MANUFACTURING STRATEGIES OF TURKISH FIRMS: AN EMPIRICAL STUDY ON BUSINESS ENVIRONMENTAL FACTORS AND COMPETITIVE PRIORITIES

A Master's Thesis

by

ÇİĞDEM ATASEVEN

Department of
Management
Bilkent University
Ankara
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MANUFACTURING STRATEGIES OF TURKISH FIRMS: AN EMPIRICAL STUDY ON BUSINESS ENVIRONMENTAL FACTORS AND COMPETITIVE PRIORITIES

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ÇİĞDEM ATASEVEN

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ANKARA

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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

_____
Asst. Prof. Emre Berk
Supervisor

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

_____
Asst. Prof. Doğan Serel
Examining Committee Member

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

_____
Asst. Prof. Alper Şen
Examining Committee Member

Approval of the Institute of Economics and Social Sciences:

_____
Prof. Dr. Erdal Erel
Director

ABSTRACT

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Ataseven, Çiğdem

M.S., Department of Management

Supervisor: Assistant Prof. Emre Berk

July 2006

There have been several studies that aim at exploring the relationships between business environment and strategy choices of firms in the literature. Cross country comparisons are provided when available to understand the differences between the manufacturing practices of the firms operating in different countries. This study analyzes the relationships between business environment, business strategy and manufacturing strategy by using the survey data gathered from Turkish manufacturing firms. The framework of these relationships used in this study is based on the relevant literature. A series of regression equations have been developed to test the effect of environment on the choice of business level competitive strategies and manufacturing strategies. In addition, the effect of competitive strategies on manufacturing strategy choices is tested. We have found significant relationships between *(i)* business environment and competitive strategy, *(ii)* business environment and manufacturing strategy, and *(iii)* competitive strategy and manufacturing strategy. An attempt to make a comparison of a previously collected data of the manufacturing firms in Ankara with the recently collected data is also included.

Keywords: Manufacturing Strategy, Business Environment, Empirical Research

ÖZET

TÜRKİYE'DEKİ FİRMALARIN İMALAT STRATEJİLERİ: İŞ ORTAMI VE REKABETÇİ ÖNCELİKLER ÜZERİNE DENEYSEL BİR ÇALIŞMA

Ataseven, Çiğdem

Yüksek Lisans, İşletme Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Emre Berk

Temmuz 2006

İmalat stratejisi literatüründe iş ortamı ve strateji seçimleri arasındaki ilişkileri araştırmak amaçlı birtakım çalışmalar yer almaktadır. Buna ek olarak, farklı ülkelerde operasyonlarını sürdüren firmaların üretim uygulamaları arasındaki farklılıkları anlamak üzere, mümkün olduğunca, ülkelerarası bazda karşılaştırmalar da yer almıştır. Bu çalışma Türkiye'deki üretim firmalarına uygulanan bir anket sonucu elde edilen veriler ışığında iş ortamı, işletme stratejisi ve imalat stratejisi arasındaki ilişkileri incelemektedir. Bu çalışmada kullanılan ilişkilerin altyapısı konuyla ilgili literatüre dayanmaktadır. İş ortamının, işletme düzeyindeki strateji seçimleri ve imalat stratejileri seçimleri üzerindeki etkilerini test etmek amacıyla bir dizi çok değişkenli regresyon modeli geliştirilmiştir. Ayrıca, işletme düzeyindeki strateji seçimlerinin imalat stratejileri seçimleri üzerindeki etkileri de test edilmiştir. Sonuç olarak, *(i)* iş ortamı ve işletme düzeyindeki stratejiler, *(ii)* iş ortamı ve imalat stratejileri, ve *(iii)* işletme düzeyindeki stratejiler ve imalat stratejileri arasında istatistiksel olarak anlamlı ilişkiler bulunmuştur. Daha önce Ankara ilindeki üretim firmalarından toplanmış veriler ile çalışmada kullanılan veriler arasında yapılan bir karşılaştırma çalışması da bu araştırmaya eklenmiştir.

Anahtar Kelimeler: İmalat Stratejisi, İş Ortamı, Deneysel Çalışma

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CHAPTER 1

INTRODUCTION

Manufacturing strategy research can be traced back to the ideas proposed by Skinner (1969), who suggests that manufacturing function of a firm can be a competitive weapon or a corporate millstone and that manufacturing decisions and decision making process are undervalued given the capital needed for implementation. These decisions should involve higher levels of management, because there is a very important relationship that cannot be ignored between manufacturing strategy and corporate strategy. Skinner thinks that establishment of a low cost manufacturing system and high efficiencies are generally seen as the signs of a good manufacturing operation. However, this approach is an oversimplification of a concept, which should be thought out carefully because of its crucial and strategic nature. According to Skinner, people should give up seeing manufacturing decisions as only

technological ones and rather try to find the manufacturing strategy best fitting to the competitive strategy of the company while understanding the tradeoffs inherent in the system. No company is expected to excel at all aspects of its operations. Thus, the best strategy that is in line with the competitive strategy should be found and implemented. This brings up a top down approach in manufacturing. This approach requires company's competitive strategy to be determinant in defining the manufacturing strategy.

There have been several studies in the area of manufacturing strategy after recognizing this need to increase the weight of manufacturing decisions. Some of these studies aim at finding the nature of the relationships between competitive strategy and manufacturing strategy like Williams *et al.* (1995),Ward *et al.* (1995), and Ward and Duray (2000). Business environmental variables are incorporated in some of these studies as factors that influence the decision making processes at both levels of the business. Along with the incorporation of environment into the related frameworks, the importance of realizing country specific information on strategy has increased. Therefore, studies, which search for the manufacturing strategies of the firms in different countries such as Singapore, the USA, Ghana or China, have been carried out. In Turkey, previous studies on manufacturing strategy include the doctoral thesis of Mehmet Aytekin, the master's thesis of Demet Teker and the study of Ulusoy and İkiz on best practice manufacturers.

With the aim of investigating manufacturing strategies and practices in industrialized nations throughout the world, IMSS (International Manufacturing Strategy Survey) network was established. The first round of this project has been completed in 1992-1994 and the fourth round (IMSS-IV) has been completed in 2005. This research focus on ISIC28-35 industry coded firms. Some researchers prefer to limit industry combination of their respondent firms to control for industry effects in their studies, whereas others prefer to not to limit this feature in order not to lose generalizability. Data gathered from this detailed survey was used by researchers to contribute to the manufacturing strategy literature.

Our study aims at filling the research gap about the relationships between business environmental variables, competitive strategy and manufacturing strategy by using survey data collected from the ISO500 list firms. This list consists of 500 largest industrial firms registered in the Istanbul Chamber of Industry. We use regression to test the relationships between our variables to explore the environment strategy relationships for business level and manufacturing function level in Turkey. SPSS 13.0 is the software we employed to run the regressions.

The rest of the thesis is organized as follows:

In Chapter 2, we will introduce the relevant literature on manufacturing strategy and discuss the research focusing on Turkey.

In Chapter 3, we will describe our survey, its connection to literature and basic test hypotheses along with the sample characteristics, and descriptive statistics of the data.

In Chapter 4, reliability and validity of the scales, empirical findings, similarities and differences with the literature will be discussed.

In Chapter 5, we will attempt to make a comparison with a readily available data of the same questionnaire conducted 4 years ago with the firms in Ankara. Similarities and differences between this set of data, which is collected from relatively small firms, and recently collected data from the firms in Turkey are presented.

In Chapter 6, we will provide the reader with the conclusions and possible future work discussions.

CHAPTER 2

LITERATURE REVIEW

Manufacturing strategy research originates in the seminal paper of Skinner (1969). In this study, Skinner emphasizes the critical role of the manufacturing function within a company. He points out that this particular function can be either "a competitive weapon or a corporate millstone". According to Skinner, manufacturing decisions are generally perceived to be routine decisions, but they are also decisions that are not easily reversed because of the high capital investments. Skinner argues that manufacturing decisions are delegated towards lower levels of management whereas lower level managers have incorrect or misunderstood assumptions regarding the corporate strategy. As a result of incongruent manufacturing and corporate strategies, companies have to deal with production systems that are costly to change in terms of money and time. In general, low costs and high efficiencies are seen as hints of a good production system. However, Skinner says that this is an oversimplification of

such a desirable system. The main argument of this work is that technically oriented concept of manufacturing is too prevalent; and that it is largely responsible for the typically limited contribution manufacturing makes to a corporation's competitive weapons. Strategy is defined to be the set of policies and plans by which a company tries to gain advantage over its competitors. All plans and policies need different sets of resources. Thus, a company pursuing a strategy needs to plan first and act accordingly to become successful. At this point, he argues that there is not a clear, absolute definition of a good plant. Determination of the policy is initiated with an evaluation of competitive situation and rival companies' positions. After that, he proposes that strategy should be set in motion by manufacturing tasks with a careful examination of constraints and limitations. Finally, programs of implementation, controls, performance measures and review procedures are determined.

There are three levels that strategy is constructed within a corporation (Slack and Lewis, 2002). The first one, corporate strategy, consists of decisions regarding the types of business the group wants to be in, location of its operations, the scope of its operations, and the distribution of cash between several business units within its body. Under the corporate group, every business unit should come up with its own business strategy, which determines its individual mission and objectives along with the decisions as to the plans of competition in its markets. Within a business unit, each function has its own functional strategy that guides its contributive actions to business. Thus, it is reasonable that manufacturing strategy should be aligned with

business strategy for success. Congruence between the strategies of those two levels provides a consistency and leads to high performance.

In his book, Christopher Voss (Chapman& Hall, 1992), argues that manufacturing in the corporate strategy is believed to be held back because of;

"(1) Strong instinctive presumptions and dispositions passed to generations of managers,

(2) The conventional functional, departmental organization of business, and

(3) Missing conceptual links in the theory of manufacturing in corporate strategy".

It is argued that manufacturing is generally perceived to be a necessary but costly and high-risk investment. Furthermore, decisions in this area are asserted to be assessed with short term objectives and measures; and success on every dimension is addressed without noticing the tradeoffs inherent in the system. It is also stated that managers in this area have little knowledge as to the strategic standing of the whole company and their particular unit, and they are not interested what is going on with other functions, and lastly they are averse to technology. Another problem is the competition between functions within a business unit due to the fact that all departments are awarded on the basis of own accomplishment but the overall accomplishment. However, it is emphasized that manufacturing needs full support from other departments to turn itself into a competitive weapon. As a result, manufacturing function needs a place that is congruent with both business strategy

and other functional departments to be used as a weapon in the competition arena.

To investigate this desired congruence among strategies of different levels within a firm and the manufacturing function, a number of empirical studies have been reported in the literature.

Our study is established on several prior studies that are on manufacturing strategy. The questions asked in the questionnaire are synthesized from these studies and the theoretical framework stated in them provided the ground for this research.

We limit the discussion of this body of work to those studies that are closest to ours in scope and methodology.

Ward *et al*. (1995) is the first study to search for the effects of environment on operations strategy selection and performance. They identify strong relationships between environmental factors such as labor availability, competitive hostility, and market dynamism and the operations strategy choices encompassed by competitive priorities. This study also shows that environmental variables can provide effective controls for industry effects in multiple industry empirical studies in operations strategy.

Authors suggest that relative neglect of environment in operations strategy research is surprising since the fit between environment and organizational capabilities is central to strategic management frameworks such as Bourgeois's (1985).

In this study, three perspectives on environment are mentioned based on the previous work of Bourgeois. First perspective focuses on groups external to the organization that influence on its activities like customers, competitors, suppliers and regulatory agencies; second perspective focuses on the attributes of external forces like complexity, dynamism and munificence, and the last one is about managerial perceptions on environmental attributes, illustrated by Swamidass and Newell (1987) as perceived environmental uncertainty. Perceived environmental uncertainty construct is defined as a consequence of the external environment, perceived by managers of the firm.

Authors remark that according to Price Waterhouse 1993 report, high levels of economic growth have resulted in environmental pressures such as perceived shortages of skilled labor and rising business costs in Singapore.

Ward *et al*. (1995) argue that empirical studies in operations strategy have sometimes dealt with environmental factors indirectly by limiting the industry coverage of the study. They point out that, since environment and industry are closely linked, limiting the study to a single industry also limits the environmental variation in the sample at the expense of some generalizability (Dess *et al*. 1990). Their study is also a multi industry survey research like our study.

Ward *et al*.'s (1995) conceptual model that is tested in this study can be visualized as:

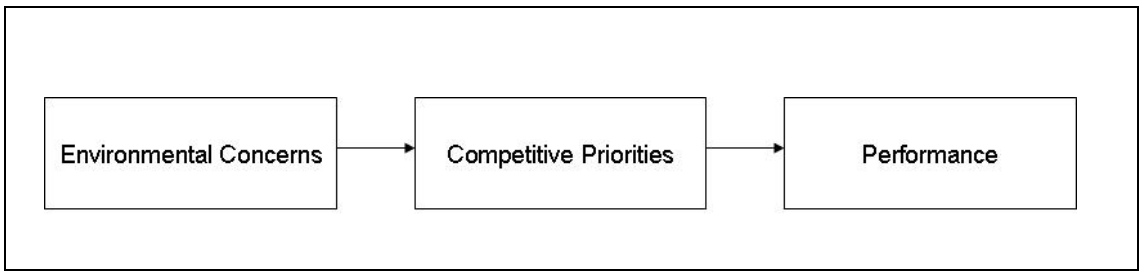

Figure 2-1: Conceptual Model of Ward *et al*. (1995)

Dimensions of environment used in Ward *et al*.'s (1995) study are environmental munificence, environmental dynamism and environmental complexity. Environmental munificence is defined to be the extent to which an environment supports growth of organizations within it. This dimension is told to be generally measured with a reverse scale as environmental hostility. Authors use three scales that are related to environmental munificence: costs of doing business in Singapore, labor availability and competitive hostility. Environmental dynamism is defined as the unpredictable change in environmental conditions faced by firms (Dess and Beard, 1984). Ward *et al*.'s scale measures the rate at which products and services become outmoded; the rate of innovation in product/service and in process; the rate of change in tastes and preference among customers.

Environmental complexity is defined as the heterogeneity and range of an organization's activities. Thus, authors point out that it is much related with corporate strategy rather than manufacturing strategy. Operations strategy is characterized by four dimensions: low cost, quality, flexibility and delivery performance.

Data used in their study are from a survey of Singaporean manufacturers about environment, manufacturing strategy and performance. 'Survey on Business Operations in Singapore' is a survey sponsored by Singapore Manufacturers' Association (SMA) to collect data about the member companies. Authors use a path analytic model to find the relationship between environmental concerns and operations strategy for high and low performers by using data from this source.

As a result of their analysis, they find no relationship between performance and capital structure or size, but there is a significant relationship between industry category and performance for the sample.

Sample is divided into two as high and low performers with respect to self-reported change in profitability. Their data support that; environment and operations strategy are related, via several paths that are significant at less than 0.05 for both high and low performers. Moreover, their hypothesis that high performers use different operations strategies than low performers when their perception of the environment is the same; is also supported.

They point out that higher environmental dynamism indicates significantly more operations strategy emphasis on delivery performance, flexibility, and quality competitive priorities. It is also said that this fact also implies that a set of capabilities that support responsiveness to customers is valued in a dynamic environment.

Authors also point out that, successful firms that face greater perceived competitive hostility respond with a greater emphasis on delivery performance. This indicates an attempt to further differentiate their products rather than reducing costs. Furthermore, the study shows that high performers respond to perceived labor shortages by a strategic emphasis on flexibility. Low performers are also reported to respond to environmental dynamism in the same direction as high performers along with more emphasis on cost reduction. Competitive hostility induces low performers to respond with greater strategic emphasis on quality, flexibility, and cost reduction as well as delivery performance.

Low performers are found to respond to increased market competition with cost reduction and differentiation capabilities whereas high performers do this with differentiation through delivery performance.

We should mention, in passing that authors use the term 'competitive priorities' for the manufacturers' choice of emphasis among key capabilities. There are also terms used for competitive priorities such as core content and content variables (Adam and Swamidass, 1989), dimensions of competition (Fitzsimmons *et al*., 1991), external performance measures (Fine and Hax, 1985), manufacturing tasks (Skinner, 1969; Berry *et al*., 1991; Richardson *et al*., 1985), order winners and order qualifiers (Hill, 1989), organizational priorities and generic capabilities (Ferdows and DeMeyer, 1990); and production competence (Vickery *et al*., 1993; Cleveland *et al*., 1989;

Vickery 1991).

Ward and Duray (2000) argue that empirical manufacturing strategy literature is dominated by studies that focus on the internal consistency of manufacturing strategy among competitive priorities and programs and the performance outcomes related to this congruence. They point out literature lacks empirical studies that concentrate on the alignment between manufacturing strategy, business-level competitive strategy and the competitive environment faced by the firm.

The conceptual model behind this study can be visualized as follows:

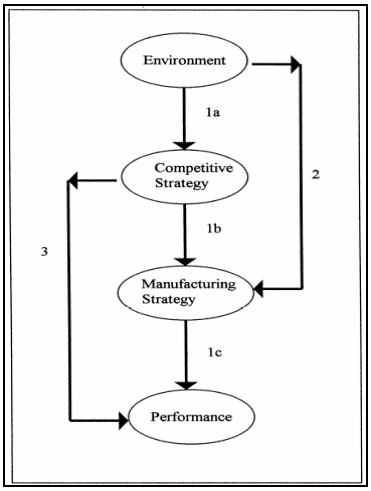

Figure 2-2: Conceptual framework of Ward and Duray (2000)

Their model suggests that environmental dynamism affects both competitive strategy and manufacturing strategy. Competitive strategy is presented to be in a mediating

relationship since it is affected by environmental dynamism and it affects manufacturing strategy. According to the model, there is a direct influence of competitive strategy to manufacturing strategy. Moreover, the relationship between environment, competitive strategy and manufacturing strategy is linked to performance. Model also suggests that direct links exist between competitive strategy and performance, and manufacturing strategy and performance.

The conceptual model is based on Skinner's seminal paper (1969) on manufacturing strategy. They say that there are other several studies in operations strategy literature such as Anderson *et al.* (1989) and Hill (1989) that incorporate environment but there has been a lack of empirical evidence on effects of environment. Authors argue that one of the reasons why their study is important is that it is a first in the area that incorporates connections between environment, competitive and manufacturing strategies and performance simultaneously with empirical evidence.

Authors use the data of a sample of 101 US manufacturers among 3 industries to estimate a path model using covariance structure analysis for the conceptual model presented for this study.

Significant paths they find from environment to differentiation and from competitive strategy variables to manufacturing strategy variables imply a causal relationship between environment and competitive strategy and between competitive strategy and

manufacturing strategy. Thus, their findings support that environmental dynamism affects competitive strategy choice; and competitive strategy influences the selection of an appropriate manufacturing strategy; and manufacturing strategy is related to performance. They did not find a significant path from environment to manufacturing competitive priorities at 0.10 level. Thus, their hypothesis that environmental factors directly influence manufacturing strategy among high performance manufacturers, is

not supported. Their high performer model that includes direct paths from each of the competitive strategy dimensions to business performance is not supported by data; there is no significant path from any of the competitive strategy dimension to business performance.

Overall, this research yields four crucial findings; long-standing conceptual arguments linking environment, competitive strategy, manufacturing strategy, and performance are empirically supported among high performance firms, this model does not fit firms that report relatively poor business performance, authors find no direct link between environmental dynamism and manufacturing strategy- this relationship is rather mediated by competitive strategy, the data do not support a direct relationship between competitive strategy and business performance. Their findings suggest that the relationship is mediated by manufacturing strategy. This last outcome of this study provides us the basis for inclusion of business strategy as a mediator between environment and manufacturing strategy choice.

Another study that is relevant in building our research is the study of Williams *et al*. This study is told to have two objectives: given the limited theory base in the area, authors attempt to develop a framework to explain the relationship between manufacturing strategy and business unit performance; and the framework is tested in a mature industry to come up with empirical support for those arguments.

Authors mention that to achieve sustainable competitive advantage in the marketplace, business unit must assemble resources that are valuable, relatively rare, imperfectly imitable, and not easily substitutable (Barney, 1991). These value generating strategies are conceptualized as the "dominant orientation" or "strategic posture" of the business unit. Authors refer to Wheelwright (1984) for his representation of the dominant orientation along two dimensions: market orientation and technology orientation. It is said that most organizations choose to employ both orientations within in varying degrees. Authors say that a business that is oriented according to market is characterized by a desire to be responsive to market demands, and this orientation is shown by different actions like variety of product offerings, diversity of materials used in the transformation process, product customization to meet customer demands, and flexible processes that can produce a diversity of quality products at low cost. An organization that is more technology oriented is said to be sensitive to dictates of technology rather than demands of the marketplace. It is argued that a firm's dominant orientation will surely affect the manufacturing

function through the establishment of strategies, policies and procedures used to support the achievement of organizational goals.

Authors assert that one possible way of effect of technology oriented posture of a business unit on manufacturing function is via the automation of planning and control activities like the ones in materials handling (Wheelwright, 1984).

Anderson *et al*.(1989) points out that technology has evolved past the point of being seen as just a way to reduce manufacturing costs and is now seen as a way to improve the effectiveness of organizational procedures. Level of sophistication of the quality assurance programs and capacity planning processes are also told to be affected by automation. Higher levels of automation allow the business units to make more frequent capacity changes. Authors refer to Milgrom and Roberts' (1990) finding that technologically advanced firms are associated with higher use of special purpose equipment, which is characterized by low setup, waste, and retooling costs.

As to manufacturing decisions that support a market orientation, authors state Noori's (1990) suggestion that higher levels of manufacturing flexibility are associated with increased market orientation of the firm. Richardson (1985) describes flexibility as the actions like volume changes, customer specifications and the ability to produce new products. It is believed that manufacturing flexibility can be achieved through higher levels of capacity slack, which is the amount of capacity in excess of expected

demand, and use of general purpose machines, which allows flexibility in the transformation process (Chase and Aquilano, 1992). Authors refer to Miles and Arnold (1991) as to their statement of the ability of manufacturing function to provide higher levels of product customization capabilities is an indicator of increased market orientation. It is also reminded by the authors that manufacturing can react to the complexity dictated by market place by increasing facility focus (Skinner, 1969), which can be based on geography, product group, process type, volume or stage of the product life cycle (Fine and Hax, 1985).

Authors' framework that relates manufacturing strategy, business strategy and business performance can be illustrated as:

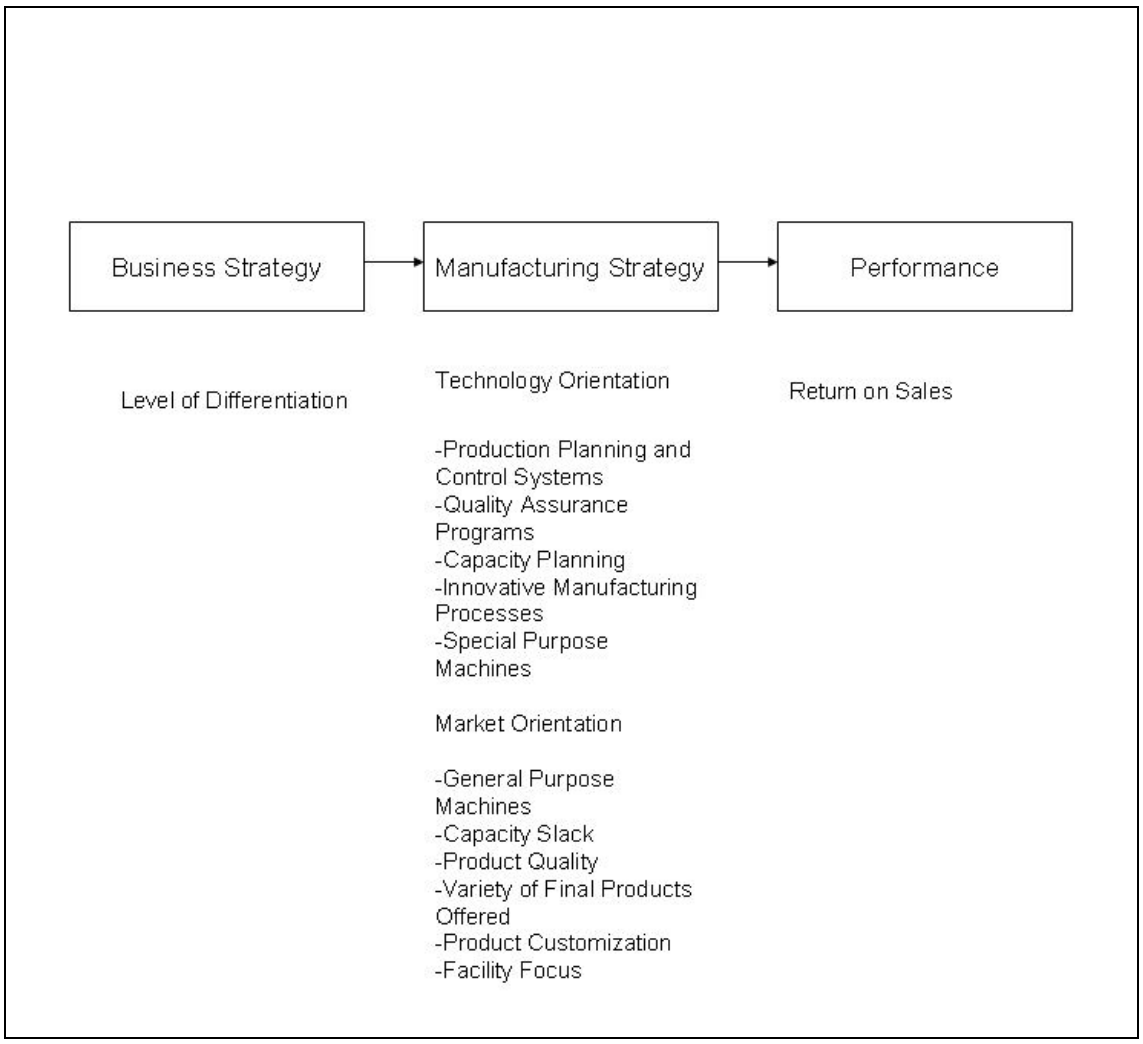

Figure 2-3: Williams *et al.*'s framework

It is argued that business strategy is operationalized in terms of level of differentiation because in a mature industry like textile industry, the underlying dimension that matters the most is differentiation according to literature. Thus, it is proposed that the ability to differentiate is the primary driver of competition and the primary focus of a business unit when developing strategy. Swamidass and Newell (1987) state that a significant correlation exists between manufacturing's contribution and the business

unit's dominant orientation as asserted before. Authors represent manufacturing's contribution to business unit's dominant orientation in two dimensions: Manufacturing's technology orientation and its market orientation.

This framework is tested on a sample of 85 firms in the broadwoven fabric industry (SIC 2211). It is reported that results show a significant relationship between business strategy and manufacturing strategy of the firm. They find another significant relationship between manufacturing strategy and performance of the firm. Specifically, manufacturing function's quality assurance process and its ability to deliver a quality product/service are found to be significantly correlated with firm performance. Models for this study are suggested as:

Model 1. Differentiation= f(Manufacturing's technology orientation)

Model 2. Differentiation= f(Manufacturing's market orientation)

Model 3. Return on Sales= f(Manufacturing's technology orientation)

Model 4. Return on Sales= f(Manufacturing's market orientation)

Their first model is related to the business strategy and manufacturing strategy link. They regress technology orientation variables on dependent variable, level of differentiation at the business level. Their overall model is found significant ($p=0.0001$) and hypothesis stating no relationship between differentiation and manufacturing unit's technology orientation is rejected. In other words, at least one predictor variable contributes information for the prediction of dependent variable.

Namely, innovative manufacturing processes variable is found to be significantly and positively correlated with level of differentiation.

As to their second model, six market orientation variables are regressed on level of differentiation at the business level and F-statistic turn out significant at p=0.0016. Therefore, hypothesis that relates differentiation and manufacturing's market orientation is also rejected and it is reported that capacity slack is significantly and inversely correlated with differentiation, variety of final product and product quality are significantly and positively correlated with differentiation.

When technology orientation is regressed against performance, resulting F-statistic is significant (p=0.001). Thus, their hypothesis that technology orientation and performance are not correlated is rejected. Quality assurance programs variable turns out significant for this regression (p=0.0001).

When market orientation is regressed against "Return on Sales", performance measure, the F-statistic is significant (p=0.02). Thus, their hypothesis that market orientation and performance are not correlated is also rejected. Product quality is the only variable that is significantly correlated with performance (at 0.05).

Authors conclude that business units will attempt to complement their business level strategy with manufacturing strategies in a competitive open market environment.

Findings of this study suggest that the most significant variables are related to quality for both market and technology orientations.

In another study, which is conducted by Li (2000), competence in marketing, product innovation, manufacturing, and human resource development across a list of 42 items have been analyzed for Chinese manufactures as the sources of competitiveness and performance. 72 companies are reported to respond for this study. The research instrument for this study is composed of questions regarding competitive priorities and performance.

Author uses least-squares technique to estimate the simple regression coefficient (b_i) in the equation for each performance factor:

Performance= b_{01}+ b_1X_1 (Marketing) + u_1

Performance= b_{02}+ b_2X_2 (Product Design and Development) + u_2

Performance= b_{03}+ b_3X_3 (Manufacturing) + u_3

Performance= b_{04}+ b_4X_4 (Human Resources) + u_4

Performance= b_{05}+ b_1X_1 (MKT) + b_2X_2 (PDD) + b_3X_3 (MFG) + b_4X_4 (HMN) + u_5, where u is the random disturbance term.

Hypothesis for this study are:

H_1: Marketing capability (X_1, MKT) positively relates to performance outcome

H_2: Product design and development capability (X_2, PDD) positively relates to performance outcomes

H_3: Manufacturing capability (X_3, MFG) positively relates to performance outcomes

H_4: Human resource capability (X_4, HMN) positively relates to performance outcomes

H_5: MKT, PDD, MFG and HMN jointly lead to performance outcomes

According to results of 16 single regression analyses, it is reported that emphasizing MKT will have a positive impact on all four performance measures at p= 0.05, PDD does not seem to be a strong predictor of performance, MFG has a strong correlation with most of the performance measures and lastly HMN is strongly correlated with all performance measures with less than p=0.05.

Multiple regression analyses indicate that emphasizing HMN is significantly correlated with all performance measures.

Another local study that is conducted to explore the manufacturing strategies vis-à-vis business environment is the one by Amoako-Gyampah (2003). This is rather a recent study compared to others. Our study is mostly similar to this particular study.

There are two main sets of variables, which are business environmental factors and manufacturing strategy choices, studied here. There are four business environmental factors used for this study; namely, business costs, labor availability, market hostility and dynamism, which are identified by Ward *et al*. (1995). The main focus of this research is that how the specific business environment in Ghana leads to the development of different manufacturing strategies. Several variables and hypotheses for this study are defined as follows:

- Business environment and flexibility: It is told that manufacturing flexibility refers to the ability to adapt quickly to changes in the environment. Author points out that two of the conditions that come with implementation of IMF/World Bank reforms are the liberalization of trade and the removal of price controls, which usually result in increase of imports.

Manufacturing firms have to adjust quickly and cost effectively to changing demands in the local market, technical requirements and even changes in the regulatory environment. Therefore, firms in Ghana are expected to include flexibility as one of their strategic options in order to respond to changes in the environment. Thus, first hypothesis for this study is that "the concerns that manufacturing managers have about the business environment will have a direct impact on the selection of flexibility as a component of manufacturing strategy".

- Business environment and quality: With the increased competition in Ghana, the emphasis placed on quality is also expected to increase and become an integral part of any manufacturing strategy. Author argues that one would expect companies to place increasing emphasis on defect reductions, improving supplier quality, and obtaining quality certifications that will enable them to sell their products both locally and abroad. Thus, second hypothesis is that "concerns about the business environment with regard to increased competition, rising costs, dynamic economic conditions will be associated with a decision to emphasize quality as part of a manufacturing strategy".

- Business environment and low cost: Author tells that production costs include the costs of materials, energy and labor. Following the implementation of IMF/World Bank reforms in Ghana, price controls were removed and a policy of floating currency was instituted. These programs are expected to effect business costs. Thus, author asserts that it is expected of manufacturing firms to develop strategies that allow them to minimize the impact of these programs on their production and other business costs. Third hypothesis is constructed as "concerns about rising business costs and other changes in the business environment will be positively associated with a firm's decision to emphasize a low cost strategy as part of its overall manufacturing strategy".

-Business environment and dependability: Author argues that, due to threats from imported goods and legislative changes due to increasing competition, it is expected of manufacturers to incorporate dependability into their strategies to build the customer loyalty. The next hypothesis is constructed as "concerns about increasing competition, legislative changes and other business environmental factors will be associated with a decision to emphasize dependability as part of manufacturing strategy".

Moreover, author's another aim is to investigate the extent to which firm size and degree of foreign ownership affect the relationships between manufacturing strategy choices and business environmental variables. Hypothesis about firm size is that "the effect that business environmental factors have on manufacturing strategy content will depend on the size of the firm", and the hypothesis about capital structure is that "the effect that business environmental factors have on manufacturing strategy content will depend on the degree of foreign ownership of the firm".

The questionnaire used for the Ghana study is the same as the one developed and validated by Ward *et al*. (1995). Badri *et al*. (2000) also use this questionnaire in their study. Author reports that the sample size for this research is 58.

The basic model to be tested here is that the types of manufacturing strategies that firms emphasize depend on the specific concerns that they have about the business

environment. In other words, manufacturing strategy content can be predicted from specific concerns about business environment. Thus, model is such that;

Flexibility (quality, low cost, dependability) = β_0 + β_1*competitive hostility + β_2*labor availability + β_3*business cost + β_4*dynamism +error.

The author introduces three other variables into the model (number of employees, fixed assets and capital structure) to investigate relationships between firm size, and the capital structure of the firm on manufacturing strategy variables. An example model is such that;

Flexibility = β_0 + β_1*competitive hostility + β_2*labor availability + β_3*business cost + β_4*dynamism + β_5*number of employees + β_6*fixed assets + β_7*capital structure +error

Another analysis includes interactions between the significant environmental variables in the first equation and the contingency variables with the goal of finding if the relationship between business environmental variables and manufacturing strategy choice is influenced by firm size and capital structure of the firm. An example of such an equation is as follows:

Flexibility = β_0 + β_1*competitive hostility + β_2*labor availability + β_3*business cost + β_4*dynamism + β_5*number of employees + β_6*fixed assets + β_7*capital structure + β_8*competitive hostility*number of employees + β_9*competitive hostility*fixed assets + β_{10}*competitive hostility*capital structure +error

Results for flexibility indicate that among all business environmental factors, competitive hostility is the only variable that has a significant effect on flexibility. Concerns about labor availability, business costs and environmental dynamism have no significant impact of the decision to include flexibility as part of manufacturing strategy for this data set. The regression coefficient for business cost has a negative value, even though it is not statistically significant. Author explains this situation with

the fact that firms are less likely to place an emphasis on flexibility when they are concerned about rising business costs. Including firm size and capital structure in the model is not reported to improve the ability to predict that flexibility will be included in manufacturing strategy if the business environmental factors are already considered. The effect of competitive hostility on flexibility is not found to depend on firm size or capital structure.

Results for quality yield that; competitive hostility is a significant predictor of quality before and after the addition of contingency variables, size and capital structure. Other environmental variables have no significant effect on the choice of quality as a

component of manufacturing strategy. Inclusion of firm size and capital structure improves the ability to explain the variation in the use of quality as a manufacturing strategy component. The interaction between competitive hostility and firm size as measured by the number of employees is slightly significant, the relationship between competitive hostility and quality is significantly more positive for larger firms than small firms.

Results for low cost point that both competitive hostility and business costs have significant effects on the degree of emphasis placed on cost as a manufacturing strategy component. Significant relationships still hold even after the inclusion of contingency variables.

Perceptions about labor availability and environmental dynamism have no significant effects. Inclusion of firm size and capital structure has no significant effect in the ability to predict the degree of emphasis placed on cost when controlling for business environmental factors. The effects of both business costs and competitive hostility are reported to be not dependent on the size of the firm or its capital structure.

Results for dependability give that labor availability and business costs have significant effects on delivery dependability. It is reported that interaction between capital structure and business cost is significant and negative, implying that joint venture firms are less likely to be concerned about business costs when deciding to

emphasize delivery dependability as part of manufacturing strategy. Effect of labor availability on delivery dependability is stronger for larger firms than for smaller firms that have fewer employees.

Overall, results of this study indicate that business environmental variables affect manufacturing strategy in an emerging economy just as in developed economies.

Finally, we discuss a taxonomy study. Miller and Roth's (1994) study describes the development and analysis of numerical taxonomy of manufacturing strategies. Taxonomy is developed with cluster analysis and it is based on the relative importance attached to 11 competitive capabilities.

These capabilities define the manufacturing task of 164 large American manufacturing business units. It is noted that although there is an industry effect, three observed manufacturing strategy types are found in various industries. The groups are told to differ from each other with the ability of the firms in them to differentiate themselves form competition with their products and services, and the scope of their product lines and markets.

This study has two purposes; one is "to identify strategic groups of manufacturers with similar manufacturing tasks- with similar sets of competitive capabilities, and the other one is to explore the central theme in the manufacturing strategy literature

by determining and comparing how members of manufacturing strategy groups typically define their business strategies, manufacturing choices, and performance measures".

Sample used for this study is obtained from 1987 Manufacturing Futures Project (MFP) Survey (Miller and Roth 1988). Sample size is 188 for this study. Their questionnaire focuses on four broad categories; profile of the company or business unit, competitive capabilities the respondents planned to pursue- manufacturing task, performance measures employed in manufacturing, business unit and overall company, and the pattern of choices in the manufacturing strategy. Eleven competitive capabilities, the taxons used here, are;

Competitive capability	Defined as
Low Price	The capability to compete on price
Design Flexibility	The capacity to make rapid design changes and/or introduce new products quickly
Volume Flexibility	The capability to respond to swings in volume
Conformance	The capability to offer consistent quality
Performance	The capability to provide high performance products
Speed	The capability to deliver products quickly
Dependability	The capability to deliver on time (as promised)
After Sale Service	The capability to provide after sale service
Advertising	The capability to advertise and promote the product
Broad Distribution	The capability to distribute the product broadly
Broad Line	The capability to deliver a broad product line

Figure 2-4: Taxons used by Miller and Roth (1994)

Interpretation of three manufacturing strategic groups found as a result of cluster analysis are predicted on a) whether there are significant differences on the cluster means of the competitive capability variables at the 0.05 level or less, and b) the relative ranking of the importance of a competitive capability within a cluster. The clusters determined by the authors are:

1) Caretakers, who place relatively low emphasis on the development of competitive capabilities that prepare them for minimum standards for competition. Price is not reported as a significantly different factor among the groups. However, depending upon its relative rank, it seems to be the dominant competitive capability for caretakers.
2) Marketeers aim to obtain broad distribution, to offer broad product lines and to be responsive to changing volume requirements. Authors point out that these are several key market oriented competitive capabilities. Top ranked priorities within this cluster are conformance quality, dependable deliveries, and product performance.
3) Innovators place relative emphasis on their ability to make changes in design and introduce new products quickly. Conformance and performance quality ranked high for innovators like marketeers. Dependability is also an important factor to the innovators.

We defer the discussion in detail of the similarities and dissimilarities between our study and the existing literature to the following chapters.

In Turkey, we can say that there is limited number of studies conducted in manufacturing strategy area. One example for studies on manufacturing strategy in Turkey is on the relationship between manufacturing strategy, competitive strategy and performance conducted with the use of the data from the firms in Gaziantep. This

is the doctoral dissertation of Mehmet Aytekin (2003). In this study, environmental variables; namely, market dynamism, scanning intensity, market attractiveness, and competitive intensity; competitive strategies (cost leadership and differentiation), manufacturing strategies (quality, cost, flexibility and delivery); and corporate performance are used as variables of analysis. The main concern of this study is to find the strategy that leads to high performance with given business environmental conditions. In contrast, we are interested in finding the relationship between environment; which is composed of Business Cost, Labor Availability, Competitive Hostility, Governmental Regulations, Dynamism (Volume/Price) and Dynamism (Obsolescence); competitive strategies (Cost Leadership, Differentiation based on Market Orientation and Differentiation based on Technology Orientation) and manufacturing strategies (Low Price, Quality, Flexibility, Delivery, After Sales and Broad Line). As indicated, our variables for environment and strategies differ from the ones that were used for this dissertation. We are also not dealing with the effects of those strategy choices on performance. Moreover, we are trying to come up with comparisons with the other studies that use similar variables with us and that were carried out in other countries. Lastly, we have chosen the respondents of our research questionnaire from all over the country and also compared the results with the results of the same questionnaire that was conducted 4 years ago in Ankara. The doctoral thesis mentioned above targets the manufacturing firms in Gaziantep.

Another study that aims at exploring the manufacturing strategies of Turkish machine manufacturing industry is the master's thesis of Demet Teker (2002).This study concerns about the "identification of key structural features of machine manufacturing industry in Turkey that determine the strength of the competitive forces and profitability in this industry". This study focuses on one industry and it basically groups the firms in the sample and analyzes the clusters found according to competitive priorities and performance objectives. Differences between groups are identified and different strategies that groups of firms employed to meet the performance objectives are shown.

Another manufacturing strategy study carried out in Turkey is Ulusoy and İkiz's (2001) study. They studied the firms in Turkey as to their position with respect to the best practice, as leaders or laggers. The performance differences between leaders and laggers are identified and industrial comparisons are made regarding best manufacturing practice implementations of the groups.

CHAPTER 3

METHODOLOGY AND THE DATA

In this chapter, we introduce our overall research questions; formulate the regression models to test those; discuss the survey instrument in detail comparing and contrasting it with the existing literature; and, finally explain the data collection.

3.1 Research Questions:

Based on the previous studies in the literature, we are interested in testing whether environmental variables have an impact on strategy selection of both levels of a business, namely competitive strategy and manufacturing strategy, and whether the competitive strategy of a firm affects the manufacturing strategy choice of the manufacturing function.

Illustration of our conceptual model is as follows:

Figure 3-1: Conceptual model

3.1.1 Variables in the Model

We use the following variables to measure business environment, competitive strategy and manufacturing strategy.

3.1.1.1 Business Environment Variables:

Business Cost, Labor Availability, Competitive Hostility, Governmental Regulations, Dynamism (Volume/ Price) and Dynamism (Obsolescence) are the variables that we use to assess the degree of concern of the manufacturing firms on business environment. We will be elaborating on the items we used to measure each item in the following sections. We use 7-point Likert scale for this group of questions, 1 indicating “Very unimportant” and 7 indicating “Very important”.

3.1.1.2 Competitive Strategy Variables:

Business level strategies are called competitive strategies of the firm. We depend on Porter's Cost Leadership and Differentiation strategies for this level of strategies. However, we are dividing Differentiation into two parts, namely, Differentiation with technology orientation and Differentiation with market orientation. Details of the items used to measure these variables will be provided later. We use 7 point Likert scale to learn the importance of the given competitive methods in meeting business strategy, 1 indicating "No importance" and 7 indicating "Absolutely critical".

3.1.1.3 Manufacturing Strategy Variables:

Manufacturing strategy variables we employed for this study are: Low Price, Quality, Delivery, Flexibility, After Sales and Broad Line. The items to measure these variables and the sources, where those items are adopted from, are elaborated more in the "Survey Instrument" section. Again, we use 7 point Likert scale to measure this set of variables.

Respondents indicated the degree of emphasis which company plans to place on the indicators of variables with 1 standing for "No emphasis" and 7 standing for "Extreme emphasis".

Thus, our extended model can be visualized as:

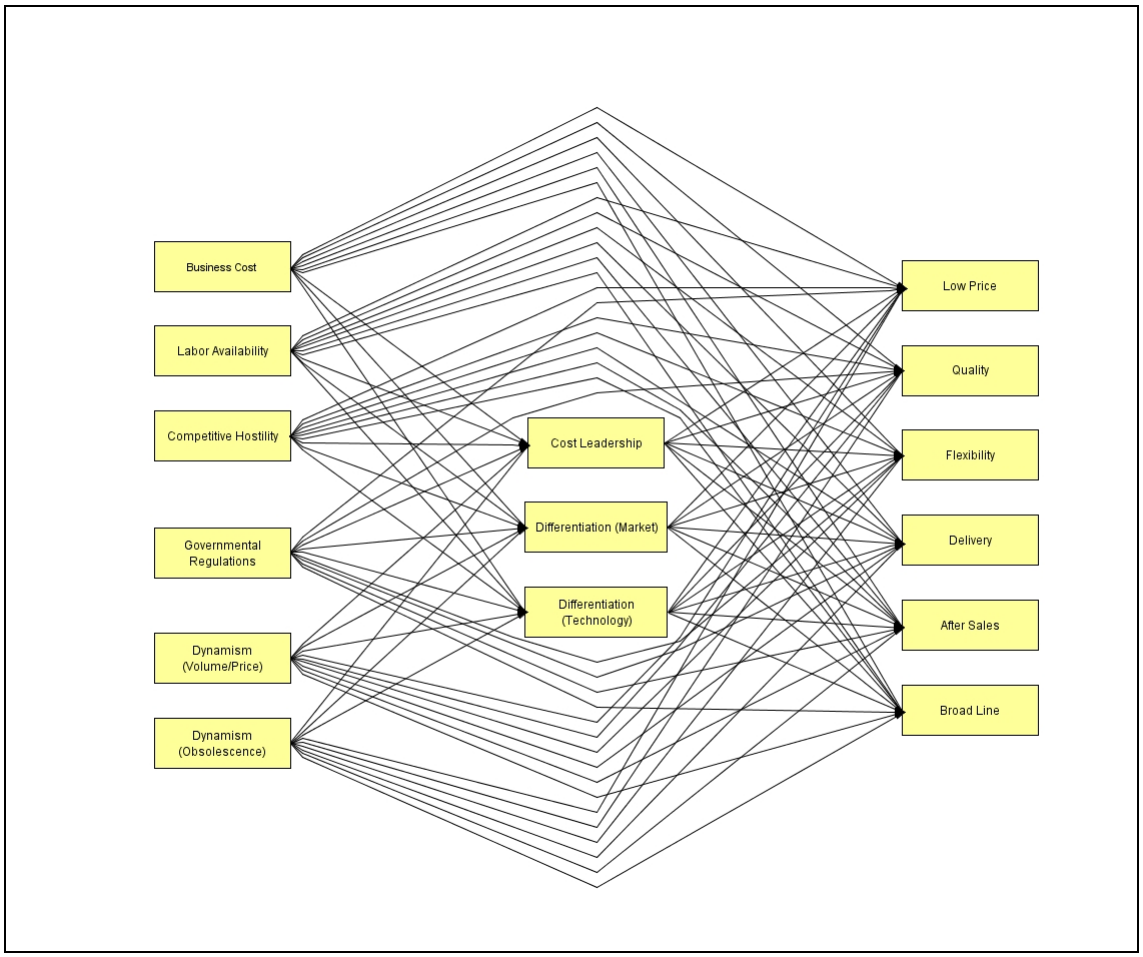

Figure 3-2: Extended conceptual model

3.1.2 The Model

We model the presumed relationships through linear regression models. Accordingly, we have three sub-models and for each sub-model we have the generic regression equation for each variable of interest. Reader should note that for notational

convenience, we use β_i (where i= 1,2,3…) to refer to regression coefficients for every independent variable included in the regression equation. Likewise, we use β_0 for denoting the constant term. Moreover, the following notations will stand for the indicated variables:

Business Environment variables:

BC= Business Cost

LA= Labor Availability

CH= Competitive Hostility

GR= Governmental Regulations

DVP= Dynamism (Volume/ Price)

DO= Dynamism (Obsolescence)

Competitive Strategy variables:

CL= Cost Leadership

MD= Differentiation on the basis of market

TD= Differentiation on the basis of technology

Manufacturing Strategy variables:

LP= Low Price

Q= Quality

F= Flexibility

D= Delivery

A= After Sales

B= Broad Line

Given the variables we are interested, our model can be written as:

3.1.2.1 Sub-model 1:

a. $LP= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on Low Price strategy of the manufacturing function of a firm depends on the concerns about the business environment.

b. $Q= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on Quality strategy of the manufacturing function of a firm depends on the concerns about the business environment.

c. $F= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on Flexibility strategy of the manufacturing function of a firm depends on

the concerns about the business environment.

d. $D= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on Delivery strategy of the manufacturing function of a firm depends on the concerns about the business environment.

e. $A= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on After Sales strategy of the manufacturing function of a firm depends on the concerns about the business environment.

f. $B= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Emphasis on Broad Line strategy of the manufacturing function of a firm depends on the concerns about the business environment.

3.1.2.2 Sub-model 2:

a. $CL= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Ratings on the importance of Cost Leadership as a competitive strategy of business depend on the concerns about the business environment.

b. $MD= \beta_0 + \beta_1*BC + \beta_2*LA + \beta_3*CH + \beta_4*GR + \beta_5*DVP + \beta_6*DO + error$

Ratings on the importance of Differentiation (Market) as a competitive strategy of

business depend on the concerns about the business environment.

c. $TD = \beta_0 + \beta_1 * BC + \beta_2 * LA + \beta_3 * CH + \beta_4 * GR + \beta_5 * DVP + \beta_6 * DO + error$

Ratings on the importance of Differentiation (Technology) as a competitive strategy of business depend on the concerns about the business environment.

3.1.2.3 Sub-model 3:

a. $LP = \beta_0 + \beta_1 * CL + \beta_2 * MD + \beta_3 * TD + error$

Emphasis on Low Price strategy of the manufacturing function of a firm depends on the ratings on the importance of competitive strategies.

b. $Q = \beta_0 + \beta_1 * CL + \beta_2 * MD + \beta_3 * TD + error$

Emphasis on Quality strategy of the manufacturing function of a firm depends on the ratings on the importance of competitive strategies.

c. $F = \beta_0 + \beta_1 * CL + \beta_2 * MD + \beta_3 * TD + error$

Emphasis on Flexibility strategy of the manufacturing function of a firm depends on the ratings on the importance of competitive strategies.

d. $D = \beta_0 + \beta_1 * CL + \beta_2 * MD + \beta_3 * TD + error$

Emphasis on Delivery strategy of the manufacturing function of a firm depends on

the ratings on the importance of competitive strategies.

e. $A= \beta_0 + \beta_1*CL + \beta_2*MD + \beta_3*TD + error$

Emphasis on After Sales strategy of the manufacturing function of a firm depends on the ratings on the importance of competitive strategies.

f. $B= \beta_0 + \beta_1*CL + \beta_2*MD + \beta_3*TD + error$

Emphasis on Broad Line strategy of the manufacturing function of a firm depends on the ratings on the importance of competitive strategies.

For all of our hypotheses, the generic form of null and alternative hypotheses is:

H0: $\beta_1= \beta_2= \beta_3=\ldots= \beta_i = 0$, where i is the number of independent variables

H1: Otherwise

If one of the beta coefficients of the independent variables appears to be significant in the regression equations that test for environment-strategy relationships, we reject the null hypothesis and conclude that there is a causal relationship between the variables tested.

3.2 Survey Instrument

We have established the manufacturing strategy survey as a synthesis of several surveys previously conducted. The structure of the survey has been developed in a graduate manufacturing strategy course in class discussions. Most of the questions are from the previous studies and measures of the variables are valid for this type of a study.

The survey was translated to Turkish and offered to the respondents in both English and Turkish versions. Respondents that requested the survey via facsimile and via posting service preferred Turkish versions, Internet version had the option to switch to the other language at any point the respondent wants.

Thus, we do not have a mechanism to check the language that group of respondents preferred. Screenshots of the webpage of our survey are included in the Appendix.

We will be using the following notation for the studies that we adopted the indicators for our variables from: Li (2000): LI, Ward and Duray (2000): WD, Ward *et al*. (1995): WA, Williams *et al*. (1995): W, Amoako-Gyampah (2003): G, Badri *et al*. (2000): B, Miller and Roth (1994): MR, Our Study: A

We asked about the performance and profile of the respondents. We did not measure performance quantitatively, because the respondents were very reluctant to release information that they deemed confidential, and performance related questions were no exception. Comparison of our measures with the literature is given below.

Performance measures are:

	LI	WD	WA	W	G	B	MR	A
Sales Volume	✓							✓
Market Share	✓	✓					✓	✓
Profit before tax			✓					✓
Return on investments	✓		✓ *					✓
Growth Rates							✓	✓
Number of employees	✓	✓	✓		✓	✓	✓	✓

* Return on sales is used in this study

"Business Cost" as a business environmental variable was measured with the following items that were adopted from the indicated studies:

	LI	WD	WA	W	G	B	MR	A
Rising labor cost			✓		✓	✓		✓
Rising material cost			✓		✓	✓		✓
Rising transport cost			✓		✓	✓		✓
Rising telecommunication cost			✓		✓	✓		✓
Rising utilities cost			✓		✓	✓		✓
Rising rental cost			✓		✓	✓		✓
Rising cost of capital								✓
Rising health care cost			✓		✓	✓		✓
Weak Turkish Lira			✓ *		✓ **	✓ ***		✓

* Strong Singapore Dollar is used
** Weak Cedi value is used
*** Strength (or weakness) of the Dirham is used

"Labor Availability", which is another business environmental variable, was measured with:

	LI	WD	WA	W	G	B	MR	A
Shortage of managerial and administrative staff			✓		✓	✓		✓
Shortage of technicians			✓		✓	✓		✓
Shortage of clerical and related workers			✓		✓	✓		✓
Shortage of skilled workers			✓		✓	✓		✓
Inability to operate second/third shift			✓		✓	✓ *		✓

* "Government regulations regarding length of each shift" is asked instead of this

"Competitive Hostility" is measured through:

	LI	WD	WA	W	G	B	MR	A
Keen competition in local markets			✓		✓	✓		✓
Keen competition in foreign markets			✓		✓	✓		✓
Low profit margins			✓		✓	✓		✓
Declining demand in local market			✓		✓	✓		✓
Declining demand in foreign market			✓		✓	✓		✓
Producing to the required quality standards			✓		✓	✓		✓
Unreliable vendor quality			✓		✓	✓		✓
Unreliable vendor delivery								✓
Broad product portfolio of competitors								✓
Threat of imports primarily due to superior quality								✓
Threat of imports primarily due to low cost								✓

"Governmental Regulations" is another variable employed in our study. Badri *et al*. (2000) also uses an environmental variable of "Governmental Laws and Regulations", but indicators for this variable are different in that study. We measured that item with the following indicators:

	LI	WD	WA	W	G	B	MR	A
Existence of special taxes								✓
Existence of import/export tariffs and quotas								✓
Existence of subsidies								✓
Existence of anti-pollution regulations								✓
Existence of recycling regulations								✓

"Dynamism (Volume/Price)" is one dimension of environmental dynamism we measured as a predictor variable of strategy.

	LI	WD	WA	W	G	B	MR	A
Frequency of price discounts								✓
Depth of price discounts								✓
Volume volatility / swings								✓
Frequency of cancellation of orders								✓
Frequency of order quantity changes								✓

"Dynamism (Obsolescence)" is another dimension of dynamism aspect of the environment. We used the following items to measure this variable:

	LI	WD	WA	W	G	B	MR	A
Rate at which products and services become outdated		✓	✓		✓	✓		✓
Rate of innovation of new products and services		✓	✓		✓	✓		✓
Rate of innovation of new operation processes		✓	✓		✓	✓		✓
Rate of change in taste and preferences of customers in your industry		✓	✓		✓	✓		✓

Business level competitive strategies are adopted from Ward and Duray's (2000) and Williams *et al.*'s (1995) studies. Ward and Duray (2000) use Price and Differentiation, or alternatively called Price Differentiation and Marketing Differentiation, as competitive strategies of a manufacturing firm. This categorization is dependent on the framework of Porter's (1980) generic strategies. However, we operationalized Differentiation under two dimensions: Market Orientation and Technology Orientation. A firm might employ both orientations with varying degrees. Dominant orientation of the firm determines the manufacturing function's mission to assist in achieving organizational goals (Williams *et al*. 1995). Thus, a manufacturing firm can differentiate on the basis of Market or Technology. We tried to get to the dominant orientation of differentiation of the business unit with the

manufacturing strategy variables associated with those two orientations. Technology orientation is measured with:

	LI	WD	WA	W	G	B	MR	A
Complexity of production planning techniques				✓				✓
Level of manual quality assurance process sophistication				✓				✓
Level of computerized quality assurance process sophistication				✓				✓
Frequency of capacity changes				✓				✓
Level of emphasis on innovative manufacturing processes				✓				✓
Level of emphasis on special purpose machines				✓				✓

Market orientation of a firm as a differentiation strategy is measured with:

	LI	WD	WA	W	G	B	MR	A
Level of emphasis on general purpose equipment				✓				✓
Level of capacity slack				✓				✓
Level of emphasis on outgoing quality								✓
Level of emphasis on superior product performance and reliability				✓				✓
Variety of final product				✓				✓
Level of product customization				✓				✓
Level of facility focus (sales region)				✓ *				✓
Level of facility focus (on process type)				✓ *				✓
Level of facility focus (on product group)				✓ *				✓
Level of emphasis on wide distribution channels								✓
Level of emphasis on high finished goods inventory levels								✓
Level of emphasis on developing new products and services								✓
Innovation in marketing techniques and methods								✓
New product introduction by licensing								✓

* Instead of three separate indicators "Level of facility focus" is used

We used the following Cost Leadership indicators to measure that variable:

	LI	WD	WA	W	G	B	MR	A
Operating efficiency		✓						✓
Competitive pricing		✓						✓
Procurement of raw materials at low price		✓						✓
Reducing product costs		✓						✓
Minimize outside financing		✓						✓
Decreasing the number of product features		✓						✓
Procurement of raw materials at low cost								✓
Vendor selection based on quality								✓
Standardize number of parts used for manufacturing								✓

Manufacturing strategies that are common in the literature are Low Price, Quality, Flexibility and Delivery. We adopted two more manufacturing strategies from Miller and Roth (1994); After Sales and Broad Line.

We measured Low Price strategy of a manufacturing firm with:

	LI	WD	WA	W	G	B	MR	A
Reduce unit costs		✓ *	✓		✓	✓		✓
Reduce material costs		✓ *	✓		✓	✓		✓
Reduce overhead costs		✓ *	✓		✓	✓		✓
Reduce unit direct labor cost		✓ *						✓
Reduce product mix to decrease costs								✓
Emphasis on economies of scale to reduce costs								✓
Select vendors on the basis of cost								✓
Develop new processes for new products to decrease costs								✓
Develop new processes for old products to decrease costs								✓
Increase material productivity								✓
Increase capacity utilization		✓						✓
Increase labor productivity through automation								✓
Reduce finished goods inventory level		✓ **	✓ **		✓ **	✓ **		✓
Reduce WIP level		✓ **	✓ **		✓ **	✓ **		✓
Reduce raw materials inventory level		✓ **	✓ **		✓ **	✓ **		✓
Use CAD/CAM to decrease costs								✓
Manufacturing parts in-house								✓

Low Price strategy indicators (continued)

	LI	WD	WA	W	G	B	MR	A
Increase labor productivity through empowerment of workers								✓
Increase the commonality of parts/components used								✓
Choose production site to reduce business costs								✓
Decrease number of product features								✓

* "Reduce production costs" used instead ** "Reduce inventory level" used instead

Quality as a manufacturing strategy was measured through:

	LI	WD	WA	W	G	B	MR	A
Reduce defective rates			✓		✓	✓		✓
Improve vendors' quality			✓		✓	✓		✓
Implement quality control circles			✓		✓			✓
Obtain ISO 000 series certification			✓		✓	✓ *		✓
Obtain local certificates of quality						✓		
Implement quality control training programs						✓		
Improve product performance and reliability			✓		✓	✓		✓
Use statistical process control		✓						✓
Use real-time process control systems		✓						✓
Develop new processes for new products to increase quality		✓						✓
Develop new processes for old products to increase quality		✓						✓
Update process equipment		✓						✓
Reduce number of vendors to improve quality								✓
Reduce product mix to reduce defect rates								✓
Increase in-house technical expertise level								✓
Use CAD/CAM to improve quality levels								✓
Substitute automation for labor to improve quality								✓

* "Obtain international quality certifications (i.e. ISO 9000)" is used instead

Another competitive priority, Flexibility, was measured with the following:

	LI	WD	WA	W	G	B	MR	A
Reduce manufacturing lead-time		✓	✓		✓	✓		✓
Reduce procurement lead-time			✓		✓	✓		✓
Reduce setup/changeover time		✓	✓		✓	✓		✓
Ability to reschedule the production								✓
Reduce number of engineering change orders								✓
Improve CAD/CAM capability to increase flexibility								✓
Improve vendor flexibility								✓
Reduce new product introduction lead-time								✓
Reduce new product development lead-time			✓		✓	✓		✓
Developing new processes for new products to increase flexibility								✓
Developing new processes for old products to increase flexibility								✓
Standardize parts used to increase flexibility								✓
Improve ability to change priorities of jobs on the shop floor		✓						✓
Improve ability to change assignments of jobs on the shop floor		✓						✓
Improve ability to handle design modifications								✓
Reduce response time to increase production volume								✓

Delivery was measured with the following items:

	LI	WD	WA	W	G	B	MR	A
Provide fast deliveries		✓			✓			✓
Meet delivery promises		✓			✓			✓
Increase delivery reliability to distributors			✓ *		✓ *	✓ *		✓
Increase delivery reliability to end-user customers					✓ *	✓ *		✓
Increase delivery speed to distributors			✓ **		✓ **	✓ **		✓
Increase delivery speed to end-user customers					✓ **	✓ **		✓
Improve presale service and technical support						✓		
Improve technical assistance of services to customers						✓		
Improve after sale service						✓		
Reduce product mix to increase delivery performance								✓
Tailor delivery options for customer needs								✓
Improve delivery performance through finished goods inventory								✓
Improve delivery performance through reduced manufacturing lead time								✓

* "Increase delivery reliability" is used instead of two separate indicators for these studies
** "Increase delivery speed" is used instead of two separate indicators for these studies

Amoako-Gyampah (2003) and Ward *et al*. (1995) both use improving after sales service as an indicator of Delivery competence. We rather separated it and employed as an independent competitive priority. After Sales priority was measured with the following items in our survey:

	LI	WD	WA	W	G	B	MR	A
Reduce customer complaints								✓
Reduce repair/refund time								✓
Wide geographical coverage of repair service								✓
Reduce response time to customers								✓
Increase warranty period on products								✓
Improve joint design capability								✓
Inform customer about the use of the product								✓

Moreover, we had another less common competitive priority, Broad Line, in our manufacturing strategy section. This competitive priority was measured by:

	LI	WD	WA	W	G	B	MR	A
Increase product customization								✓
Increase number of product features								✓
Increase number of products produced regularly								✓

The survey also included questions on infrastructure development and future improvement programs. These questions were taken from the previous studies, as well (Li, 2000). Infrastructure development programs are:

	LI	WD	WA	W	G	B	MR	A
Improve employee's responsibility	✓							✓
Improve employee's quality control responsibility	✓							✓
Improve employee's task flexibility	✓							✓
Increase professional training for managers	✓							✓
Increase job training for workers	✓							✓
Increase employee's autonomy in performing their jobs	✓							✓
Enhance employee-management relationship	✓							✓
Improve labor relationships	✓							✓
Establish compensation and recognition systems based on performance	✓							✓
Establish manual of production procedures and work rules	✓							✓

Future improvement programs we chose to ask in our questionnaire are:

	LI	WD	WA	W	G	B	MR	A
Manufacturing lead time reduction							✓	✓
Improve vendor selection program								✓
New process/New product							✓	✓
Zero defects							✓	✓
Computer Aided Manufacturing/Computer Aided Design (CAM/CAD)							✓	✓
Statistical Process Control							✓	✓
Obtain ISO 9004 certificate								✓
Obtain ISO 14000 certificate								✓
Emphasis on recyclable raw materials								✓
Obtain national quality award								✓
Reducing workforce size							✓	✓
Close plants							✓	✓
SPC for process							✓	✓
SPC for product							✓	✓

3.3 The Data and Their Collection:

Respondent candidate firms were chosen on the basis of the list of the 500 largest manufacturing firms that Istanbul Chamber of Industry publishes every year (ISO500

list). We used the list of 2003. In the first phase, firms were contacted by telephone and the person who was in charge of manufacturing operations was asked on the phone. At first, no specific title was pronounced deliberately because in every firm the person who is responsible for the manufacturing operations might have different titles. Thus, a generic definition instead of name of the position was preferred. As the firms returned to us, we saw that in general, the person that filled in the questionnaire was production manager, facility manager, deputy general manager, quality planning manager, production director or chief of strategic planning *etc*. On the phone, the nature and aim of the research study was told briefly and it was asked whether the particular firm was willing to answer the questionnaire. If the candidate respondents were affirmative, the medium, which they wanted to get and fill in the survey, was asked. There were three possible ways: from the Internet, via regular post and via facsimile. Since all three ways were self-administered, there was no difference between the data collection methods. Respondents were not influenced by another person; they answered the questions as they perceived them. However, they were made sure that they could ask anything they want or they feel ambiguous about regarding the questionnaire. There were a total of 327 firms that wanted to participate in the survey. 211 of the manufacturers wanted to fill it from the Internet, 50 of them wanted facsimiles and 66 of them wanted to have it via posting service. 4 filled in surveys were faxed back yielding a response rate of 8%, 8 filled in surveys were posted back yielding a response rate of 12% for the posting method and 46 respondents filled the questionnaire from the Internet with a response rate of 21%.

Thus, our sample consists of 58 manufacturing firms in Turkey. Overall response rate equaled 17.7%. Highest response rate of Internet based survey is due to our opportunity to probe the Internet users with several reminder e-mails. Other firms were also contacted via telephone but it was very convenient and useful to send e-mails to remind them about the questionnaire. The profile of the manufacturers according to International Standard Industrial Classification is stated below: (http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=2)

Industry Type	Number of Firms
D-27 Basic metals	10
D-17 Textiles	9
D-34 Motor vehicles, trailers and semi-trailers	8
D-15 Food products and beverages	6
D-24 Chemicals and chemical products	5
D-26 Other non-metallic mineral products	5
D-25 Rubber and plastics products	3
D- 36 Furniture; manufacturing n.e.c.	3
D- 21 Paper and paper products	3
D- 16 Tobacco products	1
D- 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1
D-31 Electrical machinery and apparatus n.e.c.	1
D-35 Other transport equipment	1
D-32 Radio, television and communication equipment and apparatus	1
E-402 Gas; distribution of gaseous fuels through mains	1
Total	58

Profiled according to number of employees, we have:

Number of Employees	Frequency
Less than 50	1
50-99	2
100-199	6
200-499	11
500-1000	20
More than 1000	17

Note that one firm did not give the information regarding the number of employees. Average of number of employees of the respondent firms is 930. We can say that the respondent firms can be considered as large firms according to number of employees.

The diversity of the industries that are included in the study might raise the question of industry specific factors and their effects on the responses of the companies from differing industries. It is obvious that limiting the study to a single industry can prevent problem of industry effects. However, this also causes the lack of generalizability (Ward *et al*., 1995). There are examples of both types of studies present in the literature. Given the reluctance and poor response rates of the firms, limitation of industry types would not be efficient along with our aim to see the general picture of manufacturing firms operating in Turkey vis-à-vis business environmental factors. Thus, we followed the prior works of Ward *et al*. (1995), Li (2000) and Amoako-Gyampah (2003), and did not limit our respondents to be members of specific industries.

CHAPTER 4

ANALYSIS

In this chapter, we discuss the reliability of the scales used in this study, provide the descriptive statistics of the survey responses, and present the results on the regression study.

4.1 Validity and Reliability of the Scales

In this section, we discuss the validity and reliability of our survey instrument. We are using summated scales in our study to come up with a composite measure for the variables of interest. We have used the theoretical background regarding our study to find the measures for the concepts that we are after. Since the individual items are taken from previous studies and pretests with few exceptions, we have the content

validity of our questions. Moreover, we have adopted the framework indicating the relationships between business environment, business strategy and manufacturing strategy from the previous studies carried out in the field. In the literature review section, these studies are told in detail. Thus, the framework we depend has theoretical validity.

Reliability, which is a measure of degree of consistency between the indicators of a summated scale, assures that the same construct is measured by the individual items.

In order to measure the reliabilities of the scales, we employed inter item analysis by using Cronbach's coefficient alpha, which is a widely used measure in similar studies to assess reliability. It basically evaluates the consistency of the indicators in measuring the same construct, with the following formula:

$\alpha = \frac{N \times \bar{r}}{1 + (N-1) \times \bar{r}}$, where N is the number of items and $\bar{r}$ is the average inter-item correlation among the items. (http://www.ats.ucla.edu/stat/spss/faq/alpha.html)

Generally accepted lower limit for this measure is 0.7. However, it is also possible to use an item that has an alpha of 0.6 for exploratory research (Hair *et al.*, 1998). Cronbach's coefficient alpha results for this study are shown below:

Variable	Cronbach's Coefficient Alpha
Business Cost	0.789
Labor Availability	0.784
Competitive Hostility	0.810
Governmental Regulations	0.847
Dynamism (Volume/Price)	0.799
Dynamism (Obsolescence)	0.809
Cost Leadership	0.671
Technology Orientation	0.705
Market Orientation	0.862
Low Price	0.878
Quality	0.898
Flexibility	0.948
Delivery	0.824
After sales	0.765
Broad line	0.843

Table 4-1: Cronbach's coefficient alpha scores for variables

As these scores are higher than 0.6, we can say that our scales for the variables we use are reliable for our exploratory study.

4.2 Descriptive Statistics

In this section, we provide the descriptive statistics of the survey responses.

4.2.1 Business Performance

Total number of respondents for our survey is 58, as mentioned before. The business performance of the firms can be summarized as:

CORPORATE OBJECTIVES	MEAN	STANDARD DEVIATION	INCREASED	STAYED THE SAME	DECREASED
Sales Volume	2.51	0.80	39	7	11
Market Share	2.54	0.73	34	15	8
Profit before tax	2.87	0.91	25	9	18
Return on investments	2.75	0.85	27	12	14
Growth Rates	2.66	0.79	30	15	11
Number of employees	2.77	0.91	31	8	18

Table 4-2: Summary of responses for business performance measures

It is meaningful to use the number of firms that report listed performance measures as "increased", "stayed the same" or "decreased" respectively rather than the mean values for those measures since 2,3 and 4 are used as categorical choices for increase, same and decrease. Mean scores only show the tendency of the measures towards an overall performance of the respondents. For instance, mean value of 2.508 that is between an increase (categorical variable-2) and having the same (categorical variable- 3) sales volume.

The number of respondents that report their sales volume to have increased is 39, whereas the number of firms that indicate their sales volume performance to have stayed the same and the number of firms that indicate their sales volume performance to have decreased are 7 and 11, respectively. When it comes to the market share

measure, increased market shares are reported by 34 firms, same market shares are reported by 15 firms and decreased market shares are reported by 8 firms. Profit before tax seems to be the most "stayed the same" item if we check the mean value but the individual numbers for each performance state of business indicate that there are almost as many increased PBT firms as decreased PBT firms. Most companies have increased return on investments and increased growth rates. Most firms also report increased number of employees. However, we can see that the number of firms that report decreased number of employees is not small. This can be an indicator of increased labor productivity. The total number of firms for each particular performance measure item does not sum to 58 because some firms chose not to answer the relevant questions.

During the follow up telephone conversations, candidate respondents said that they were sensitive about the information regarding measures on performance and some of them actually chose not to answer those types of questions. Overall, we can say that we have a high performer respondent profile according to the responses to the "How did the company perform this year when compared with last year?" question.

4.2.2 Business Environment

When we analyze business environmental variables, we get the following mean scores for the indicators of each variable:

Business Cost	Mean
Rising labor cost	5.50
Rising material cost	5.95
Rising transport cost	4.90
Rising telecommunication cost	3.25
Rising utilities cost	5.09
Rising rental cost	2.58
Rising cost of capital	4.93
Rising health care cost	2.91
Weak Turkish Lira	5.88

Table 4-3: Mean scores of responses in Business Costs section

Rising material cost is the most important concern for Turkish manufacturers. Following rising material cost, there come weak Turkish Lira and rising labor cost. Minimum importance is given to rising rental cost and rising health care cost by the respondents. Overall mean of this section is found to be 4.55.

Labor Availability	Mean
Shortage of managerial and administrative staff	3.28
Shortage of technicians	4.41
Shortage of clerical and related workers	2.82
Shortage of skilled workers	4.59
Inability to operate second/third shift	3.81

Table 4-4: Mean scores of responses in Labor Availability section

In this category, the most important concern for the respondents is the shortage of

skilled workers and shortage of technicians. However, shortage of clerical and related workers is the least important aspect regarding labor availability. It is an interesting observation that shortage of managerial and administrative staff is less important than the shortage of technical or skilled staff in manufacturing industry. This might be due to the promotion of skilled or technical staff for managerial positions from within rather than promotion of administrative staff from outside. Overall the mean value is 3.78 for this item.

Competitive Hostility	Mean
Keen competition in local markets	5.61
Keen competition in foreign markets	5.86
Low profit margins	6.18
Declining demand in local market	4.66
Declining demand in foreign market	5.13
Producing to the required quality standards	5.36
Unreliable vendor quality	4.98
Unreliable vendor delivery	5.04
Broad product portfolio of competitors	3.75
Threat of imports primarily due to superior quality	3.63
Threat of imports primarily due to low cost	4.82

Table 4-5: Mean scores of responses in Competitive Hostility section

Low profit margins and keen competition in local and foreign markets rank the first three most important elements in competitive hostility section. Threats of imports primarily due to superior quality are given the least importance by respondents. Since imports from the Far East to Turkey increased during the last years, we expect to see threats of imports as important factors for manufacturers as to competitive hostility.

Respondents do not perceive those imports to be threats of superior quality. However, import threats due to low cost are perceived to exist. Competitive hostility section has the highest mean of all business environmental items with a value of 5 points.

Governmental Regulations	Mean
Existence of special taxes	4.85
Existence of import/export tariffs and quotas	4.50
Existence of subsidies	4.21
Existence of anti-pollution regulations	4.24
Existence of recycling regulations	4.16

Table 4-6: Mean scores of responses in Governmental Regulations section

All the elements in this section have similar mean values; existence of special taxes and existence of import/export tariffs and quotas being the most important concerns for the respondents. Overall mean for this section is 4.39.

Dynamism (Volume/Price)	Mean
Frequency of price discounts	4.88
Depth of price discounts	4.83
Volume volatility / swings	5.23
Frequency of cancellation of orders	3.57
Frequency of order quantity changes	4.55

Table 4-7: Mean scores of responses in Dynamism (Volume/ Price) section

Dynamism has two aspects; volume/price dynamism has an overall mean of 4.61 over 7. The most important concerns indicated by firms are volume volatility/swings,

frequency of price discounts and depth of price discounts when volume/price dynamism is concerned. Volume volatility calls for careful production planning processes for the manufacturing firms given their high concern on this item. The importance given to frequency and depth of price discounts also shows the severe competition and the dependency of the actions of firms on competitors' actions or in other words the salience of following the competitors and act accordingly to keep up with the competition in manufacturing industry.

Dynamism (Obsolescence)	Mean
Rate at which products and services become outdated	3.87
Rate of innovation of new products and services	4.56
Rate of innovation of new operation processes	4.48
Rate of change in taste and preferences of customers in your industry	4.64

Table 4-8: Mean scores of responses in Dynamism (Obsolescence) section

In the Obsolescence aspect of the dynamism factor, rate of change in taste and preferences of customers in the industry ranks the first and after that rate of innovation of new products and services come as the next most important factors. Moreover, rate of innovation of new operation processes is considered important by respondents. All these results indicate the need for new product and process developments; especially market requires the change in products since customers' tastes and preferences exert a power on firms to innovate as to obsolescence facet of dynamism. Overall mean value for this section is 4.38.

4.2.3 Competitive Strategy

Competitive strategy section shows that the most important competitive strategy for the respondents is cost leadership and followed by differentiation on basis of technology orientation and differentiation on the basis of market orientation.

Cost Leadership	Mean
Operating efficiency	6.41
Competitive pricing	5.73
Procurement of raw materials at low price	6.00
Reducing product costs	6.23
Minimize outside financing	4.31
Decreasing the number of product features	3.20
Procurement of raw materials at low cost	5.88
Vendor selection based on quality	5.46
Standardize number of parts used for manufacturing	4.95

Table 4-9: Mean scores of responses in Cost Leadership section

Under cost leadership, operating efficiency has the highest mean indicating the most importance given to that particular item. Cost leadership has an overall mean of 5.35.

Differentiation (Technology Orientation)	Mean
Complexity of production planning techniques	5.70
Level of manual quality assurance process sophistication	4.44
Level of computerized quality assurance process sophistication	5.46
Frequency of capacity changes	4.64
Level of emphasis on innovative manufacturing processes	5.80
Level of emphasis on special purpose machines	5.27

Table 4-10: Mean scores of responses in Differentiation (Technology) section

For differentiation on the basis of technology orientation section, respondents rank level of emphasis on innovative manufacturing processes as the most important factor on this area. The whole section has an overall mean of 5.21.

Differentiation (Market Orientation)	Mean
Level of emphasis on general purpose equipment	3.94
Level of capacity slack	5.20
Level of emphasis on outgoing quality	6.38
Level of emphasis on superior product performance and reliability	6.23
Variety of final product	4.89
Level of product customization	5.69
Level of facility focus (sales region)	4.96
Level of facility focus (on process type)	5.16
Level of facility focus (on product group)	4.60
Level of emphasis on wide distribution channels	4.86
Level of emphasis on high finished goods inventory levels	3.52
Level of emphasis on developing new products and services	5.54
Innovation in marketing techniques and methods	5.33
New product introduction by licensing	4.73

Table 4-11: Mean scores of responses in Differentiation (Market Orientation) section

Differentiation on basis of market orientation section, having an overall mean of 5.08, has level of emphasis on outgoing quality as the most important factor followed by level of emphasis on superior product performance and reliability.

4.2.4 Manufacturing Strategy

In the manufacturing strategies of respondent firms, after sales as a performance objective has the highest mean among all strategic options. After that, delivery comes as the first runner up according to overall means of the related sections. It is worth mentioning that low price priority has the lowest overall mean contradicting with the scores on business level competitive priorities. Cost leadership was the one with the highest mean score when the question was asked as the ranking of competitive methods on how important they were in meeting business strategy. The question regarding manufacturing strategy asked the degree of emphasis which the company planned to place on various manufacturing related activities over the next years to remain competitive. Maybe the firms meet their business strategies by cost leadership as the competitive priority now but they plan to switch to other strategies in their manufacturing practices like taking after sales ahead of other options.

Low Price	Mean
Reduce unit costs	6.70
Reduce material costs	6.18
Reduce overhead costs	6.02
Reduce unit direct labor cost	5.68
Reduce product mix to decrease costs	3.26
Emphasis on economies of scale to reduce costs	4.54
Select vendors on the basis of cost	4.63
Develop new processes for new products to decrease costs	4.88
Develop new processes for old products to decrease costs	4.88
Increase material productivity	5.56
Increase capacity utilization	5.93
Increase labor productivity through automation	5.41
Reduce finished goods inventory level	5.02
Reduce WIP level	4.98
Reduce raw materials inventory level	5.04
Use CAD/CAM to decrease costs	4.71
Manufacturing parts in-house	3.37
Increase labor productivity through empowerment of workers	4.44
Increase the commonality of parts/components used	4.25
Chose production site to reduce business costs	4.09
Decrease number of product features	3.00

Table 4-12: Mean scores of responses in Low Price section

If we analyze each individual manufacturing strategy choice sequentially, we see that reducing unit costs has a very high mean score within low price section with 6.7. Lowering costs via decreasing number of product features is the least scored item in the regarding section with a mean of 3. This makes sense because the keen competitions in both local and foreign markets are indicated to be important concerns for respondent companies. They do not want to simplify their products in order not to lose their customers whom they sell their current augmented product.

Quality	Mean
Reduce defective rates	6.48
Improve vendors' quality	5.89
Implement quality control circles	5.31
Obtain ISO 000 series certification	5.54
Improve product performance and reliability	6.25
Use statistical process control	5.43
Use real-time process control systems	5.47
Develop new processes for new products to increase quality	5.16
Develop new processes for old products to increase quality	5.12
Update process equipment	5.02
Reduce number of vendors to improve quality	3.70
Reduce product mix to reduce defect rates	3.07
Increase in-house technical expertise level	5.30
Use CAD/CAM to improve quality levels	4.87
Substitute automation for labor to improve quality	4.67

Table 4-13: Mean scores of responses in Quality section

Another important manufacturing strategy choice, quality, has an overall average score of 5.15. Reducing defective rates is found to be the most scored item within this section with 6.4. It is followed by improving product performance and reliability. Again, reducing product mix to reduce defect rates is the least scored item within this category creating a situation, which is in line with the explanation regarding the competition and simplification of products. Peeling of products to reduce costs or improving quality is not a preferred planned action for our respondents.

Flexibility	Mean
Reduce manufacturing lead-time	5.71
Reduce procurement lead-time	5.49
Reduce setup/changeover time	5.60
Ability to reschedule the production	5.25
Reduce number of engineering change orders	4.63
Improve CAD/CAM capability to increase flexibility	4.54
Improve vendor flexibility	4.81
Reduce new product introduction lead-time	5.04
Reduce new product development lead-time	5.00
Developing new processes for new products to increase flexibility	4.65
Developing new processes for old products to increase flexibility	4.60
Standardize parts used to increase flexibility	4.62
Improve ability to change priorities of jobs on the shop floor	5.09
Improve ability to change assignments of jobs on the shop floor	4.80
Improve ability to handle design modifications	4.96
Reduce response time to increase production volume	5.83

Table 4-14: Mean scores of responses in Flexibility section

Flexibility, having an overall mean of 5.03, includes reducing response time to increase production volume as the highest ranked item followed by reducing manufacturing lead-time. “Improve CAD/CAM capability to increase flexibility” is the least selected item in this category with a mean of 4.53.

Delivery	Mean
Provide fast deliveries	6.25
Meet delivery promises	6.45
Increase delivery reliability to distributors	5.93
Increase delivery reliability to end-user customers	6.29
Increase delivery speed to distributors	5.56
Increase delivery speed to end-user customers	5.98
Reduce product mix to increase delivery performance	3.15
Tailor delivery options for customer needs	4.98
Improve delivery performance through finished goods inventory	3.71
Improve delivery performance through reduced manufacturing lead time	5.43

Table 4-15: Mean scores of responses in Delivery section

Delivery, which is the second in terms of manufacturing strategy choices according to mean scores, has meeting delivery promises as the highest scored item in this section. This situation is in line with "Increase delivery reliability to end-user customers" being the second highest item. We can say that dependability is very important for our respondents in this manner. Again, reducing product mix to increase delivery performance is selected to be the minimum scored item in this category indicating the reluctance of our respondents to choose to decrease product variety and product features for gaining several advantages.

After Sales	Mean
Reduce customer complaints	6.74
Reduce repair/refund time	5.75
Wide geographical coverage of repair service	4.70
Reduce response time to customers	6.38
Increase warranty period on products	4.75
Improve joint design capability	4.70
Inform customer about the use of the product	5.04

Table 4-16: Mean scores of responses in After Sales section

After sales has "reduce customer complaints" as the highest ranked item with 6.73 Having wide geographical coverage of repair service is assessed to be the least emphasized item in this section. As mentioned before, this section has the highest overall mean score of all competitive priorities.

Broad Line	Mean
Increase product customization	5.60
Increase number of product features	4.69
Increase number of products produced regularly	4.72

Table 4-17: Mean scores of responses in Broad Line section

Lastly, broad line has an overall mean of 5. Moreover, increasing product customization is scored highest in this category.

4.2.5 Infrastructure Development

In this subsection, we report the descriptive statistics of the responses of Turkish manufacturing firms in human resources area. All the questions in this section are

adopted from Li (2000). We asked the respondents to rate the importance of infrastructural features from 1 indicating 'No Emphasis' to 7 indicating 'Extreme Emphasis'. The results follow:

Infrastructure Development	Mean
Employee Empowerment	
Improve employee's responsibility	5.73
Improve employee's quality control responsibility	6.25
Improve employee's task flexibility	5.23
Job Enlargement	
Increase professional training for managers	5.45
Increase job training for workers	5.82
Increase employee's autonomy in performing their jobs	5.04
Labor-management relationship improvement	
Enhance employee-management relationship	5.79
Improve labor relationships	5.36
Performance measure criteria development	
Establish compensation and recognition systems based on performance	5.89
Establish manual of production procedures and work rules	5.82

Table 4-18: Mean scores of responses in Infrastructure Development section

Regarding employee empowerment, improving employee's quality control responsibility ranks as the first feature in this group. In job enlargement section, "Increase job training for workers" is the highest ranked item. Labor-management relationship improvement section has "Enhance employee-management relationship"

item with a higher mean score than “Improve labor relationships” item. Lastly, performance measure criteria development section has two items that has close mean scores indicated above.

4.2.6 Future Improvement Programs

In this section of our survey, we asked our respondents to indicate the degree of emphasis to the future improvement programs we listed with 1 indicating 'No emphasis' and 7 indicating 'Extreme emphasis'. Results are the following:

Improvement Program	Mean
Manufacturing lead time reduction	5.83
Improve vendor selection program	4.85
New process/New product	5.11
Zero defects	6.14
Computer Aided Manufacturing/Computer Aided Design (CAM/CAD)	5.02
Statistical Process Control	5.25
Obtain ISO 9004 certificate	5.30
Obtain ISO 14000 certificate	4.91
Emphasis on recyclable raw materials	4.92
Obtain national quality award	4.79
Reducing workforce size	4.75
Close plants	3.19
SPC for process	4.94
SPC for product	4.85

Table 4-19: Mean scores of responses in Future Improvement Programs section

Zero defects program has the highest mean score with 6.14 and closing plants is the

future program that was given the least emphasis with 3.19.

4.3 Regression Analysis:

In this section, we discuss the relationships among the variables within each level-environment, competitive strategy and manufacturing strategy. We begin with the analysis of correlation between variables.

When a correlation analysis is conducted between environmental concerns of the firms, most of the variables are observed to be correlated with each other.

Correlations

		Business Cost	Labor Availability	Competitive Hostility	Governmental Regulations	Dynamism(Volume/Price)	Dynamism(Obsolescence)
Business Cost	Pearson Correlation	1	.286*	.318*	.241	.387**	.033
	Sig. (2-tailed)		.030	.015	.073	.003	.805
	N	58	58	58	56	58	58
Labor Availability	Pearson Correlation	.286*	1	.338**	.488**	.480**	.102
	Sig. (2-tailed)	.030		.009	.000	.000	.447
	N	58	58	58	56	58	58
Competitive Hostility	Pearson Correlation	.318*	.338**	1	.639**	.519**	.246
	Sig. (2-tailed)	.015	.009		.000	.000	.063
	N	58	58	58	56	58	58
Governmental Regulations	Pearson Correlation	.241	.488**	.639**	1	.543**	.304*
	Sig. (2-tailed)	.073	.000	.000		.000	.023
	N	56	56	56	56	56	56
Dynamism(Volume/Price)	Pearson Correlation	.387**	.480**	.519**	.543**	1	.176
	Sig. (2-tailed)	.003	.000	.000	.000		.185
	N	58	58	58	56	58	58
Dynamism(Obsolescence)	Pearson Correlation	.033	.102	.246	.304*	.176	1
	Sig. (2-tailed)	.805	.447	.063	.023	.185	
	N	58	58	58	56	58	58

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4-20: Correlations between environmental variables

Correlation between Dynamism (Volume/Price) and Dynamism (Obsolescence) turn out to be nonsignificant. This supports dividing the Dynamism variable into two

dimensions; one related to volume and price fluctuations, the other one related to the dynamics in the market that lead the products to become obsolete.

Variance Inflation Factor is a commonly used measure for investigating multicollinearity. It is used to assess the collinearity between independent variables in a regression equation. It is calculated as:

$VIF = \frac{1}{1 - R_j^2}$, where R_j^2 is the coefficient of determination when the j'th independent variable is regressed against the remaining independent variables.

We want the VIF value to be closer to 1 to make a better estimation. Multicollinearity is considered a problem when VIF is greater than 10 (Hair *et al*., 1998). Although we do not have a problematic VIF value for six of our business environmental variables, significant correlations should be kept in mind while making conclusions about the significance of these variables. Table showing the VIF values for business environmental variables is available below:

Business Environmental Factor	Tolerance	VIF
Business Cost	0.838	1.194
Labor Availability	0.686	1.457
Competitive Hostility	0.541	1.849
Government Regulations	0.462	2.166
Dynamism (Volume/Price)	0.580	1.724
Dynamism (Obsolescence)	0.896	1.117

* Tolerance is a similar measure for multicollinearity, it equals 1/VIF

Table 4-21: Variance Inflation Factor values for environmental variables

Significant correlations between independent variables may lead to confusing results since there is an overlapping of information as a result of these correlations. This might cause t-values of β estimates to come out to be nonsignificant, even though F-test results for the hypothesis of β's (H_0: $\beta_1 = \beta_2 = \ldots = \beta_i = 0$) are highly significant. F-test indicates the significance of at least one of the coefficients is effective in predicting the dependent variable. However, t-tests might result in nonsignificant coefficients because of the overlapping effect of independent variables. Thus, including one of the variables out of the correlated ones in the regression equation can help solve this problem. Our procedure is like a stepwise regression, but it is not a purely automated process of choosing out of all the possible environmental factors as independent variables. We rather included factors in the equations depending on the previous studies and any significant outcome resulted from the regression of all possible environmental factors on priority choices in order to find the best equations that explains these relationships. In other words, we have attempted to identify a set of equations for each relationship to understand the preferences of the manufacturing firms better.

Following are the regression results of the models constructed according to previous studies conducted in the area.

4.3.1 Business Environment- Manufacturing Strategy

Low Price: Low Price is a competitive priority that is widely accepted in the literature. Business environmental factors like "Business Costs", "Labor Availability", and "Competitive Hostility" are found to have a relationship with this particular priority in Amoako-Gyampah (2003) and Badri (2000). Amoako-Gyampah's study is conducted in Ghana and Badri's study is conducted in United Arab Emirates. Both being emerging economies, they provide a good benchmark for us to select environmental factors depending on those studies. We used the results of those studies to test the relationships not only of Low Price with environmental factors, but also of other competitive priorities in our data set. One asterisk indicates significance of a beta coefficient at 0.01 level, two asterisk indicates significance of a beta coefficient at 0.05 level and three asterisk indicates significance of a beta coefficient at 0.10 level; unless specified otherwise.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Low Price	All possible environmental variables	<0.001	0.407	0.334	BC**= 0.251 DO***= 0.213
Low Price	CH, LA, BC	0.003	0.230	0.187	CH**= 0.272
Low Price	BC, CH	0.002	0.202	0.173	CH**= 0.321 BC***= 0.229
Low Price	LA, BC	0.006	0.168	0.138	BC**= 0.259 LA***= 0.253

Table 4-22: Regression runs for ISO500 firms with environmental variables as independent variables and Low Price as the dependent variable

When all possible environmental factors are included as independent variables in the regression equation, Business Cost's (0.251) and Dynamism (Obsolescence)'s (0.213) beta coefficients are found to be significant at 0.05 and 0.10 level, respectively. Emphasizing "Business Cost" as an environmental concern is a logical determinant for choosing Low Price as a competitive priority for obvious reasons. Moreover, Dynamism is found to be a significant factor in adopting Low Price priority in the study of Ward *et al*. (1995) for low performer group. The following regression is established according to the Ghana study's results. The indicated independent variables were found significant for Ghanian manufacturers' Low Price priority.

For the case, where "Business Cost", "Labor Availability" and "Competitive Hostility" are entered in the regression equation as independent variables, "Competitive Hostility" is found to be significant in predicting Low Price competitive priority at 0.05 level. Beta coefficient for "Competitive Hostility" is 0.272 for this instance.

Since Competitive Hostility and Labor Availability are correlated significantly at 0.01 level, regression is rerun with dropping one of the correlated independent variables from the equation. In this case, "Business Cost" is found to be significant at 0.10 level, whereas "Competitive Hostility" is found to be significant at 0.05 level with the resulting beta coefficient of 0.321.

When we interchange "Competitive Hostility" with "Labor Availability" and run the regression with "Business Cost" and "Labor Availability" being the dependent variables, "Business Cost" is found to be significant at 0.05 level and "Labor Availability" is found to be significant at 0.10 level. Corresponding beta coefficients are 0.259 and 0.253, respectively.

Quality: When it comes to the estimation of regression equations related to the choice of Quality as a competitive priority, we get the following results for regression estimations we performed:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Quality	All possible environmental variables	0.022	0.252	0.160	BC**= 0.303 GR***= 0.317
Quality	LA, CH	0.087	0.085	0.052	CH***= 0.232
Quality	BC, CH	0.037	0.113	0.080	None significant at less than 0.10 level
Quality	LA, BC	0.077	0.089	0.056	BC***= 0.238
Quality	GR, BC	0.002	0.216	0.187	GR**= 0.322 BC**= 0.267
Quality	LA, GR	0.013	0.151	0.119	GR**= 0.364
Quality	DVP, DO, GR	0.027	0.160	0.112	GR**= 0.401

Table 4-23: Regression runs for ISO500 firms with environmental variables as independent variables and Quality as the dependent variable

The equation that takes all possible independent variables into account results that "Business Cost" is the most significant factor with a beta coefficient of 0.303 at 0.05

level. “Governmental Regulations” variable is significant at 0.10 level with a beta coefficient of 0.317.

In the study of Amoako-Gyampah (2000), “Competitive Hostility” and “Labor Availability” are found to be significant determinants of Quality as the competitive priority of a manufacturing firm. Moreover, along with “Competitive Hostility”, “Dynamism” and “Governmental Regulations” come out to be significant for Quality priority choice in the study of Badri *et al*. (2000). When we include “Labor Availability” and “Competitive Hostility” in the regression equation as independent variables, we find that “Competitive Hostility” is significant at 0.10 level (beta coefficient=0.232). F test is significant at 0.10 level and R square is relatively small with respect to other equations present in this study. The drawback of this particular regression equation is the significant correlation between the two independent variables.

“Business Cost” and “Competitive Hostility” did not turn out to be significant for the equation that is run for Quality as dependent and “Business Cost” and “Competitive Hostility” as independent variables. If we include “Governmental Regulations” and exclude “Competitive Hostility”, “Business Cost” and “Governmental Regulations” both turn out to be significant at 0.05 level with beta coefficients of 0.267 and 0.322, respectively.

Since we measure Dynamism as two split variables- “Dynamism (Obsolescence)”

and "Dynamism (Volume/Price)"- we included both of them in the regression equation for quality with "Governmental Regulations", which is a significant predictor for Quality in our study. For this instance, "Governmental Regulations" is the only independent variable that turn out to be significant at 0.05 level with beta coefficient of 0.401.

Delivery: When delivery is the competitive priority of interest, regression equations with different sets of independent variables gives the following results:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Delivery	All possible environmental variables	<0.001	0.442	0.374	CH**= 0.314 BC***= 0.229 DO***= 0.202
Delivery	BC, LA	0.002	0.198	0.169	BC**= 0.292 LA**= 0.263
Delivery	CH, BC	<0.001	0.315	0.290	CH*= 0.447 BC***= 0.225
Delivery	BC, GR	<0.001	0.330	0.305	GR*= 0.455 BC**= 0.258
Delivery	DO, BC, CH	<0.001	0.344	0.308	CH*= 0.401 BC**= 0.234

Table 4-24: Regression runs for ISO500 firms with environmental variables as independent variables and Delivery as the dependent variable

Amoako-Gyampah's study reveals that "Business Cost", "Labor Availability" and "Competitive Hostility" are the independent variables determining the Delivery priority choice of manufacturing firms in Ghana. In our study, "Competitive Hostility" is the most significant factor with beta coefficient of 0.314 at 0.05 level when all possible environmental variables are entered in the regression equation as

independent variables. “Business Cost” and “Dynamism (Obsolescence)” are other factors that are found to be important at 0.10 level with beta coefficients of 0.229 and 0.202, respectively.

If we run the regressions by boiling independent variables down according to Ghana study, both “Business Cost” and “Labor Availability” come out to be significant with beta coefficients of 0.292 and 0.263, respectively at 0.05 level.

When we enter “Business Cost” and “Competitive Hostility” as independent variables in the equation, we find that “Business Cost”, significant at 0.10 level, has a beta coefficient of 0.225; and “Competitive Hostility”, significant at 0.01 level, has a beta coefficient of 0.447.

In the study of Badri *et al*. (2000), a significant relationship between Dynamism and Delivery are found for manufacturing firms in United Arab Emirates. Depending on this observation, if we include “Dynamism (Obsolescence)”, which is found to be significant in the first equation for Delivery, in the equation as an independent variable along with “Business Cost” and “Competitive Hostility”, it turns out to be nonsignificant. Other two variables are still significant with one difference, which is the significance level of “Business Cost”. It decreases to 0.05 level from 0.10 level.

Badri *et al.* (2000) also point out a relationship between government laws and improving delivery as a priority in their study. Thus, we included “Governmental Regulations” in our regression equation to see the results. This set of independent

variables yields that "Governmental Regulations" and "Business Cost" are significant at 0.01 and 0.05 levels, with beta coefficients of 0.455 and 0.258 respectively. Our sample proves Badri's findings right as to the effect of "Governmental Regulations" on choice of Delivery as a priority.

Flexibility: Regression equations of Flexibility as the dependent variable yield the following results:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Flexibility	All possible environmental variables	<0.001	0.466	0.400	DO*= 0.324 GR**= 0.395
Flexibility	CH, BC	0.001	0.219	0.191	CH*= 0.458
Flexibility	GR, BC	<0.001	0.333	0.308	GR*= 0.552
Flexibility	DO, BC, GR	<0.001	0.438	0.406	GR*= 0.444 DO*= 0.341
Flexibility	DVP, DO	<0.001	0.261	0.234	DO*= 0.414 DVP***= 0.235
Flexibility	LA, DO	0.001	0.222	0.193	DO*= 0.443
Flexibility	GR, DO	<0.001	0.429	0.407	GR*= 0.470 DO*= 0.336

Table 4-25: Regression runs for ISO500 firms with environmental variables as independent variables and Flexibility as the dependent variable

When all possible independent variables are entered in the equation, "Governmental Regulations" and "Dynamism (Obsolescence)" are found to be significant at 0.10 level and 0.05 level with beta coefficients of 0.395 and 0.324, respectively.

"Competitive Hostility" and "Business Cost" are the important factors determining the choice of Flexibility as a competitive priority for Ghanian manufacturers. "Labor Availability", Dynamism and "Competitive Hostility" are the resulting variables that have significant relationships with the Flexibility priority in the study conducted in UAE.

Regressions were run according to these prior findings and "Competitive Hostility" is found to be significant for the run that Business Cost, Competitive Hostility are independent variables. Resulting beta coefficient is 0.458 at 0.01 significance level.

Since we have a significant relationship between "Governmental Regulations" and Flexibility, we include "Governmental Regulations" as an independent variable in the regression equation with "Business Cost" and leave "Competitive Hostility" out.
In this case, "Governmental Regulations" is the significant variable with beta coefficient of 0.552 at 0.01 level of significance.

If a company places a high level of emphasis on the factors like the time that products become outdated, or the speed of innovation in the marketplace, we expect it to aim to be flexible in its operations to keep up with competition. Since "Dynamism (Obsolescence)" is a factor that is deemed to be important logically and also empirically for Flexibility choice, we entered it to the regression equation to see the outcome and found that "Governmental Regulations" and "Dynamism

(Obsolescence)" are significant at 0.01 level, but "Business Cost" is left out as to significance. Beta coefficients are 0.444 and 0.341, respectively for the significant variables.

Along with the significant "Dynamism (Obsolescence)" variable in the first equation for Flexibility, "Dynamism (Volume/Price)" is entered in another regression equation for Flexibility priority. Volatility/swings in the volume of the products is rationally tied to the Flexibility competence of a manufacturing firm since the greater the emphasis placed on environmental concerns related to volume and price, the more likely a firm to choose Flexibility as a competitive priority.

Dynamism (Obsolescence) is significant at 0.01 and Dynamism (Volume/Price) is significant at 0.10 level for the run with both Dynamism variables as independent variables with beta coefficients 0.414 and 0.235, respectively.

"Dynamism (Obsolescence)" and "Governmental Regulations" are both significant at 0.01 level when they are the only independent variables entered in the regression equation for Flexibility as the dependent variable. Their beta coefficients are 0.336 and 0.470, respectively.

Broad Line: Another competitive priority possible for manufacturing firms is Broad Line. The regression results for this priority follow:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Broad Line	All possible environmental variables	0.037	0.235	0.140	GR***= 0.345 DO***= 0.259
Broad Line	DVP, DO	0.023	0.130	0.098	DO**= 0.295
Broad Line	CH, DO	0.010	0.158	0.127	DO**= 0.274 CH***= 0.232
Broad Line	GR, DO	0.002	0.218	0.188	DO**= 0.257 GR**= 0.322

Table 4-26: Regression runs for ISO500 firms with environmental variables as independent variables and Broad Line as the dependent variable

"Dynamism (Obsolescence)" and "Governmental Regulations" are the factors that turn out to be significant for the equation with all the possible environmental variables included as independent variables at 0.10 level. Corresponding beta coefficients for these variables are 0.259 and 0.345, respectively.

Miller and Roth (1994) show that marketeer group in their study is the one that has the highest mean score for Broad Line, which is described as 'the capability to deliver a broad product line', with respect to caretakers and innovators. Thus, we might call Broad Line a marketing related strategy type; and since Broad Line is a marketing

related competitive choice, we expect the priority given to it by manufacturers to be parallel with the emphasis placed on market oriented environmental factors like "Competitive Hostility", "Dynamism (Obsolescence)" and "Dynamism

(Volume/Price)", rather than the factors like "Labor Availability" or "Business Cost" that are related to input side of production process in our survey and test this accordingly.

"Dynamism (Obsolescence)" is the only significant independent variable at 0.05 level with beta coefficient of 0.295, when Dynamism (Volume/Price) and Dynamism (Obsolescence) are entered in the regression equation.

When we enter "Competitive Hostility" and "Dynamism (Obsolescence)" as independent variables in the equation for Broad Line, we get "Dynamism (Obsolescence)" with a beta coefficient of 0.274 at 0.05 level, and "Competitive Hostility" with a beta coefficient of 0.232 at 0.10 level.

"Governmental Regulations" and "Dynamism (Obsolescence)" are both significant at 0.05 level with beta coefficients of 0.322 and 0.257, respectively, when they are entered in the regression equation as independent variables for Broad Line.

After Sales: The last manufacturing strategy choice we employed in our study, After Sales, yield the following regression equations:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
After Sales	All possible environmental variables	0.019	0.258	0.167	None significant at less than 0.10 level
After Sales	GR, DO	0.001	0.220	0.191	GR*= 0.390
After Sales	CH, DO	0.003	0.194	0.164	CH*= 0.378
After Sales	DVP, DO	0.043	0.108	0.076	DVP***= 0.225

Table 4-27: Regression runs for ISO500 firms with environmental variables as independent variables and After Sales as the dependent variable

For the equation with all possible environmental variables are tested as predictors, none of the independent variables come out significant. However, when we include Governmental Regulations and Dynamism (Obsolescence) as independent variables, "Governmental Regulations" is found to be significant at 0.01 level and this item has a beta coefficient of 0.390.

In the equation with Competitive Hostility and Dynamism (Obsolescence) as tested predictors, "Competitive Hostility" is found to be significant at 0.01 level with 0.378 beta coefficient.

For the regression run with both Dynamism variables are entered as independent variables in the equation, "Dynamism (Volume/Price)" is found significant at 0.10 level with beta coefficient of 0.225.

	BC	LA	CH	GR	DVP	DO
LP	0.251**					0.213***
Q	0.303**			0.317***		
F				0.395**		0.324*
D	0.229***		0.314**			0.202***
A						
B				0.345***		0.336***

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 4-28: Summaries of resulting beta coefficients of environmental variables as predictors for manufacturing strategy choices

4.3.2 Business Environment- Competitive Strategy

Cost Leadership: In the literature, business strategy is considered to have an effect on choosing manufacturing strategy. This makes sense, since businesses and functions need to be in line with the corporation's objectives to help achieve them. Ward *et al*. (2000) used a model that incorporates both competitive strategy and manufacturing strategy as the two levels of strategies that are affected by environmental dynamism and also one level affects the other. Namely, competitive strategy is a predictor for manufacturing strategy. Moreover, environmental concerns

have impact on choosing higher level strategies as well as choosing manufacturing strategy. This framework provides the basis for us. The following are tested accordingly:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Cost Leadership	All possible environmental variables	0.028	0.247	0.153	BC***= 0.236
Cost Leadership	DO, BC, LA	0.013	0.183	0.136	BC**= 0.269
Cost Leadership	BC, GR	0.004	0.193	0.162	GR**= 0.337 BC***= 0.216
Cost Leadership	CH, BC	0.006	0.174	0.143	CH**= 0.264 BC***= 0.252
Cost Leadership	BC	0.011	0.111	0.095	BC**= 0.333

Table 4-29: Regression runs for ISO500 firms with environmental variables as independent variables and Cost Leadership as the dependent variable

"Business Cost" is the only variable that is significant when all possible environmental variables are entered as independent variables in the regression equation. It has a beta coefficient of 0.236 at 0.10 level. This is a logical finding since costs are of great concern to businesses that want to produce with minimal costs and sell at lower prices.

"Business Cost" is the only significant variable in the equation including Business Cost, Labor Availability and Dynamism (Obsolescence) as independent variables

with 0.269 beta coefficient at 0.05 level.

In the regression run with Business Cost and Governmental Regulations as independent variables, "Governmental Regulations" turns out to be significant at 0.01 level with beta coefficient of 0.337 and "Business Cost" is the other significant variable with 0.216 beta coefficient at 0.10 level. Special taxes and existence of trade tariffs/quotas might be worrisome for a firm that adopts Cost Leadership strategy.

"Competitive Hostility" is significant at 0.05 level and "Business Cost" is significant at 0.10 level when only both of them are entered as independent variables in the regression equation. Corresponding beta coefficients are 0.264 and 0.252, respectively.

When only, "Business Cost" is entered in the equation as an independent variable, overall significance of the model decreases and "Business Cost" is found to be significant at 0.05 level, yielding a beta coefficient of 0.333.

Market Differentiation: Market Differentiation as a business strategy yields the following results:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Market Differentiation	All possible environmental variables	<0.001	0.409	0.335	GR**= 0.392 DO***= 0.207
Market Differentiation	CH, DO	<0.001	0.276	0.249	DO**= 0.245 CH*= 0.403
Market Differentiation	DVP, DO	0.001	0.214	0.185	DO**= 0.297 DVP**= 0.303
Market Differentiation	GR, DO, DVP	<0.001	0.359	0.322	GR*= 0.482 DO***= 0.201
Market Differentiation	BC, DO, GR	<0.001	0.397	0.362	BC***= 0.202 DO***= 0.212 GR*= 0.450
Market Differentiation	CH, DO, BC	<0.001	0.327	0.289	CH*= 0.327 DO**= 0.256 BC**= 0.238

Table 4-30: Regression runs for ISO500 firms with environmental variables as independent variables and Differentiation (Market Orientation) as the dependent variable

When all possible environmental variables are entered in the regression equation as independent variables for Market Differentiation, it is found that "Governmental Regulations" has a significance level of 0.05 with beta coefficient of 0.392 and "Dynamism (Obsolescence)" has a significance level of 0.10 with beta coefficient of 0.207. "Governmental Regulations" might be significant due to the fact that it is significantly correlated with "Competitive Hostility" at 0.01 level.

"Competitive Hostility" is a significant variable with 0.403 beta coefficient at 0.01 level and "Dynamism (Obsolescence)" is also significant with 0.245 beta coefficient at 0.05 level, when these two variables are entered to the regression equation as independent variables.

Both Dynamism variables turn out significant at 0.05 level with beta coefficients of 0.297 for “Dynamism (Volume/Price)” and 0.303 for “Dynamism (Obsolescence)”, when only they are entered in the regression equation.

In the regression run, which include Dynamism (Volume/Price), Dynamism (Obsolescence) and Governmental Regulations as independent variables, “Governmental Regulations” is found to be a significant determinant for Market Differentiation strategy at 0.01 level yielding beta coefficient of 0.482 and “Dynamism (Obsolescence)” is also found to be significant with beta coefficient 0.201 at 0.10 level.

It is also interesting to include “Business Cost” into a regression equation of Market Differentiation to see whether an environmental variable that is mostly related to cost focused strategies has an impact on Market Differentiation.

In the case, where Dynamism (Obsolescence), Governmental Regulations and Business Cost are independent variables, “Governmental Regulations” is found to be the significant variable that has a beta coefficient of 0.450 at 0.01 level. “Business Cost” and “Dynamism (Obsolescence)” also turn out to be significant at 0.10 level with beta coefficients of 0.202 and 0.212.

Since “Competitive Hostility” is correlated with “Governmental Regulations”, we

have another regression run that is the modified version of the previous model, where "Governmental Regulations" is replaced with "Competitive Hostility". The regression run yields that "Competitive Hostility" is significant at 0.01 level with beta coefficient of 0.327. "Business Cost" and "Dynamism (Obsolescence)" are significant at 0.05 level with 0.238 and 0.256 beta coefficients.

Technology Differentiation: Another competitive strategy, Technology Differentiation, has the following regression results, given several combinations of environmental variables as independent variables:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Technology Differentiation	All possible environmental variables	0.004	0.322	0.237	BC**= 0.270 GR**= 0.356 DO***= 0.236
Technology Differentiation	BC, CH	0.015	0.147	0.115	BC**= 0.291
Technology Differentiation	DO, BC, GR	0.001	0.288	0.246	BC**= 0.246 GR**= 0.307 DO***= 0.222
Technology Differentiation	LA, DO, GR	0.002	0.254	0.210	GR**= 0.287 DO***= 0.216
Technology Differentiation	CH, DO	0.014	0.148	0.116	DO**= 0.290

Table 4-31: Regression runs for ISO500 firms with environmental variables as independent variables and Differentiation (Technology Orientation) as the dependent variable

For the equation, in which all environmental variables are entered as independent variables, "Business Cost" and "Governmental Regulations" turn out significant at

0.05 level with 0.270 and 0.356 beta coefficients, respectively. “Dynamism (Obsolescence)” is another significant factor with 0.236 beta coefficient at 0.10 level. A firm that is concerned about “Business Cost” might try to decrease various costs, such as quality costs or labor costs, by investing in automation. However, it is possible to argue that technology is itself a costly investment and cost sensitive firms are not expected to be oriented through technology. “Dynamism (Obsolescence)” section includes innovation related questions and Technology is an integral part of innovation. Thus, it is logical to have “Dynamism (Obsolescence)” concerns as a predictor for Differentiation on the basis of Technology. The reduced version of the previous equation yields that “Business Cost” and “Governmental Regulations” are significant at 0.05 level with beta coefficients of 0.246 and 0.307. “Dynamism (Obsolescence)” is also significant with beta coefficient 0.222 at 0.10 level, when Business Cost, Governmental Regulations, Dynamism (Obsolescence) are the independent variables.

When “Business Cost” and “Competitive Hostility” are entered in the equation as independent variables, “Business Cost” turns out to be significant at 0.05 level with 0.291.

“Labor Availability”, “Governmental Regulations” and “Dynamism (Obsolescence)” are entered as independent variables to see the result even though it is not desirable to include correlated variables in the same equation. In this case, “Governmental

Regulations" is the only variable significant at 0.05 with 0.287 beta coefficient, whereas "Dynamism (Obsolescence)" is significant at 0.10 level with beta coefficient of 0.216. However, "Labor Availability" and "Governmental Regulations" are correlated. Thus, we entered "Labor Availability" and excluded "Governmental Regulations" to eliminate the overlapping effects due to the significant correlation. Business Cost is another variable that is included with Labor Availability and Dynamism (Obsoloscence). For this case, "Labor Availability" comes out significant at 0.10 level with 0.228 beta coefficient, and "Business Cost" and "Dynamism (Obsolescence)" are significant at 0.05 level with beta coefficients of 0.268 and 0.301, respectively.

So far, the effects of environmental variables on competitive strategy and manufacturing strategy selection are considered. As we said before, there is an interaction between competitive strategy and manufacturing strategy to achieve the objectives of the business. In the next section, regressions regarding this relationship will be analyzed.

	BC	LA	CH	GR	DVP	DO
CL	0.236***					
MD				0.392**		0.207***
TD	0.270**			0.356**		0.236***

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 4-32: Summaries of resulting beta coefficients of environmental variables as predictors for competitive strategy choices

4.3.3 Competitive Strategy- Manufacturing Strategy

The following are the regression equations, where competitive strategies are tested as the predictors for possible manufacturing strategy selections. Correlation matrix for competitive strategies is the following:

Correlations

		Cost Leadership	Diff(Technology)	Diff(Market)
Cost Leadership	Pearson Correlation	1	.389**	.553**
	Sig. (2-tailed)		.003	.000
	N	57	56	57
Diff(Technology)	Pearson Correlation	.389**	1	.530**
	Sig. (2-tailed)	.003		.000
	N	56	56	56
Diff(Market)	Pearson Correlation	.553**	.530**	1
	Sig. (2-tailed)	.000	.000	
	N	57	56	57

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4-33: Correlations between competitive strategy variables

Variance Inflation Factors of competitive strategy variables are:

Competitive Strategy Variable	Tolerance	VIF
Cost Leadership	0.670	1.493
Differentiation (Market)	0.567	1.762
Differentiation (Technology)	0.707	1.414

Table 4-34: Variance Inflation Factor values for competitive strategy variables

Low Price: Low Price priority is the first manufacturing strategy choice that we are trying to find the competitive strategy determinants of.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Low Price	CL, MD, TD	<0.001	0.395	0.360	MD*= 0.491
Low Price	TD, CL	<0.001	0.258	0.230	CL*= 0.369 TD***= 0.234
Low Price	MD, TD	<0.001	0.377	0.353	MD*= 0.571
Low Price	CL, MD	<0.001	0.364	0.341	MD*= 0.471

Table 4-35: Regression runs for ISO500 firms with competitive strategies as independent variables and Low Price as the dependent variable

Market Differentiation is found to be significant at 0.01 level with 0.491 beta coefficient, when all three competitive strategy variables are entered in the equation as independent variables. It is interesting that market oriented differentiation strategy is a significant competitive strategy variable for Low Price priority. It is important to keep the highly significant correlations between all of the competitive strategies in mind while making conclusions. Cost Leadership might be nonsignificant because of

overlapping effects due to correlation.

When only Cost Leadership and Technology Differentiation are included as independent variables, Cost Leadership is found to be significant at 0.01 level with beta coefficient of 0.369 and Technology Differentiation is found to be significant at 0.10 level with beta coefficient of 0.234. Cost Leadership is a reasonable predictor for Low Price strategy selection of manufacturing function. Cost Leadership, or as they call it- Price, is also found to be significant for Cost as a manufacturing strategy in Ward *et al*. (2000) study, as well.

Market Differentiation is significant at 0.01 level with beta coefficient of 0.571, when only differentiation variables are entered as independent variables and Cost Leadership is left out.

Market Differentiation is again significant at 0.01 level with beta coefficient of 0.471, when Cost Leadership and Market Differentiation are included as independent variables.

Quality: When Quality as a manufacturing strategy is the dependent variable and business strategies are independent variables, the following results come out:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Quality	CL, MD, TD	<0.001	0.471	0.440	TD**= 0.258 MD*= 0.384
Quality	MD, TD	<0.001	0.447	0.427	TD**= 0.281 MD*= 0.476
Quality	CL, MD	<0.001	0.376	0.353	MD*= 0.433 CL***= 0.257
Quality	TD, CL	<0.001	0.387	0.364	CL*= 0.348 TD*= 0.398

Table 4-36: Regression runs for ISO500 firms with competitive strategies as independent variables and Quality as the dependent variable

When all competitive strategy variables are tested as predictors for manufacturing strategy choice of Quality, Market Differentiation is found to be significant at 0.01 level and Technology Differentiation is significant at 0.05 level. Corresponding beta coefficients are 0.384 and 0.258, respectively. This finding is in line with the Ward and Duray's (1995) study, where Differentiation strategy in business level influences the selection of Quality as a manufacturing strategy. However, it should be noted that Differentiation item in that particular study is mostly marketing oriented.

In another regression run, we included both differentiation variables as predictors for Quality and left Cost Leadership out. Market Differentiation is found to be significant at 0.01 level with 0.476 beta coefficient and Technology Differentiation is found to be significant at 0.05 level with beta coefficient of 0.281. In this case, Technology Differentiation has become significant along with Market Differentiation. Quality can be determined by Technology Differentiation strategy of the business. Our questions on Technology Differentiation include Quality assurance sophistication and

Technology- Quality interface. Quality assurance processes are highly tied to computerization and technology nowadays. This can explain the significance of Technology Differentiation on Quality priority choice.

When Cost Leadership and Market Differentiation are the independent variables for the regression estimation for Quality priority, Market Differentiation turns out significant at 0.05 level (beta coefficient is 0.433) and Cost Leadership turns out significant at 0.10 level (beta coefficient is 0.257). Ward *et al.*(2000) also found a significant relationship between Differentiation and Quality in their study. However, Price as a competitive strategy is only related to Cost as a manufacturing strategy out of the four strategies they used.

For the regression equation, where Cost Leadership and Technology Differentiation are independent variables, Cost Leadership is found to be significant at 0.01 level and Technology Differentiation is found to be significant at 0.01 level, as well. Corresponding beta coefficients are 0.348 and 0.398.

Delivery: As to delivery, the regressions yield the following results:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Delivery	CL, MD, TD	<0.001	0.472	0.442	TD*= 0.381 MD*= 0.374
Delivery	MD, TD	<0.001	0.471	0.451	TD*= 0.387 MD*= 0.398
Delivery	CL, MD	<0.001	0.403	0.380	MD*= 0.608
Delivery	TD, CL	<0.001	0.393	0.370	TD*= 0.517 CL***= 0.206

Table 4-37: Regression runs for ISO500 firms with competitive strategies as independent variables and Delivery as the dependent variable

When all three competitive strategy variables are entered as independent variables, Technology Differentiation and Market Differentiation are both found to be significant at 0.01 level with beta coefficients of 0.381 and 0.374, respectively. Differentiation is a precursor variable for Delivery in Ward and Duray's paper. There is a significant relationship between both facets of Differentiation and Delivery here as well.

The regression run, done with the exclusion of Cost Leadership as an independent variable, yields significance of both independent variables included with beta coefficients of 0.387 for Technology Differentiation and 0.398 for Market Differentiation.

When Cost Leadership is entered the regression equation with Market Differentiation, Differentiation variable is the one that is significant at 0.01 level with 0.608 beta coefficient, which is very high. Cost Leadership is not significant here. "Dependable

deliveries" is found to be a top ranked priority for marketeer cluster in Miller Roth's study as well.

For the case that has Cost Leadership and Technology Differentiation as independent variables, Technology Differentiation is found to be significant at 0.01 level with beta coefficient of 0.517 and Cost Leadership is significant at 0.10 level. Corresponding beta coefficient for Cost Leadership is 0.206.

Flexibility: Following are the results for regressions where Flexibility is the dependent variable and independent variables are chosen out of competitive strategies:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Flexibility	CL, MD, TD	<0.001	0.502	0.474	MD*= 0.634
Flexibility	MD, TD	<0.001	0.500	0.481	MD*= 0.603
Flexibility	CL, MD	<0.001	0.460	0.440	MD*= 0.686
Flexibility	CL, TD	<0.001	0.274	0.247	TD*= 0.408

Table 4-38: Regression runs for ISO500 firms with competitive strategies as independent variables and Flexibility as the dependent variable

For the run with all competitive strategy variables are entered in the equation, Market Differentiation is the only significant variable with 0. 634 beta coefficient at 0.01 level. R^2 for this equation is very high with respect to other equations. However, the next equation has the highest model- data set fit according to adjusted R^2 values.

Market Differentiation is found to be significant at 0.01 level with beta coefficient of 0.603, when only differentiation variables are entered to the regression equation for Flexibility. Ward and Duray (2000) also state the significant relationship between Differentiation and Flexibility in their study.

Market Differentiation has a beta coefficient of 0.686 at 0.01 level for the equation with Flexibility as dependent and Cost Leadership and Market Differentiation are independent variables.

In the last equation, where Cost Leadership and Technology Differentiation are tested as predictors for Flexibility, Technology Differentiation is found to be significant at 0.01 level.

In the paper of Stobaugh and Telesio (1983), key manufacturing task of a technology driven strategy is told as "to manufacture high-technology products and to be flexible enough to change products and processes quickly". Therefore, this significant relationship between Technology Differentiation and Flexibility makes sense.

Any firm that chooses to be Flexible in its manufacturing operations seems to have a Differentiation strategy behind at the business level, but not a Cost Leadership motive according to our data. This fact is also in line with the literature.

Broad Line: Broad Line is a marketing related manufacturing task as mentioned before. The regression equations yielded the following for Broad Line:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Broad Line	CL, MD, TD	0.010	0.197	0.150	MD***= 0.325
Broad Line	MD, TD	0.003	0.196	0.165	MD**= 0.345
Broad Line	CL, TD	0.020	0.139	0.106	TD***= 0.265

Table 4-39: Regression runs for ISO500 firms with competitive strategies as independent variables and Broad Line as the dependent variable

First regression equation includes all competitive strategy variables as independent variables and Broad Line as the dependent variable. Market Differentiation is significant at 0.10 level with a beta coefficient of 0.325. Other two independent variables turn out nonsignificant.

For the equation with differentiation variables are tested as predictors for Broad Line, Market Differentiation is again found to be significant but this time at 0.05 level with beta coefficient of 0.345. It is rational to have the business strategy as Market Differentiation and have Broad Line as manufacturing strategy accordingly, since market orientation includes variety of products sold to customers and product customization level as indicators.

The equation with Cost Leadership and Technology Differentiation as independent

variables yields Technology Differentiation as significant at 0.10 level with beta coefficient of 0.345.

After Sales: After Sales is the last manufacturing strategy item to analyze in this section. This strategy is related to high concerns in marketing and also technology. This manufacturing task is found high ranked by marketeers and innovators by Roth and Miller. The results for this section are summarized as:

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
After Sales	CL, MD, TD	<0.001	0.290	0.249	MD*= 0.427
After Sales	MD, CL	<0.001	0.322	0.297	MD*= 0.505
After Sales	TD, CL	0.004	0.187	0.156	CL**= 0.330
After Sales	MD, TD	<0.001	0.275	0.248	MD*= 0.502

Table 4-40: Regression runs for ISO500 firms with competitive strategies as independent variables and After Sales as the dependent variable

For the equation with all competitive strategies are included as independent variables, Market Differentiation is found to be significant at 0.01 level with beta coefficient of 0.427. This supports the finding of Roth and Miller as to After Sales being an important priority for marketeers.

For the equation that Broad Line is the dependent, and Cost Leadership and Market Differentiation are the independent variables, Market Differentiation is found to be

significant at 0.01 level with beta coefficient of 0.505.

Cost Leadership is significant at 0.05 level with beta coefficient of 0.330, when it is tested with Technology Differentiation as predictors for After Sales. This is an interesting result since Cost Leadership strategy is not generally associated with After Sales priority.

For the last equation that includes differentiation variables as predictors for After Sales priority, Market Differentiation is found to be significant at 0.01 level with beta coefficient of 0.502. Overall, After Sales seems to be mostly related to Market Differentiation. Maybe we can think of the product and the service given with it as an augmented product that is offered to customers, and this privilege for the customers might differentiate the manufacturing firm from its competitors.

	CL	MD	TD
LP		0.491*	
Q		0.384*	0.258**
D		0.374*	0.381*
F		0.634*	
A		0.427*	
B		0.325***	

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 4-41: Summaries of resulting beta coefficients of competitive strategies as predictors for manufacturing strategy choices

CHAPTER 5

ATTEMPT AT A COMPARISON

In this chapter, we analyze the data pertaining to local firms (in Ankara) in a specific industry obtained about four years ago as a preliminary study to this work. The survey was conducted as a class project by undergraduate students at the end of year 2002. The sample was chosen from Ankara Chamber of Industry. Firms were members of Manufacture of Basic Metals industry operating in Ankara. Students visited the firms and made contact people fill in the questionnaire or they faxed the questionnaire to them and had the survey faxed back. There are total of 53 firms that filled in the survey. Since one firm was assigned for every student to conduct the survey, every time a firm refused to fill in the survey, a new firm was assigned to the student.

We intend to make a comparison as to the strategy preferences of the firms in their

perceived environment for the two samples. While making comparisons, it should be noted that Ankara firms are small and local firms while recent sample is formed of larger firms and some of these firms have international counterparts. Industry types are various in the recent data, whereas Ankara firms belong to one industry. Moreover, the two sets of data are collected in different time periods. We analyze this data set in the manner discussed in the previous chapter.

Correlations between environmental variables and also business strategy variables for Ankara data set are the following:

Correlations

		bus cost	labor ava	com hos	gov regula	dyn vp	dyn obs
bus cost	Pearson Correlation	1	.076	.143	.115	.268	.218
	Sig. (2-tailed)		.590	.306	.416	.055	.124
	N	53	52	53	52	52	51
labor ava	Pearson Correlation	.076	1	.081	.147	-.075	.039
	Sig. (2-tailed)	.590		.567	.304	.599	.790
	N	52	52	52	51	51	50
com hos	Pearson Correlation	.143	.081	1	.455**	.186	.081
	Sig. (2-tailed)	.306	.567		.001	.186	.571
	N	53	52	53	52	52	51
gov regula	Pearson Correlation	.115	.147	.455**	1	.162	.259
	Sig. (2-tailed)	.416	.304	.001		.250	.069
	N	52	51	52	52	52	50
dyn vp	Pearson Correlation	.268	-.075	.186	.162	1	.256
	Sig. (2-tailed)	.055	.599	.186	.250		.072
	N	52	51	52	52	52	50
dyn obs	Pearson Correlation	.218	.039	.081	.259	.256	1
	Sig. (2-tailed)	.124	.790	.571	.069	.072	
	N	51	50	51	50	50	51

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5-1: Correlations between environmental variables for the firms in Ankara

Correlations

		costlead	tec diff	market diff
costlead	Pearson Correlation	1	.621**	.306*
	Sig. (2-tailed)		.000	.029
	N	53	52	51
tec diff	Pearson Correlation	.621**	1	.599**
	Sig. (2-tailed)	.000		.000
	N	52	52	50
market diff	Pearson Correlation	.306*	.599**	1
	Sig. (2-tailed)	.029	.000	
	N	51	50	51

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5-2: Correlations between competitive strategy variables for the firms in Ankara

For convenience, we will be using the following notation: Business Cost= BC, Labor Availability= LA, Competitive Hostility= CH, Governmental Regulations= GR, Dynamism (Volume/ Price)= DVP, Dynamism (Obsolescence)= DO.

Similar regressions as for the ISO500 list firms are run for the firms in Ankara. The results, and corresponding similarities and differences are the following:

5.1 Business Environment- Manufacturing Strategy

In this section we are testing business environmental factors as predictors for manufacturing strategy choices for Ankara data.

Low Price: Low Price is a competitive priority emphasized by our sample when concerns about "Competitive Hostility", "Business Cost" and "Labor Availability" are high. As we can see from the table below, concerns about "Competitive Hostility"

and "Governmental Regulations" seem to have impact on choosing Low Price as a manufacturing task by the firms in Ankara. In this section, the models are significant as well as the models of Low Price for ISO500 firms data. Models for both Ankara and ISO500 data are significant according to F-tests.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Low Price	All possible environmental variables	0.004	0.353	0.261	CH**= 0.294 GR**= 0.316
Low Price	CH, LA, BC	0.002	0.270	0.225	CH*= 0.489
Low Price	BC, LA, GR	0.003	0.260	0.213	GR*= 0.476
Low Price	BC, GR	0.002	0.221	0.189	GR*=0.446
Low Price	BC, CH	<0.001	0.268	0.239	CH*= 0.488

Table 5-3: Regression runs for Ankara firms with environmental variables as independent variables and Low Price as the dependent variable

Quality: For Quality, concerns on "Governmental Regulations", "Competitive Hostility" and "Dynamism (Obsolescence)" are found to be significant predictors depending on the sample drawn from firms in Ankara. For the data gathered from firms of ISO500 list, "Business Cost" and "Governmental Regulations" seem to have the most significance in determining the Quality priority for the manufacturing function of firms. Models are all significant at 0.10 level at most. The models we tested for ISO500 firms are also significant at most at 0.10 level for this section.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Quality	All possible environmental variables	0.006	0.336	0.241	GR*= 0.413
Quality	LA, CH	0.083	0.097	0.060	CH**= 0.309
Quality	GR, LA	0.002	0.236	0.204	GR*= 0.491
Quality	DO, CH	0.014	0.162	0.127	CH**= 0.273 DO**= 0.274

Table 5-4: Regression runs for Ankara firms with environmental variables as independent variables and Quality as the dependent variable

Delivery: Ankara data yield the following results indicated in the table below. Delivery priority is predicted by the concerns regarding "Competitive Hostility" and "Dynamism (Obsolescence)". Data from ISO500 firms yield that "Competitive Hostility", "Business Cost", "Governmental Regulations" and "Dynamism (Obsolescence)" have relationships with the Delivery priority. There are more factors affecting the choice of Delivery as a priority according to recently collected data. Models run for ISO500 data are found to be more significant than the ones run for Ankara data.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Delivery	All possible environmental variables	0.085	0.228	0.115	DO**= 0.323
Delivery	CH, LA, BC	0.090	0.128	0.072	CH**= 0.292
Delivery	CH, LA	0.067	0.107	0.070	CH**= 0.310
Delivery	BC, CH	0.055	0.111	0.075	CH**= 0.285

Table 5-5: Regression runs for Ankara firms with environmental variables as independent variables and Delivery as the dependent variable

Flexibility: When it comes to Flexibility choice of firms in Ankara, "Dynamism (Volume/Price)" and "Dynamism (Obsolescence)" seem to be significant predictors for this particular manufacturing priority choice. The same priority for ISO500 firms is affected by concerns on environmental variables of "Dynamism (Obsolescence)", "Governmental Regulations", "Competitive Hostility" and less significantly by "Dynamism (Volume/Price)". F-tests for this section yield less significant results for Ankara data than for ISO500 data.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Flexibility	All possible environmental variables	**0.104**	0.217	0.103	None significant at less than 0.10 level
Flexibility	BC, CH	**0.104**	0.088	0.051	CH***= 0.246
Flexibility	BC, GR	0.057	0.112	0.075	GR**= 0.307
Flexibility	DO, DVP, GR, BC	0.047	0.193	0.119	DVP***= 0.252
Flexibility	DO, DVP	0.015	0.166	0.130	DVP***= 269 DO***= 0.261
Flexibility	GR, DO, DVP	0.022	0.192	0.138	DVP***= 0.245
Flexibility	CH, DO, DVP	0.030	0.178	0.123	DVP***= 0.250 DO***= 0.250
Flexibility	BC, CH, DO, DVP	0.064	0.180	0.105	DVP***= 0.259 DO***= 0.259

Table 5-6: Regression runs for Ankara firms with environmental variables as independent variables and Delivery as the dependent variable

Broad Line: Regressions in this section generally yield nonsignificant results as to the model itself. Only significant equation, which is significant at 0.10 level, result

with the significance of "Governmental Regulations" predicting Broad Line priority at 0.10 level. Corresponding beta coefficient for "Governmental Regulations" is 0.248.

ISO500 data yield more useful models according to F-tests, and "Dynamism (Obsolescence)" and "Governmental Regulations" seem to have predictive power as to Broad Line for this data set.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Broad Line	All possible environmental variables	**0.178**	0.187	0.069	GR**= 0.370 LA***= -0.251
Broad Line	GR, DO, DVP	**0.100**	0.128	0.070	GR***= 0.284
Broad Line	GR	0.080	0.061	0.042	GR***= 0.248
Broad Line	CH, DO, DVP	**0.428**	0.059	-0.004	None significant at less than 0.10 level

Table 5-7: Regression runs for Ankara firms with environmental variables as independent variables and Broad Line as the dependent variable

After Sales: "Dynamism (Obsolescence)" comes out as a significant independent variable that predicts After Sales manufacturing task. ISO500 data set yields different results for this section. "Governmental Regulations" and "Competitive Hostility" are significant predictors according to ISO500 data as a result of more significant models compared to models run with Ankara data.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
After Sales	All possible environmental variables	**0.138**	0.207	0.088	None significant at less than 0.10 level
After Sales	CH, DVP, DO	**0.113**	0.125	0.066	DO**= 0.319
After Sales	GR, DVP, DO	0.047	0.163	0.106	DO***= 0.274
After Sales	GR, DO	0.021	0.157	0.120	DO**= 0.291
After Sales	DVP, DO	0.049	0.125	0.087	DO**= 0.319

Table 5-8: Regression runs for Ankara firms with environmental variables as independent variables and After Sales as the dependent variable

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	BC	LA	CH	GR	DVP	DO
LP	0.251**		**0.294****	**0.316****		0.213***
Q	0.303**			0.317*** **0.413***		
F				0.395**		0.324*
D	0.229***		0.314**			0.202*** **0.323****
A						
B				0.345***		0.336***

Beta coefficients in boldface numbers are for Ankara data
Beta coefficients in regular numbers are for ISO500 data

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 5-9: Summaries of resulting beta coefficients of environmental variables as predictors for manufacturing strategy choices for Ankara data compared to ISO500 data

5.2 Business Environment- Competitive Strategy

In this section, we are testing business environmental factors as predictors for competitive strategy choices for Ankara data.

Cost Leadership: Concerns for "Competitive Hostility" and "Governmental Regulations" are significant predictors for Cost Leadership strategy. "Business Cost", "Governmental Regulations" and "Competitive Hostility" are significant predictors for Cost Leadership according to ISO500 data. It is an interesting finding that "Business Cost" concern is not a significant predictor for Cost Leadership strategy when it is tested with Ankara data.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Cost Leadership	All possible environmental variables	**0.281**	0.156	0.035	None significant at less than 0.10 level
Cost Leadership	CH. LA, BC	0.062	0.141	0.087	CH*= 0.377
Cost Leadership	CH, BC	0.016	0.153	0.120	CH*= 0.394
Cost Leadership	BC, GR	0.046	0.118	0.082	GR*= 0.346
Cost Leadership	LA, GR	0.032	0.134	0.098	GR*= 0.360

Table 5-10: Regression runs for Ankara firms with environmental variables as independent variables and Cost Leadership as the dependent variable

Market Differentiation: "Governmental Regulations" "Dynamism (Obsolescence)" and "Business Cost" and "Competitive Hostility" seem to predict this strategy. "Business Cost" has a negative beta coefficient, meaning the higher the concern for "Business Cost", the less likely the choice for Market Differentiation. Same environmental variable is a significant and positively associated factor according to ISO500 data results. F-tests for this set of data gathered in Ankara indicate the regression equations are significant. ISO500 data set also yields significant regression equations for this variable.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Market Differentiation	All possible environmental variables	0.011	0.328	0.227	BC**= -0.343 DO***= 0.276 GR***= 0.257
Market Differentiation	DO, CH, BC	0.028	0.181	0.126	CH**= 0.287 DO***= 0.259 BC***= -0.242
Market Differentiation	DO, CH	0.045	0.126	0.088	CH***= 0.264

Table 5-11: Regression runs for Ankara firms with environmental variables as independent variables and Differentiation (Market orientation) as the dependent variable

Technology Differentiation: This strategy is predicted by concerns on "Dynamism (Volume/Price)" and "Business Cost". "Business Cost" is negatively associated with this Differentiation dimension as well. This is also a very interesting result compared to ISO500 data results, because "Business Cost" is a positively associated significant predictor for ISO500 list firms. Models are significant for Ankara data set as well as for ISO500 data set.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Technology Differentiation	All possible environmental variables	0.004	0.354	0.262	BC*= -0.365 DVP**= 0.300 LA***= -0.226
Technology Differentiation	DVP, LA, BC	0.005	0.238	0.189	DVP*= 0.428 BC**= -0.279
Technology Differentiation	DVP, BC	0.002	0.218	0.186	DVP*= 0.462 BC**= -0.266

Table 5-12: Regression runs for Ankara firms with environmental variables as independent variables and Differentiation (Technology orientation) as the dependent variable

	BC	LA	CH	GR	DVP	DO
CL	0.236***					
MD	**-0.343****			0.392** **0.257*****		0.207*** **0.276*****
TD	0.270** **-0.365***	**-0.226*****		0.356**	**0.300****	0.236***

Beta coefficients in boldface numbers are for Ankara data
Beta coefficients in regular numbers are for ISO500 data

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 5-13: Summaries of resulting beta coefficients of environmental variables as predictors for competitive strategy choices for Ankara data compared to ISO500 data

5.3 Competitive Strategy- Manufacturing Strategy

In the following section, business level strategies are tested as predictors for manufacturing priorities of firms in Ankara. Comparison with ISO500 data will also be provided.

Low Price: Cost Leadership strategy is a significant predictor of Low Price priority. This fact is in line with literature and also common sense. However, Market Differentiation is found as a significant predictor along with Cost Leadership for Low Price priority according to Ankara data. Technology Differentiation is also found significant for Low Price. This might be due to the significant correlations between all the business strategies for Ankara firms. According to ISO500 firms data, Market Differentiation and Cost Leadership strategies are significant predictors for Low Price priority. Significance levels of the models for Ankara data are small as well as for ISO500 data. They are all significant at 0.01 level.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Low Price	MD, TD, CL	<0.001	0.391	0.352	CL*= 0.520 MD***= 0.280
Low Price	MD, CL	<0.001	0.417	0.393	CL*= 0.505 MD**= 0.277
Low Price	CL	<0.001	0.368	0.356	CL*= 0.607
Low Price	MD, TD	0.003	0.220	0.187	TD***= 0.309

Table 5-14: Regression runs for Ankara firms with competitive strategy variables as independent variables and Low Price as the dependent variable

Quality: Differentiation on the basis of Market and also Differentiation on the basis of Technology both are significant predictors for Quality. Cost Leadership, as opposed to the results of ISO500 data, seems not to have a significant affect on Quality priority selection of firms in Ankara. Significance levels for both data sets are small indicating high significance.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Quality	MD, TD, CL	<0.001	0.402	0.362	MD**= 0.343 TD***= 0.340
Quality	TD, MD	<0.001	0.400	0.375	TD**= 0.370 MD**= 0.337
Quality	TD	<0.001	0.345	0.332	TD*= 0.588
Quality	CL, MD	<0.001	0.363	0.337	MD*= 0.509

Table 5-15: Regression runs for Ankara firms with competitive strategy variables as independent variables and Quality as the dependent variable

Delivery: Cost Leadership turns out to be a predictor for Delivery priority for Ankara firms. However, Differentiation variables are the significant predictors for ISO500 data. Significance levels for Ankara data are large, indicating less significance compared to ISO500 data results.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Delivery	MD, TD, CL	**0.169**	0.103	0.044	CL***= 0.302
Delivery	CL, MD	0.044	0.122	0.086	CL***= 0.281
Delivery	CL, TD	0.059	0.111	0.074	CL***= 0.295

Table 5-16: Regression runs for Ankara firms with competitive strategy variables as independent variables and Delivery as the dependent variable

Flexibility: Differentiation on the basis of Market and Differentiation on the basis of Technology are the significant predictors for Flexibility priority. For ISO500 data, more significantly Market Differentiation and also Technology Differentiation turn out to be predictors for Flexibility. Significance levels are small indicating high significance for both data sets.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Flexibility	CL, MD, TD	<0.001	0.401	0.361	MD**= 0.373 TD***= 0.330
Flexibility	TD, MD	<0.001	0.401	0.375	MD**= 0.372 TD**= 0.335
Flexibility	CL, MD	<0.001	0.380	0.354	MD*= 0.548

Table 5-17: Regression runs for Ankara firms with business strategy variables as independent variables and Flexibility as the dependent variable

Broad Line: Market Differentiation and less significantly Technology Differentiation are the resulting predictors for Broad Line manufacturing task. The same is true for ISO500 data as well. Significance levels for Ankara data are less than for ISO500 data.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
Broad Line	CL, MD, TD	0.001	0.312	0.267	MD*= 0.505
Broad Line	CL, MD	<0.001	0.329	0.301	MD*= 0.536
Broad Line	TD, CL	0.008	0.184	0.150	TD**= 0.415
Broad Line	TD, MD	<0.001	0.308	0.278	MD*= 0.495

Table 5-18: Regression runs for Ankara firms with competitive strategy variables as independent variables and Broad Line as the dependent variable

After Sales: Cost Leadership turns out to be significant for this priority. It is interesting since it is a service that increases costs and it is expected to have Market Differentiation strategy of the business unit behind After Sales priority of a manufacturing unit. Regression equations with Differentiation as the independent variable turn out nonsignificant. Following are the significant models for After Sales according to Ankara data. Market Differentiation is the significant factor in predicting After Sales priority for ISO500 data. Moreover, ISO500 data models give more significant results as to After Sales.

Dependent	Independent	F-significance	R^2	Adjusted R^2	Beta Coefficients
After Sales	CL, TD, MD	0.049	0.158	0.102	CL*= 0.495 TD**= -0.424
After Sales	CL, TD	0.030	0.138	0.102	CL*= 0.499

Table 5-19: Regression runs for Ankara firms with business strategy variables as independent variables and After Sales as the dependent variable

	CL	MD	TD
LP	**0.520***	0.491* **0.280****	
Q		0.384* **0.343****	0.258** **0.340****
D	**0.302****	0.374*	0.381*
F		0.634* **0.373****	**0.330****
A	**0.495***	0.427*	**-0.424****
B		0.325*** **0.505***	

Beta coefficients in boldface letters are for Ankara data
Beta coefficients in regular letters are for ISO500 data

* Independent variable significant at 0.01 level
** Independent variable significant at 0.05 level
*** Independent variable significant at 0.10 level

Table 5-20: Summaries of resulting beta coefficients of competitive strategy variables as predictors for manufacturing strategy choices for Ankara data compared to ISO500 data

CHAPTER 6

CONCLUSIONS AND FUTURE WORK

In this study, we analyze the data of firms selected from ISO500 list of year 2003 and the data from a convenience sample obtained previously on local firms. We focus on the relationships of business environment, competitive strategy and manufacturing strategy. We employ a questionnaire that was prepared depending on the relevant literature and similar studies in the area to gather data. A total of 58 firms filled in and returned the survey back. The local data contained 53 firms and was analyzed as an attempt to identify the differences of the national versus local firms if any.

According to the literature, we expect to find significant relationships between business environment, competitive strategy and manufacturing strategy as results of regressions we performed to analyze the data. Specifically, we search for the causal relationship between environment and competitive strategy, environment and

manufacturing strategy, and competitive strategy and manufacturing strategy.

As a result, our findings indicate that all of the relationships we expected to find are realized. One significant relationship between environment and strategies in both levels is enough to reject the hypothesis that beta coefficients are zero for the regression equations tested. We have found at least one significant relationship between the variables we are interested among the regression equations we tested.

Specifically; Business Costs, Competitive Hostility and Dynamism (Obsolescence) are the factors that affect Low Price priority for ISO500 firms whereas Governmental Regulations and Competitive Hostility are the significant predictors for Ankara firms. Amoako-Gyampah (2003) also found significant relationships between Competitive Hostility and Business Costs with Low Price. Thus, this finding is in line with the literature. For Quality, Governmental Regulations and Business Costs are significant predictors according to ISO500 data. Ankara data also indicates the significance of Governmental Regulations on Quality priority choice. Competitive Hostility was found as the significant predictor for Quality priority by Amoako-Gyampah (2003). As to Flexibility priority choice, Governmental Regulations and Dynamism (Obsolescence) are found significant predictors for ISO500 data, whereas none of the environmental variables turns out significant when all variables are entered as independent variables. However, Dynamism (Volume/Price) and Dynamism (Obsolescence) are found significant when some subsets of those variables are

entered as predictors for Flexibility choice. Competitive Hostility was found significant in Amoako-Gyampah's (2003) study for this priority. For Delivery priority, Business Costs, Competitive Hostility and Dynamism (Obsolescence) are found as significant predictors according to ISO500 data. Dynamism (Obsolescence) and Competitive Hostility seem to effect the choice of Delivery priority for Ankara firms. Amoako-Gyampah found Business Costs and Labor Availability as significant predictors of Delivery dependability priority for manufacturing firms in Ghana. After Sales priority does not have any significant predictors of environmental variables when all possible variables are entered in the regression equations both for ISO500 and Ankara data. For Broad Line, Governmental Regulations and Dynamism (Obsolescence) are significant predictors according to data of ISO500 firms. However, Ankara data revealed a nonsignificant model for Broad Line priority when all possible environmental variables are entered in the equation.

When environmental variables are tested as predictors of competitive strategy choices, Business Costs are found as the predictor for Cost Leadership strategy. This is a logical finding and it was expected due to the common sense. Governmental Regulations and Dynamism (Obsolescence) are found as significant predictors for Differentiation (Market orientation) strategy according to ISO500 data. Along with the positive relationships of Differentiation (Market orientation) and these two environmental variables, Business Costs are found to have a negative relationship with Differentiation (Market orientation) for Ankara data. Ward and Duray (2000)

found a positive significant relationship between Environmental Dynamism and Differentiation. As to Differentiation (Technology orientation); Business Costs, Governmental Regulations and Dynamism (Obsolescence) are found as significant and positively related predictors for this competitive strategy for ISO500 data. However, Business Costs and Labor Availability are found as negatively related significant predictors for Differentiation (Technology orientation) for Ankara data. This might be caused by the fact that technology requires skilled labor and relatively small sized local companies have some difficulty to employ those employees.

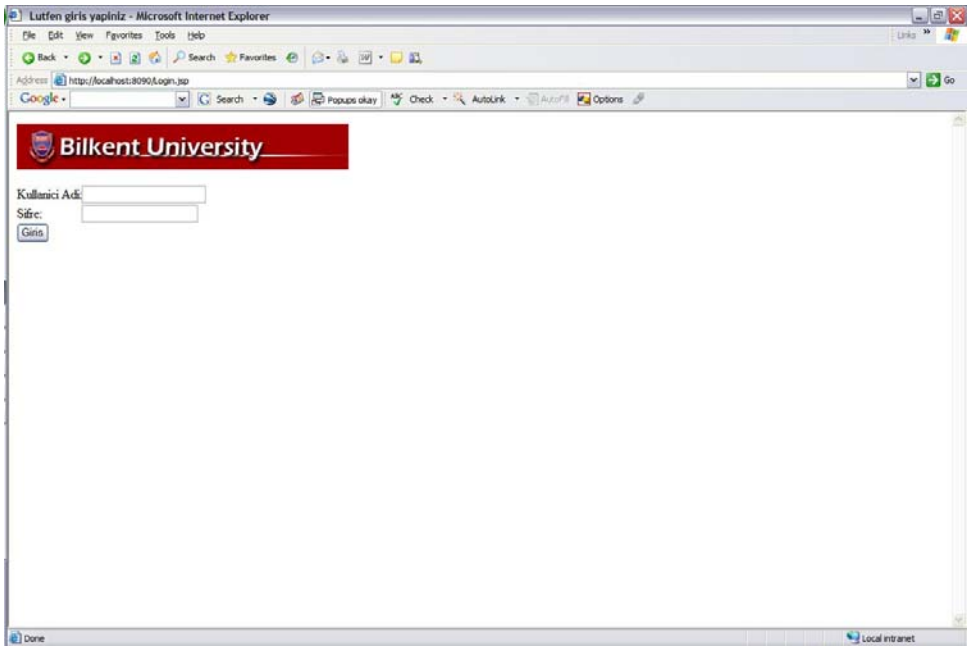
When we analyze the relationships between competitive strategy and manufacturing strategy relationship, we found that Cost Leadership is a predictor for Low Price, Delivery and After Sales according to Ankara data whereas it has no significant effect on manufacturing strategy choices for ISO500 firms. Differentiation (Market orientation) is a significant predictor for all of the manufacturing strategy choices we employed according to ISO500 data. This competitive strategy has significant relationships with Low Price, Quality, Flexibility and Broad Line priorities according to Ankara data. Lastly, Differentiation (Technology orientation) is a significant predictor for Quality and Delivery priorities according to ISO500 data whereas it has significant relationships with Quality, Flexibility and After Sales priorities according to Ankara data.

We have several drawbacks and limitations about our research. Limited sample size is

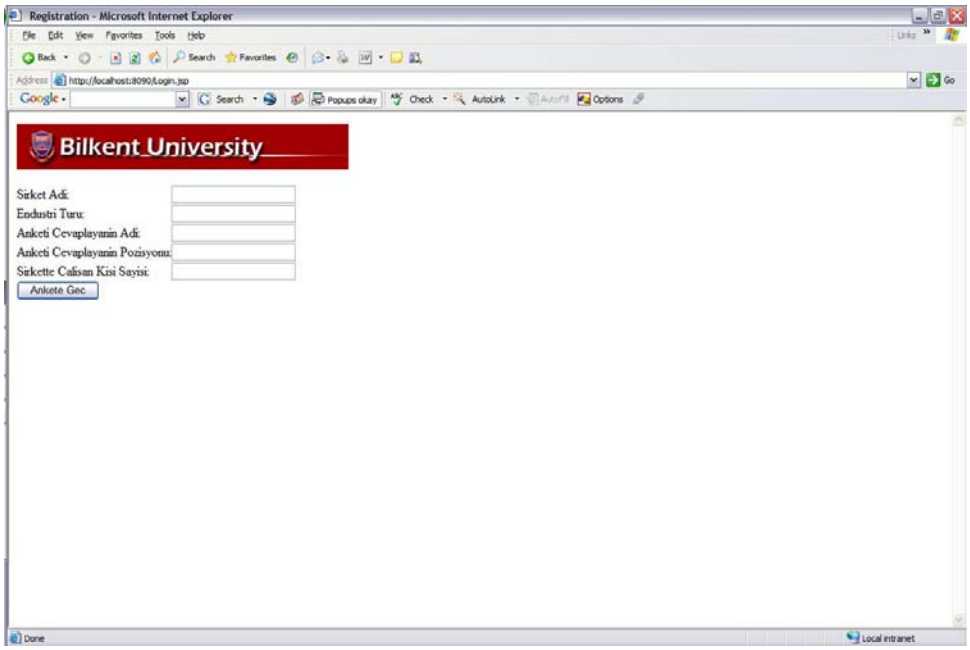
one of them. We aimed at expanding the sample size to at least 100. However, the reluctance of the companies caused us to stick to 58 firms' answers for this study. We planned to use path analytic methodology as we started this project, but the sample size did not allow us for conducting such a study given the complexity of our model as a result of high number of variables employed. As a future work, it is possible to repeat this study with higher number of firms. Chamber of Industry organizations of the industrialized cities in Turkey might be incorporated for the future study to increase the sample size. Moreover, it can be interesting to make comparisons with the data on hand if another round of this survey can be carried out to come up with longitudinal data like IMSS project data.

Data collection phase lasted 6 months because of the reluctance of the firms to respond to the questionnaire. Firms were probed several times to increase the sample size to a decent amount. It would be preferable to have the answers within a shorter time period like a few months to consider them in a certain time frame. Research that contain environment would rather be controlled to get the answers quicker than six months since it is a long time for measuring the environmental variables. However, we assume environmental concerns are not that volatile.

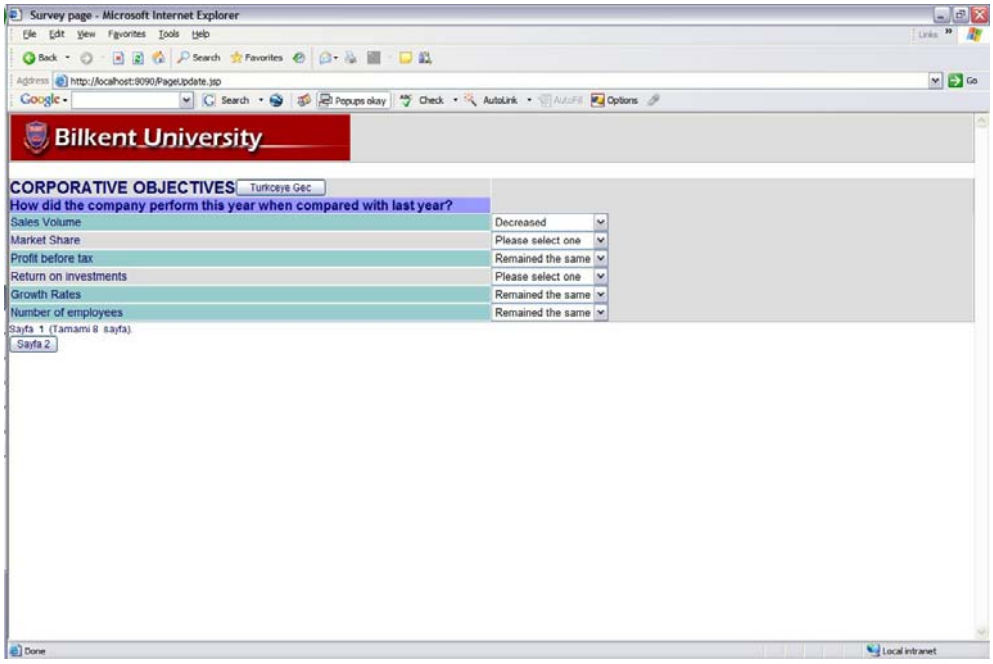
APPENDIX I Screenshots from the survey on the Internet



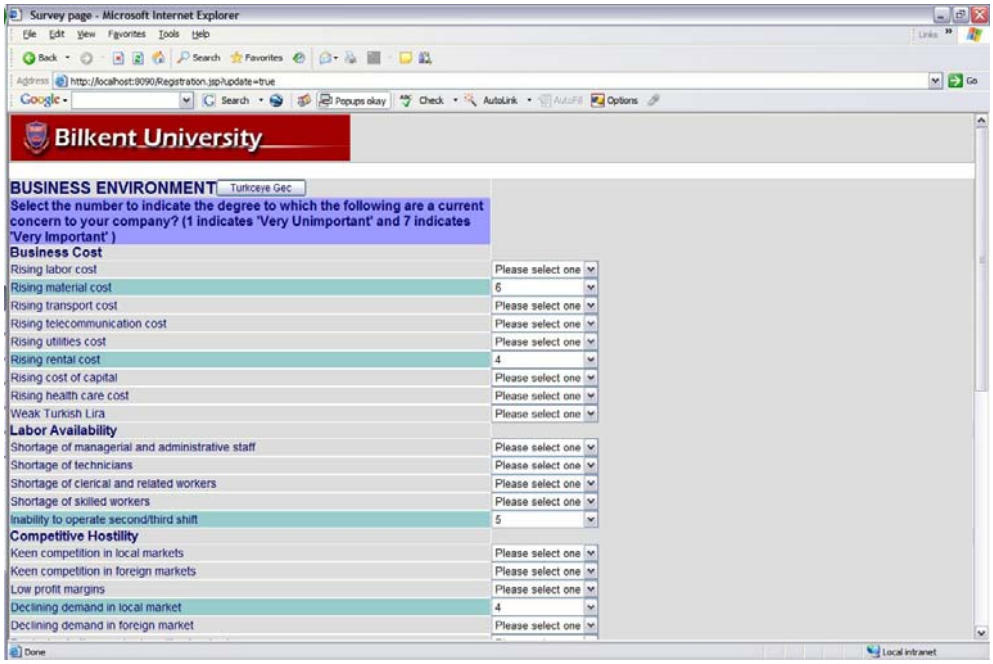
Login page



Respondent profile page



Corporate Objectives page



Sample Body page

APPENDIX II Survey Instrument

BİLKENT ÜNİVERSİTESİ, İŞLETME FAKÜLTESİ

TÜRKİYE'DEKİ FİRMALARIN İMALAT STRATEJİLERİ ANKETİ

Sayın İlgili,

Bilkent Üniversitesi İşletme Fakültesi'nde yürütülmekte olan Türkiye'deki Firmaların İmalat Stratejileri konulu tez çalışması kapsamında konuyla ilgili bir anket düzenlenmiştir. Ankete katılması planlanan şirketler İstanbul Sanayi Odası'nın her sene yayınladığı "Türkiye'nin 500 Büyük Sanayi Kuruluşu" listelerinden seçilmiştir. Şirketiniz de bu listede yer almış olup, anketle ilgili olarak daha önceden bilgilendirilmiştir. Anketi cevaplayacak kişi şirketin üretimden sorumlu kişisi olmalıdır. Bu bağlamda, bahsi geçen anketi cevaplayan kişinin siz değil de bir başkası olması gerektiğini düşünüyorsanız ilgili şahsa ulaştırılmasının gereğini belirtmek istiyor ve bu hususta yardımınızı rica ediyoruz.

Anket 2005 yılı içerisinde tamamlanmalıdır. Soruların cevaplanması yarım saat civarında vaktinizi alacaktır. Bu konuda göstereceğiniz hassasiyet için şimdiden teşekkür ediyoruz.

Sözkonusu anket, tümüyle akademik amaçlıdır. Verilen cevaplar anonim kalacak, kesinlikle üçüncü şahıslarla paylaşılmayacak, şirket bilgilerinin mahremiyetine titizlik gösterilecektir.
Anketi samimi bir şekilde cevaplamak konusunda göstereceğiniz özen ve ayıracağınız zaman için teşekkürlerimizi sunuyoruz. Anket hakkında sormak istediğiniz herhangi bir sorunuz olduğu takdirde, aşağıda belirtilen iletişim bilgilerini kullanabileceğinizi hatırlatır, saygılar sunarız.

İletişim: mfg2005@bilkent.edu.tr

Yrd. Doç. Dr. Emre Berk
Bilkent Üniversitesi
İşletme Fakültesi

Tel: +90 312 290 2413
Faks: +90 312 266 4958

Yük. Lis. Öğr. Çiğdem Ataseven
Bilkent Üniversitesi
İşletme Fakültesi

Tel: +90 312 290 2817
Faks: +90 312 266 4958

İMALAT STRATEJİLERİ ANKETİ

Şirketin adı:
Endüstri türü:
Anketi cevaplayanın adı:
Anketi cevaplayanın pozisyonu:
Şirkette çalışan kişi sayısı:

İŞLETME HEDEFLERİ

Şirketiniz geçen yılla karşılaştırıldığında nasıl bir performans sergiledi?
(Soruya karşılık gelen cevaplardan birini daire içine alınız.)

Satış hacmi	Arttı / Aynı kaldı / Azaldı
Pazar payı	Arttı / Aynı kaldı / Azaldı
Vergiden önceki k*ar*	Arttı / Aynı kaldı / Azaldı
Yatırım getirisi (ROI)	Arttı / Aynı kaldı / Azaldı
Büyüme oranı	Arttı / Aynı kaldı / Azaldı
Calışan sayısı	Arttı / Aynı kaldı / Azaldı

İŞ ORTAMI

Aşağıdaki etkenlerin sirketiniz için halen arzettiği önemi rakamları daire içine alarak belirtiniz.	Çok önemsiz						Çok önemli	N/A
İş yapma maliyeti								
Artan işgücü maliyeti	1	2	3	4	5	6	7	9
Artan malzeme maliyeti	1	2	3	4	5	6	7	9
Artan nakliye maliyeti	1	2	3	4	5	6	7	9
Artan haberleşme maliyeti	1	2	3	4	5	6	7	9
Artan elektrik/su vb. maliyeti	1	2	3	4	5	6	7	9
Artan kira maliyeti	1	2	3	4	5	6	7	9
Sermaye maliyetindeki artış	1	2	3	4	5	6	7	9
Artan sağlık harcamaları	1	2	3	4	5	6	7	9
Türk Lirası'nın reel değeri	1	2	3	4	5	6	7	9
İşgücü arzı								
İdari personel arzı yetersizliği	1	2	3	4	5	6	7	9
Teknisyen arzı yetersizliği	1	2	3	4	5	6	7	9
Memur/büro elemanı arzı yetersizliği	1	2	3	4	5	6	7	9
Vasıflı işçi arzı yetersizliği	1	2	3	4	5	6	7	9
İkinci ve/ya üçüncü vardiya çalıştıramama	1	2	3	4	5	6	7	9
Rekabet								
Yerel/yurtiçi pazarlardaki yoğun rekabet	1	2	3	4	5	6	7	9
Yabancı/yurtdışı pazarlardaki yoğun rekabet	1	2	3	4	5	6	7	9
Düşük kar marjları	1	2	3	4	5	6	7	9
Yerel pazarda düşen talep	1	2	3	4	5	6	7	9
Yabancı pazarda düşen talep	1	2	3	4	5	6	7	9
Belirli kalite standartlarında üretme zorunluğu	1	2	3	4	5	6	7	9
Tedarikçi kalitesine güvensizlik	1	2	3	4	5	6	7	9
Tedarikçi teslimatına güvensizlik	1	2	3	4	5	6	7	9
Rakiplerin geniş ürün gamı/yelpazesi	1	2	3	4	5	6	7	9
Özellikle üstün kaliteli ithalatın yarattığı tehdit	1	2	3	4	5	6	7	9
Özellikle düşük fiyatlı ithalatın yarattığı tehdit	1	2	3	4	5	6	7	9
Hukuki çevre								
Özel vergilerin mevcudiyeti	1	2	3	4	5	6	7	9
İthalat/ihracat tarife ve kotaların mevcudiyeti	1	2	3	4	5	6	7	9
Sübvansiyonların mevcudiyeti	1	2	3	4	5	6	7	9
Çevre kirliğini önlemeye yönelik mevzuat/yönetmelikler	1	2	3	4	5	6	7	9
Geri kazanıma (recycling) yönelik mevzuat/yönetmelikler	1	2	3	4	5	6	7	9

Dinamizm (Fiyat vb.)

Fiyatlarda indirim sıklığı	1	2	3	4	5	6	7	9
Fiyatlarda indirim derinliği	1	2	3	4	5	6	7	9
Satış hacminde dalgalanmalar/hareketlilik	1	2	3	4	5	6	7	9
Sipariş iptalindeki sıklık	1	2	3	4	5	6	7	9
Sipariş miktarınıın değişmesindeki sıklık	1	2	3	4	5	6	7	9

Dinamizm

Aşağıdaki etkenlerin önümüzdeki iki yılda ne oranda değişeceğini belirtiniz:	Yavaş						Hızlı	N/A
Ürün ve hizmetlerin modasının geçmesinin hızı	1	2	3	4	5	6	7	9
Yeni ürün ve hizmetlerdeki innovasyon (yenilikçilik) hızı	1	2	3	4	5	6	7	9
Yeni üretim süreçlerindeki innovasyon hızı	1	2	3	4	5	6	7	9
Bulunduğunuz sanayideki müşterilerin beğeni ve tercihlerinin değişme hızı	1	2	3	4	5	6	7	9

Rekabet Stratejisi

Aşağıdaki rekabet stratejilerini en önemliden en az önemliye doğru sıralayınız	En önemli			Orta		En önemsiz		N/A
Maliyet/fiyat lliderliği	1	2	3	4	5	6	7	9
Teknoloji yönelimi temelinde farklılaşma	1	2	3	4	5	6	7	9
Pazar yönelimi temelinde farklılaşma	1	2	3	4	5	6	7	9

Aşağıdaki strateji yöntemlerini işletme stratejisi gerçekleştirebilmedeki önemlerine göre sıralayınız	Hiç önemi yok					Kritik önemde		N/A
Maliyet Liderliği								
İşletme verimliliği	1	2	3	4	5	6	7	9
Rekabetçi fiyatlandırma	1	2	3	4	5	6	7	9
Hammaddelerin düşük fiyatla temini	1	2	3	4	5	6	7	9
Ürün maliyetini düşürme	1	2	3	4	5	6	7	9
Dış finansmanı en aza indirme	1	2	3	4	5	6	7	9
Ürün özelliklerinin sayısını azaltma	1	2	3	4	5	6	7	9
Hammaddelerin düşük maliyete alımı	1	2	3	4	5	6	7	9
Kalite esaslı tedarikçi seçimi	1	2	3	4	5	6	7	9
Üretimde kullanılan parçaların standardizasyonu	1	2	3	4	5	6	7	9

Farklılaşma

Teknolojik yönelim

Üretim planlama tekniklerinin gelişmişliği	1	2	3	4	5	6	7	9
Manüel kalite güvencesi sağlama tekniklerinin gelişmişlik düzeyi	1	2	3	4	5	6	7	9
Bilgisayarlı kalite güvencesi sağlama tekniklerinin gelişmişlik düzeyi	1	2	3	4	5	6	7	9
Kapasite değişikliklerinin sıklığı	1	2	3	4	5	6	7	9
İmalat süreçlerinde yenilikçiliğe (innovasyona) verilen önem	1	2	3	4	5	6	7	9
Özel kullanımlı/ihtisaslaşmış ekipmana verilen önem	1	2	3	4	5	6	7	9

Aşağıdaki strateji yöntemlerini işletme stratejisi gerçekleştirebilmedeki önemlerine göre sıralayınız	Hiç yok	önemi				Kritik önemde		N/A
Pazar yönelimi								
Genel kullanımlı/ihtisaslaşmamış ekipmana verilen önem	1	2	3	4	5	6	7	9
Kapasite boşluğu/fazlası düzeyi	1	2	3	4	5	6	7	9
Çıkan mamul kalitesine verilen önem	1	2	3	4	5	6	7	9
Üstün ürün performansı ve güvenilirliğine verilen önem	1	2	3	4	5	6	7	9
Nihai ürün çeşitliliği	1	2	3	4	5	6	7	9
Siparişe göre ürün yapma düzeyi	1	2	3	4	5	6	7	9
Tesis odagı düzeyi (satış bölgesi)	1	2	3	4	5	6	7	9
Tesis odagı düzeyi (üretim sürecine göre)	1	2	3	4	5	6	7	9
Tesis odagı düzeyi (ürün grubuna göre)	1	2	3	4	5	6	7	9
Geniş dağıtım kanallarına verilen önem	1	2	3	4	5	6	7	9
Bitmiş ürün stoklarının yüksek tutulmasına verilen önem	1	2	3	4	5	6	7	9
Yeni ürün ve hizmetler geliştirmeye verilen önem	1	2	3	4	5	6	7	9
Pazarlama teknik ve yöntemerinde yenilik (innovasyon)	1	2	3	4	5	6	7	9
Yeni ürün ve hizmetleri orijinal geiştirici olarak piyasaya sürme	1	2	3	4	5	6	7	9
Yeni ürün ve hizmetleri lisansör olarak piyasaya sürme	1	2	3	4	5	6	7	9

İmalat Stratejisi

Şirketinizin rekabetçi kalmak için önümüzdeki yıllarda aşağıdakilere verdiği önemi belirtiniz	Hiç önemli değil					Çok önemli		N/A
Düşük maliyet								
Ürün birim maliyetini düşürme	1	2	3	4	5	6	7	9
Malzeme maliyetlerini düşürme	1	2	3	4	5	6	7	9
Genel giderleri düşürme	1	2	3	4	5	6	7	9
Birim üründeki doğrudan işgücü maliyetini düşürme	1	2	3	4	5	6	7	9
Maliyetleri düşürmek için ürün çeşitliliğini azaltma	1	2	3	4	5	6	7	9
Maliyetleri düşürmek için ölçek ekonomilerini kullanma	1	2	3	4	5	6	7	9
Tedarikçileri maliyet esasında seçme	1	2	3	4	5	6	7	9
Maliyetleri düşürme amacıyla yeni ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9
Maliyetleri düşürme amacıyla eski/mevcut ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9
Malzeme verimliliğini artırma	1	2	3	4	5	6	7	9
Kapasite kullanımını artırma	1	2	3	4	5	6	7	9
Otomasyon yoluyla işgücü verimliğini artırma	1	2	3	4	5	6	7	9
Bitmiş ürün stok düzeylerini azaltma	1	2	3	4	5	6	7	9
İşlenmekte olan ara mamul (WIP) stok düzeylerini azaltma	1	2	3	4	5	6	7	9
Hammadde stok düzeylerini azaltma	1	2	3	4	5	6	7	9
Maliyeti düşürmek için bigisayar destekli tasarım ve üretim (CAD/CAM) kullanma	1	2	3	4	5	6	7	9
Halihazırda dışarıdan alınan parça ve komponentleri işletmenin kendisinin üretmesi	1	2	3	4	5	6	7	9
İşçilere daha çok karar yetkisi vererek verimliliği artırma	1	2	3	4	5	6	7	9
Kullanılan parça ve komponentlerin müşterekliğini artırma	1	2	3	4	5	6	7	9
İşletme maliyetlerini düşürmek üzere üretim yerleşimi seçme	1	2	3	4	5	6	7	9
Ürün özelliklerini azaltma	1	2	3	4	5	6	7	9

Kalite								N/A
Hatalı ürün oranını azaltma	1	2	3	4	5	6	7	9
Tedarikçi kalitesini artırma	1	2	3	4	5	6	7	9
Kalite Halkaları uygulaması	1	2	3	4	5	6	7	9
ISO 9000 sertifikasyonu	1	2	3	4	5	6	7	9
Ürün performans ve güvenilirliğini artırma	1	2	3	4	5	6	7	9
İstatistiksel süreç kontrol tekniklerini kullanma	1	2	3	4	5	6	7	9
Gerçek zamanlı süreç kontrol tekniklerini kullanma	1	2	3	4	5	6	7	9
Kaliteyi artırma amacıyla yeni ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9
Kaliteyi artırma amacıyla eski/mevcut ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9
Üretim ekipmanını güncelleme	1	2	3	4	5	6	7	9
Kaliteyi artırma amacıyla tedarikçi sayısını azaltma	1	2	3	4	5	6	7	9
Hatalı ürün oranını düşürme amacıyla ürün çesitliliğini azaltma	1	2	3	4	5	6	7	9
İşletmede sahip olunan teknik deneyim düzeyini artırma	1	2	3	4	5	6	7	9
Kalite düzeyini artırmak için bigisayar destekli tasarım ve üretim (CAD/CAM) kullanma	1	2	3	4	5	6	7	9
Kaliteyi artırmak amacıyla insan gücü yerine otomasyona geçme	1	2	3	4	5	6	7	9
Esneklik								
Üretim süresini kısaltma	1	2	3	4	5	6	7	9
Tedarik süresini kısaltma	1	2	3	4	5	6	7	9
Kurma/kalıp değiştirme süresini kısaltma	1	2	3	4	5	6	7	9
Üretim planlarında değişiklik yapabilme	1	2	3	4	5	6	7	9
Mühendislik/tasarım değişikliği emri (engıneering change order) sayısını azaltma	1	2	3	4	5	6	7	9
Esnekliği artırma amacıyla CAD/CAM kabiliyetini geliştirme	1	2	3	4	5	6	7	9
Tedarikçi esnekliğini artırma	1	2	3	4	5	6	7	9
Piyasaya yeni ürün sürme zamanının azaltılması	1	2	3	4	5	6	7	9
Yeni ürün geliştirme zamanının azaltılması	1	2	3	4	5	6	7	9
Esnekliği artırma amacıyla yeni ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9
Esnekliği artırma amacıyla eski/mevcut ürünler için yeni üretim süreçleri geliştirme	1	2	3	4	5	6	7	9

Esnekliği artırmak için kullanılan parça/komponentlerde standardizasyon	1	2	3	4	5	6	7	9
Üretim sırasında işlerin önceliğini değiştirebilme kabiliyeti	1	2	3	4	5	6	7	9
Üretim sırasında işlerin yüklemesini değiştirebilme kabiliyeti	1	2	3	4	5	6	7	9
Tasarım değişiklikleriyle başa çıkma	1	2	3	4	5	6	7	9
Üretim hacmini artırabilmek için gerekli zamanın kısaltılması	1	2	3	4	5	6	7	9
Teslimat								N/A
Hızlı teslimat sağlayabilme	1	2	3	4	5	6	7	9
Teslimat taahhütlerini yerine getirme	1	2	3	4	5	6	7	9
Dağıtımcılara teslimatta güvenilirliği artırma	1	2	3	4	5	6	7	9
Nihai müşteriye teslimatta güvenilirliği artırma	1	2	3	4	5	6	7	9
Dağıtımcılara teslimatta hızın artırılması	1	2	3	4	5	6	7	9
Nihai müşterilere teslimata hızın artırılması	1	2	3	4	5	6	7	9
Teslimat performasını artırma amacıyla ürün çeşitliliğini azaltma	1	2	3	4	5	6	7	9
Müşteri ihtiyaçlarına göre teslimat opsiyonlarını ayarlama	1	2	3	4	5	6	7	9
Teslimat performansını nihai ürün stokları aracılığıyla artırma	1	2	3	4	5	6	7	9
Teslimat performansını üretim süresini kısaltma yoluyla artırma	1	2	3	4	5	6	7	9
Satış sonrası								
Müşteri şikayetlerinin azaltılması	1	2	3	4	5	6	7	9
Tamir/iade süresinin azaltılması	1	2	3	4	5	6	7	9
Geniş coğrafi alanda tamir servisi	1	2	3	4	5	6	7	9
Müşterilere yanıt(geri dönme) zamanının azaltılması	1	2	3	4	5	6	7	9
Ürünlerdeki garanti süresinin uzatılması	1	2	3	4	5	6	7	9
Müşteriyle ortaklaşa tasarım kabiliyetinin geliştirilmesi	1	2	3	4	5	6	7	9
Müşterinin ürünü kullanma hakkında bilgilendirilmesi	1	2	3	4	5	6	7	9
Geniş Ürün								
Siparişe göre üretim yapmayı artırma	1	2	3	4	5	6	7	9
Ürün özelliklerini artırma	1	2	3	4	5	6	7	9
Düzenli olarak üretilen ürün sayısını artırma	1	2	3	4	5	6	7	9

Altyapı Geliştirme

Aşağıdakilere hiç önemi yok (1) den çok önemli (7) ye kadar bir numara veriniz	Hiç önemi yok					Çok önemli		N/A
Çalışanın sorumluluklarını artırma	1	2	3	4	5	6	7	9
Çalışanın kalite kontorl sorumluluklarını artırma	1	2	3	4	5	6	7	9
Çalışanın iş esnekliğini artırma	1	2	3	4	5	6	7	9
İdarecilere yönelik meslek içi eğitimi artırma	1	2	3	4	5	6	7	9
İşçiler için iş eğitimini artırma	1	2	3	4	5	6	7	9
İşlerini yapmada çalışanlara özerklik tanıma	1	2	3	4	5	6	7	9
İşçi-yönetici ilişkisini geliştirme	1	2	3	4	5	6	7	9
İşçi ilişkilerini geliştirme	1	2	3	4	5	6	7	9
Performansa dayalı ödüllendirme ve tazmin sistemlerinin kurulması	1	2	3	4	5	6	7	9
Üretim prosedürleri ve çalışma kuralları elkitabı oluşturulması	1	2	3	4	5	6	7	9

İyileştirme Programları

Yakın gelecekte düşünülen iyileştirme programlarının önemini belirtiniz	Hiç önemi yok					Çok önemli		N/A
İmalat süresinin azaltılması	1	2	3	4	5	6	7	9
Tedarikçi seçme programının geliştirilmesi	1	2	3	4	5	6	7	9
Yeni ürün/yeni üretim süreçleri	1	2	3	4	5	6	7	9
Sıfır hata oranı	1	2	3	4	5	6	7	9
Bilgisayar destekli tasarım ve üretim (CAD/CAM)	1	2	3	4	5	6	7	9
İstatistiksel Süreç Kontrolü (SPC)	1	2	3	4	5	6	7	9
ISO 9000-9004 sertifikasyonu	1	2	3	4	5	6	7	9
ISO 14000 sertifikasyonu	1	2	3	4	5	6	7	9
Geri kazanılabilir hammaddeler	1	2	3	4	5	6	7	9
Ulusal kalite ödülünü almak	1	2	3	4	5	6	7	9
İşgücü hacmini azaltma	1	2	3	4	5	6	7	9
Fabrika/üretim tesisi kapatma	1	2	3	4	5	6	7	9
Üretim süreçlerinde SPC (İSK) uygulamak	1	2	3	4	5	6	7	9
Üründe SPC uygulamak	1	2	3	4	5	6	7	9

Katılımınız için çok teşekkür ederiz, doldurmuş olduğunuz anketi zarf içinde bulacağınız adres etiketini kullanarak ilgili kişiye postalayabilirsiniz...

APPENDIX III Regression Results for ISO500 Data

Dependent	**Independent**	**F-significance**	**R^2**	**Adjusted R^2**	**Beta Coefficients**
Low Price	All possible environmental variables	<0.001	0.407	0.334	BC**= 0.251 DO***= 0.213
Low Price	CH, LA, BC	0.003	0.230	0.187	CH**= 0.272
Low Price	BC, CH	0.002	0.202	0.173	CH**= 0.321 BC***= 0.229
Low Price	LA, BC	0.006	0.168	0.138	BC**= 0.259 LA***= 0.253
Low Price	LA, CH	0.002	0.197	0.168	CH**= 0.320 LA***= 0.219
Quality	All possible environmental variables	0.022	0.252	0.160	BC**= 0.303 GR***= 0.317
Quality	LA, CH	0.087	0.085	0.052	CH***= 0.232
Quality	BC, CH	0.037	0.113	0.080	None of significant at less than 0.10 level
Quality	LA, BC	0.077	0.089	0.056	BC***= 0.238
Quality	GR, BC	0.002	0.216	0.187	GR**= 0.322 BC**= 0.267
Quality	LA, GR	0.013	0.151	0.119	GR**= 0.364
Quality	DVP, DO, GR	0.027	0.160	0.112	GR**= 0.401
Quality	GR, CH	0.011	0.157	0.125	GR***= 0.315
Delivery	All possible environmental var.	<0.001	0.442	0.374	CH**= 0.314 BC***= 0.229 DO***= 0.202
Delivery	BC, LA	0.002	0.198	0.169	BC**= 0.292 LA**= 0.263
Delivery	CH, BC	<0.001	0.315	0.290	CH*= 0.447 BC***= 0.225
Delivery	DO, BC, CH	<0.001	0.344	0.308	CH*= 0.401 BC**= 0.234
Delivery	DO, CH	<0.001	0.295	0.269	CH*= 0.478
Delivery	GR, DO	<0.001	0.302	0.275	GR*= 0.458
Delivery	BC, DO, GR	<0.001	0.370	0.333	BC**= 0.269 GR*= 0.389 DO***= 0.209
Delivery	BC, GR	<0.001	0.330	0.305	GR*= 0.455 BC**= 0.258

Flexibility	All possible environmental variables	<0.001	0.466	0.400	DO*= 0.324 GR**= 0.395
Flexibility	CH, BC	0.001	0.219	0.191	CH*= 0.458
Flexibility	GR, BC	<0.001	0.333	0.308	GR*= 0.552
Flexibility	DO, BC, GR	<0.001	0.438	0.406	GR*= 0.444 DO*= 0.341
Flexibility	DVP, DO	<0.001	0.261	0.234	DO*= 0.414 DVP***= 0.235
Flexibility	LA, DO	0.001	0.222	0.193	DO*= 0.443
Flexibility	GR, DO	<0.001	0.429	0.407	GR*= 0.470 DO*= 0.336
Broad Line	All possible environmental var.	0.037	0.235	0.140	GR***= 0.345 DO***= 0.259
Broad Line	DVP, DO	0.023	0.130	0.098	DO**= 0.295
Broad Line	CH, DO	0.010	0.158	0.127	DO**= 0.274 CH***= 0.232
Broad Line	GR, DO	0.002	0.218	0.188	DO**= 0.257 GR**= 0.322
Broad Line	LA, DO	0.039	0.113	0.080	DO**= 0.320
Broad Line	BC, DO	0.025	0.127	0.095	DO**= 0.323
After Sales	All possible environmental variables	0.019	0.258	0.167	None significant at less than 0.10 level
After Sales	GR, DO	0.001	0.220	0.191	GR*= 0.390
After Sales	CH, DO	0.003	0.194	0.164	CH*= 0.378
After Sales	LA, DO	0.070	0.092	0.059	DO***= 0.224
After Sales	DVP, DO	0.043	0.108	0.076	DVP***= 0.225
Cost Leadership	All possible environmental variables	0.028	0.247	0.153	BC***= 0.236
Cost Leadership	DO, BC, LA	0.013	0.183	0.136	BC**= 0.269
Cost Leadership	BC, GR	0.004	0.193	0.162	GR**= 0.337 BC***= 0.216
Cost Leadership	CH, BC	0.006	0.174	0.143	CH**= 0.264 BC***= 0.252
Cost Leadership	BC	0.011	0.111	0.095	BC**= 0.333
Market Differentiation	All possible environmental variables	<0.001	0.409	0.335	GR**= 0.392 DO***= 0.207
Market Differentiation	CH, DO	<0.001	0.276	0.249	DO**= 0.245 CH*= 0.403

Market Differentiation	DVP, DO	0.001	0.214	0.185	DO**= 0.297 DVP**= 0.303
Market Differentiation	GR, DO, DVP	<0.001	0.359	0.322	GR*= 0.482 DO***= 0.201
Market Differentiation	GR, DO	<0.001	0.359	0.334	GR*= 0.499 DO***= 0.201
Market Differentiation	BC, DO, GR	<0.001	0.397	0.362	BC***= 0.202 DO***= 0.212 GR*= 0.450
Market Differentiation	CH, DO, BC	<0.001	0.327	0.289	CH*= 0.327 DO**= 0.256 BC**= 0.238
Market Differentiation	DO, DVP, BC	0.001	0.272	0.230	DO**= 0.305 BC**= 0.260
Technology Differentiation	All possible environmental variables	0.004	0.322	0.237	BC**= 0.270 GR**= 0.356 DO***= 0.236
Technology Differentiation	BC, CH	0.015	0.147	0.115	BC**= 0.291
Technology Differentiation	DO, BC, GR	0.001	0.288	0.246	BC**= 0.246 GR**= 0.307 DO***= 0.222
Technology Differentiation	LA, DO, GR	0.002	0.254	0.210	GR**= 0.287 DO***= 0.216
Technology Differentiation	CH, DO	0.014	0.148	0.116	DO**= 0.290
Technology Differentiation	LA, DO, BC	0.001	0.273	0.231	LA***= 0.228 DO**= 0.301 BC**= 0.268
Low Price	CL, MD, TD	<0.001	0.395	0.360	MD*= 0.491
Low Price	TD, CL	<0.001	0.258	0.230	CL*= 0.369 TD***= 0.234
Low Price	MD, TD	<0.001	0.377	0.353	MD*= 0.571
Low Price	CL, MD	<0.001	0.364	0.341	MD*= 0.471
Quality	CL, MD, TD	<0.001	0.471	0.440	TD**= 0.258 MD*= 0.384
Quality	MD, TD	<0.001	0.447	0.427	TD**= 0.281 MD*= 0.476
Quality	CL, MD	<0.001	0.376	0.353	MD*= 0.433 CL***= 0.257
Quality	TD, CL	<0.001	0.387	0.364	CL*= 0.348 TD*= 0.398
Delivery	CL, MD, TD	<0.001	0.472	0.442	TD*= 0.381 MD*= 0.374
Delivery	MD, TD	<0.001	0.471	0.451	TD*= 0.387 MD*= 0.398
Delivery	CL, MD	<0.001	0.403	0.380	MD*= 0.608
Delivery	TD, CL	<0.001	0.393	0.370	TD*= 0.517 CL***= 0.206

Flexibility	CL, MD, TD	<0.001	0.502	0.474	MD*= 0.634
Flexibility	MD, TD	<0.001	0.500	0.481	MD*= 0.603
Flexibility	CL, MD	<0.001	0.460	0.440	MD*= 0.686
Flexibility	CL, TD	<0.001	0.274	0.247	TD*= 0.408
Broad Line	CL, MD, TD	0.010	0.197	0.150	MD***= 0.325
Broad Line	MD, TD	0.003	0.196	0.165	MD**= 0.345
Broad Line	CL, TD	0.020	0.139	0.106	TD***= 0.265
After Sales	CL, MD, TD	<0.001	0.290	0.249	MD*= 0.427
After Sales	MD, CL	<0.001	0.322	0.297	MD*= 0.505
After Sales	TD, CL	0.004	0.187	0.156	CL**= 0.330
After Sales	MD, TD	<0.001	0.275	0.248	MD*= 0.502

Possible environmental variables: Business Cost (BC), Labor Availability (LA), Competitive Hostility (CH), Governmental Regulations (GR), Dynamism (Volume/Price) (DVP), Dynamism (Obsolescence) (DO)
Competitive Strategies: Cost Leadership (CL), Market Differentiation (MD), Technology Differentiation (TD)

* significant at <0.01 level
** significant at <0.05 level
*** significant at <0.10 level

APPENDIX IV Regression Results for Ankara Data

Dependent	**Independent**	**F-significance**	**R^2**	**Adjusted R^2**	**Beta Coefficients**
Low Price	All possible environmental variables	0.004	0.353	0.261	CH**= 0.294 GR**= 0.316
Low Price	CH, LA, BC	0.002	0.270	0.225	CH*= 0.489
Low Price	BC, LA, GR	0.003	0.260	0.213	GR*= 0.476
Low Price	BC, GR	0.002	0.221	0.189	GR*=0.446
Low Price	BC, CH	<0.001	0.268	0.239	CH*= 0.488
Quality	All possible environmental variables	0.006	0.336	0.241	GR*= 0.413
Quality	LA, CH	0.083	0.097	0.060	CH**= 0.309
Quality	GR, LA	0.002	0.236	0.204	GR*= 0.491
Quality	DO, CH	0.014	0.162	0.127	CH**= 0.273 DO**= 0.274
Delivery	All possible environmental variables	0.085	0.228	0.115	DO**= 0.323
Delivery	CH, LA, BC	0.090	0.128	0.072	CH**= 0.292
Delivery	CH, LA	0.067	0.107	0.070	CH**= 0.310
Delivery	BC, CH	0.055	0.111	0.075	CH**= 0.285
Flexibility	All possible environmental variables	0.104	0.217	0.103	None significant at less than 0.10 level
Flexibility	BC, CH	0.104	0.088	0.051	CH***= 0.246
Flexibility	BC, GR	0.057	0.112	0.075	GR**= 0.307
Flexibility	DO, DVP, GR, BC	0.047	0.193	0.119	DVP***= 0.252
Flexibility	DO, DVP	0.015	0.166	0.130	DVP***= 269 DO***= 0.261
Flexibility	GR, DO, DVP	0.022	0.192	0.138	DVP***= 0.245
Flexibility	CH, DO, DVP	0.030	0.178	0.123	DVP***= 0.250 DO***= 0.250
Flexibility	BC, CH, DO, DVP	0.064	0.180	0.105	DVP***= 0.259 DO***= 0.259
Broad Line	All possible environmental variables	0.178	0.187	0.069	GR**= 0.370 LA***= -0.251

Broad Line	GR, DO, DVP	0.100	0.128	0.070	GR***= 0.284
Broad Line	GR	0.080	0.061	0.042	GR***= 0.248
Broad Line	CH, DO, DVP	0.428	0.059	-0.004	None significant at less than 0.10 level
After Sales	All possible environmental variables	0.138	0.207	0.088	None significant at less than 0.10 level
After Sales	CH, DVP, DO	0.113	0.125	0.066	DO**= 0.319
After Sales	GR, DVP, DO	0.047	0.163	0.106	DO***= 0.274
After Sales	GR, DO	0.021	0.157	0.120	DO**= 0.291
After Sales	DVP, DO	0.049	0.125	0.087	DO**= 0.319
Cost Leadership	All possible environmental variables	0.281	0.156	0.035	None significant at less than 0.10 level
Cost Leadership	CH. LA, BC	0.062	0.141	0.087	CH*= 0.377
Cost Leadership	CH, BC	0.016	0.153	0.120	CH*= 0.394
Cost Leadership	BC, GR	0.046	0.118	0.082	GR*= 0.346
Cost Leadership	LA, GR	0.032	0.134	0.098	GR*= 0.360
Market Differentiation	All possible environmental variables	0.011	0.328	0.227	BC**= -0.343 DO***= 0.276 GR***= 0.257
Market Differentiation	DO, CH, BC	0.028	0.181	0.126	CH**= 0.287 DO***= 0.259 BC***= -0.242
Market Differentiation	DO, CH	0.045	0.126	0.088	CH***= 0.264
Technology Differentiation	All possible environmental variables	0.004	0.354	0.262	BC*= -0.365 DVP**= 0.300 LA***= -0.226
Technology Differentiation	DVP, LA, BC	0.005	0.238	0.189	DVP*= 0.428 BC**= -0.279
Technology Differentiation	DVP, BC	0.002	0.218	0.186	DVP*= 0.462 BC**= -0.266
Low Price	MD, TD, CL	<0.001	0.391	0.352	CL*= 0.520 MD***= 0.280
Low Price	MD, CL	<0.001	0.417	0.393	CL*= 0.505 MD**= 0.277
Low Price	CL	<0.001	0.368	0.356	CL*= 0.607
Low Price	MD, TD	0.003	0.220	0.187	TD***= 0.309

Quality	MD, TD, CL	<0.001	0.402	0.362	MD**= 0.343 TD**= 0.340
Quality	TD, MD	<0.001	0.400	0.375	TD*= 0.370 MD**= 0.337
Quality	TD	<0.001	0.345	0.332	TD*= 0.588
Quality	CL, MD	<0.001	0.363	0.337	MD*= 0.509
Delivery	MD, TD, CL	0.169	0.103	0.044	CL***= 0.302
Delivery	CL, MD	0.044	0.122	0.086	CL**= 0.281
Delivery	CL, TD	0.059	0.111	0.074	CL***= 0.295
Flexibility	CL, MD, TD	<0.001	0.401	0.361	MD*= 0.373 TD***= 0.330
Flexibility	TD, MD	<0.001	0.401	0.375	MD*= 0.372 TD**= 0.335
Flexibility	CL, MD	<0.001	0.380	0.354	MD*= 0.548
Broad Line	CL, MD, TD	0.001	0.312	0.267	MD*= 0.505
Broad Line	CL, MD	<0.001	0.329	0.301	MD*= 0.536
Broad Line	TD, CL	0.008	0.184	0.150	TD**= 0.415
Broad Line	TD, MD	<0.001	0.308	0.278	MD*= 0.495
After Sales	CL, TD, MD	0.049	0.158	0.102	CL*= 0.495 TD**= -0.424
After Sales	CL, TD	0.030	0.138	0.102	CL*= 0.499

Possible Environmental Variables: Business Cost (BC), Labor Availability (LA), Competitive Hostility (CH), Governmental Regulations (GR), Dynamism (Volume/Price) (DVP), Dynamism (Obsolescence) (DO)
Competitive Strategies: Cost Leadership (CL), Market Differentiation (MD), Technology Differentiation (TD)

* significant at <0.01 level
** significant at <0.05 level
*** significant at <0.10 level

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