

**CONTROL, COORDINATION AND CONFLICT
IN CONTRACTOR-SUBCONTRACTOR RELATIONSHIPS**

T. C.
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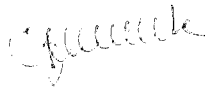
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LIST OF TABLES

Table 1 - Information About the 5 Construction Firms in the Research

Table 2 - Information About the Subcontractors

Table 3 - Alfa Coefficients for Multi-item Scales

Table 4 - Mean, Standard Deviation and Correlation Results Between Independent Variables

Table 5 - Correlation Results Between the 3C's and Perceived Effectiveness

Table 6 - Correlation Results Between Independent and Dependent Variables

Table 7 - Correlation Results Between Methods and 3C's

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1. INTRODUCTION

2. THEORETICAL BACKGROUND

- 2.1. Unique Characteristics of the Construction Industry
- 2.2. The Extensive Use of Subcontracting in Construction
- 2.3. Subcontractor-Contractor Relationship in the Context of Interorganizational Relationships
- 2.4. Managing the Subcontractor Relationship
- 2.5. Theories and Models
- 2.6. Organizational and Interorganizational Variables

3. METHOD

- 3.1. Research Setting
- 3.2. Data Collection
- 3.3. Variables and Measures
 - 3.3.1. Dependent Variables
 - 3.3.2. Independent Variables

1. INTRODUCTION

This research explores aspects of control, conflict and coordination in interorganizational relationships, specifically contractor-subcontractor relationships, in the setting of construction industry in Turkey. It studies the relationships of control, conflict and coordination to various aspects of the contractor-subcontractor relationship and organizational characteristics of the subcontractor. Interorganizational variables include intensity of the relationship, dependence of the subcontractor and the criticality of the tasks carried out by the subcontractor; whereas, organizational characteristics include the technology, age and size of the subcontractor.

The practice of subcontracting is widely employed in the construction industry. Several researchers have observed this fact, but very few of them have studied subcontracting in an interorganizational context. (Eccles, 1981; Usdiken and Sozen, 1989) Examples used by interorganizational theory scholars focus mostly on non-profit organizations or social welfare agency networks. From an interorganizational theory perspective, subcontractor-contractor relationships may provide very interesting examples for the literature. Therefore, this study combines the research on subcontracting with the literature on interorganizational theory; and thus, explores subcontracting in an interorganizational perspective.

The research applies interorganizational management concepts, such as the 3C's (Control, Coordination and Conflict) to the subcontractor-contractor relationship. Furthermore, it studies the relationships between the degrees of the 3C's and the overall perceived effectiveness of the relationship. The study also explores the effects of organizational characteristics of the subcontractor (age, size, technology); and interorganizational variables (intensity of the relationship, criticality and dependence) on the practice of the 3 C's.

The study is based on data obtained from 30 contractor-subcontractor relationships. First, perceptions of the nature of these relationships with respect to control, coordination and conflict resolution were measured. Secondly, the methods that are used as mechanisms of control, coordination and conflict resolution were studied. Thirdly, the effects of the organizational characteristics of the subcontractor; as well as the effects of the interorganizational variables, on the 3 C's were examined. Lastly, the overall perception of the relationship was evaluated with the notion of perceived effectiveness. The effects of the 3 C's on perceived effectiveness of the contractor-subcontractor relationship were also considered as points of interest.

2. THEORETICAL BACKGROUND

2.1. Unique Characteristics of Construction Industry

The literature on construction industry agrees on the fact that the special working conditions of construction necessitates an organizational model different from those used in other areas of manufacturing. Construction projects are produced and coordinated on site; and this requires different schedules, programs and improvised solutions for each project. The unique characteristics of the construction industry that are listed below demand organizational forms different from mass assembly and process technologies typically found in manufacturing. (Eccles, 1981)

The conditions affecting construction are:

- On Site Production:

As Bresnan et al., (1984) have observed, "the product of the construction industry is immobile and produced at the point of consumption." Site conditions in a construction project can be unpredictable and unexpected natural events can negatively affect construction programs and schedules. Weather conditions constitute the most important and unpredictable handicap for the production processes of construction (Eccles, 1981). Changes in weather have two different side effects. First, unexpected changes in weather might stop, slow down or completely destroy production. Secondly, weather conditions confine the production process to mild seasons. Because of the difficulties of executing outdoor activities in the winter, construction activities show a trend of seasonality.

- Demand Volatility:

Demand is both seasonal and volatile. As expressed earlier, because winter is a problematic season, most of the production has to be completed before winter, and this puts an unbalanced load of work on other seasons. Summer is the high, and most active season for all the projects in a contractor's portfolio.

Construction projects usually have large budgets, and are executed over a long period of time. Because of this, demand for a contractor's products (i.e. buildings, bridges, refineries etc.) is not regular. Because of the volatile demand, construction firms have difficulty in keeping their overhead down in the case of low demand. On the other hand, the same difficulty applies to the case of high demand. During times of high demand, responding to the load of irregular demand forces the contractor to search for other organizational forms than the traditional forms used in manufacturing.

-Labor Specialties:

Construction projects require a large number of labor specialties (Eccles, 1981), such as electrical installation, heat insulation, etc. Most of these trades demand the knowledge and experience of experts. Because contractors' projects have different characteristics, if and when a problem arises, the solution will be

different in a building project, compared to a solution in an industrial plant project. Therefore, the experience of experts is required. It is a hard and long way for a contractor to gain this expertise through project experiences; therefore, outside assistance, such as, consultants or subcontractors are needed.

On the other hand, these special trades are linked to each other in very complex schedules. This puts a burden of controlling and coordinating schedules and activities of these trades, on the contractor.

-Non-Routine Production Systems:

In construction, production systems are "less amenable to routinization".(Bresnan et al., 1984) As mentioned earlier, because construction projects are executed over a long period of time, and because products of a contractor have diverse characteristics, production cannot be routinized. A construction firm can execute projects of a dam, a motorway and a skyscraper, all of which require different production schedules and systems, all at the same time. This introduces uncertainty to the decisions of labor and machinery investments. Coordination of resources among different projects becomes a major problem; moreover, new schedules and programs are required for each new project. Therefore, the literature has named construction a "casual industry" (Bresnan et al., 1984; Clarke, 1980) that requires short-term project objectives and flexibility.

The construction industry traditionally uses the method of subcontracting to fulfill these short-term project objectives and

the need for flexibility. As Eccles (1981) has suggested, "Given bounded rationality of the general contractor in highly uncertain conditions, market contracting for input resources is preferred over vertical integration". In the next section, I will refer to the characteristics of construction industry to explain why subcontracting is so extensively used in construction.



2.2. The Extensive Use of Subcontracting in Construction

The theory of subcontracting proposed in the literature, refers to a positive relationship between project complexity, project size, the extent of the market and the amount of subcontracting. (Eccles, 1981) When demand and prices are uncertain, but the firm is relatively sure of obtaining the necessary resource inputs, no incentive exists for backward integration. This is the case for construction, and here, subcontracting is preferred. (Eccles, 1981)

Subcontracting is preferred in order to gain the following advantages:

- Overhead costs can be lower.
- Construction costs can be kept lower.
- The contractor can respond to volatile work load.
- Supervision problems can be reduced.
- Equipment and investment costs are lower. (Eccles, 1981)
- The contractor has the flexibility to work in different geographical locations.
- The risks of seasonality are reduced.

It will be more convenient for the reader to evaluate these advantages of subcontracting in relation to the distinct characteristics of construction industry.

On-Site Production and Subcontracting:

On-site production becomes less problematic with the use of subcontractors. First, the production responsibility is distributed to different subcontractors. This reduces the contractor's risk of facing unexpected problems at site. On the other hand, each subcontractor has a chance of examining the probability of unexpected events, and making the necessary arrangements, accordingly.

Using a subcontractor also provides for a general contractor the flexibility to work in different geographical locations. When the site is far from the contractor's resources, working at that site becomes harder. Again, in this case, using a local subcontractor or a subcontractor who has resources at a close distance reduces the contractor's risks and leaves the burden of finding resources and arranging transportation to the subcontractor.

Demand Volatility and Subcontracting:

This may be the most important reason for using subcontracting. Responding to irregular work load is a problem for every organization, but in construction, the budgets are high and in order to add a new project to its portfolio, a construction company might have to double or even triple its resources, such as labor and machinery. This puts a burden of investment and overhead costs on the contractor. In this case, subcontracting is perceived as a method to keep costs of responding to volatile work load low.

Also, by using more than one subcontractor, the main contractor obtains the chance of speeding an activity by increasing labor and machinery. This method of using more than one subcontractor can also help the main contractor to execute more than one project at the same time that requires the same inputs. For example, by using two mechanical installation teams, the contractor is able to execute two different buildings at the same time.

Labor Specialties and Subcontracting:

A special trade contractor who focuses on one trade and works for a number of general contractors can obtain production economies and better quality. The expertise of the subcontractor who has worked on the same kind of activity for some time, helps the main contractor solve the problem of executing "new" projects without the expensive help of outside parties; such as, consultants or expert transferred from experienced firms. Also, stressing on one activity and repeating the same activity enables the subcontractor to save on labor and material inputs. This makes the subcontractor's product more economical compared to the main contractor who has to execute the activity for the first time or from time to time.

Non-Routine Production Systems and Subcontracting:

Although new projects look "non-routine" in character from a main contractor's point of view, the subcontractor, by focusing on one activity, routinizes the production of his activity. This, in a way, solves the contractor's problem of responding to the different labor, machinery and program requirements of each new project. Because of the routinized production systems it obtained, the subcontractor has all the necessary investments for the inputs required, and has obtained the expertise to execute the activity according to various schedules and programs that the individual characteristics of projects might demand.

Variation in the Degree of Subcontracting:

Although it is known that subcontracting is extensively used in construction, not in all trades do construction firms prefer subcontracting over integration. There is variation in the degree of subcontracting with respect to different trades. Eccles (1981) defines the trades used in construction under five major sections: Basic trades (carpentry etc.), labor specialties (foundations etc.), labor and material specialties (insulation etc.), unskilled trades (landscaping etc.), technical specialties (heating and cooling etc.). It was found that basic trades and unskilled trades were more often integrated; whereas, the other three categories were nearly always subcontracted. (Eccles, 1981) This might be because basic and unskilled trades do not require expertise, and they are usually repeated in all the projects (such as excavation activities).

2.3. Subcontractor-Contractor Relationship in the Context of Interorganizational Relationships

An interorganizational system, according to Van de Ven occurs when two or more organizations transact resources (Van de Ven, 1976). This relationship can be temporary or long lasting. Van de Ven (1976) defines interorganizational relationships (IR's) with the following characteristics:

- "Behaviour among members is aimed at attaining collective and self-interest goals".

A subcontractor-contractor relationship is formed in order to execute a construction project while both parties benefit from this relationship independently. The contractor enjoys the advantages of reducing uncertainty; on the other hand, the subcontractor is able to execute a new job and increase its volume.

- "Interdependent processes emerge through division of task and funds among members".

A construction project is divided into different activities each of which is undertaken by a subcontractor. These activities are connected to each other in a network schedule and each activity is dependent on the completion or start of several other activities. Also, the notion of interdependence in this type of interorganizational relationship is structured around the division of work between the subcontractor and the contractor. As mentioned above, the exchange of resources in the relationship creates the interdependence concept.

- "An IR can act as a unit and has a unique identity separate from its members. The end objective of organizations involved in an IR is the attainment of goals that are unachievable by organizations independently" (Van de Ven, 1976).

The subcontractor and the contractor are different and independent organizations. They come together on a project basis. After the project has been finished, they freely continue on to independent projects.

Van de Ven (1976) proposes that an IR can be studied by defining and quantifying its dimensions in terms of (a) Structure (Formalization, Centralization, Complexity); (b) Process (Direction and Intensity of resource and information flows); (c) Ends (Perceived effectiveness of interagency of relationships). This research examines the process (3C's) and ends (perceived effectiveness) of the subcontractor-contractor relationship with respect to an array of organizational and interorganizational variables.

2.4. Managing the Subcontractor Relationship

Up to now, I have discussed the distinctive characteristics of construction, and how the method of subcontracting decreased the uncertainty of the construction environment. Oliver (1990) stresses the same point by arguing that interorganizational relationships serve as coping strategies to forecast and absorb uncertainty. In spite of all its benefits, managing an interorganizational relationship also has some drawbacks.

Although the method of subcontracting reduces a considerable amount of the main contractors' uncertainty, it also

- a) reduces the main contractors' freedom to act independently;
- b) forces the main contractor to dedicate some of its resources on the issue of maintaining the subcontractor relationship (Eccles, 1981; Van de Ven, 1976).

Among the aspects of managing interorganizational relationships that the literature on interorganization theory focuses on, three aspects gathered the most attention: Control, coordination and conflict (3 C's) (Van de Ven, 1976; Hall et al., 1977; Eccles, 1981; Usdiken, 1981; Green&Welsh,1988; Alter,1990) Although these three elements have not yet been assessed together, there are examples of researches that have used two of these elements together.(Hall et al., 1977; Alter,1990)

The aspect of control focuses on the dependency relationship, and on the issue of reducing the dependency. On the other hand, the aspect of coordination deals with the instruments of maintaining the relationship.

Control:

In the management of subcontractor-contractor relationships, control is used in a sense slightly different from its usual meaning. Control, in this case, is to monitor the activities done with respect to the planned schedules, and to intercept when necessary.

Subcontracting inevitably shifts the nature of the main contractor's dependence on external elements. The degree of dependence measures the ability of the organization to "achieve its goal in the absence of the other party" (Green & Welsh, 1988). The initiation of control is related with the resource dependence perspective and the activity of control emerges from a dependence relationship. The contractor tries to reduce or manage its dependence on the subcontractor by establishing a control system. This system enables the contractor to conduct the flow of the needed resources, and to intercept when necessary. Therefore, the subcontractor's autonomy is decreased; and the contractor can manipulate the flow of resources according to his plans and schedules.

Obviously, this control system is associated with the contractor's power and influence on the relationship. Therefore, another

characteristic of the interorganizational relationship -asymmetry- is observed, where one party exercises more power and control over the other party. (Oliver, 1990; Usdiken, 1990)

Coordination:

Coordination has received the most attention in interorganizational theory literature compared to conflict and control (Van de Ven, 1976; Hall et al., 1977; Usdiken, 1981; Alter, 1990). When a firm decides to get involved in an interorganizational relationship (in this research in a subcontractor-contractor relationship) it has to invest a certain amount of its resources (i.e. time, labor, etc.) in maintaining this relationship, and monitoring it with respect to other interorganizational relationships of the firm (Eccles, 1981). Hall et al. (1977) argue that work coordination is required to make the relationships among organizations in balance or equilibrium. However, some prior research evidence shows that coordinating the work of subcontractors is not evaluated as a problem by contractors (Eccles, 1981).

Coordination has been defined as a mechanism that acts to monitor and integrate work activity across organizational boundaries (Alter, 1990) ; or as the extent to which organizations attempt to ensure that their activities take into account those of other organizations (Hall et al., 1977). For construction industry, coordination can be defined as developing and maintaining the relationships between different components of a project. The most important element in coordination of subcontractor-contractor

relationship is time. Meeting the schedules becomes extremely important when many subcontractors are involved in a single project.

Coordination can be formal or informal (Hall et al., 1977). Hall et al. (1977) found that person to person interaction was strongly related to coordination while other modes of interacting were not. In the same research, little relation to coordination was found when there was a formal agreement. Van de Ven et al. (1976), on the other hand, argued that when size increases, person to person coordination decreases. At the intraorganizational level, Usdiken's research reinforces the same idea by stating that even in uncertain conditions, large firms prefer coordination by programming (Usdiken, 1981). Usdiken (1981) also points out that as predictability decreases coordination by programming decreases, too.

Conflict:

Although interorganizational conflict has a negative connotation, researchers found out that conflict contributed to the development of relationships (Alter, 1990). Alter (1990) states that the resolution of conflict ranges from withdrawal to strengthened ties. Conflict has long term benefits if it enhances both parties' understanding of the common goals, tasks and roles. Hall et al. (1977) also argue that "partial conflict" contributes to coordination. Therefore, the literature accepts that conflict in interorganizational relationships is unavoidable, but the main point is to manage conflict, and to closely monitor and change structural

factors that increase the degree of conflict. In this research conflict is defined as an organizational behavior that results from the disagreements between the two parties. In the event of conflict, organizations undertake communication or actions that is meant to neutralize, exclude or harm other organizations. (Alter,1990)

Like coordination, conflict resolution methods range from formal to informal, too. A formal agreement is argued to solve many of the power relationships in the beginning, and this way, to discard some of the reasons of conflict.(Hall et al., 1977) On the other hand, informal methods such as, frequency of contact (Hall et al., 1977) and quality of communications (Usdiken, 1990) are found to be negatively related to the degree of conflict. Moreover, Alter(1990) argues that organizations should prevent a system from becoming unnecessarily bureaucratic in order to manage conflict.

Relationships of Control, Conflict and Coordination:

Finding methods to increase control via coordination in order to reduce conflict (Dewitt, 1977 as quoted by Alter, 1990) has been one of the major concerns of management literature. But as described above, conflict cannot be avoided, and ways of "gaining" from conflict should be searched. Therefore, conflict and coordination will exist simultaneously in interorganizational relationships. Although they are not mutually exclusive, researchers have found a negative relationship between the degrees of coordination and conflict (Hall et al., 1977). Alter (1990) in spite of reinforcing the same idea by stating that coordinative mechanisms prevented excessive conflict, argues that there is a threshold before which coordination and conflict are positively related. Beyond this point where high levels of coordination -particularly task coordination among professionals- are exercised, the level of conflict decreases. Because this research aims at exploring the behavior of managers who consciously use coordination as a management tool, it might be expected that the coordination efforts in these firms are beyond the threshold; therefore, coordination and conflict should be negatively related to each other.

Although coordination and control are different aspects, they are both instruments of management in interorganizational relationships. Therefore, it might be expected that control and coordination will show parallel responses to certain factors of interorganizational relationships.

Although prior research does not give much information on the relationship of control with either coordination or conflict, Hall et al. (1977) argue that formal methods -which might be considered instruments of control- can prevent conflict by clarifying some of the expected behavior, beforehand. This might be interpreted as a negative relationship between the degrees of control and conflict.

Perceived Effectiveness

The outcome of the execution of the 3C's are evaluated in the notion of "perceived effectiveness". "The perceived effectiveness of an interorganizational relationship refers to the extent to which the agencies subjectively believe that each party carries out its commitments and that the relationship is worthwhile, equitable, productive and satisfying."(Van de Ven, 1976) A good perception of a relationship will lead to positive contribution and consensus in future operations.(Van de Ven, 1976; Hall et al., 1977; Usdiken, 1990)

Control would be expected to increase with high perception of effectiveness because better perceived effectiveness can create dependency in the long run.(Usdiken,1988) As mentioned in the earlier sections, dependency will result in the generation of control mechanisms.

On the other hand, the opposite might also be expected, considering that the contractor might allow some flexibility for the

subcontractor if he perceives the relationship to be proceeding according to his expectations. In the long run, interorganizational relationships will adopt mutual trust and common goals (Van de Ven, 1976) which might lead to loosened control on the subcontractor's activity. Usdiken (1988) also mentions that for certain components of interorganizational activity, the dependent party might enjoy more autonomy as net dependence increases. (Usdiken, 1988). Research results will hopefully bring some clarification on this issue.

On the other hand, positive assessments of organizations were found to be positively related to coordination and negatively related to conflict. (Hall et al., 1977) Therefore, one would expect to find the same results in this research, too.

2.5. Theories and Models

This research builds on the ideas around Exchange Theory and Resource Dependence Approaches.

The Exchange Theory Approach emphasizes mutual benefits in transactions among organizations and assumes that "norms of reciprocity govern interorganizational relationships". (Usdiken, 1990) Interorganizational relationships are formed to serve mutual benefits of both parties (Oliver, 1990). These parties assume that the benefits of exchanging resources exceed the disadvantages of losing autonomy, and the costs of managing the relationship (Provan, 1984, as quoted by Oliver, 1990).

Hall et al. (1977), on the other hand, express that one cannot rely exclusively on exchange theory as the explanation of patterns of interorganizational relationships, given the formal agreements or legally mandated interorganizational relationships.

The Resource Dependence Approach is frequently used to explain subcontracting. This model explores the environmental factors affecting the organization and argues that organizations are dependent on external parties who handle the resources that the organization needs for its production. To reduce this uncertainty, the organizations either try to reduce their dependence or increase

the external parties' dependence on the organization (Usdiken and Sozen, 1989). Resource and information flows determine the activity of the interorganizational relationship (Van de Ven, 1976).

The Exchange Theory is based on cooperation, collaboration and coordination; rather than aspects, such as domination, power and control that the Resource Dependence Theory emphasizes (Oliver,1990).



2.6. Organizational and Interorganizational Variables

The factors that affect the interorganizational relationships can be discussed in two different groups: Organizational variables of the subcontractor, and interorganizational variables.

Organizational variables of the subcontractor include the following factors:

***Age:**

The number of years that the subcontractor spent in the market.

***Size:**

The financial volume of the subcontractor.

***Technology:**

The system of construction that the subcontractor uses in production.

Interorganizational relationship variables involve the following components:

***Intensity of relationship:**

The extent to which the subcontractor and the contractor work together, either in terms of years or in terms of number of projects.

***Criticality:**

- Criticality of the subcontractor:

The indispensability of the subcontractor

- Number of alternatives available:

The number of subcontractors in the market who are able to do the same job.

*** Dependence of subcontractor:**

The extent to which the subcontractor needs the contractor's resources.

Interorganizational Relationship Variables and the 3C's

To Van de Ven(1976), the greater the intensity of an IR, the greater its formalization and centralization. Therefore, it can be expected that as intensity increases, coordination and control efforts have to increase too. Although there is not much information about the relationship of intensity and conflict, the expected negative relationship of conflict with either coordination or control might imply that as intensity increases, conflict should decrease.

Van de Ven also proposes that in the long run historically successful IRs become meshed together in a web of interdependencies.(Van de Ven, 1976) This implies that dependence of both parties should increase with intensity. As mentioned earlier, control is expected to increase with dependence. Since coordination usually behaves parallel to control, coordination would have a tendency to increase with dependence, too. On the other hand, Usdiken (1988) has proposed that as the relationship got

older, the more dependent parties had more autonomy in some of the factors of the relationship. This might also mean that efforts of control and coordination might decrease as dependence increases.

Van de Ven also argues that the greater the length of time and degree of intimacy in the personal relationships between organizational boundary spanners, the more similar their attitudes, values and goals; the greater their mutual trust of one another. Therefore, this might also imply that when intensity and dependence increases, one might expect efforts of control, coordination and conflict resolution to decrease.

As mentioned earlier, the solution of this contradiction will be clarified with the results of this research.

Organizational Variables of the Subcontractor and the 3 C's

The size of an organization has been defined as a potential for countervailing power in the literature (Usdiken, 1990). Contractors working with large subcontractors will try to change the balance of the power relationship in favor of themselves. Therefore, larger size would be expected to imply increase in the efforts of control and coordination for the contractor. Conflict will, in turn, be expected to decrease.

Age of the subcontractor is expected to show the same trends and implications with the size of the subcontractor. Therefore, as age increases, degrees of coordination and control might increase, too; parallel to increasing formalization (Child, 1972). As the negative relationship of conflict with either control or coordination implies, with increasing control and coordination, conflict is expected to decrease. Therefore, as age of the subcontractor increases, the level of conflict might decrease.

High structuring of activities is likely to be most effective under conditions of standardized mass production or high technology. (Child, 1972) Control systems are easier to implement in mass production technologies. Therefore, this might imply that control will increase with high technology. A high level of control, in turn, will reduce the level of conflict.

3. METHOD

3.1. Research Setting

The research examines 30 subcontractor-contractor relationships. For this purpose, five Turkish construction firms were chosen. To guarantee the homogeneity of the sample, these firms were chosen out of the 39 members of the Turkish Contractors Association. The Association members are large construction companies that have undertaken about 90% of the domestic, and almost 100% of the international projects accomplished by Turkish companies. The total value of the projects that the members of this association have successfully completed in the Near and Middle East as well as in North Africa reached approximately USD 20 billion. (Directory of Turkish Contractors, Turkish Contractors Association, 1990) The oldest of these firms was founded thirty years ago. Two of these firms are listed in ENR (Engineering News Record) among the largest 250 international contractors. (See Table 1 for details)

In each of these five companies, two projects were chosen. The priority in choosing these projects was the size and importance of the projects. At the time, these specific projects had the most strategic importance to the firms concerned. Among these projects, two were on mass housing, four were office building projects, and two were quality housing constructions. One firm declined to give project names.

TABLE 1 - INFORMATION ABOUT 5 CONSTRUCTION FIRMS IN THE RESEARCH

	Overseas Projects	Overseas Offices	Field of Activities	Number of Subsidiaries
FIRM 1	Saudi Arabia, Iraq, Yemen Kuwait, USSR	New York, Paris, Riyadh, London, Tehran, Baghdad	Pipelines, Steel Storage Tanks, Concrete Reservoirs, Petroleum Refineries, Mass Housing, Motorways Electrical Instrumentation	30
FIRM 2	Saudi Arabia, Iraq, Jordan USSR	New York, London, Munich Wiesbaden, Stockholm, Moscow Belgrade, Baghdad, Moscow, Aman, Tehran, Tripoli, Bengazi	Pipelines, Refineries, Industrial and Housing Complexes, Motorways, Shipyards, Airports, Dams Reservoirs, Power Plants	15
FIRM 3	Iran, Iraq, Jordan	Information Not Available	Chemical Plants, Refineries, Treatment Plants, Metallurgical Plants, Thermal Power Plants Hydroelectric Power Plants, Steel and Paper Mills	NA
FIRM 4	Information Not Available	Information Not Available	Motorways, Hospitals, Hotels, Business Centers, Housing, Sewage Systems, Treatment Plants, Industrial Plants	NA
FIRM 5	Information Not Available	Information Not Available	Marine Structures, Water Supply Facilities, Transportation Facilities	10

The project managers of each of the selected projects filled out questionnaires concerning three different subcontractors working on their project. These project managers chose the subcontractors themselves. The main criterion was again the size and criticality of the subcontractor. Working fields of these subcontractors has been summarized in Table 2.



TABLE 2 - INFORMATION ABOUT THE SUBCONTRACTORS

No:	Activity:
1	Tunnel Form work
4	Excavation
1	Bricklaying and heat isolation
3	Wooden window frames and doors
1	Electrical installation
3	Sanitary installation
2	Formwork
2	Gypsum ceilings and walls
2	Plaster works
1	Wall Painting
1	Floor heating systems
3	Aluminium window frames
1	Tiling
2	Mechanical Installation
2	Rebarring for Concrete
1	Water proofing

All of the 10 project managers accepted to join the research sample and returned the questionnaires. Although some of the answers were missing, all of the questionnaires could be used.



3.2. Data Collection

In order to be able to hand out the questionnaires, a top management member was informed about the reason and aim of the research and objective evaluations of the firm's experiences were requested. This manager chose two project managers or site engineers who were currently working on a project involving subcontractors. The priority in choosing these project managers or site engineers were their close relationships with the subcontractors concerned. The same information about the research were given to the project managers by the top management member and they were requested to fill out the questionnaires. Some of the missing values were filled out after the questionnaires were received through telephone conversations with the project managers. These project managers were also assured that the answers would be strictly confidential and would be used solely for research purposes; in order to receive candid answers to the questions about the subcontractors.

3.3. Variables and Measures

The research basically measured the managers' perception of coordination, conflict and control (3 C's) concerning their relationship with their subcontractors; and the factors that are likely to effect these relationships.

In order to check if there are firm effects, a Kruskal-Wallis One Way Analysis of Variance Test was executed. This test showed that there were no significant firm effects concerning the dependent variables which are control, coordination, conflict and perceived effectiveness. As far as the independent variables are concerned, no firm effects were involved in:

- Intensity of the interorganizational relationship
- Criticality
- Number of alternatives available
- Age of the subcontractor
- Size of the subcontractor
- Technology of the subcontractor

On the other hand, it was found that the variable that measured the dependence of the subcontractor on the contractor had significant firm effects. (Significance level, $p < 0.04$)

Some of the methods of the 3C's had significant firm effects as well. Three of the control methods (written reports, direct supervision, unwritten rules), two of the coordination methods (meetings, face to face personal contacts); and four of the conflict

resolution methods (face to face personal contacts, meetings, go-betweens, contracts) were found to have significant firm effects.

The significance in firm effects that does not show in dependent or independent variables, but appear in the methods of the 3C's, might demonstrate the varying utilization of these methods in different firms.

An analysis of reliability for the multi-item scales was also executed which demonstrated very high reliability. This test included control, conflict, coordination, perceived effectiveness and technology. The alpha coefficients for these multi-item scales are reported in Table 3. As seen in this table, the reliability of the multi-item scales were assessed through alpha coefficients which showed very high values.

TABLE 3 - ALFA COEFFICIENTS FOR MULTI-ITEM SCALES

VARIABLE	COEFFICIENT ALPHA
Control	0.85
Coordination	0.84
Conflict	0.81
Perceived Effectiveness	0.87
Technology	0.75



3.3.1. Dependent Variables

The dependent variables used in the research were:

- Control
- Coordination
- Conflict
- Perceived Effectiveness of the Relationship

The perception of 3C's in the relationship was measured with respect to two different aspects:

* The first variable measured the intensity of control, coordination and conflict resolution efforts with respect to different components of a construction activity.

These components were decided upon during preliminary interviews with the members of different construction firms before the questionnaire was formed. They represent the elements and the reasons of the interorganizational relationship between the contractor and the subcontractor. It was concluded that these were the main points involved in the daily relationship of above mentioned parties.

The components of the first variable that measured the degree of control were:

- Time
- Quality
- Workforce
- Materials
- Machinery
- Payments and financial matters
- Transportation
- Maintenance and warranties

The variable measured how good the manager felt these matters were controlled. In the question, which was formed as a Likert scale matrix, the rows showed the components of the 3C's (such as time, materials, etc.) whereas, the columns showed the amount of control practiced; i.e., the answers ranged from "completely under control" to "definitely not under control".

The components of the first variable that measured the degree of coordination were:

- Time
- Quality
- Workforce
- Materials
- Machinery
- Payments and financial matters
- Transportation
- Maintenance and warranties

Exactly the same as control, this variable measured how well the manager thought the activities of the subcontractor was coordinated with respect to other activities in the project. The rows in the matrix question showed the components listed above; on the other hand, the columns showed the amount of coordination. The answers ranged from "very well coordinated" to "very badly coordinated".

The components of the first variable that measured the degree of conflict were:

- Time
- Quality
- Workforce
- Materials
- Machinery
- Payments and financial matters
- Transportation
- Maintenance and warranties

This variable measured how well the conflicts on these components were resolved. The question was again formed as a Likert scale matrix, rows of which exhibited the components of the interorganizational activity listed above; and columns of which showed the frequency of conflict experienced in the relationship. The answers for this question ranged from "always conflict experienced" to "never conflict experienced".

Therefore, a detailed measure of the manager's perception of his relationship with his subcontractor in terms of 3C's (control, coordination and conflict) was attained.

* The second variable measured the degree of formality regarding the methods of 3C's, (i.e. informal method versus formal methods).

For control, these methods were determined as:

- Written agreements
- Written reports
- Close supervision
- Periodic supervision
- Unwritten rules agreed upon by both parties

For coordination, the methods were:

- Work schedules
- Written communication
- Meetings
- Face to face personal contacts
- Telephone conversations

Conflict resolution methods were determined as:

- Contracts and agreements
- With the help of third parties (go-betweens)
- Meetings
- Face to face personal contacts
- Telephone conversations

These variables were again formed as a Likert scale matrix, the rows showing the methods used and the columns showing the extent of using these methods, ranging from "always" to "never".

This idea of measuring efforts of coordination was also used by Hall et al.(1977) in a different form. Hall et al in their research did not include the components of coordination, but measured the perception of coordination efforts; together with the methods used. In this research, the method of measurement that Hall et al. used for coordination was applied to conflict and control.

3.3.2. Independent Variables:

The independent variables can be classified in two distinct categories:

Organizational variables of the subcontractor

- * Age
- * Size
- * Technology

Interorganizational variables

- * Intensity of relationship
- * Criticality

Criticality of the subcontractor's activity

Number of alternatives available in the market

- * Dependence of the subcontractor

The organizational variables of the subcontractor defined the capacity and characteristics of the subcontractor which could help explain the 3 C's. The interorganizational variables, on the other hand, defined the distinctive points in the particular subcontractor-contractor relationship.

The age of the subcontractor was measured in terms of years the subcontractor worked in the market. This variable was measured in categories, ranging from "0-1 year" to "11-20 years". Last line of the scale allowed the project manager to write the number of years if the subcontractor was older than 20 years.

The size of the subcontractor was quantified by its yearly volume which was measured in categories ranging from "up to 500.000 Turkish Liras" to "10 to 50 Billion Turkish Liras". If the yearly volume of the subcontractor was assessed as more than 50 Billion Turkish Liras, the project manager was asked to write this number down.

Age and size were included as independent variables in the same way in Usdiken's 1988 Manufacturer-Dealer Network research, too.

Technology was measured on a Likert scale which had three items. The project managers were asked to assess the extent to which the subcontractor's technology could be defined with respect to the following variables ranging on a scale from:

- high technology to conventional methods
- prefabrication to in-situ production
- mechanization to hand production.

Of the interorganizational variables, intensity of relationship which defines the age and the frequency of the relationship was measured by two different variables:

- a) the number of projects completed together,
- b) the number of years of working together.

Criticality was assessed by two variables: Criticality of the subcontractor's activity, and the number of alternatives available. Criticality of the subcontractor's activity for the contractor was measured with respect to:

- a) Financial criticality of the subcontractor's activity, measured by the financial volume of the subcontractor's activity compared to the volume of other subcontractors involved. The project managers were asked how important the subcontractor's activity was from a financial point of view.

- b) Strategic criticality of the subcontractor's activity, measured by the importance of the subcontractor's activity for the execution of the whole project. The project managers were asked about the importance of the subcontractor's activity to assure the continuation and execution of the project.

The lack of alternatives available in the market was also assessed by two variables:

- a) Indispensability of the subcontractor, where the project managers were asked how indispensable the subcontractor was, ranging from definitely not indispensable to definitely indispensable.

b) Number of subcontractors available in the market who were able to do the same job, which was measured in categories, ranging from "no subcontractors at all" to "6-10 subcontractors". The question also included another category which gave the project manager a chance to clarify the answer if there are more than 10 subcontractors. The project manager was asked to write the number of alternatives available if there were more than 10 subcontractors.

These two variables were later combined into one variable because of the high correlation between them. The new variable was named the lack of alternatives available in the market. This variable included a negative connotation in its meaning, i.e. "lack of alternatives" because it actually showed another facet of the criticality of the subcontractor from the contractor's point of view.

Because dependence of both parties should be observed in the evaluation of an interorganizational relationship, dependence of the subcontractor on the main contractor was also included as a variable. This variable measured the percentage of volume that the main contractor provides for the subcontractor. Volume of resource flows has been used in the literature as the determinant of dependence (Usdiken, 1990). Here, we might assume that the volume the contractor provides for the subcontractor might be considered a resource.

4. FINDINGS AND DISCUSSION

4.1. Results Concerning the Independent Variables

4.1.1. Relationships Among Organizational Variables of the Subcontractor

The statistical results for the relationships of the independent variables are exhibited in Table 4.

A significant relationship ($r=0.35$, $p<0.05$) between high technology and size turned out to be positive as might be expected. The firms who employ high technology tend to be larger in size.

However, the study found no significant results concerning the relationship between size and age of subcontractors.

On the other hand, age of the subcontractor tended to have a negative relationship with technology, although the result does not reach statistical significance. Therefore, maybe as a result of the recent boom of high technology in construction industry, high technology firms are usually younger.

TABLE 4 - MEAN, STANDARD DEVIATION AND CORRELATION RESULTS BETWEEN INDEPENDENT VARIABLES

ORGANIZATIONAL VARIABLES

	MEAN	ST.DEV.	1	2	3	4	5	6	7	8
Quantity (Projects)	1.60	0.56								
Quantity (Years)	1.76	0.41	0.38*							
Quantity of Subcontr.	3.13	1.00	-0.15	-0.15						
Quantity of Alternatives	5.10	1.80	-0.26	-0.04	-0.13					
Quantity (Financial)	3.68	0.72	0.01	0.17	-0.37*	0.37*				
Quantity (Strategic)	3.83	0.53	0.12	-0.03	-0.28	0.45***	.51***			

ORGANIZATIONAL VARIABLES
OF THE SUBCONTRACTOR

Quantity of Subcontr.	3.17	0.79	0.31*	-0.09	-0.07	-0.13	-0.34*	-0.18		
Quantity of Subcontr.	2.33	0.76	-0.08	0.15	-0.56***	0.30	0.38*	0.31*	0.13	
Quantity of Technology	9.19	3.39	-0.47**	-0.38*	-0.23	0.39*	.43*	0.37*	-0.29	0.35*

*** = P<.001 , ** = P<.01 , * = P<.05

4.1.2. Relationships Among Interorganizational Variables

Interorganizational variables were defined in three groups as mentioned earlier: Intensity, criticality and subcontractor dependence. Lack of alternatives and criticality demonstrated the contractor's perception on how critical the subcontractor seems to be ; on the other hand, dependence of the subcontractor examined the relationship from the point of view of the subcontractor, i.e. the subcontractor's need for the contractor's resources.

The negative relationship ($r=-0.37$, $p<0.05$) between financial criticality and dependence of the subcontractor suggests that the more critical the subcontractor's activity, the less dependent the subcontractor becomes. Another argument might be that the activities of dependent subcontractors also might seem less critical to the contractors.

If subcontractor alternatives are rare in the market, both financial ($r=0.37$, $p<0.05$) and strategic criticality ($r=0.45$, $p<0.01$) seem to increase which is not very surprising. The activities of subcontractors that are harder to find, and that are costly to lose will inevitably be critical.

4.1.3. Relationships of Organizational and Interorganizational Variables

In general, size of the subcontractor is positively related to criticality; and negatively related to the dependence of the subcontractor.

The significant negative relationship ($r=-0.56$, $p<0.001$) between the size and dependence of the subcontractor is not surprising. Small sized subcontractors are more dependent on the main contractor compared to larger firms.

On the contrary, the activities of relatively larger subcontractors are perceived as more critical both financially ($r=0.38$, $p<0.05$) and strategically ($r=0.31$, $p<0.05$). This result is not surprising as well since larger subcontractors would be expected to bear more responsibilities.

Similarly, size and lack of alternatives had a positive relationship although the result does not reach statistical significance. This shows that market of subcontracting is smaller (i.e. subcontractors are rare) for activities that require large size firms. This might suggest that in this sample, contractors do not usually work with large subcontractors.

Age of the subcontractor was found to have a positive relationship ($r=0.31$, $p<0.05$) with intensity of relationship. This is not surprising because as the subcontractor firm gets older, it is more likely to have longer relationships.

Age of the subcontractor has a negative relationship with financial criticality of the subcontractor's activity ($r=-0.34$, $p<0.05$). This implies that the older the subcontractor, the less critical it is for the contractor.

Technology of the subcontractor is negatively related to intensity both in terms of years spent together ($r=-0.38$, $p<0.05$) and in terms of number of projects executed together. ($r=-0.47$, $p<0.01$) This suggests that intensity of relationships are not high with high technology subcontractors. This might also be because high technology firms are usually younger, or because high technology building materials are not yet used very extensively in construction projects.

A general finding is that criticality variables of the contractor increase with the degree of the subcontractor's technology; whereas, subcontractor's dependence decreases with high technology.

High technology activities are assumed critical both from strategic ($r=0.37$, $p<0.05$) and financial perspectives ($r=0.43$, $p<0.05$). The firms who employ high technology are larger in size, as mentioned above. Larger size, on the other hand, indicates criticality on the part of the resources that the subcontractor provides.

Lack of alternatives also increases with technology ($r=0.39$, $p<0.05$) which might mean that high technology firms are rare in the market. This issue also explains the decrease , which does not show statistical significance, in the dependence of the subcontractor when high technology is concerned. Because high technology firms are very few in number, they are less dependent on the contractors.

As explained above, size and technology show similar responses to the issues of intensity and dependence. This supports the strong relationship between size and technology.



4.2. Relationships Between the 3C's

There is a significant positive relationship between control and coordination. ($r=0.80$, $p<0.001$) This implies that although control and coordination are different concepts of managing an interorganizational relationship, they show parallel responses to other components of the relationship. As far as independent variables and methods of the 3 C's are concerned, control and coordination displayed similar behavior. In other words, control and coordination mechanisms are used together and in collaboration in managing interorganizational issues.

Perception of conflict was found to be covarying negatively with both control and coordination as expected. This finding supports the argument that control mechanisms (such as formal agreements) (Hall et al. ,1977); and coordinative mechanisms (Alter, 1990) prevent conflict.

TABLE 5 - CORRELATION RESULTS BETWEEN THE 3C'S AND PERCEIVED EFFECTIVENESS

	CONTROL	COORDINATION	CONFLICT
ROL			
DINATION	.80***		
LICT	-.31	-.45**	
PERCEIVED EFFECTIVENESS	.76***	.79***	-.57***

*** = P<.001 , ** = P<.01 , * = P<.05



4.3. Independent Variables and the 3 C's

The results showing the relationships between the independent variables and the 3 C's are exhibited in Table 6.

Intensity of the relationship seems to have a negative relationship with control and coordination although the result does not reach statistical significance. This finding is surprising and contrary to what was expected. It might mean that in short-term relationships control and coordination are less problematic. This might also mean that the degree of coordination decreases as a relationship gets older. This fact supports Van de Ven's (1976) and partly Usdiken's (1988) arguments, too. This might be a result of obtaining mutual trust after years of working together.

Criticality variables of the contractor tend to have a positive relationship with control and coordination. The more critical a subcontractor's activity, the higher is the degree of control and coordination. With respect to the degree of coordination practiced, criticality of the subcontractor's activity increases both financially ($r=0.42$, $p<0.05$), and strategically ($p=0.38$, $p<0.05$). In other words, the degree of control and coordination practiced increases if the subcontractor's resources are critical. This might also be a result of the main contractor's need to control and coordinate the critical activity because of the risk involved, in the case of losing or misusing that resource. Another reason might be that the subcontractors of critical activities conceive the importance of their resources, and cooperate with the main contractor in his efforts of control and coordination.

TABLE 6 - CORRELATION RESULTS BETWEEN DEPENDENT AND INDEPENDENT VARIABLES

INDEPENDENT VARIABLES	CONTROL	COORDINATION	CONFLICT
Number of Projects	-0,21	-0,16	0,09
Number of Years	-0,30	-0,24	0,12
Frequency of Subcontr.	0,02	-0,13	-0,06
Number of Alternatives	0,29	0,51***	0,16
Cost-effectiveness(Financial)	0,24	0,42*	-0,10
Cost-effectiveness(Strategic)	0,35*	0,38*	0,07
DEPENDENT VARIABLES			
TOWARDS THE SUBCONTRACTOR			
Frequency of Subcontr.	-0,07	0,06	-0,24
Number of Subcontr.	-0,05	0,15	0,00
Technology	0,38*	0,39*	0,11

*** = P < .001 , ** = P < .01 , * = P < .05

The degree of coordination also increases if there is a lack of alternatives in the market ($r=0.51$, $p<0.01$). This might mean that if the contractor does not have many alternatives in the market, the contractor's coordination efforts will increase to reduce this dependence.

The degree of control and coordination practiced increases with high technology. ($r=0.38$, $p<0.05$ for control, $r=0.39$, $p<0.05$ for coordination) This result also supports the finding that high technology activities are assumed critical and need more control and coordination. It might also imply that high technology can be monitored more easily because of the prefabricated and pre-thought production system. This system might create convenience in meeting the time schedules or quality standards, all of which make the main contractor's practice of control and coordination easier. No significant results between the amount of conflict and technology was obtained, but the results suggest a positive relationship between these two variables.

4.4. Methods of 3C's

4.4.1. General Findings About Methods and the 3 C's

The results of the relationships between the methods and the 3 C's are reported in Table 7.

In general, the results report significant positive relationships between "informal methods" and the degrees of control and coordination. Informal methods also emerge as significant factors of reducing conflict. Although this argument supports Alter's (1990) perception that coordinative mechanisms prevent excessive conflict, the same finding might also be interpreted that low levels of conflict can lead to the utilization of informal methods.

Unwritten, common rules adopted by both parties, face to face interactions and telephone conversations were found to be positively affecting the degree of control and coordination achieved while reducing the amount of conflict.

Written agreements, periodic supervisions and unwritten common rules adopted both by the contractor and the subcontractor appeared to reduce the level of conflict. There were significant negative relationships between these methods and the degree of conflict experienced. This supports Hall et al.'s (1977) argument that formal methods could prevent conflict by clarifying some of the expected behavior beforehand.

TABLE 7 - CORRELATION RESULTS BETWEEN METHODS AND JC'S

	CONTROL	COORDINATION	CONFLICT
CONTROL METHODS			
Written Agreements	0,10	0,11	-0,38*
Written Reports	-0,03	0,10	0,07
Close Supervision	0,14	0,10	0,10
Periodic Supervision	0,19	0,43*	-0,39*
Unwritten Rules	0,45**	0,51**	-0,46**
COORDINATION METHODS			
Work Schedules	0,05	0,18	-0,07
Written Communication	0,05	0,17	0,05
Meetings	0,15	0,15	-0,19
Face to face contacts	0,48**	0,37*	-0,04
Telephone conversations	0,36*	0,63***	-0,16
CONFLICT RESOLUTION METHODS			
Telephone Conversations	0,13	0,49**	-0,08
Face to face contacts	0,53**	0,27	0,09
Meetings	-0,20	0,03	-0,16
Go-betweens	-0,40*	-0,12	-0,09
Contracts and agreements	-0,24	0,00	-0,13

*** = P<.001, ** = P<.01, * = P<.05

4.4.2. Details of the Relationships Between the 3 C's and Their Methods

Control and Methods of Control

All of the control methods, formal or informal, were positively related to the degree of control. Among these, unwritten rules adopted by both parties appeared with an especially significant positive relationship to control. ($r=0.45$, $p<0.01$).

Conflict, Coordination ;and Methods of Control

Formal control methods such as written agreements were found to be able to reduce conflict ($r=-0.38$, $p<0.05$); as well as informal methods such as periodic supervision ($r=-0.39$, $p<0.05$) and unwritten rules ($r=-0.46$, $p<0.01$).

Informal methods were more effective as far as the degree of coordination practiced was concerned. Periodic supervision ($r=0.43$, $p<0.05$) and unwritten rules adopted by both parties ($r=0.51$, $p<0.01$) tended to increase as coordination increases.

Coordination and Methods of Coordination

Among the coordination methods, formal methods ,such as work schedules and written communication, turned out to be negatively related to the degree of coordination although no statistical

significance was obtained. On the other hand, meetings which are half way between formal and informal methods appeared to be affecting coordination positively. However, this result does not show any statistical significance. Completely informal methods, such as face-to-face contacts and telephone conversations reported significantly positive relationships with coordination. ($r=0.38$, $p<0.05$) for face-to-face contacts; $r=0.63$, $p<0.001$ for telephone conversations)

Control, Conflict ;and Methods of Coordination

The degree of control practiced increased with informal methods of coordination, i.e. face to face contacts ($r=0.48$, $p<0.01$) and telephone conversations ($r=0.36$, $p<0.05$).

On the other hand, no relationship was found in this study between conflict and methods of coordination.

Conflict and Conflict Resolution Methods

As far as conflict resolution methods are concerned, face-to-face contacts -although not significant- appeared to be increasing the amount of conflict. On the other hand, telephone conversations, meetings, go-betweens and contracts turned out to be methods that reduce the level of conflict. However, this result is unable to provide any statistical significance.

Control, Coordination ,and Conflict Resolution Methods

Face to face contacts had a positive relationship with the amount of control practiced ($r=0.53$, $p<0.01$). On the contrary, go-betweens had a negative effect on the degree of control ($r=-0.40$, $p<0.05$).

Telephone conversations as conflict resolution methods turned out to be significantly affecting the amount of coordination practiced ($r=0.49$, $p<0.01$). Other methods did not produce any significant results as far as coordination is concerned.

4.5. Perceived Effectiveness and the 3C's

This study exhibited significant results showing that control and coordination were positively related to perceived effectiveness while conflict had a negative effect. This supports Hall et al.(1977) and Alter's (1990) arguments that positive assessments of organizations are positively related to coordination and negatively related to conflict. Information about these findings are summarized in Table 5.

Directions for Further Study

A major obstacle of this study was the sample size. A research with more than 30 relationships would produce more significant results. The sample size also limited the utilization of different statistical tools. Correlation analysis that was used in this research provided inadequate information about the direction of the relationships, i.e. the opportunity to produce causal arguments was limited.

The research selected large size contractors from Turkish construction industry which were very similar in character. A study that observes a variety of construction firms with diverse characteristics would contribute to and reinforce the findings of this study.

Also, this study does not take the subcontractor's point of view into consideration. Interorganizational research usually examines the relationship with respect to the perceptions of both parties. Such a research would widen the perspectives of the results obtained in this study.

5. CONCLUSIONS

The study reported interesting points on the interorganizational nature of subcontractor-contractor relationships. The construction industry provided a dynamic setting for the research; and interesting results were obtained on the practices of the 3 C's, and the effects of organizational and interorganizational variables on the 3 C's.

The results showed that control and coordination increased the perceived effectiveness of a relationship. Contractors that felt their control and coordination mechanisms were successful, were also satisfied with the relationship. On the other hand, conflict had a negative effect on the perceived effectiveness of the relationship. High levels of conflict were found to lead to unfavorable perceptions of the relationship.

Control and coordination acted very similarly with respect to organizational variables of the subcontractor; interorganizational variables; and methods of the 3 C's. Although control and coordination are two different mechanisms of managing interorganizational relationships, because they serve the same purpose, they also showed the same responses to changes in other variables.

Organizations were found to be able to reduce conflict with the use of control and coordination mechanisms. Especially control methods -formal methods such as written agreements or informal methods such

as unwritten common rules and periodic supervisions- turned out to be significantly decreasing conflict in interorganizational relationships.

Larger size and high technology subcontractors were found to increase the dependence of the contractors. Also, the contractor's dependence appeared to decrease as the intensity of the relationship increased.

Similarly, it was observed that larger size and high technology subcontractors were less dependent on the main contractor. Larger sized and high technology subcontractors also tend not to get involved in intense relationships with main contractors. Older subcontractors in the market, on the other hand, were more inclined to get involved in intense relationships.

As in the case of control and coordination, size and technology showed similar responses to organizational elements, as well.

The degrees of control and coordination were observed to increase with the dependence of the contractor. Also, the level of conflict was low in situations where the contractor was dependent on the subcontractor. The contractor tries to reduce its dependence on the subcontractor by establishing control and coordination systems. These systems, in turn, decrease the level of conflict in the relationship.

The degrees of control and coordination practiced in a relationship increases with subcontractors who have high technology products. It might be concluded that high technology production requires precise scheduling and programming; thus, this type of production technology might be more inclined to adapt to the main contractor's control and coordination system.

Informal methods; such as, face to face interactions, telephone conversations and unwritten common rules emerge as methods to increase the degrees of control and coordination; and obviously to decrease the level of conflict.

All control methods, formal or informal, contributed positively to the degree of control. Formal methods, on the other hand, affected the degree of coordination negatively. Coordination was found to be increasing with the practice of informal methods. Face-to-face interactions, surprisingly turned out to be invigorating conflict; whereas, other formal or informal methods, especially contracts and written agreements significantly reduced conflict.

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Bu anket, Boğaziçi Üniversitesi'nde tamamen akademik amaçlarla hazırlanmıştır. Ankete verilen tüm yanıtlar kesinlikle gizli tutulacak ve toplu analizler ve toplu sonuçlar dışında hiç bir yerde kullanılmayacaktır.

Her anket şu anda çalıştığınız proje ve bir taşeronu konu almakta ve ana firma-taşeron ilişkisini incelemektedir. Soruların "doğru" veya "yanlış" cevapları yoktur. Önemli olan sizin konu hakkındaki görüşlerinizdir. Lütfen tüm soruları cevaplamaya çalışın. Eğer cevap maddeleri sizin görüşünüzü tam olarak yansıtmıyorsa, düşüncenize en yakın şıkki işaretleyin. Gerek gördüğünüz yerlerde düşüncelerinizi yazmaktan çekinmeyin.

Anketin sonuçlarının iş dünyasında da yararlı olabilmesi sizin vereceğiniz sağlıklı cevaplara bağlıdır. Gösterdiğiniz ilgi ve zahmete şimdiden çok teşekkür ederiz.

Projenin deęişik bileşenleri arasındaki ilişkiyi sağlamak ve yürütmek anlamına gelen koordinasyon çok bileşenli oelerde önemli bir yönetim aracıdır. Siz bir yönetici olarak taşeronun çalışmalarını diğer faaliyetlerle, aşağıdaki inularda ne derecede iyi koordine edebiliyorsunuz?

	1. Oldukça iyi	2. İyi	3. Yeteri kadar	4. Kötü	5. Çok kötü
İre					
alite					
gücü					
alzeme					
akina demeler, ali konular					
akliye akım, aranti					

Taşeronun çalışmalarını diğer faaliyetlerinizle nasıl koordine ediyorsunuz?

	1. Her zaman	2. Oldukça sık	3. Zaman zaman	4. Seyrek	5. Hiçbir zaman
programlarıyla azılı haberleşme oluyla					
oplantılarla üzyüze kişisel işkilerle elefon onuşmalarıyla					

Taşeronla aranızda aşağıdaki konularda hangi sıklıkta anlaşmazlık çıkıyor?

	1. Her zaman	2. Oldukça sık	3. Zaman zaman	4. Seyrek	5. Hiçbir zaman
üre					
alite					
gücü					
alzeme					
akina demeler, ali konular					
akliye akım, aranti					

Taşeronla ilişkilerinizde anlaşmazlıkları nasıl çözümlüyorsunuz?

	1. Her zaman	2. Oldukça sık	3. Zaman zaman	4. Seyrek	5. Hiçbir zaman
İlefon görüşmeleriyle yüz yüze görüşülerek					
Ortak toplantılarla üçüncü şahıslar (aracılar) yardımıyla anlaşma/sözleşme yapılarak					

AŞERONUN ÖZELLİKLERİ

Firmanızla taşeron ne kadar zamandır birlikte çalışıyor?

- 1= İlk çalışmamız
- 2= 1-5 projeden beri
- 3= 6-10 projeden beri
- 4= 11-20 projeden beri
- 5= Daha fazla ise lütfen belirtiniz:

Firmanızla taşeron kaç yıldır kesintisiz birlikte çalışıyor?

- 1= 1 yıldan az
- 2= 1-5 yıl
- 3= 5-10 yıl
- 4= Daha fazla ise lütfen belirtiniz:

Taşeronun faaliyeti sizin tüm faaliyetleriniz içinde aşağıdaki özellikler yönünden ne derecede önemli ?

	1. En önemli faaliyet	2. Oldukça önemli	3. Ne önemli Ne önemsiz	4. Oldukça önemsiz	5. Tamamen önemsiz
1) Parasal yönden					
2) Projenin yürütülmesi ve gerçekleşmesi açısından					

D. Taşeron sizin için ne derecede vazgeçilmez (alternatifsiz) ?

- 1= Kesinlikle vazgeçilmez
- 2= Vazgeçilmez
- 3= Bazen vazgeçilebilir, bazen vazgeçilmez
- 4= Vazgeçilebilir
- 5= Kesinlikle vazgeçilebilir

4. Piyasada aynı işi sizin beklentileriniz doğrultusunda yapabilecek kaç taşeron var?

-] 1= Hiç yok
-] 2= 1 taşeron
-] 3= 2-5 taşeron
-] 4= 6-10 taşeron
-] 5= Daha fazla ise lütfen belirtiniz:

5. Sizin firmanız taşeronun iş hacminin ne kadarını sağlıyor?

-] 1= %1'den azını
-] 2= %1-%10'unu
-] 3= %10-%50'sini
-] 4= %50-%70'ini
-] 5= Daha fazla ise lütfen belirtiniz:

6. Taşeron firma kaç yıldır piyasada çalışıyor?

-] 1= 0-1 yıl
-] 2= 1-5 yıl
-] 3= 6-10 yıl
-] 4= 11-20 yıl
-] 5= Daha fazla ise lütfen belirtiniz:

7. Taşeron firmanın yıllık tahmini cirosu ne kadardır?

-] 1= 500 milyon liraya kadar
-] 2= 501 milyon-1 milyar lira
-] 3= 1-10 milyar lira
-] 4= 10-50 milyar lira
-] 5= 50 milyar liradan fazla ise lütfen belirtiniz:

8. Taşeronun işlerinde kullandığı teknoloji nasıl değerlendirilebilir?
(izgi üzerinde işaretleyiniz)

İnşaat teknolojisi	1	2	3	4	5	Geleneksel Yapım
Fabrikada üretim	1	2	3	4	5	Şantiyede Üretim
Otomatizasyon	1	2	3	4	5	Elle Üretim

9. Taşeronla çalışma ilişkinizi aşağıdaki konularda ne derecede başarılı buluyorsunuz?

	1. Çok başarılı	2. Başarılı	3. Ne başarılı Ne başarısız	4. Başarısız	5. Çok başarısız
Kontrol					
Koordinasyon					
Çatışmazlıkların çözülmesi					
İletişimde					

Firma adı :
Taşeron adı :
Tarih :

Ana firmanın iş türü :
Taşeronun iş türü :