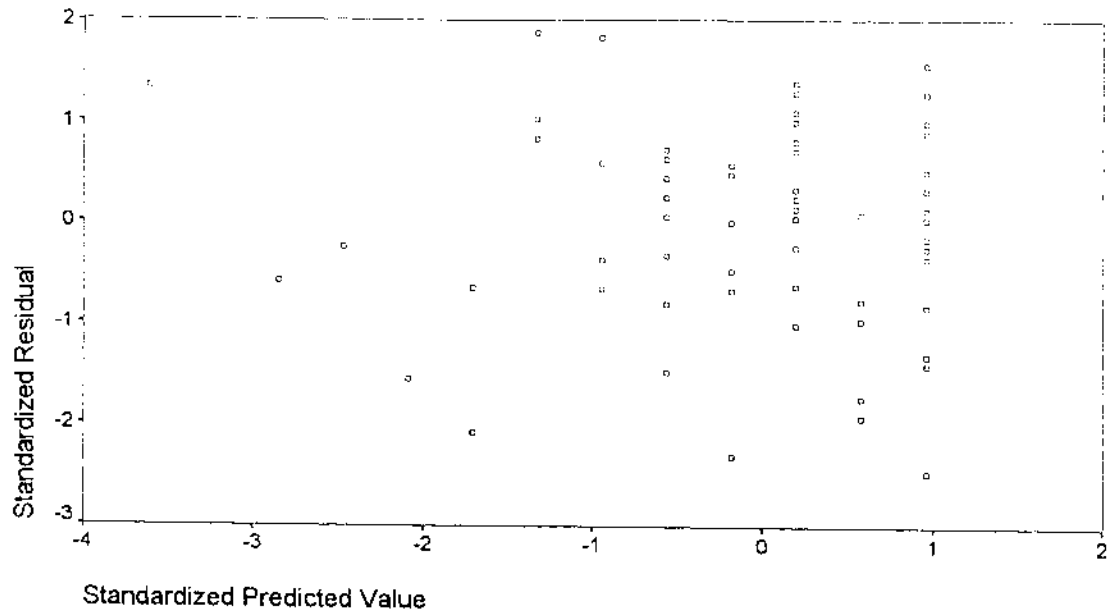
Scattergram of Residuals and Pred Y' for Indcol1



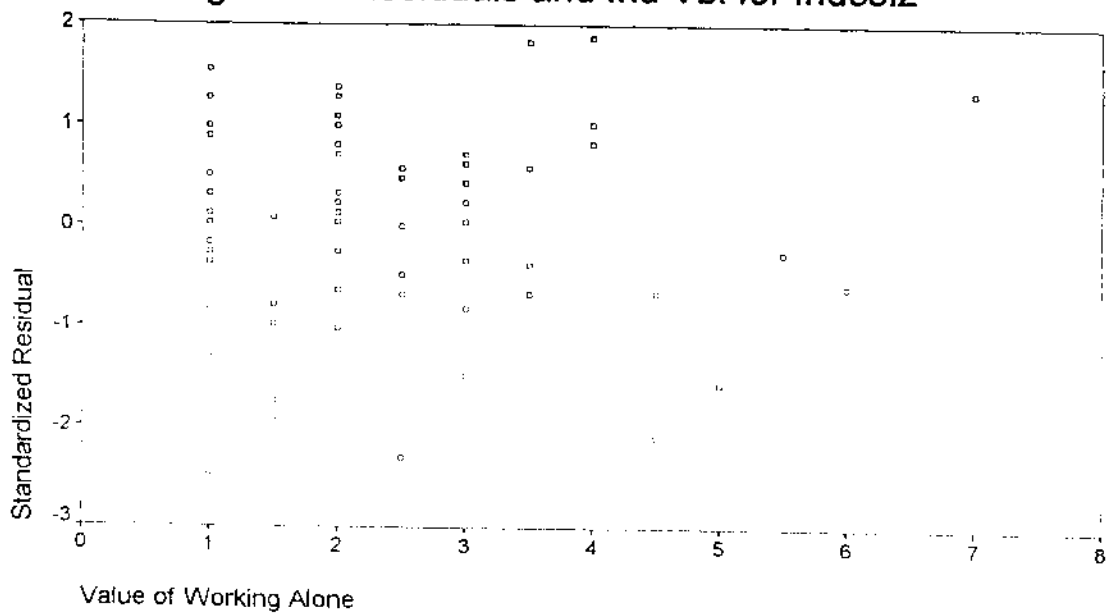
Scattergram of Residuals and Ind Vbl for Indcol1



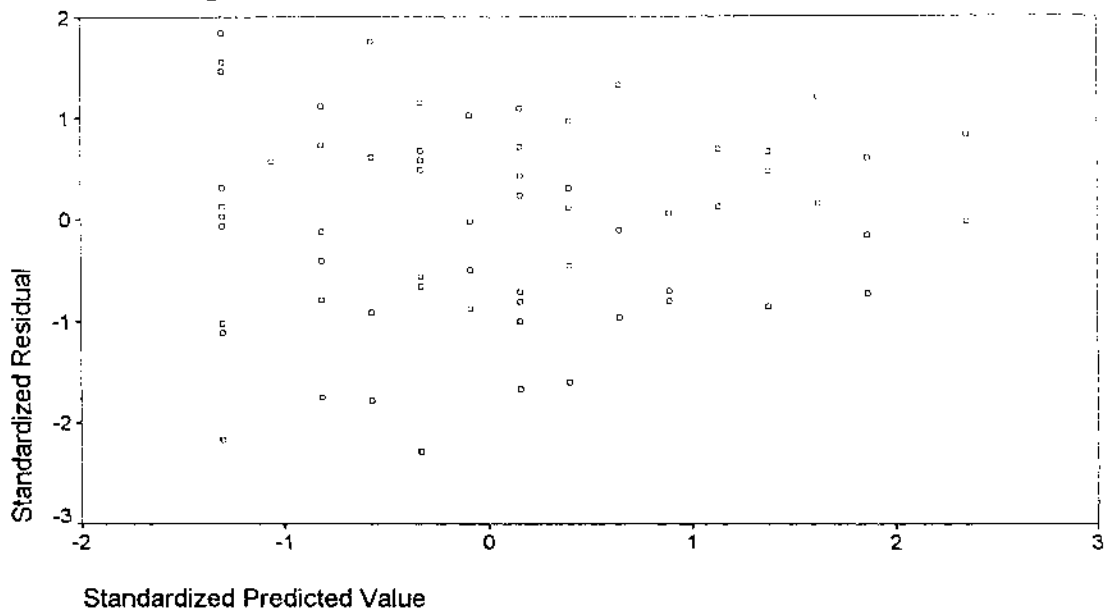
Scattergram of Residuals and Pred Y' for Indcol2



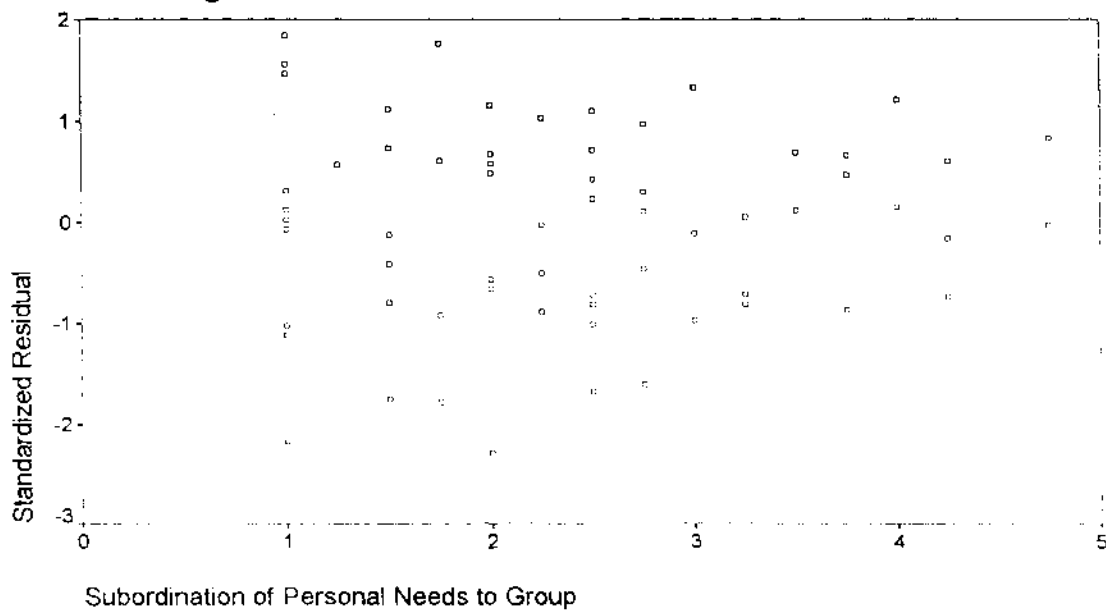
Scattergram of Residuals and Ind Vbl for Indcol2



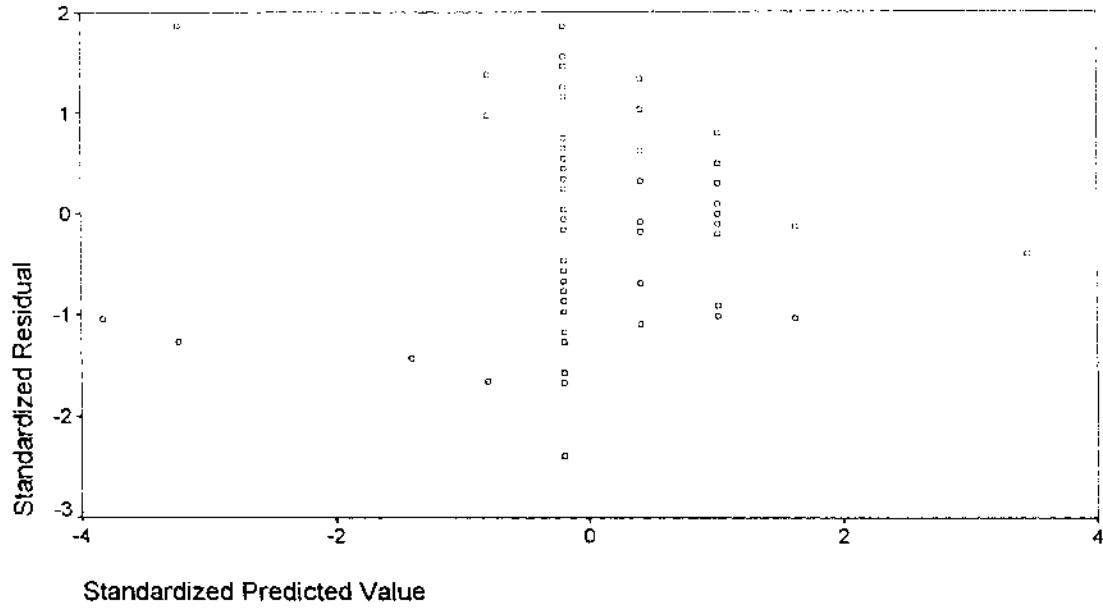
Scattergram of Residuals and Pred Y' for Indcol3



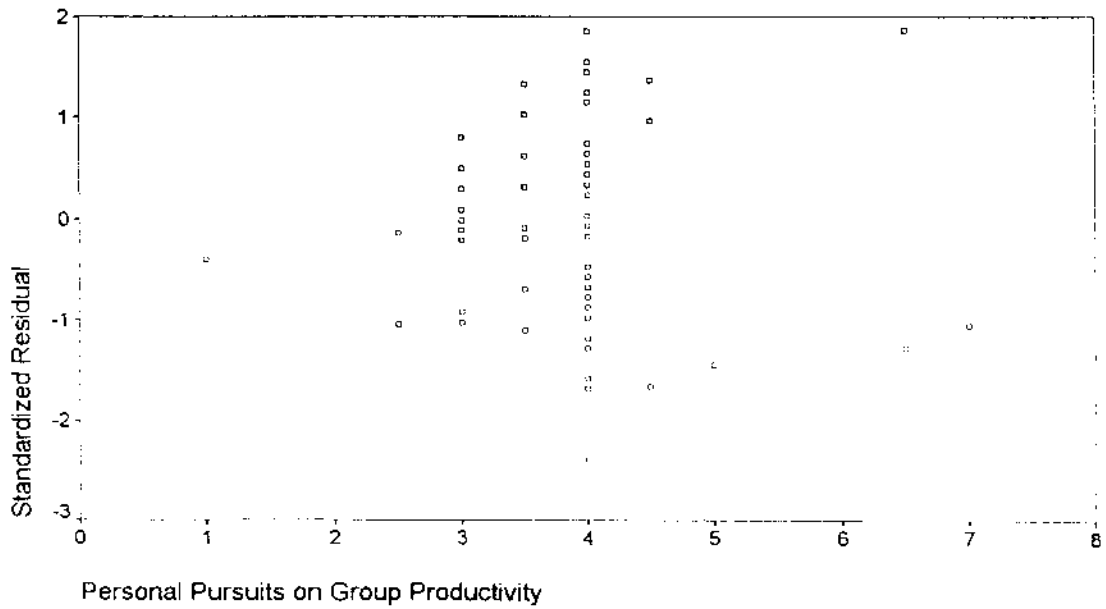
Scattergram of Residuals and Ind Vbl for Indcol3



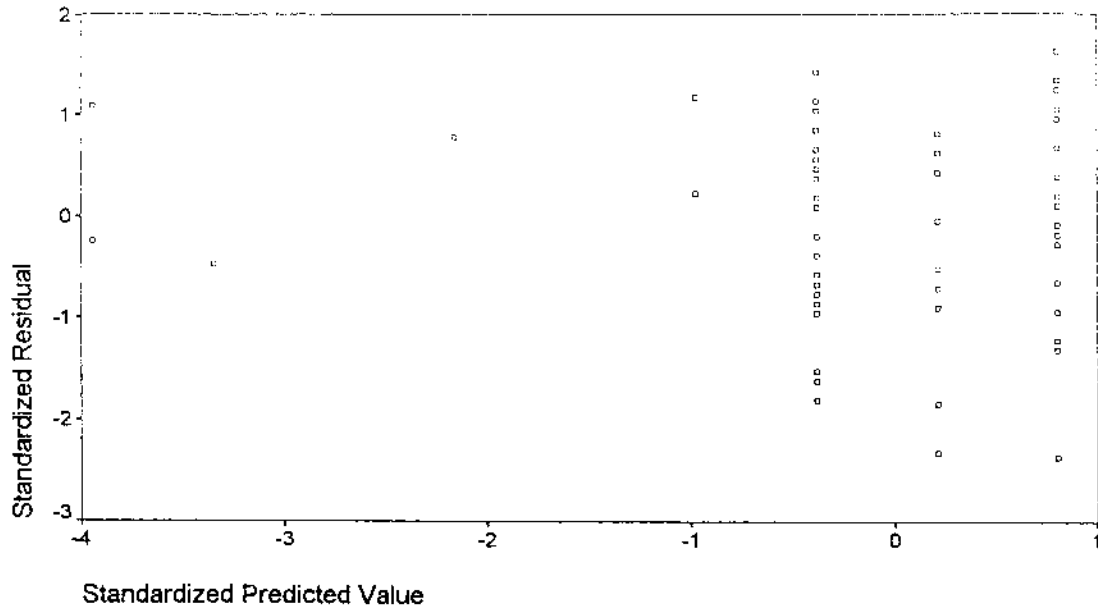
Scattergram of Residuals and Pred Y' for Indcol4



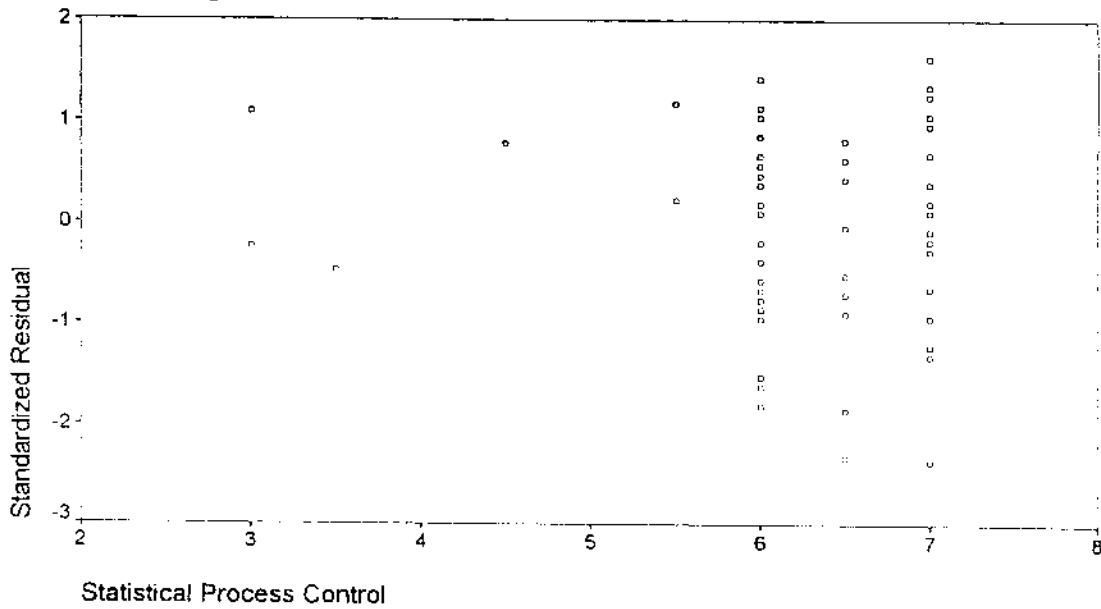
Scattergram of Residuals and Ind Vbl for Indcol4



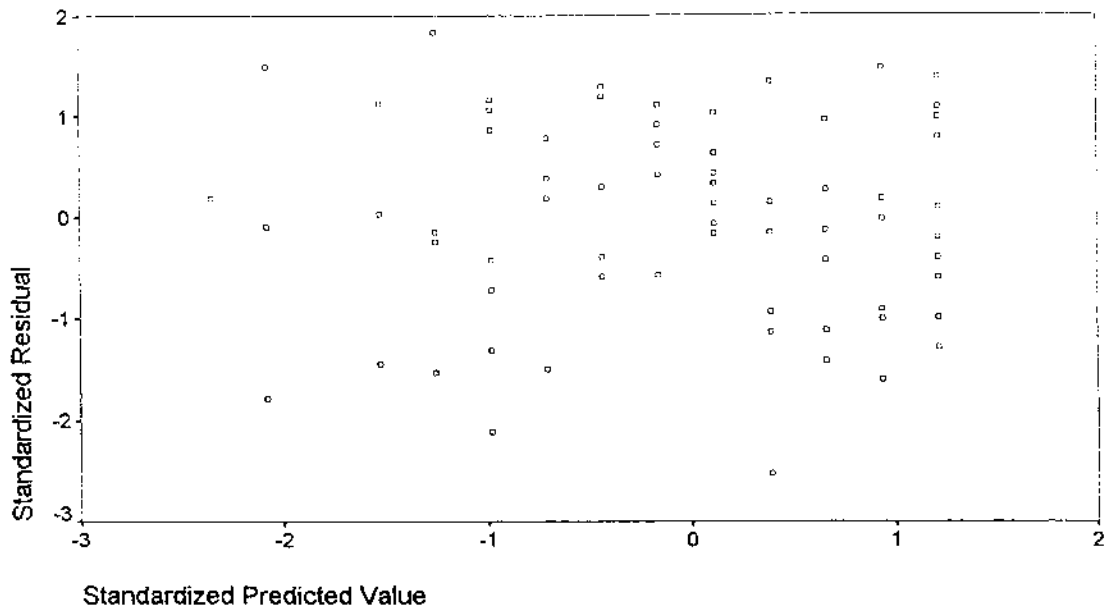
Scattergram of Residuals and Pred Y' for TQM1



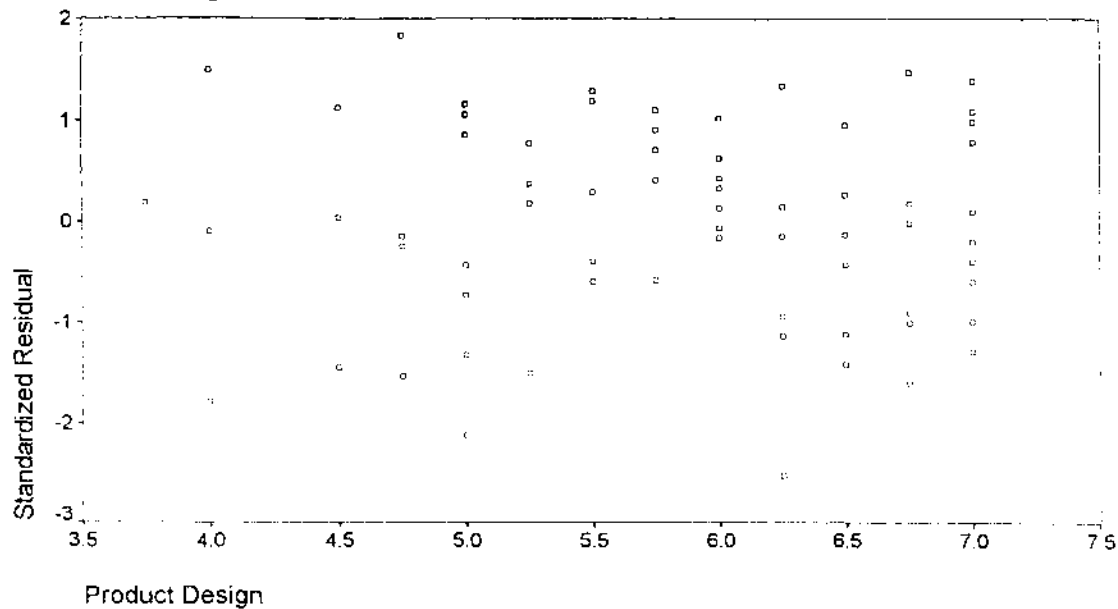
Scattergram of Residuals and Ind Vbl for TQM1



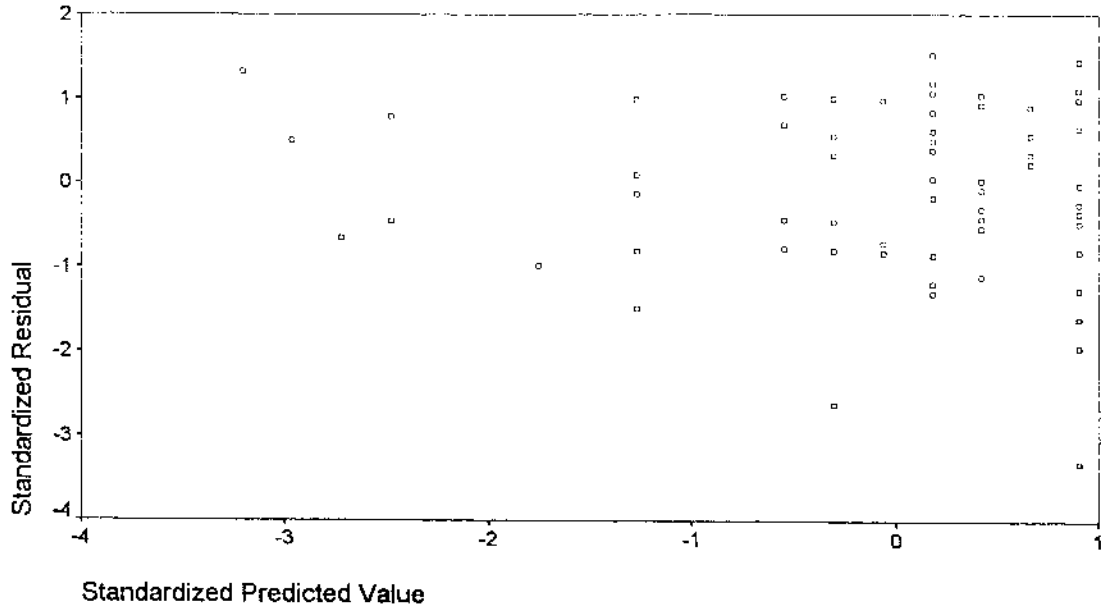
Scattergram of Residuals and Pred Y' for TQM2



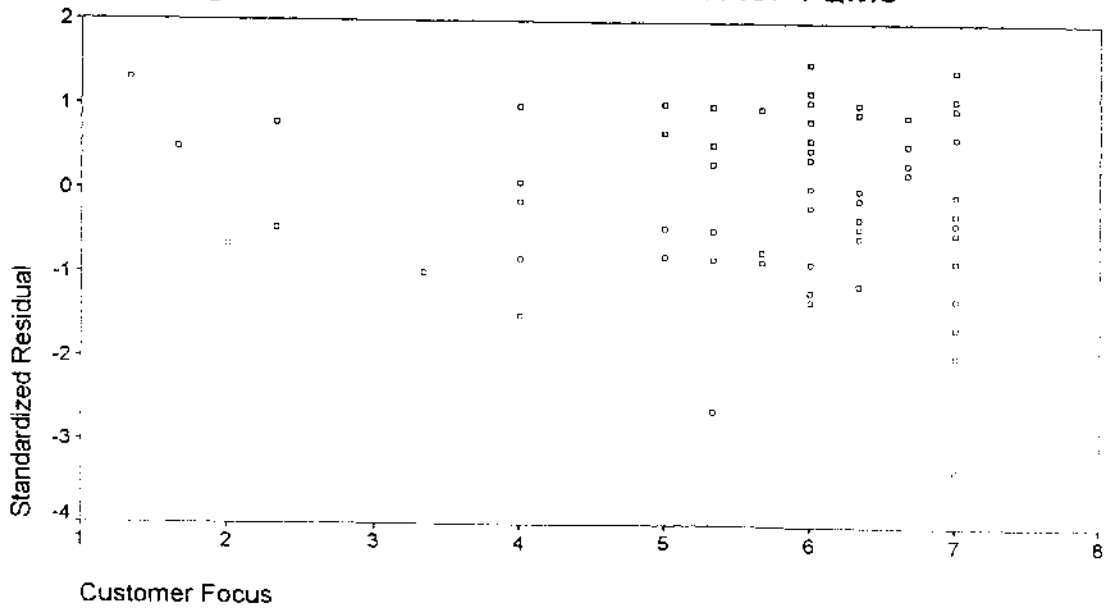
Scattergram of Residuals and Ind Vbl for TQM2



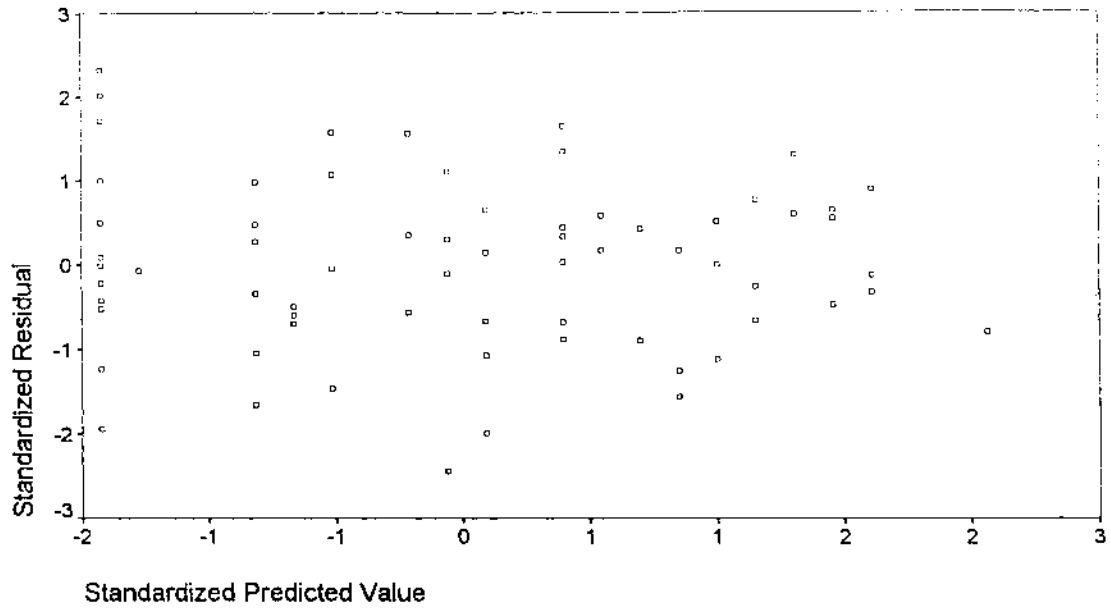
Scattergram of Residuals and Pred Y' for TQM3



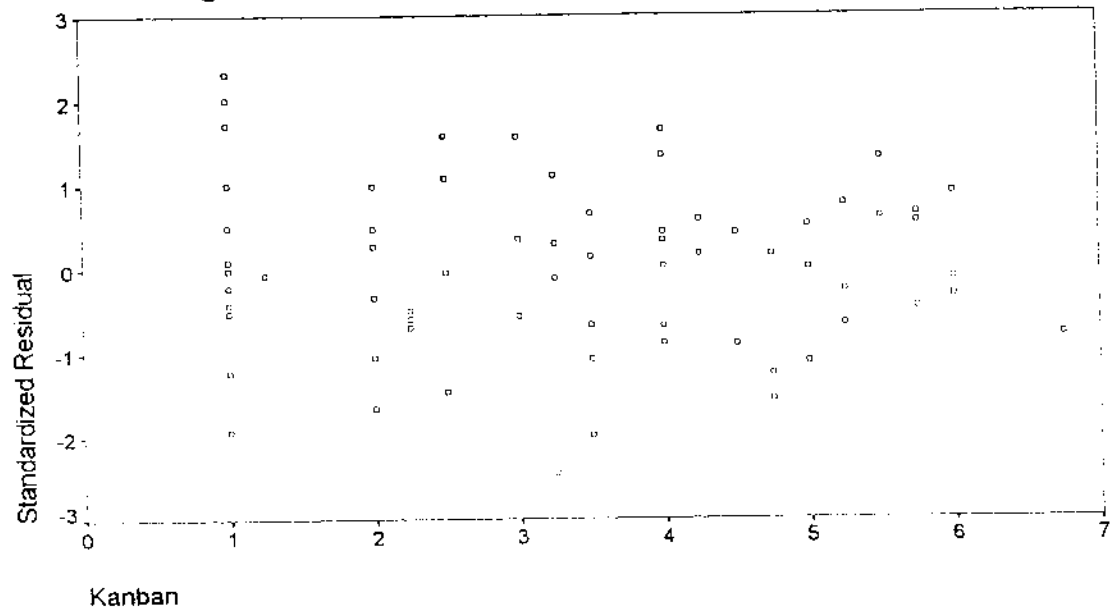
Scattergram of Residuals and Ind Vbl for TQM3



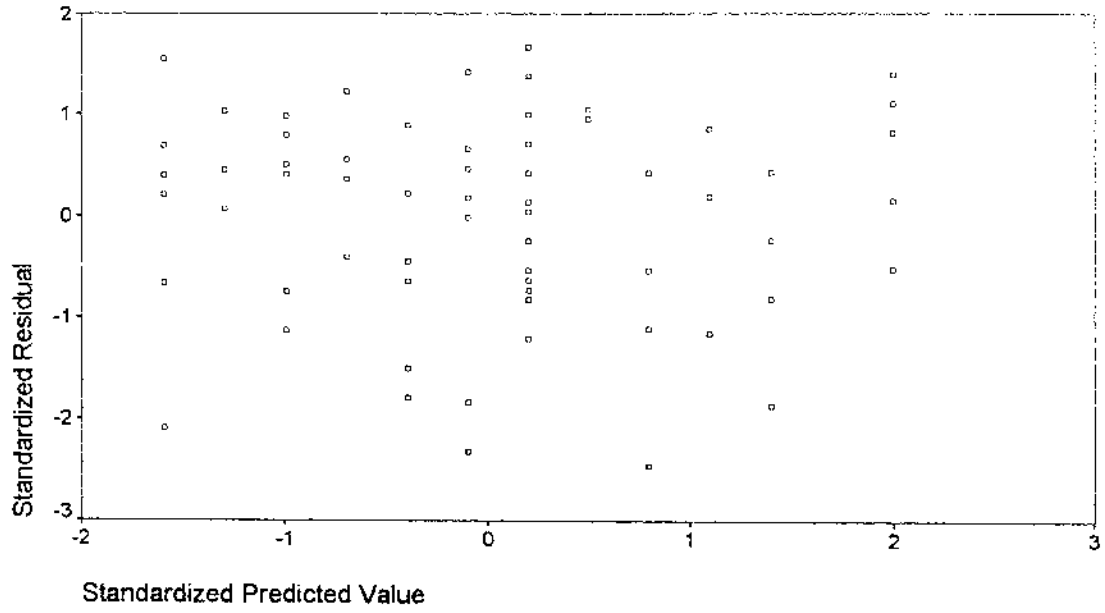
Scattergram of Residuals and Pred Y' for JIT1



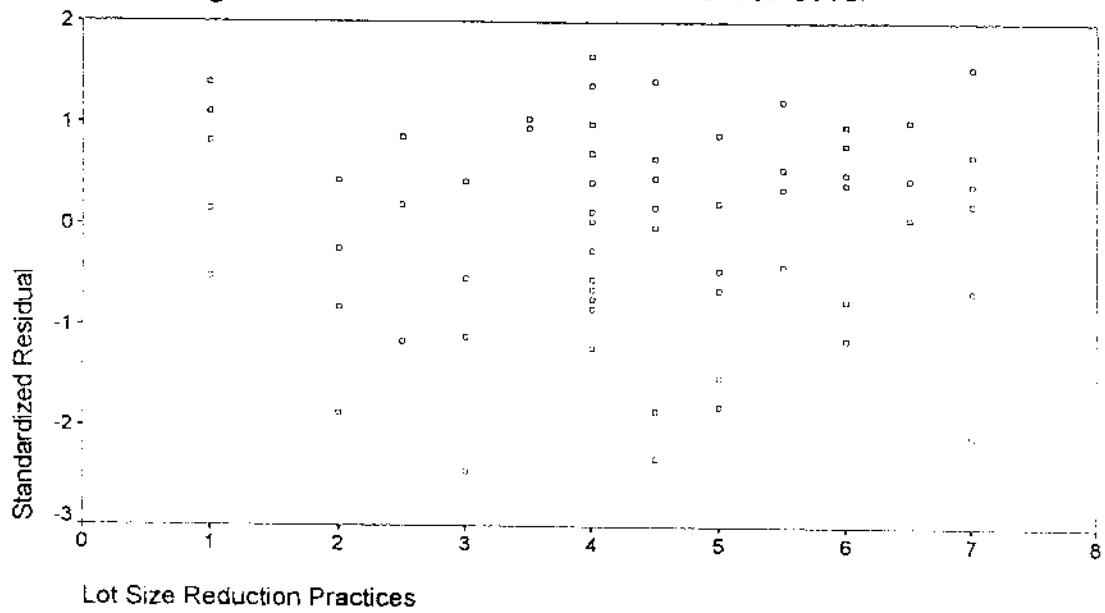
Scattergram of Residuals and Ind Vbl for JIT1



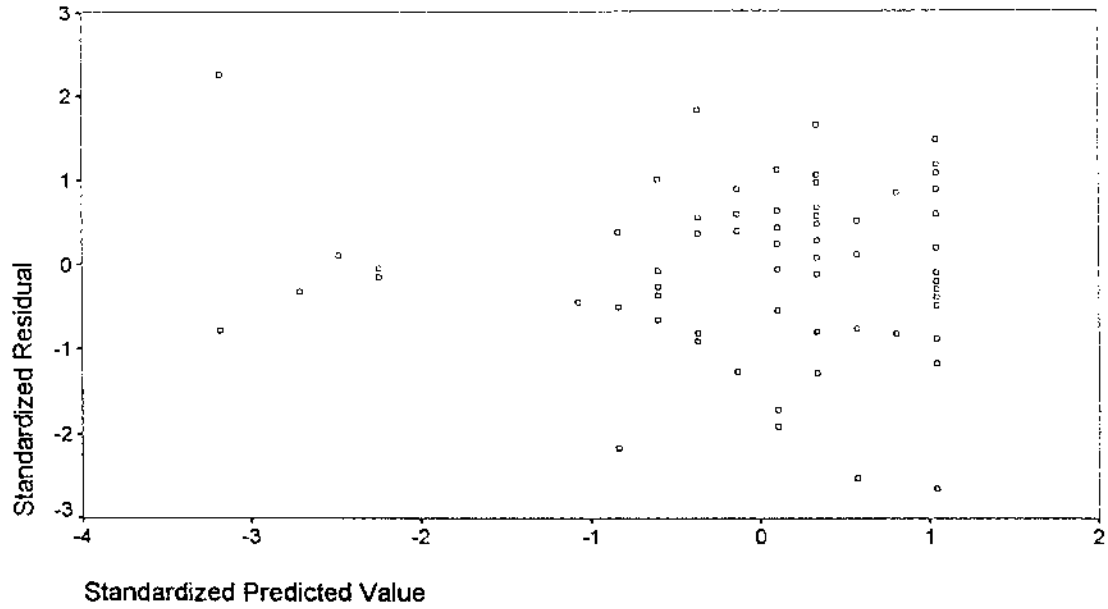
Scattergram of Residuals and Pred Y' for JIT2



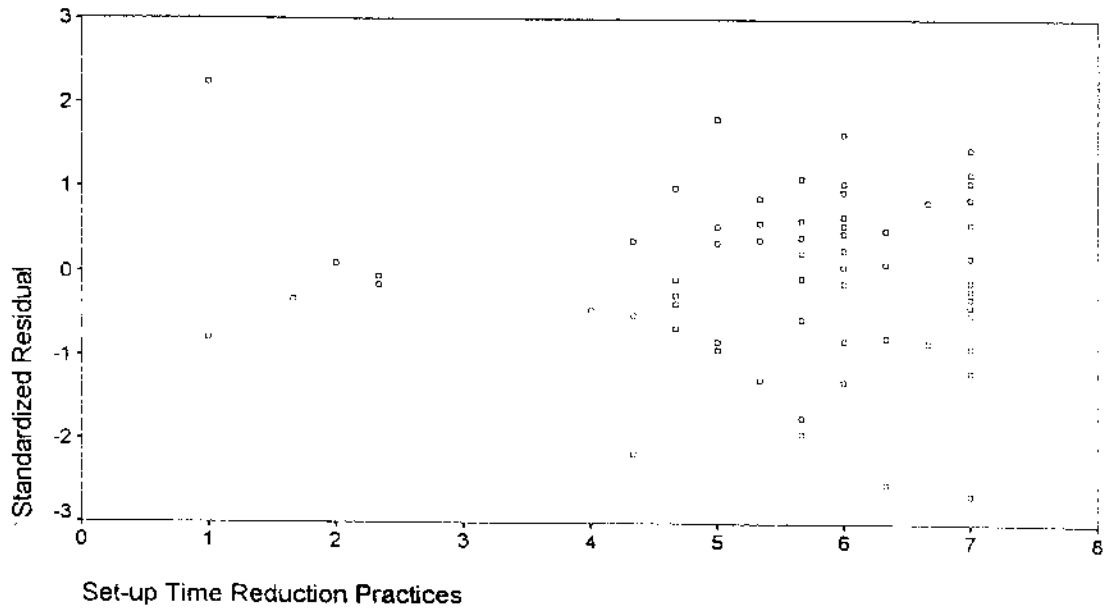
Scattergram of Residuals and Ind Vbl for JIT2



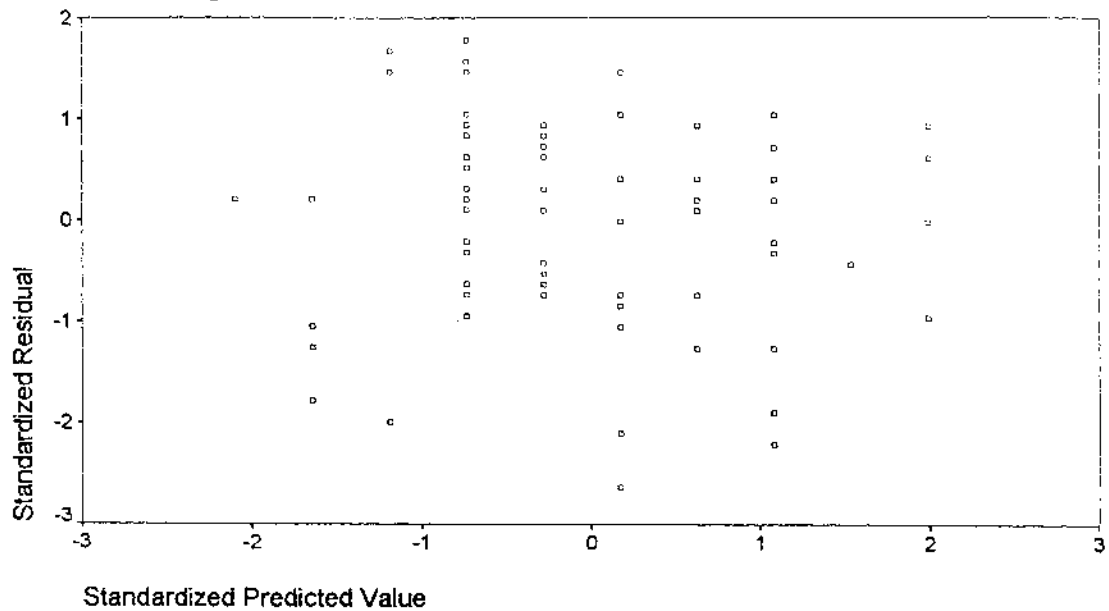
Scattergram of Residuals and Pred Y' for JIT3



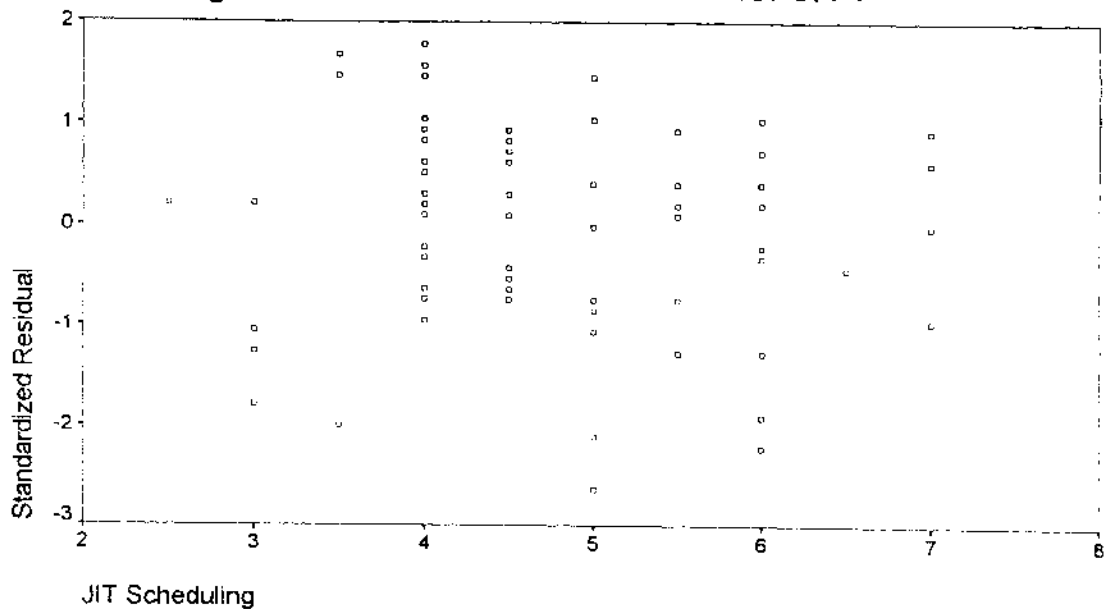
Scattergram of Residuals and Ind Vbl for JIT3



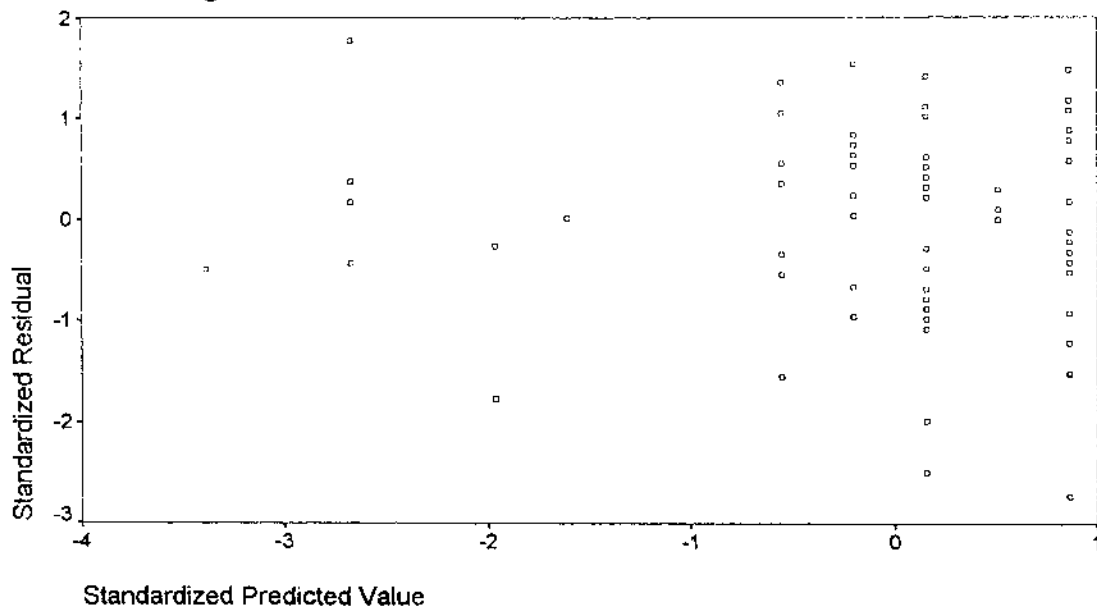
Scattergram of Residuals and Pred Y' for JIT4



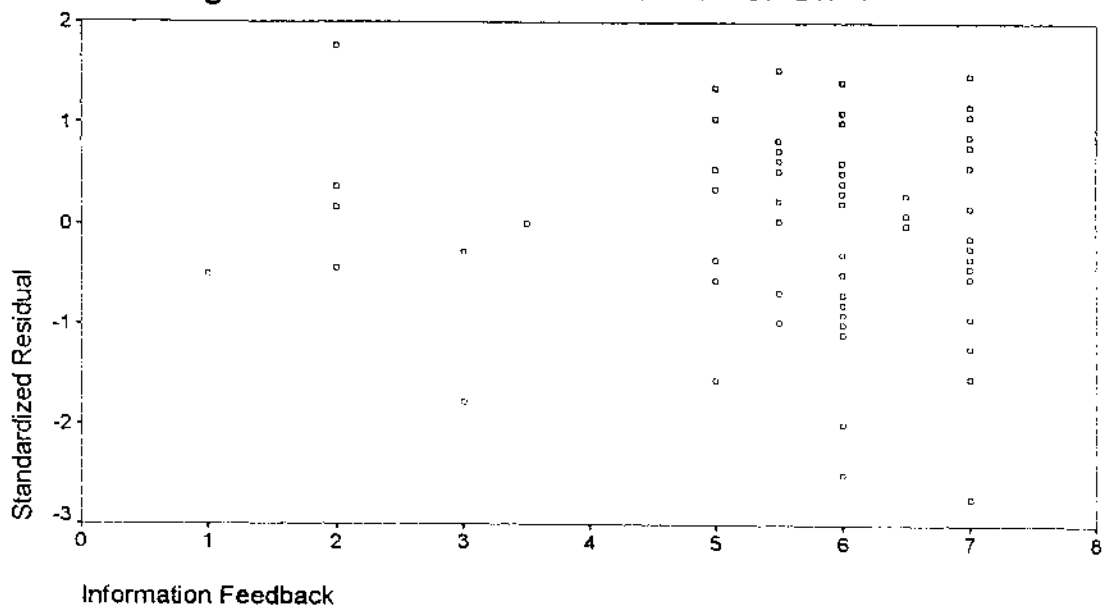
Scattergram of Residuals and Ind Vbl for JIT4



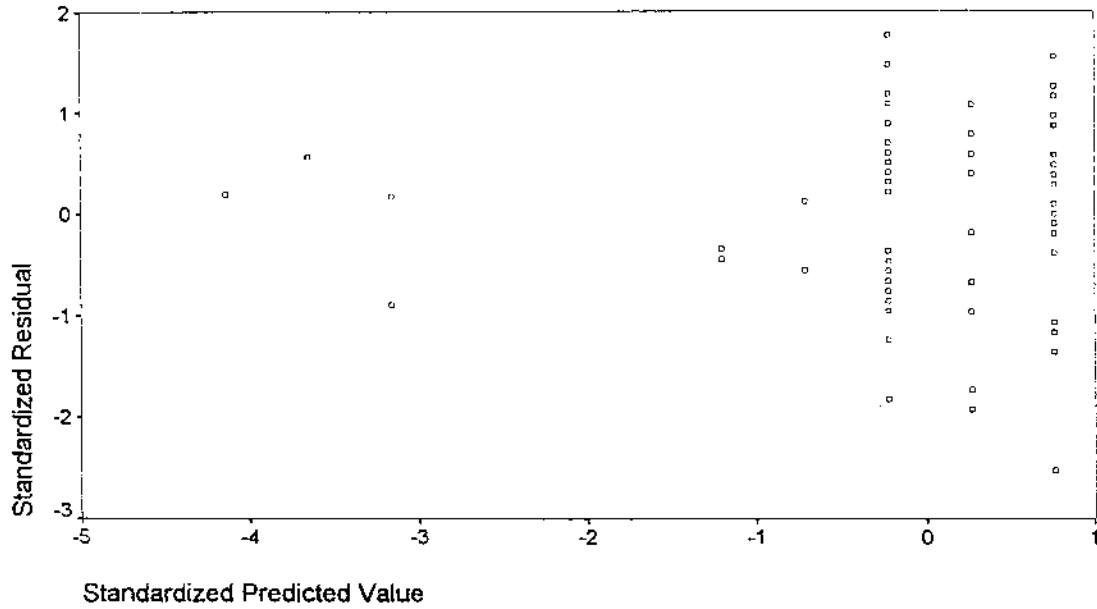
Scattergram of Residuals and Pred Y' for CIP1



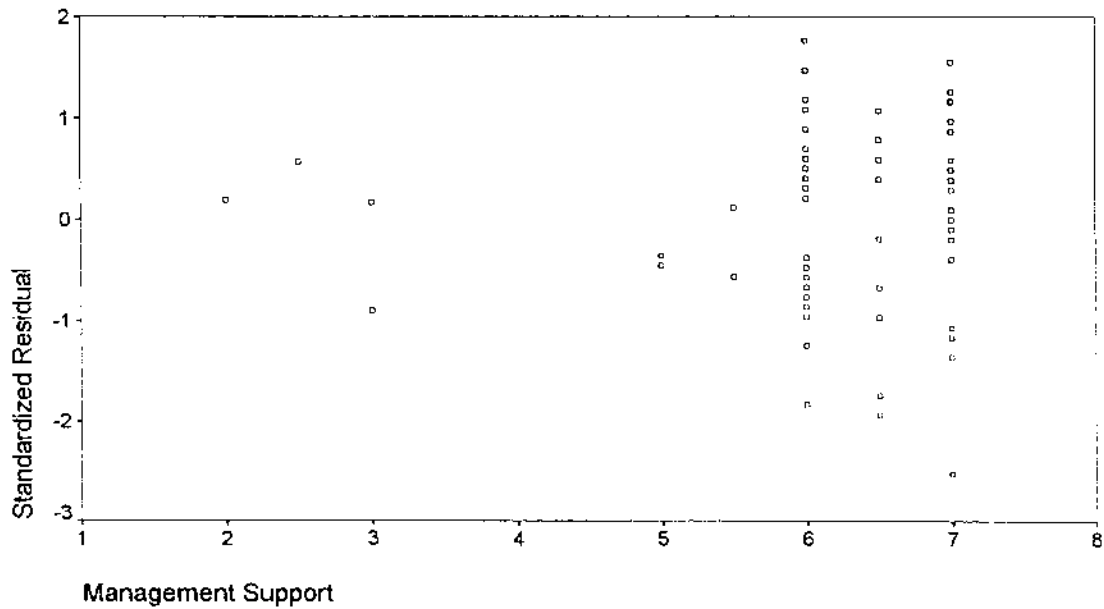
Scattergram of Residuals and Ind Vbl for CIP1



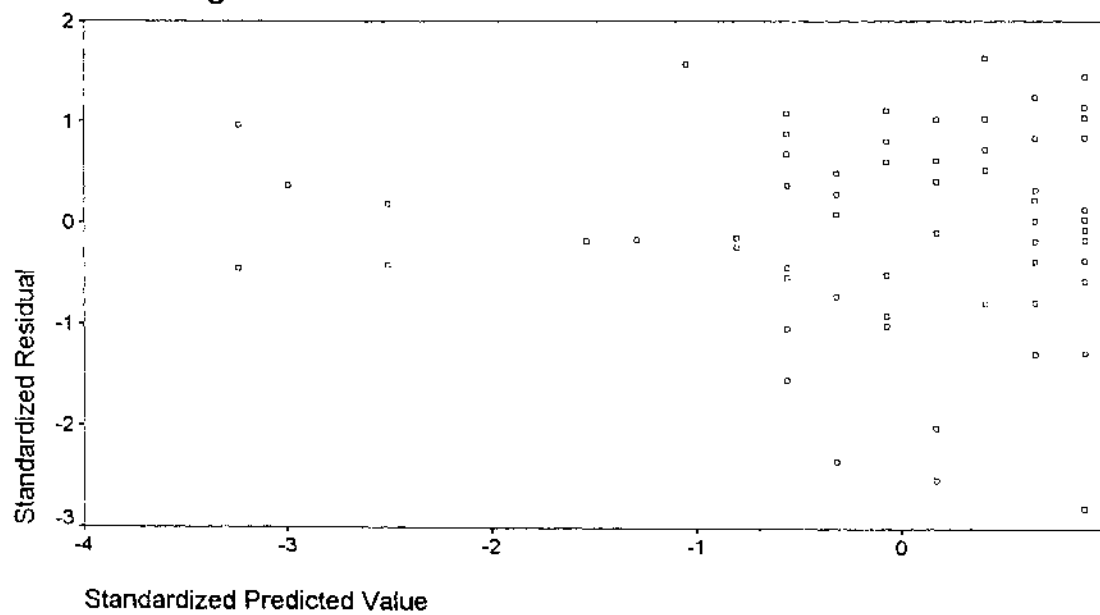
Scattergram of Residuals and Pred Y' for CIP2



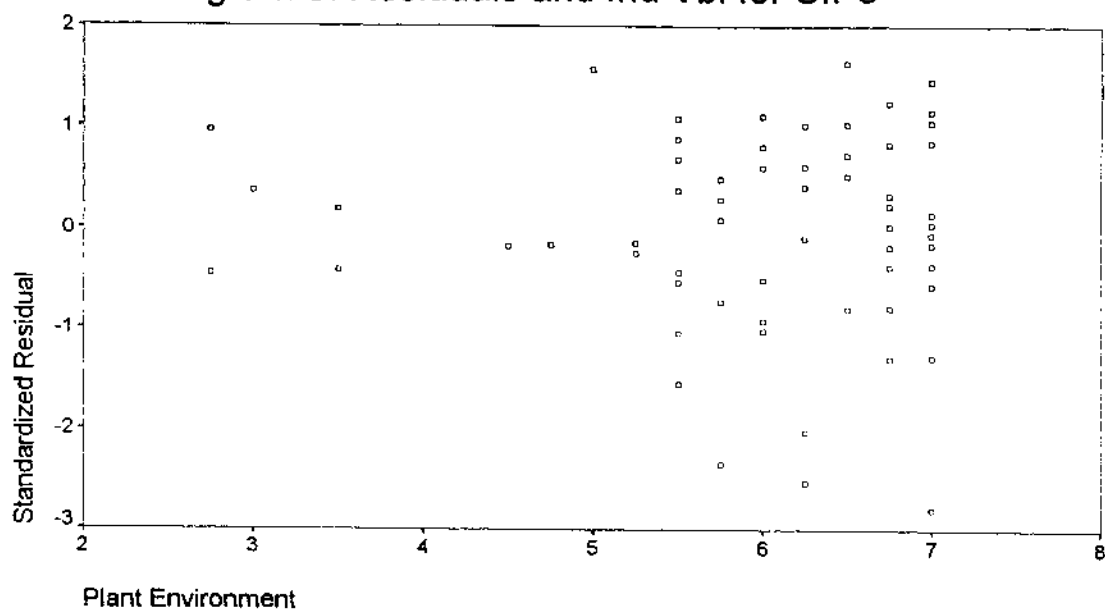
Scattergram of Residuals and Ind Vbl for CIP2



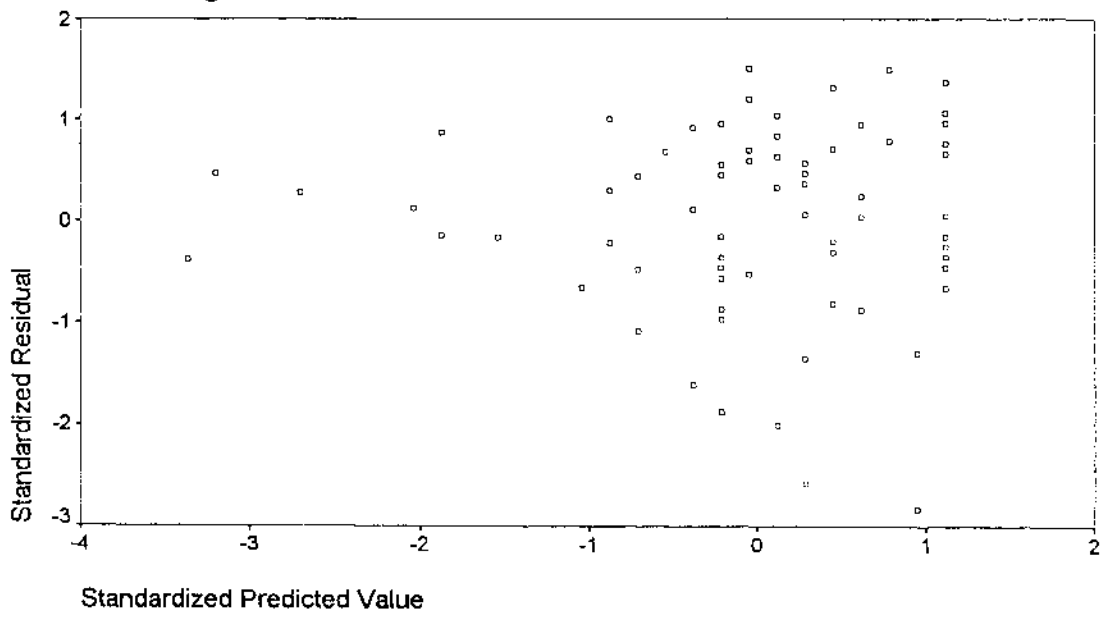
Scattergram of Residuals and Pred Y' for CIP3



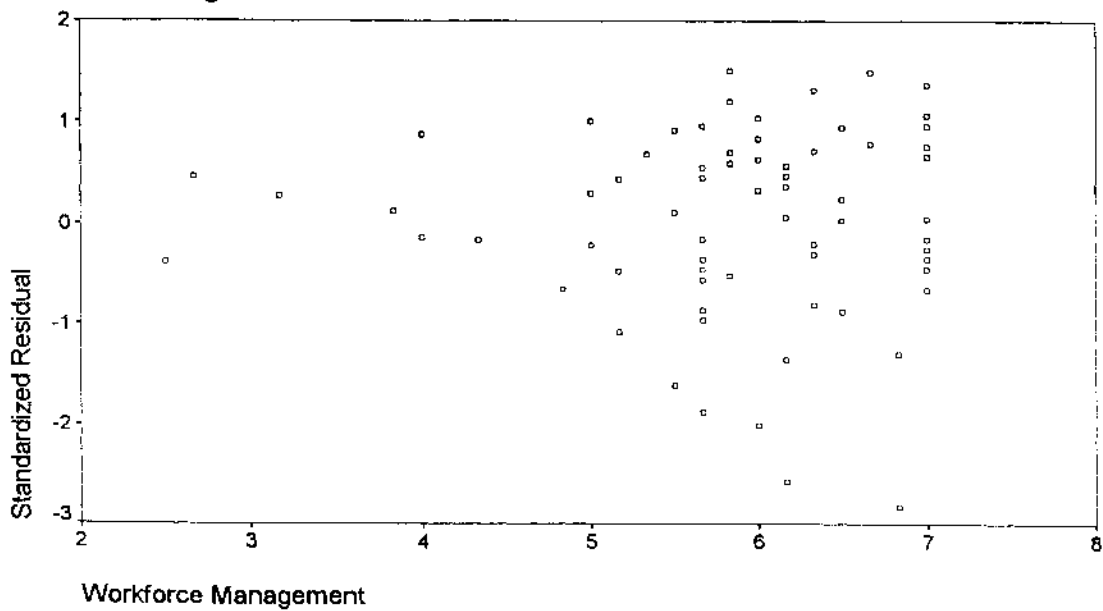
Scattergram of Residuals and Ind Vbl for CIP3



Scattergram of Residuals and Pred Y' for CIP4



Scattergram of Residuals and Ind Vbi for CIP4



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