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**The impact of operations management techniques on  
productivity under Turkish Premier Özal's new industrial policy**

Yildirim, Hayri Tacettin, M.S.

The University of Arizona, 1987

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THE IMPACT OF OPERATIONS MANAGEMENT TECHNIQUES  
ON PRODUCTIVITY UNDER TURKISH PREMIER ÖZAL'S  
NEW INDUSTRIAL POLICY

by

Hayri Tacettin Yıldırım

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A Thesis Submitted to the Faculty of the  
Department of Management Information Systems  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTER OF SCIENCE  
In the Graduate College  
THE UNIVERSITY OF ARIZONA

1987

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To  
Cafer Tayyar, Mjgan, Arif, Asuman  
Yıldırım

## PREFACE

This thesis is an introductory research study on productivity changes in Turkish manufacturing industry since 1980. To the best of my knowledge, no research has been published in this area, either in Turkey or abroad. This study is designed to both inform the reader and whet his curiosity about Turkey, Turkish industry and the Turkish people.

It would be a grave oversight not to acknowledge my committee members individually. Without their insightful contributions and acceptance of my unorthodox thesis subject, it simply would not have been done. I would like to thank my adviser, Dr. Nicholas Aquilano, whose definitive book on Production and Operations Management has made me love the subject and caused me to choose it as a career. His valuable views on the thesis topic and the contents were instrumental in producing it. I must also thank Dr. Donald Leckie for editing my work and also providing me a job as his assistant to support myself through college. Last but certainly not least, I would like to express my gratitude to Dr. Bharat Kaku for providing me a valuable part-time job, helping me focus my views on the thesis subject, and especially for his continued belief in me when I least deserved it. Thank you all.

Tucson, Arizona

Hayri T. Yıldırım

May 1987

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## ABSTRACT

This thesis is an introductory research study on the impact of operations management techniques on productivity under Turkish Premier Turgut Özal's new industrial policy.

The effectiveness of opening up the economy to international competition has been analyzed by comparing the present industrial productivity to the productivity figures before Premier Turgut Özal. The evaluation is done through four major areas: quality, operations research techniques, inventory and manpower planning. The final chapter gives a summary of the findings and suggests that competition most likely has helped Turkish industry increase their productivity in these four areas.



## CHAPTER 1

### INTRODUCTION

Economic development—improvement of the material and nonmaterial conditions of the population—can be achieved through technological advancement, dissemination of knowledge, and structural transformation from a predominantly agricultural economy to a more productive industrial economy.<sup>1</sup> In many countries of the world, such a transformation from the agricultural sector, where productivity is low, to the industrial sector, where productivity is high, has not materialized to a satisfactory degree. It may be because a change from an agriculturally based, inward-looking manufacturing to one based on export oriented, productive industry and services sector requires a complex transformation. Some of these transformations may be in the technology of productions (better utilization of up-to-date techniques), physical and human capital structure, social and political institutions as well as cultural activities.<sup>2</sup>

A country that is at present trying to achieve such a radical transformation is the Republic of Turkey. In Turkey

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<sup>1</sup>Hicks, John. "Capital and Growth." Oxford University Press. New York. 1969. Pp. 3-4.

<sup>2</sup>Manoucher, Parvin, Hic, M̄kerrem. "Land Reform vs. Agricultural Reform." Middle East Journal. May 1984.

particularly, this transformation is from state-intervention to market orientation, from inward looking, import-substitution industrialization to an open and competitive economy, and from the rhetoric of a so-called "mixed economy" to an explicit support of the more productive private sector, and to attempts to limit the size of the public sector.<sup>3</sup>

We can also label this transformation era as the Search for Productivity, since the most obvious and striking feature of this transformation is to make industry---government and private---more productive, thereby leading to higher economic growth.<sup>4</sup>

Productivity has always been considered to be a major concern by the Turkish planning authorities. The need for achieving higher productivity rates has been a major ongoing theme in the five-year Development Plans since 1960's. The examples of United States, and lately Japan, are pointed out as industrial giants that have attained greatness through productivity.

It is clearly evident that Turkish government planners, especially since 1980, have paid a great deal of attention to the overall productivity of Turkish industry. The basic raison d'etre for this attention to productivity has been the realization by the

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<sup>3</sup>Gönensay, Emre. "From Bankruptcy to Revival: The Turkish Experience with Restructuring Economic Incentives, 1980-1984." in Economic Incentives. ed. Bela Balassa and Herbert Giersch. Macmillan, Inc. Hong Kong. 1986.

<sup>4</sup>Various speeches of P. M. Turgut Özal.

government that a sound economy is based not only on a producing economy but also a productive one.

The economic developments in the seventies and the early eighties have been forceful reasons for turning attention again to the crucial importance which productivity has for the performance of Turkish industry: high rates of inflation (three-digits in 1979), and in particular surging wages, impaired the cost performance of industry; changes in international trade patterns signalled alterations in the traditional competitive position of countries; new combinations in the use of basic production factors, especially energy, had to be sought in response to changes in price levels. At the same time, there were increasingly signs of a slide in the efficiency of industry reflected in a slow-down of productivity advance, weakening the capacity of industry to respond to this new situation.

Management improvements are now fully acknowledged as an important factor in long-term productivity enhancement. This relates to management's orientations and attitudes, that largely developed during the period of fast economic growth in the 1960's, as well as to technological competence. Also important is the ability of management to establish and sustain management/labor relations which are adaptable to the changing socio-economic environment in which companies operate.<sup>5</sup>

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<sup>5</sup>"Productivity in Industry." OECD, 1986.

In order to understand what changes Turkish manufacturing industries have been going through, this thesis will attempt to compare and contrast Turkish manufacturing industry's productivity record, mainly through how the application of operation management techniques helped to achieve this record specifically. Productivity record in the manufacturing industry will be analyzed through the utilization of operations management methods of Turkish industry today, as compared to pre-1980.

The breakdown period of 1980 was chosen because of the implementation of the above mentioned "transformation" that took place in 1980, under the then "economic supremo," now Prime Minister Turgut Özal.

An extensive survey of the available literature from the United States as well as Turkey will provide the substance of this study, which focuses on four issues.

1. That the primary goal of increased productivity has been achieved through better quality management techniques for Turkish manufactured products since 1980.

2. That the utilization of operations management techniques to increase productivity, has been widespread since 1980.

3. That through better management of inventory, the productivity of Turkish firms has increased since 1980.

4. That manpower planning policies which are an important factor in productivity growth have improved since 1980.

The basic reason for looking at only these four factors is a study done by the National Productivity Center of Turkey in 1985, by Atilla Tezeren. The important relationship between these factors to productivity can be seen in Table 1.

Table 1. Factors that Adversely Affect Productivity Growth

<u>Factors</u>	<u>Percentage Productivity Loss</u>
Quality	14.4
Absence of skilled workers	14.0
Technical and technological problems	13.7
Lack of incentive schemes	12.6
Inefficient manpower planning	11.0
Losses due to energy problems	10.6
Material handling problems	10.3
Maintenance and spare parts problems	8.6
Others	<u>4.8</u>
Total	100.0

Source: Atilla Tezeren. 1985.

Again in the same survey, the techniques used to increase productivity by Turkish firms today are summarized in Table 2.

Table 2. Techniques Used to Increase Productivity by Manufacturing Organizations

<u>Techniques</u>	<u>Productivity Increase (Percent)</u>
On the job training	15
Application of O.R. techniques	14
Manpower planning	12
Quality control	11
Capital investment	10
Incentive schemes	10
Application of labor standards	8
Better working conditions	8
Inventory control	7
Explanation of the importance of productivity	5

Source: Atilla Tezeren. 1985.

In the thesis, these four factors (quality control, application of OR techniques, inventory and manpower planning) include a study of all the productivity increase methods used by Turkish manufacturing organizations.

### Structure of the Report

The structure of the report is as follows. This chapter sets the stage for the thesis by introducing the hypotheses and the justification for a study of this type and its importance. In Chapter two, history and the composition of the Turkish industry will be examined with an emphasis on the changes brought about by the liberalization of the economy since 1980. Chapter three will look at productivity in individual firms and look at measures that would help in productivity growth. Four factors considered under this heading will be: quality, operations research techniques, inventory and manpower planning. Chapter four will contain the body of the research. A study of the changes that have come about in the four factors mentioned since 1980 will be attempted. Chapter five will have an analysis of the data in Chapter four, and some conclusions will be drawn as to the changes in productivity with the effective implementation of the four factors. Finally, a number of recommendations for future research on Turkish manufacturing industry's productivity will be attempted.

This thesis is not intended to be a comprehensive study of Turkish economy, although a constant problem in writing it is to establish a dividing line between those factors affecting productivity and those relevant for the analysis between the economy and productivity in general. The discussion will be

limited to the productivity picture based on the four factors and their general implications to Turkish manufacturing industry.

Certainly, productivity is a central problem of Turkish development; however, other factors not dealt with in this thesis, such as education, foreign trade, population growth and dynamics, political and social stability, as well as a host of other topics are important. These topics will be eluded to from time to time; however, a comprehensive view of Turkish development is thus not to be expected here. Furthermore, topics which are normally under the heading of productivity, such as capital productivity and labor productivity, will not be analyzed here because of their broadness and the lack of sufficient data on Turkish manufacturing industry. The scope of this study is limited to quality, management techniques, inventory and manpower policies of Turkish manufacturing industry and their implications on the productivity of the overall industry.

The justification for such a limited study is two-fold. Firstly, productivity is the best measure of how well resources are brought together in organizations and utilized for accomplishing a set of results. It is also the only way of being a modern, developed country. It is reaching the highest level of performance with the least expenditure of resources. Since Turkey has limited resources, the productive utilization of resources for maximum economic development is of utmost importance.



Secondly, because economic growth is such a complex process that it is more fruitful in this thesis to attempt to understand in the micro level—organizational productivity—rather than to cover at a more superficial level general economic productivity and industrialization strategy.

## CHAPTER TWO

### TURKISH INDUSTRY

#### Composition

Turkish industry, both public and private, started almost from scratch after the declaration of the Republic in 1923. The Ottoman Empire, Turkey's predecessor, was basically an agriculturally based economy and therefore left behind only two or three factories. One of them was a fez (old Turkish headgear) manufacturer and it was closed after the government outlawed the wearing of it.

The leaders of new Turkey were impatient for change and concrete manifestations of progress under the new republic. Atatürk (Turkey's founder) and others saw regional industrialization both as a matter of sound development policy and as a unifying political force.<sup>1</sup>

Turkey was short of entrepreneurs, managers and engineers; they wanted to correct that deficiency quickly. They studied both the industrial economies of the West, and the planned economy of the Soviet Union, and they worked out a compromise. Quite

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<sup>1</sup>Walsted, Bertil, "State Manufacturing Enterprise in a Mixed Economy: The Turkish Case." The John Hopkins University Press for the World Bank. Baltimore and London. 1980.

pragmatically, they reached the conclusion that, in Turkey, the state should take vigorous action both in supporting private enterprise and in launching state industries. In the absence of entrepreneurs having the necessary capital to invest, the state .. began the process of building up Turkish industry. This policy was labeled as etatism. Bernard Lewis, a well informed observer of Turkey, defines etatism as the intervention of the state as a pioneer and director of industrial activity, in the interest of national development and security, in a country in which private enterprise is either suspect or ineffective.<sup>2</sup>

Ever since the beginning of these etatist policies, the State Economic Enterprises (SEEs) slowly started to dominate the Turkish industry, producing and selling almost everything from shoes to meat products.

In 1983, there were 554 SEEs in operation in Turkey, with a total labor force of 554,000 people, out of a total work force of 15,577,000 people.<sup>3</sup>

Turkish private industry is only a generation old and almost entirely dominated by a number of families. Turkish firms tend to be family concerns, because the accumulation of capital has been skewed negatively towards a minority of the population.

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<sup>2</sup>Lewis, Bernard. "Turkey Today." Hutchinson and Company. London. 1952.

<sup>3</sup>"Özelleştirme." TUSIAD. Istanbul. May 29, 1986.

Also, because Turks tend to rely on close ties such as family, marriage, education or hometown to generate the trust needed to work in business with others.<sup>4</sup>

It is only in the past fifteen years, however, that the family groups have been appearing in large numbers and their economic strength has begun to overtake that of the major state enterprises. A list in August 1984 issue of Fortune magazine listed only three companies in the top 500 companies outside the United States. The largest of the three is Türkiye Petrolleri, a state owned petroleum corporation which came 116th. The other groups were Sabancı Holding (168th) and the Koç Group (175th) which are private enterprises.

Koç and Sabancı are both very familiar names in Turkey. Anyone traveling in Turkey will see the evidence of their activity at almost every turn including radio and television. Of the 500 largest Turkish companies, 23 belong to Koç Group, and 15 to Sabancı Holding. Other companies such as Yaşar, Anadolu Endüstri, and Çukurova follow them. Appendix A.

Like the majority of the private companies, they are integrated vertically as well as horizontally. Koç makes white goods, tires and cars, Sabancı makes tires, electromechanical goods, foodstuffs, chemicals, cords. Yaşar is noted for its meat

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<sup>4</sup>"Turkish Banking and Investment." Financial Times. London. November 4, 1985

and dairy products. Anadolu Endüstri is a beer producer but also owns Turkey's largest aluminum manufacturing facilities.

Most of these companies have extensive contacts with foreign companies. They have either artificial contacts where they just buy know-how or they have umbilical contracts such as assembling of a product (mainly automobiles) with the majority of the parts coming in from another country. Some examples of this are the Fiat-Murat and Renault-Reno relationship.

In summary, Turkish manufacturing consists of three parts. First part is completely dominated by the government SEEs which function basically in heavy industries. Secondly, the private sector which employ more than fifty people. They function basically in consumer goods, medium type of industries. Thirdly, there are small, family oriented industries which employ from one to fifty people. Although they have a great deal of input to the economy in small, usually disposable consumer goods, they will not be dealt with in this thesis because of the lack of any reliable data on their operation and performance.

#### State Economic Enterprises

Background. Economic climate was at best difficult at the birth of the Turkish republic. A large amount of debt remained from Ottoman rule that had to be repaid. The Treaty of Lausanne (1923) retained the foreign privileges of the capitulations until 1929. The capitulations of Ottoman government were a series of

agreements with foreign countries that granted foreigners extensive freedom of movement and activity as well as preferential tariff treatment, resulting in considerable imports and foreign domination of mining, industry and commerce. The capitulations expended to the minorities and they were the primary businessmen of their time. The large scale emigration of these had stripped the republic of nearly all of its managerial and entrepreneurial talent. Combined with that was the world depression of 1930's that left industry paralyzed.

These adverse conditions, a tradition of central government, and large bureaucracy and the dominant personality of the great leader M. Kemal Atatürk led to a central government involvement in Turkish economic affairs. The intent was that government would establish suitable conditions and participate to the degree necessary for development of the economy. It would do what the individual would not do. From the beginning, there has been a mixture of public and private sectors, and this remains true today.

The government soon became directly involved in the economy. Transportation was restored and expanded, particularly the railroads. The government rescued the silk industry and started the sugar industry.

The role of government in the economy was justified in the concept of etatism, which was never clearly defined by the planners. In actual practice, however, much of the government's

role came to be embodied in the SEEs. The first, a state railroad company, was formed in 1924, and a second in food processing was formed in 1925. Many SEEs were formed in the 1930's because private investment was unable and/or unwilling to undertake much development, particularly in the modern industries. More SEEs were created in subsequent years. Pragmatism and expediency, more than ideology, guided the formation and expansion of SEEs.

SEEs as they evolved were not a single kind of economic enterprise; nor could they be easily described, except that the government owned at least 50 percent. About thirty five of the SEEs accounted for most of the SEEs' assets. Some were national companies in such specific industries such as railroads, electricity and oil, perhaps with subsidiaries for particular operations. Some were banks with ownership in many companies, sometimes in particular field such as textiles or sugar refining; others were conglomerates with holdings in many fields, such as minerals and chemicals with necessary processing facilities. Some were strictly financial, such as banks, insurance and pension funds, and a national lottery. Some SEEs controlled companies in which government ownership was only partial, ownership being shared with private investment that in some cases were foreign companies. A few SEEs were part of the central government budgets while others had their own budgets. A few SEEs had direct access to Central Bank credits, but since 1961 most have had to go

through the treasury for funds. The State Investment Bank was formed in 1964 to provide SEEs with long term investment funds.

By the late 1970's, SEEs had extensive influence throughout the economy. In 1977 there were more than 100 SEEs employing more than 650,000 people. They accounted for about 10 percent of GNP and nearly 40 percent of industrial output. Only a few were monopolies—primarily the railroads, airlines, municipal public transport, and industries producing salt, opium products, alcoholic beverages, and tobacco products for internal consumption. Other SEEs dominate particular fields such as mining, wood and paper, basic metals, oil refining, and basic petrochemicals and some derivatives such as chemical fertilizers. Other SEEs are in the fields in which private industry might predominate such as textiles.

Part of the SEEs' influence emanated from their development of key industries, such as electricity, fuels, basic metals and petro-chemicals which supplied inputs for development of industry in general.

Eight enterprises account for almost all the economic activity of the public sector in manufacturing today. Ranked by fixed capital; they are Makina Kimya Endüstrisi Kurumu (MKEK), machinery and chemicals; Sümerbank, chiefly textiles; Türk Çimento Sanayi (TCS), cement; Türk Demir Çelik (TDC), iron and steel; SEKA, paper; Petkim, petrochemicals; Azot Sanayi (AS),



fertilizers; Türk Şeker Fabrikaları, sugar. In 1984 their capital investment amounted to Turkish Lira (TL) 1406 million. (exchange rate: \$1 = 526 TL)

Of the 20 principal manufacturing categories only in beverages and petroleum does the performance of the work force in the SEEs measured as a ratio of employment to production appear to be better than that of their counterparts in the private sector.

Percent shares in the manufacturing industry: (1976) in-

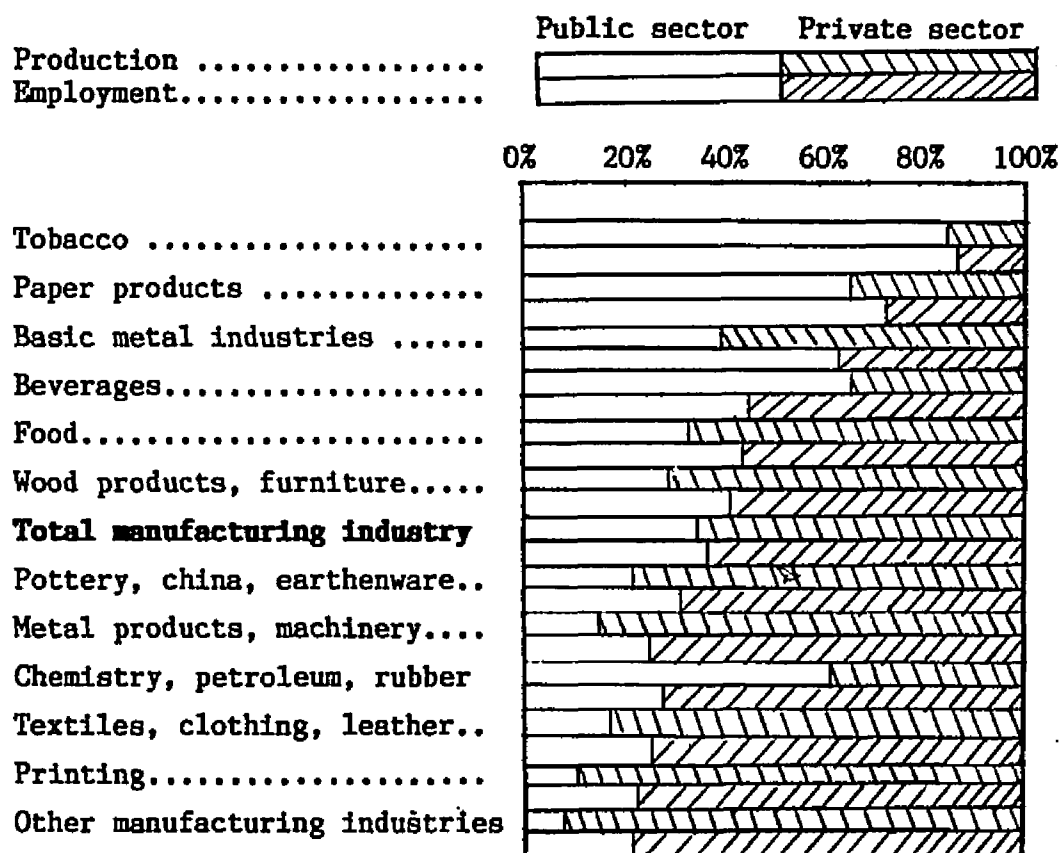


Figure 1. The Public Sector:  
Important but Inefficient

Source: State Institute of Statistics

The productivity of the labor employed by the SEEs in the transport equipment sector, where the state enterprise TUMOSAN with invested capital of TL4.1 billion has aspirations of becoming a giant manufacturer of trucks and tractors, registers the worst performance followed by the printing and publishing sector.<sup>7</sup>

There seems to be many reasons for their poor productivity performance; however, the biggest reason given by everyone is the inability of the managers to run them efficiently. A study prepared by the very influential employers group TUSIAD in 1983, places the blame for poor performance directly on the shoulders of public sector managers, stating "there is no doubt that, given the same high standards of management as applied in Western Europe, our economy would be as sound and as well advanced as that of any other country in the world."

Managers, appointed for political reasons, had an average tenure of just nine months, even though successive governments promised that each change would be the very last.

Under these circumstances, it was natural, as one official explained, that managers felt no sense of responsibility. "If you give them production targets, as we did in the past, then you simply get lousy quality products. It was all too easy for them to blame everything on their predecessors—or their successors."

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<sup>7</sup>"Turkey: A New Era." Euromoney. London. 1984.

The extremely low-level of managers' pay also has been an important factor in explaining the poor performance of management in the SEEs and the public sector. The pay scales of managers were governed by the inadequate rates paid to civil servants, while workers' rates were fixed after discussions with the powerful unions (whom managers had no incentive to oppose). Even senior managers with many years of service were not financially able to provide housing for their families and to pay for the education of their children, resulting in predictably low levels of morale, and increasing the likelihood of corruption.<sup>8</sup>

There is another factor that greatly impedes innovation and initiative from the managers' viewpoint, which is the policy of promotion based on seniority rather than performance. Among the SEEs the poor quality of management has been essentially unchallenged because of the privileged and highly protected position of these economic enterprises in the economy.

Another serious obstacle to productivity has been the unchecked growth of the employee numbers in the SEEs. After a decade of pure pork-barrel policies, the number of blue collar workers in the SEEs had more than doubled to 450,000 in 1980 and

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<sup>8</sup>As an example, my father who is on the second highest grade wage scale used to make \$300 per month up until 1984. In 1984, his salary jumped to \$780 per month.

to 554,000 by 1983,<sup>9</sup> and the number of staff and technicians (overhead) had soared by 100,000 to 260,000 without any compensating increase in production. By 1979 wages took up nine-tenths of all the money gained from sales. Because of the SEEs' importance, the workers were virtually unsackable (because of lifetime employment guarantees by the state),<sup>10</sup> and as already mentioned above politically determined prices prevented any incentive to productivity and profitability.

A major reason for the general economic inefficiency of many SEEs is the trade barriers erected to discourage imports which have provided a high degree of protection. Planners, following a policy of import-substitution, have relied almost exclusively on the public sector for the production of basic and capital intensive intermediate goods such as steel, chemicals, petrochemicals, and paper—areas where Turkey arguably lacks comparative advantage.

In addition, the reliance on shadow pricing and the use of price controls made it extremely difficult to allocate investment funds towards profitable industries. The available statistics from the State Institute of Statistics detailing capital investment in the SEEs and their output clearly point out that the

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<sup>9</sup>Turkish government report on State Economic Enterprises. Ankara. 1983.

<sup>10</sup>"Will the Experiment with Capitalism Work?" Euromoney Publications. London. February 1982.

returns on capital in the public sector is below the rate of interest on financial capital.

In a report published by the government of Turkey under the heading of "Major Problems of State Economic Enterprises," the problems are clearly identified. It is an extremely useful abstract to the discussion in this thesis; therefore, it will be given in its entirety<sup>11</sup> before discussing changes that occurred in the SEEs under the leadership of Turgut Özal after 1980.

#### Problems in State Economic Enterprises

1.1 Many studies of the problems of the State Economic Enterprises and their solutions have been made by national and foreign experts, and many reports have been issued. It is taken for granted that the issues are too clear to require any further investigation.

1.2 They may be reduced to essential elements: profitability and productivity.

1.3 What the state expects from public enterprise is an increase in factor returns—that is, an increase in financial returns or in socioeconomic returns, such as regulation of the market, performance of effective public service, creation of employment, a pioneering role in the development of backward regions and sectors, accumulation of high technology, or, finally,

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<sup>11</sup>"Strategy for Reorganization of SEEs." Third Five-Year Development Plan. 1973-1977. Government of Turkey. Ankara. 1972.

entering into production processes in which private enterprise will not engage because of high capital requirements or high risks. Enterprises which rely heavily on socioeconomic returns or enter fields into which private enterprise could not afford to venture are not in a position to offer any profit to the government. Their task, therefore, becomes a matter of raising production and productivity.

1.4 Profitability and productivity require the rational use of inputs and continuous progress in adapting the outputs to the needs of consumers. The apparent reasons for low profitability and productivity are set below.

#### Administration and Organization

1.5 The organizational structure of the enterprises generally is not consistent with their basic functions and responsibilities. Gaps in responsibilities, friction, duplication, and insufficient coordination and communication are apparent. Some important functions such as finance, marketing, investment, etc. have not been organized in a manner necessary for smooth functioning.

1.6. In general, insufficient attention is paid to the elaboration of yearly or long-term programs and the definition of policy objectives. As a result the work objectives and duties of middle and lower level administrators are not defined either. Hence, there can be no effective evaluation of performance.

1.7 Many of those who occupy key positions do not possess knowledge of their functions, powers and responsibilities within

the organization. Nor have they mastered the techniques necessary for profitability and productivity.

1.8 An efficient communication and reporting system has not been developed to help managers make timely and effective decisions.

1.9 The importance of efficient and simple administrative procedures is not sufficiently appreciated.

1.10 Personnel policy is not flexible, and differences in [working conditions and rewards] among the several enterprises is not commensurate with their size and level of technology. There is no reward system to encourage qualified personnel, which are very few, to run their workshops efficiently.

1.11 Frequent changes among top level administrators, thwart the development of a stable, capable and experienced administration.

1.12 There is [generally] an excessive complement of officers, engineers, and workers while, at the same time, there is an insufficiency of personnel at some levels. [This suggests that qualified manpower is not distributed in a balanced manner within the enterprise or between the different enterprises.]

1.13 The significance of the personnel function, specifically manpower planning and administration and training of manpower is not well understood.

1.14 Collective bargaining [or, rather, the strong position of the unions], together with political interference, cause an increase in wages disproportionate to the productivity of labor;

therefore a [wage and] salary system based on productivity can not be developed.

#### Financial Affairs and Accounting

1.15 The state economic enterprises are not given sufficient [fixed] and [working] capital, considering the financial and technological burdens of investment imposed on them. The losses created by special duties assigned to them by the government are not compensated in time, and there is no top organization to coordinate (the use of state economic enterprise funds); hence, most organizations are dependent on the General Budget and other external sources. A balance of financial sources [for example, between debt and equity?] can not be achieved, and dependable sources of finance are not available; hence the burden of interest becomes excessive.

1.16 The accounting framework does not lend itself to administrative control nor does it incorporate an efficient budgeting system.

1.17 Enterprises do not employ flexible price policies. In many cases prices are determined without reference to market factors [inside or outside the country].

1.18 Financial statements do not reflect the real assets of the enterprise.

1.19 Since the meaning of cost is not well understood by the enterprises and supervisory authorities, physical production is



given [more importance than it deserves in the evaluation of the activities].

#### Separation of Accounts

1.20 Services, such as organization, finance and personnel [management] performed by an enterprise in its capacity as a public agent in fields outside its normal business activities [such as research and development], are not separately distinguished in the accounts of the state economic enterprises.

#### Conduct of Business

1.21 Production control is either not carried out or insufficiently developed. Industrial engineering is not taken seriously.

1.22 There is no effective system of quality [control].

1.23 The system of central inventory control has led to an excessive and unnecessary accumulation of inventories.

1.24 [Technological] research and development activities have been neglected.

#### Marketing

1.25 The marketing function has not been sufficiently developed. Currently this function is being carried out by sales departments; techniques of marketing generally are not known and applied.

#### Investment

1.26 Since investment projects are prepared based on multiple [criteria], and since political and social concerns intervene, the selection of technology and location of investment can not be

accurately determined. Therefore, scarce resources are wasted. Implementation of investment projects is delayed and, therefore, prices rise to an unpredictable level.

#### Legal Status

1.27 Since public enterprises are included in the general budget, and since they are created in accordance with either Law 440, or commercial law, or some special laws, various political, administrative, legal and financial problems of supervision are encountered. There are also some judicial problems.

#### Coordination

1.28 The coordination among enterprises and between ministries and enterprises is insufficient. Enterprises do not carry out effective research within the country and abroad such as is necessary for a proper analysis of [supplies and markets].

#### Political Pressure

1.29 Noneconomic pressures always have negative effects.

This report clearly identified problem areas and difficulties in state economic enterprises in 1972. Instead of taking measure to overcome these difficulties, decision makers kept letting these problems ride until it came to a head in September 1980, when the military took over the running of the government temporarily.

The first step in a long-term program for making state enterprises productive was taken in January 1980 under Turgut Ozal. The first and most important step, has been the pricing

policy of the SEEs, stated by Yavuz Canevi, the central bank governor.<sup>12</sup> The policy was to have SEEs set their prices according to costs and market conditions. By abolishing subsidies to them as well as allowing them to make regular price adjustments, there has been a dramatic turnaround in the profitability of the major SEEs. However, this was accomplished for the most part by sharp price increases in almost all of the state enterprises. There has been no clear increase in productivity in the textbook case. However, there has been an increase in output because of full working days. (Strikes were banned from 1980 to 1984). It may be a good area to look at the accounts of the state enterprises; however, these do not necessarily point to increased productivity! (Table 3)

Another step taken which should increase the overall productivity of the SEEs is a government decision to put a hiring freeze across the board. Some other steps taken in the reform of the SEEs are the minimization of political interference, the decentralization of decision making, the rationalization of the structure of the SEEs, the clarification and concentration of responsibility for the control of the SEEs, and rewards for success to managers.

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<sup>12</sup>Cited in Euromoney. February, 1982 issue.

Table 3. SEEs Profit and Loss Account  
(TL bn)

	1977	1978	1979	1980	1981	1982	1983	1984
Expenditure	208.9	328.4	585.7	1,169	1,759	2,583	3,630	5,901
Wages & salaries	61.3	102.9	153.5	238	314	370	464	702
Other inputs (purchases)	133.8	201.7	414.6	898	1,390	2,135	2,973	5,012
Depreciation and other	13.8	23.9	17.6	33	55	78	193	187
Gross profit (or loss-)	-36.2	-52.1	-60	-23	8	67	-34	230

Source: State Planning Organization

The reform proposals also envisage reorganizing productive SEEs into holdings, each of which would have a number of subsidiary companies. These holdings would then be sold to the general public. At the shareholders' meeting a team of a full-time chairman, five part-time board members, and the general manager would be elected annually. Under a recent decree, the managers and skilled personnel will not have civil service status. They would receive a general increase of their wages and they will also receive incentive payments for performance.

Overall policy guidance for the holdings would be set by a high level coordination committee and the performance of the holdings would be periodically monitored by the responsible ministry on the basis of performance criteria, including increases in production, productivity and profit.<sup>13</sup>

Another important area of reform has been the opening of the whole Turkish market to international competition. With trade barriers lifted, the industry—public and private—has to perform better. Prime Minister Turgut Özal has clearly indicated to these enterprises that they have to be productive. When he was asked by a Financial Times reporter in 1981 if he would allow the collapse of Isdemir, the huge Soviet built and supplied state iron and steel plant at Iskenderun, he was, as typical, brutally frank. "Why not?" he responded instantly. "You have to have the sword of Damocles over these companies." Most companies which functioned under monopolies now are facing stiff competition from abroad as well as from the private sector. One example of this is the Tekel (cigarette production) company. Turks are very heavy smokers, and when filter cigarettes were introduced in 1966 they became very popular. But for the next fifteen years, Tekel's factories could never supply enough of them. Things reached the very bottom before 1980; the country's most modern factory was working at 10 percent of capacity, and the government was having to ship local tobacco to Yugoslavia and Bulgaria to have it made into cigarettes for reimport back into Turkey. When in 1983, the cigarette

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<sup>13</sup>Balassa, Bela. "Turkey. Industrialization and Trade Strategy." World Bank. 1982.

liberalization law came into effect Rothman's International started exporting cigarettes to Turkey albeit in higher prices than the locally produced ones. Under this stiff competition, cigarette production has doubled for every year, and for the first time since 1966, there is even a glut of locally produced filter tips.

There is a clear tendency for production in the state economic enterprises to increase since 1980. SEEs have been Turkey's version of UFOs: undercapitalized, run by a floating management and grossly overstaffed. For the purposes of this paper it might be unproductive, financially troubled and organizationally defunct. The government of Turgut Ozal has been trying to change these around. However, all of the decisions taken by the government may contribute to overall productivity of the SEEs in the macro sense. Factors that influence productivity in the micro-sense—productivity through production management—have not been given a great deal of priority.

An examination of micro-level productivity enhancement through technical and management methods (product design and new product development), production planning and work methods, quality control, labor training, research and development, capital utilization, machinery utilization, plant location and level of technology certainly are needed to understand productivity enhancers in Turkish industry. Before an analysis of the above

dealt with, an analysis of the Turkish private sector, in general terms, will be presented. Once the background of the private sector is clear, then a comparison of different sectors in terms of productivity will be a good indication of the productivity in Turkish industry.

### Private Sector

Background. As explained in the first part of this thesis, private industry in Turkey started from scratch after the declaration of the Republic in 1923. The Turkish private industry, for all practical purposes is only a generation old and almost entirely dominated by a number of families. The rise of the Turkish merchant state, perhaps predictably, has been accompanied by the appearance of several important dynasties of merchant—or rather industrial—princes who dominate the country's economic life.<sup>14</sup> A list of these major holdings can be seen in Appendix A.

Nearly all the large private holding groups are highly diversified in industry and active in trade. The relative share of the private sector in investment in manufacturing was relatively low compared to the public sector. However, average labor productivity in the private sector increased by nine percent a year from 1965–1975 compared with a seven percent in the public sector. Private sector industries with above average productivity

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<sup>14</sup>Financial Times. November 4, 1985.

growth rates included engineering, tobacco processing, paper, rubber and petroleum.

In 1979, private sector exhibited higher levels of labor productivity in all sectors except for wearing apparel (Table 4).

In manufacturing as a whole, labor productivity was on the average 30 percent higher in the private sector than in the public sector. However, the public sector paid 32 percent higher wages and salaries than the private sector, most likely due to overstaffing.

On the whole, small (establishments with less than 50 workers) and medium-scale establishments (employing 50-200 workers) are predominant in Turkish manufacturing. By contrast, large establishments dominate the public sector. While only 7 percent of private establishments employ more than 200 workers, this is the case for about 80 percent of establishments in the public sector. The average public manufacturing establishment is roughly ten times the size of the average private manufacturing establishment.<sup>15</sup>

Turkey's industry suffers from the problem of uneconomically small size of establishments. The technically optimal scale of establishment exceeds the average size by a

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<sup>15</sup>K. Ebiri, Z. Bozkurt and A. Culfaz, "Capital and Labor in the Turkish Manufacturing Industry." State Planning Organization. 1977.



Table 4. Value Added Per Worker in  
Manufacturing, 1979 (TL 000)

<u>Industry</u>	<u>Public</u>	<u>Private</u>
Processed food	222	348
Beverages	603	689
Tobacco	402	461
Textiles	236	413
Wearing Apparel	339	206
Fur and Leather Products	—	294
Wood and Cork	287	392
Furniture and Fixtures	231	638
Paper	225	638
Printing and Publishing	291	417
Chemicals	881	1,045
Petroleum	2,210	2,380
Rubber and Rubber Products	117	539
Non-metallic Minerals	291	415
Basic Metals	267	657
Metal Products	1,014	1,387
Machinery	372	414
Electrical Machinery	231	534
Transport Equipment	312	530
Miscellaneous	250	310
Total	374	482

Source: Balassa, Bela. P. 211.

factor of ten in ethylene, bricks, and tractors and by a factor of twenty in diesel engines. This is in part the result of the import-substitution strategy applied before 1980 that permitted small establishments to be set-up, often with the duplication of facilities, in the protected domestic market.

Istanbul, trade capital of Turkey, accounted for 42 percent of the total number of establishments followed by Marmara, Izmir and Ankara regions with 14 percent, 10 percent and 8 percent respectively, in 1977. Istanbul also has the highest concentration in most industries, especially in chemicals (62 percent), engineering industries (52 percent) and textiles (47 percent).<sup>16</sup>

Calculations of capital-labor ratios are fraught with difficulties due largely to the overvaluation of capital. In the 1972-75 period, capital intensity was on the average about 50 percent higher in public than in private sector enterprises; the ratio would even be higher if overstaffing in public enterprises were avoided.<sup>17</sup> Part of the explanation lies in the prevalence of private firms in light industries and engineering that have relatively low capital-labor ratios; these ratios are generally

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<sup>16</sup>IBRD. "Turkey-Prospects for Small Medium Scale Industry Development and Employment Generation." 1980.

<sup>17</sup>Ebiri, et al. Ibid. P. 25.

high in intermediate product industries where public firms predominate. (Table 5)

Private manufacturing investment declined by nearly one-half between 1978 and 1980. Preliminary data indicate that only in chemicals, where domestic demand is not fully saturated and firms which have also been able to find outlets in Middle Eastern

Table 5. Capital Requirements per Job in 1980

<u>Industry</u>	<u>Capital Requirement (TL million)</u>	<u>Ranking</u>
Crude Oil Extraction	95.2	1
Fertilizer	36.2	2
Oil Refining	30.7	3
Energy	25.7	4
Iron and Steel	17.8	5
Cement	16.1	6
Paper	12.7	7
Flour and Flour Products	8.2	8
Fruit and Vegetable Processing	8.1	9
Skin and Fur	6.8	10
Sugar	6.5	11
Agriculture Machinery	6.1	12
Slaughter House	5.3	13
Beverages	5.1	14
Motor Vehicles	5.0	15

Source: SPO

countries, and non-metallic minerals which have been little affected by declining demand, has the level of investment been maintained. (Table 6)

In turn, investment has declined the most in food-processing, textiles, iron and steel, and electrical machinery.

Table 6. Private Manufacturing Investment, 1980  
(1978 = 100)

Food Processing	38
Textiles	47
Chemicals	102
Earthenware	100
Iron and Steel	39
Non-electrical machinery	55
Electrical machinery	24
Transport Equipment	84
Other	71
Total	63

Source: TSKB.

One of the reasons for the sharp decline in investment in the manufacturing sector is the low extent of capacity utilization. In the aggregate, capacity utilization is estimated to be around 56 percent in 1978, 45 percent in 1979 and 1980. The figures for 1983, 1984 and 1985 are 69.6 percent, 72 percent and 72.7 percent, respectively. Some of the reasons for low capacity

utilization before 1980 were shortages of raw material, oil and power. After 1980 they were low demand and difficulties in financing.<sup>18</sup>

As stated earlier, Turkish private sector also benefitted from high trade barriers imposed by the government. These tariff protection policies created an ever increasing demand for Turkish products without competition. Especially in the area of quality, there were no "incentives" to be more quality conscious since everything that was produced was gobbled up by the public. Apart from large holdings which produce white goods, automobiles, etc. the small private sector is a low quality producer. When in 1980, Turgut Ozal welcomed foreign competition, the low quality producers of products seemed to have screamed the most.

The private sector also had to operate in the shadow of the SEEs. In 1982, only three areas were totally free from SEE competition. The giant SEEs not only competed with private firms, but also supplied raw materials to most of them. Therefore, to a large extent the success of the private sector depended on the public sector. However, private sector undeniably also benefitted from the inefficiency of the public sector in competition.

The development of the Turkish private sectors seems to have been achieved with the help of the government. Prime Minister Turgut Özal firmly believes that Turkish industry is free

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<sup>18</sup>Istanbul Chamber of Commerce. "Economic Report." May, 1986.

to compete in a free and fully competitive market. The recent achievements of the construction firms and textile producers seems to affirm his view. Through an opening to world markets via exports, Turkish firms now have to compete in order to stay alive. They have to be productive and quality conscious.

#### Growth Performance

For economic, historic, institutional and policy reasons, Turkey's post war growth strategy has generally been inward looking. In comparison to other newly developing nations of similar size, Turkey has had a very low share in Gross Domestic Product (GDP) until recently, because of higher production costs of products as well as low quality. One other reason for this limited role of trade in Turkey's industrialization has been due to its large size of domestic markets, its natural diversity, and the structure of incentives. Unlike other semi-industrialized countries that had switched from an import substitution to an export strategy, Turkey had prolonged the inward oriented phase of its manufacturing growth, because of local pressure. As a result, a highly protected industrial structure, inefficient and low quality for the most part, that relied heavily on the import of intermediate goods became a costly and low-productive feature of Turkish industrialization.<sup>19</sup>

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<sup>19</sup>Balassa, Bela. Ibid.

In the 1950's, the Turkish industrial sector was relatively small, accounting for only 12.9 percent of GDP while agriculture accounted for 47.8 percent and services for the rest. According to the 1950 industrial census, public enterprises were concentrated in the basic heavy industries and accounted for 46 percent of value added in manufacturing and 33 percent of manufacturing employment.

Table 7. Import and Export Performance  
(Millions of Dollars)

<u>Year</u>	<u>Imports</u>	<u>Exports</u>
1972	1,562.6	885.0
1973	2,086.6	1,317.1
1974	3,777.6	1,532.2
1975	4,738.6	1,401.1
1976	5,129.0	1,960.0
1977	5,796.3	1,753.0
1978	4,599.3	2,288.2
1979	5,069.4	2,261.2
1980	7,666.3	2,910.1

Source: State Planning Organization (SPO) and Ministry of Finance

The private sector concentrated mainly in major cities but mostly in Istanbul, dealt mainly in consumer goods, while the public enterprises which on the whole were much larger, were regionally dispersed, mainly because many of them were resource oriented (e.g., mining, steel, paper, etc.).

Between 1950 and 1962 industry grew at an average of 8.3 percent per annum, more than agriculture (5.2 percent) and GDP (6.3 percent). In this period, the tendency was strongly towards import substitution and the main growth occurred in the heavy industries in the state sector. With the introduction of planning, the Five-Year Development Plan in 1963, the emphasis on import substitution continued and industry was given high priority. Between 1963 and 1976, before the recession set in, industry grew at an average annual rate of 9.9 percent. It increased its share of GDP from less than 17 percent in 1960 to about 23 percent in 1976.

The main manufacturing activities have been in traditional consumer goods: foods, beverages, tobacco, textiles and clothing which accounted for 47.7 percent of manufacturing production in 1976, down from 62.3 percent in 1962. During the 1960's and 1970's modern intermediate and investment goods industries developed fast (mainly petroleum products, chemicals, iron and steel) and increased their share of manufacturing production from 37.7 percent in 1962 to 52.3 percent in 1976.

Industry has absorbed a growing share of the country's resources as the number and size of investment projects increased in both state and private sectors. The share of industry in total gross fixed investments rose from 27.8 percent in 1960 to 37.9 percent in 1976. It was during this period that Turkey acquired a highly diversified industrial structure. Typically, the growth of



industrial output and investment in industry was characterized by a high capital output ratio and a slow growth of employment. In 1962 industrial employment stood at 995,000 or 8.3 percent of total employment. By 1976, however, this had increased to 1,849,000 or 12.6 percent of the total. Over the same period the rising investments per worker contributed to output per worker in industry rising from TL 15,100 in 1962 to TL21,400 in 1976, a rise of 41.7 percent in real terms.

Table 8. Gross Industrial Product

<u>Gross Industrial Product</u>	<u>1962</u>	<u>1972</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
TL billion at 1968 prices	10.1	28.3	45.0	42.5	45.4	47.5
Industrial Employment (thousands)	995	1,500	1,794	1,771	1,822	1,851
Share of Industry in Total Employment (%)	8.3	11.1	11.8	11.6	11.9	12.0
Output per Capita in Industry (TL 000 at 1968 prices)	15.1	18.6	25.1	24.0	24.9	25.7

Source: State Institute of Statistics (SIS)

#### Industry as Leading Sector

With the establishment of the State Planning Organization in 1962, economic policy gave priority to industry and this became embodied in the series of Five-Year Plans beginning in 1963. Industry was planned to become a leading sector which would reduce import requirements, create jobs and stimulate economic growth. To achieve these objectives Turkey's infant industries needed to

be given incentives and protected from low cost producers in the industrialized world. As a result, the import substitution industries grew fast but many remained inefficient with uneconomic size plants. Industrial exports grew slowly while imports of intermediate and capital goods expanded.

By the mid-1970's, Turkey had achieved a high degree of self sufficiency in industry but possibilities for further import substitution had become limited. During the 1960's, rapid growth based on domestic industry was possible because of the large protected market in Turkey, which was growing, and the level of imports was rising less rapidly than industrial expansion. A major difficulty emerged in 1970's due to high imports. Over 90 percent of Turkey's imports in the mid-1970's were investment goods and raw materials (including oil) and, with the terms of trade deteriorating, import spending was increasing as rapidly as national product and the trade deficit too grew alarmingly.

Unfortunately, Turkey was unable to break its dependence on a small range of commodities for export, and even in 1976 three products (cotton, hazelnuts and tobacco) accounted for over 45 percent of export earnings. Industrial exports were 35.9 percent of the total in 1975 but their growth performance had been poor until the 1970 devaluation, partly related to inefficiency and an over valued exchange rate, but also linked to the inadequately developed export channels.

Industrial development policy after 1963 made no distinction between those industries in which Turkey had a comparative advantage and those which were characterized by economic disadvantage. Examples of the former were textiles and processed agricultural and primary products, which accounted for the major proportion of exports in 1976, while the latter included petrochemicals, machinery, vehicles and steel which could not compete freely in world markets. Certain types of industries should perhaps be given high priority in the industrial development plans. Thus, labor intensive industries were potentially more competitive and would have created more jobs and contributed to regional development. In addition those industries based on domestic natural resources (minerals, woods, textiles, food, etc.) and their linked processing, and supply activities could have been stimulated to a great advantage.

Until 1977 the limitations and contradictions of import-substituting industrialization in a developing country had not seriously held back growth. It was the rapidly deteriorating external balance that finally imposed a marked slowdown in GNP growth in 1977. For over a quarter century Turkey had experienced an average growth rate of more than six percent but in 1977 it was only 3.9 percent, in 1978, 2.8 percent and in the next two years it was negative.

Inevitably industry was effected by the recession (Figure 2). Value added in industry had been growing at an

average annual rate of more than 10 percent before the crisis but then fell by 5.6 percent in 1979 and 5.9 percent in 1980, the latter year being adversely affected by bottlenecks in the supply of imported goods (inputs) and increased strike activity. There was a reversal of this trend in 1981 with value added increasing by 7.2 percent, from a depressed level. The moderate rate of

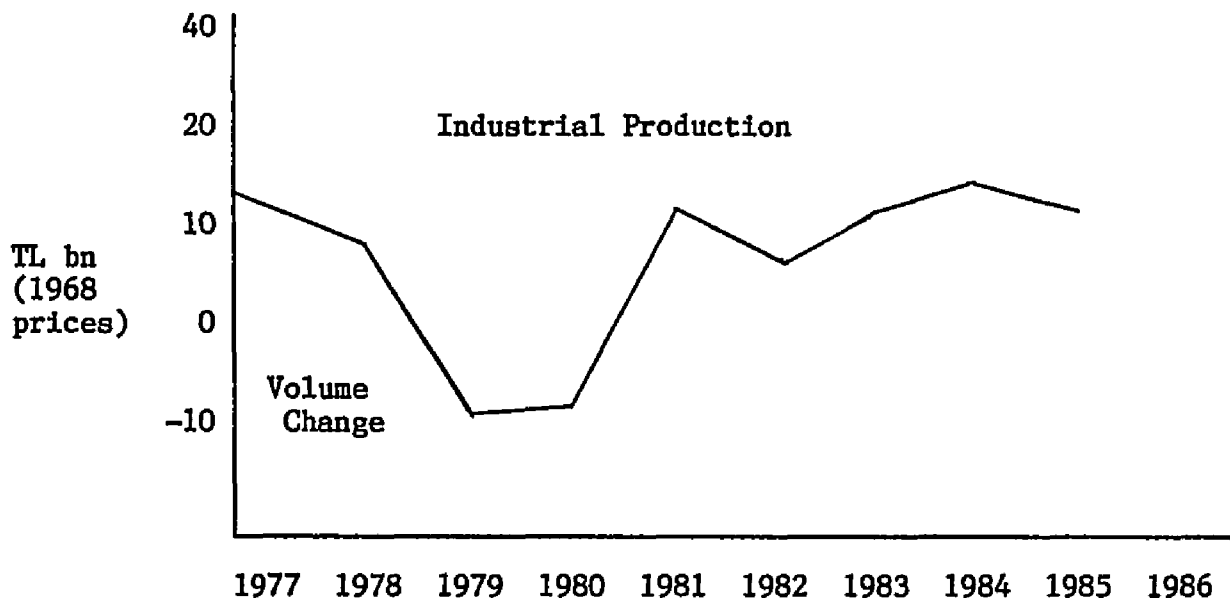


Figure 2. Industrial Production

Source: Economic Report-Istanbul Chamber of Commerce November, 1986.

Industrial growth in 1982 (3.2 percent) was a more accurate reflection of the tight money policy stance although in 1983 there was a rise in industrial growth to 7.1 percent. In 1984 9.3 percent and in 1985 5.7 percent and 10.5 percent in 1986.

Exports of processed and manufactured goods rose particularly fast in dollar terms in 1981 (120 percent) and 1982 (50 percent). This largely explains the growth of industrial output in those years. The growth of industrial exports (where quality and cost competitiveness is a must) after the 1980 stabilization programme affected many products which had formerly accounted for a relatively low share of the foreign sales—such as chemicals, rubber, plastics, iron and steel, machinery and motor vehicles.<sup>20</sup> This has resulted in the diversification of manufactured exports and the share of textiles and clothing and leather in total manufacturing exports which had averaged 60 percent between 1973–1979 and fell to 37 percent in 1982. Moreover, for the first time in 1981 industrial exports accounted for more than half of export earnings (52.8 percent) and in 1982 this increased further to 62.7 percent. By 1985 it was 79 percent and 76 percent in 1986. (Figure 3) It is quite evident that there are some changes in Turkish industry. One question might be whether the industry is growing because of efficiency and effectiveness or is it growing because of government incentives. This thesis will compare and correlate data that is relevant to productivity and will try to answer that question in the next sections.

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<sup>20</sup>Financial Times. December 19, 1983.

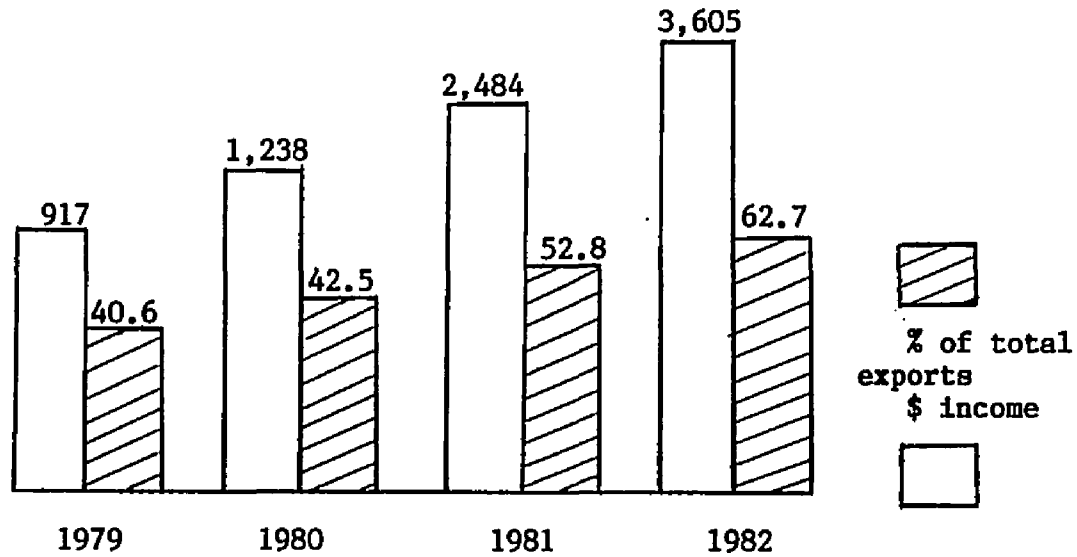


Figure 3. Export of Industrial Goods (Processed and Manufactured Products, Mining)

Source: TUSIAD-Turkish Industrialists and Businessmen Association

## CHAPTER THREE

### PRODUCTIVITY

Productivity improvement is important to both national economies and industry. In industry, productivity growth leads to lower costs and provides an opportunity for lower priced products and/or higher profits.<sup>1</sup> It also makes possible increased compensatory benefits for employees. In national economies, productivity growth helps to ensure that the economy is on solid footing and resources are being utilized in the best manner possible.

#### Definition of Productivity

The productivity of any industrial firm is a measure of how well resources in that firm are brought together and used to accomplish a set of results. Productivity is not just an increase in the volume of shipments, although this is one element.<sup>2</sup> Traditionally, productivity has been defined as the acceptable output per labor hour. Using this definition, we would quickly

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<sup>1</sup>"Productivity in Industry. Prospects and Policies."  
OECD. Paris. 1986.

<sup>2</sup>Kendricks, John W. and Grossner, Elliot. "Productivity Trends in the United States." John Hopkins University Press, 1979.

discover that in a firm with many employees and little automation, productivity depends principally upon human achievement. On the other hand, in a firm where automation predominates, the human contributions to productivity play a lesser role.

Fred G. Steingraber has written a fine summary of how the definition of productivity has changed over the years. This is the way he summarizes it:

. . . The definition of productivity has changed considerably over the past fifty years. Back in the 40's and 50's the measurement of productivity focused on output, or the production of as much as possible.<sup>3</sup> In the 60's and 70's quantity was no longer as important as efficiency, or production at the lowest possible cost. Now in the 80's, given the constraints imposed by scarcities, regulations, changes in the job skill and cost mix, and greater international competition, the productivity emphasis is on effectiveness. Corporations are increasingly liable for the quality of their products and the services they offer. [Corporations] are considered social entities, not just economic entities. And as social entities, [they] are held accountable for attitudes toward issues ranging from the environment to the quality of life at the workplace, and ultimately to the quality of the product delivered. As a result, the definition of productivity as output over input is useless unless we realize that output now includes in addition to product such factors as quality, service and safety, while the input is government, unions, people, money, technology, information, motivation.

Productivity is more than output over input. It is the relationship of the quantity and quality of products, goods and services produced to the quantity of resources (personnel, capital facilities, machine tools and equipment, materials and information) required to produce them.

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<sup>3</sup>Cited in Kendricks, John W.



In order to improve productivity in an industrial firm, both the output (performance achieved) and the input (resources consumed) must be capable of being measured. The ratio set forth below provides a measure of how well the expended resources are able to accomplish the established performance objectives, i.e., the ratio provides a measure of the value added.

$$\text{Productivity} = \frac{\text{performance achieved}}{\text{resources consumed}}$$

Focusing on the industrial firm, there are several ratios that one can use to express productivity in definitive terms. For example, one ratio that might be used to express the efficiency of the entire firm is as follows:

$$\text{Productivity} = \frac{\text{product and service}}{\text{labor + materials + overhead + capital}}$$

This productivity ratio is an all inclusive statement of the value of the product and service produced based upon a summary of the value of all the inputs used. In this example, money (dollars or TL) is used in both the numerator and denominator to allow the diverse products and resources to be expressed in equivalent terms. Special adaptations of the basic productivity ratio could be made to represent the functions in any manufacturing organization. For example, a firm-wide productivity ratio could be expressed in any one of the following ways:

$$\frac{\text{sales} + \text{inventory change} + \text{plant}}{\text{labor} + \text{material} + \text{services} + \text{depreciation} + \text{investment}}$$

$$\frac{\text{shipments}}{\text{direct labor} + \text{indirect labor} + \text{materials}}$$

$$\frac{\text{revenue}}{\text{direct labor} + \text{indirect labor} + \text{total direct procurement} + \text{other expenses} + \text{capital cost} - \text{inventory change}}$$

$$\frac{\text{total goods and services billed}}{\text{employee compensation} + \text{direct material cost} + \text{facilities change} + \text{business service cost}}$$

$$\frac{(\text{Production cost}) - (\text{Purchased material cost}) - \text{depreciation} - \text{taxes}}{(\text{labor input cost}) - (\text{net investment} \times \text{rate of return})}$$

The preferred productivity ratio for any endeavor is the one that best fits the purpose and resources of the organization involved.<sup>4</sup> Practice, comparative use, and historic validation are some of the methods for giving productivity ratios meaning and/or validity.

In measuring the productivity of a service organization, such as a data processing organization, measures of effectiveness are sometimes combined with measures of efficiency. The effectiveness of data processing operations can be defined by the timeliness of the organization in meeting the output schedule.

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<sup>4</sup>Judson, Arnold S. "The Awkward Truth About Productivity." Harvard Business Review. 1982.

The efficiency can be defined by the extent of the utilization of the computer and the peripheral support devices. Let us assume that efficiency will be measured by traditional input-output ratios and effectiveness is related to the quality of the product. If a number of points are allowed for each measure, and the total score is computed for each time period being measured, the results will represent the total effectiveness score and total efficiency score for each time period. In this example, the productivity of the data processing operation can be defined as the product of effectiveness multiplied by efficiency. Because there is not a constant measure of output in this example, the effectiveness score should be multiplied by the familiar efficiency (output-input ratio) as shown below:

$$\text{Productivity} = \text{effectiveness} \times \frac{\text{output}}{\text{input}}$$

This example illustrates an important assumption regarding simple productivity ratios: the quality of effectiveness of the output has to be factored into the equation. In an era of rapidly changing technology, comparisons of output become almost meaningless. In the service area, such as the one described above, the definitions are very difficult to analyze. Whether one is concerned with a product or a service area, there are four primary methods for increasing productivity—through the work force, the work methods, management behavior and the equipment.

To determine productivity one must ask: First, was the desired result achieved (the effectiveness question)? And, second, what was the quantity of resources consumed to achieve it (the efficiency question)? How well resources are brought together and utilized is indicated by comparing the magnitude/volume results, usually called the output (effectiveness), with the magnitude/volume of the resources consumed, usually called the input (efficiency). This ratio then becomes an index of the definition and a measurement of productivity.

#### Trends in Productivity Growth

In recent years both the United States and Europe have been losing their dominance in many industries to the Japanese.<sup>5</sup> The results of recent studies of Japanese improvements in productivity, product quality, process control and management have become the basis for changes in industrial practices worldwide.

During the 1950's and 1960's the United States maintained a relatively high productivity growth rate. During the 1970's the growth rate declined, but the United States is still ahead of the rest of the world. The Bureau of Labor Statistics in the Department of Labor indicates that when comparing the real domestic production per employed person—the national measures of

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<sup>5</sup>"OECD Report on Productivity in Industry."  
DSTI/IND/84.12. P. 89.

productivity—the United Kingdom is 39.5 percent behind the United States. Italy trails by 39.4 percent, Japan by 31.6 percent, West Germany by 11.3 percent, France by 10.6 percent and Canada and the Netherlands by 8 percent. Newly developing nations such as India, Korea and Turkey do not even come close to these ranges.<sup>6</sup>

However, the challenge to the United States from all these countries is a real one. If anyone wants to come close to the United States's ratio, they should make a commitment to more innovation and strong leadership.

#### Turkish Productivity

Increase in productivity is no doubt, the password for real economic growth. In simple terms, increased productivity is equivalent to greater, better and cheaper production per unit.<sup>7</sup>

However, what does productivity really mean and how can it be measured and compared? Is it, in agriculture or elsewhere, measured by the gross output per unit of production; or value added only, or in view of differences in inputs of labor and capital?; or is it output per working hour, again gross or net of all input except labor? How can one speak of low productivity if the latter is affected, for instance, by under-utilization of capacity (evidently a chronic Turkish problem attributed to

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<sup>6</sup>Annual Survey of European Management Forum.

<sup>7</sup>Hershtag, Z. Y., "Turkey—The Challenge of Growth." Brill. 1968.

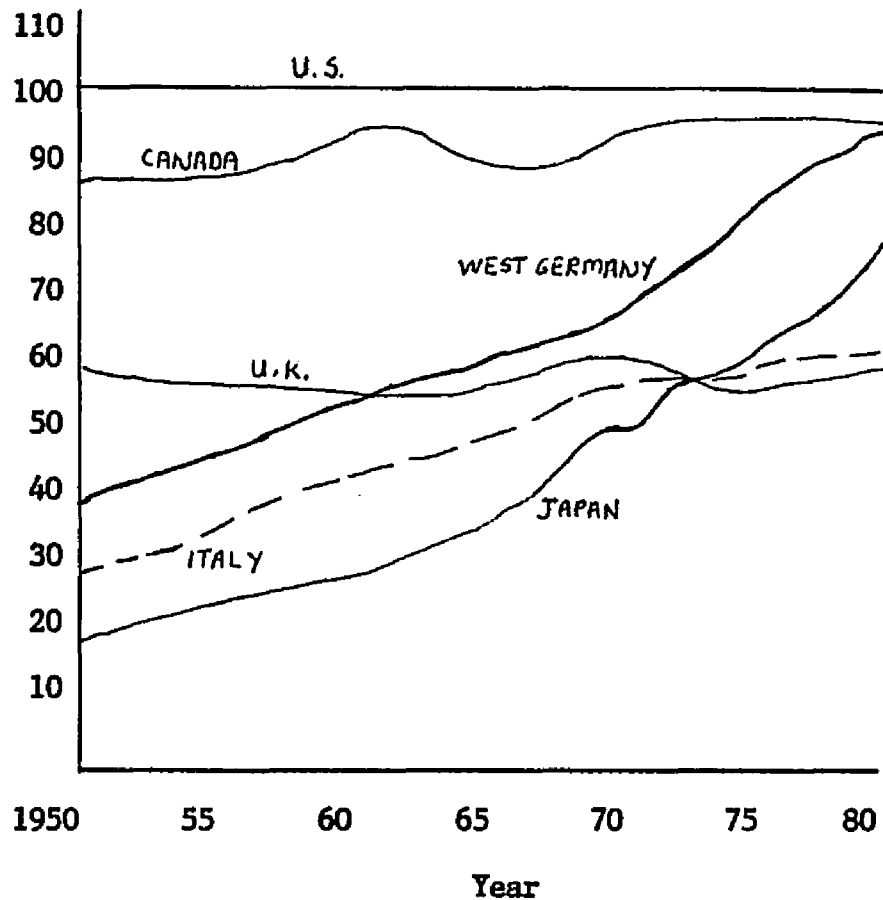


Figure 4. International Productivity Rating  
Relative to Manufacturing: 1960-1980

import-substitution policies) due to poor organization and planning, lack of managerial skill, overcentralized administration, insufficient working capital, deficient supply of raw materials and spare parts, or market conditions? Or, finally, how do the prices of inputs from other countries or other sectors influence productivity if measured by value added?

All of these questions concern national economies at varying stages of development, but they complicate the issue still more in a developing country such as Turkey, where the structure

of capital, organization, management and techniques significantly differ from enterprise to enterprise.<sup>8</sup> The summary talk of low productivity in some sectors is being denied by balance sheets and profits of quite a number of enterprises and dismissed by some large-scale entrepreneurs, while others do deplore the efficiency of labor, especially when the latter starts pressing for higher wages.<sup>9</sup>

In Turkish industry, where the measurement of productivity ratios did not actually start until 1965, productivity has played a minor role to problems such as widespread strikes, limitations to importing raw materials and spare parts, a general recession.<sup>10</sup>

The usage of labor and capital productivity to measure overall productivity seems to be a good yardstick to go by for two reasons; first it makes it easier to compare it to the other nations and secondly the calculation of it is much easier. Since labor productivity is simply the ratio of output to labor input. Although this is a general approach taken by Turkish planners as well as international bodies such as the United Nations (U.N.) and Organization for Economic Cooperation and Development (O.E.C.D.), there really are no scientific studies on the productivity of labor and capital. Especially in the State Economic Enterprises, this lack of general understanding of low productivity in itself

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<sup>8</sup>S. P. O. Report on Turkish Productivity. Annually. Ankara.

<sup>9</sup>Walsted, Bertil. "State Manufacturing Enterprise in a Mixed Economy." Johns Hopkins. 1980.

<sup>10</sup>TUSIAD's Annual Survey of Turkish Economy.

reduces the pressure for improvements. The textiles industry is a prime example of this, as a 1970 study by an international textiles consultant indicated that productivity in public Turkish textile mills were equal to only about a quarter of the corresponding productivity of U.S. workers using the same equipment, because of "the excessive number of workers employed, lower machine utilization efficiencies, too large a product mix, and poor utilization of finishing equipment."<sup>11</sup> On the other side of the coin, the private textile mills are the opposite. Exports of Turkey's top 40 textile items reached \$1.5 billion in 1985.<sup>12</sup> Textiles has been the country's most internationally competitive industry—an achievement ironically recognized in decisions by the EEC, the U.S. and Canada, to slap restrictions on Turkish textile exports. In a study made by Turkish Industrialist and Businessman's Association (TUSIAD), it was estimated that the level of productivity in the modern private sector was at least 50 percent higher than in the public sector.<sup>13</sup>

Therefore, there is a duality in the Turkish industrial scene. On one side is the public sector where there are widespread inefficiencies, huge financial losses, and low quality.

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<sup>11</sup>Study by James Nannery and Associates (July 1970). Sponsored by World Bank and Turkish Industrial Development Bank.

<sup>12</sup>Financial Times. May 19, 1986.

<sup>13</sup>"KIT'lerin Ozellestirilmesi." Government of Turkey. May, 1986.



However, there is a great social value in providing employment. On the other side is the private sector, where productivity is considerably higher, the operation efficient and effective, medium to high quality products, and the private sector is usually profit making.

As an example of this we can cite a survey done by The Banker magazine in July 1986 issue of top 500 banks in the world. According to this survey, two Turkish banks qualified to be in this category. T. C. Ziraat Bankası (Turkish Republic Agricultural Bank) was listed 320th with 36,973 employees. The bank before it (319th) had the same profit ratio with 4,970 employees. On line 422, Türkiye İş Bankası (Turkish Work Bank) was listed with 22,384 employees. The bank listed before it had made better profits with only 852 employees! This little comparison might point out the problems of measuring and evaluating productivity in international comparison. One other point that would demonstrate the dualism between public and private corporations in Turkey; the difference in the number of people employed. T. C. Ziraat Bankası is state owned, and Türkiye İş Bankası is a semi-private company. The difference in the number of people employed between them is 14,589 employees.

Although there are widespread differences between public and private firms in Turkey, the figures for productivity are almost always given for the national economy as a whole, differentiating only between subsectors. This makes it very hard

to pinpoint problem areas in one sector. In the next section, some of these problems will be sorted and analyzed under the headings of public and private firms productivities.

At this point a closer look at productivity figures in Turkey seems to be warranted. An important point to remember when discussing productivity figures is that Turkish exchange rate has been changing by great amounts from month to month. Therefore analyzing productivity growth in actual lira figures might be misleading. Instead, on analysis based on percentage rate change over the previous year would be an easier way to analyze growth. Another important point to look at is the differences before 1980 and after 1980. This will serve the purpose of differentiating growth before and after Özal's policies on productivity which is the basic emphasis of this thesis.

Table 9. Gross Domestic Productivity in Yearly Percentage Change

Industry	<u>1961-77</u>	<u>1978-82</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
	4.8	0.6	-2.9	-4.0	3.6	2.1	4.0	5.1

Source: OECD. Turkey. May 1985

These figures in Table 9 are calculated by taking the Gross Domestic Product in industry and dividing by the number employed, taking into account for currency fluctuations and comparing it to the previous years to find the percent change.

The above table is a good indication of how industry fared from 1961 to 1984. Years 1979 and 1980 indicate a terrible

productivity growth; however, beginning from 1981 onwards we can see a tremendous improvement in productivity growth.

One other important area to look into is the change of manufacturing production from 1973 to 1986 as percentage volume change over the previous year. Table 10 gives us the actual change in production over the years in Turkish manufacturing industry. It is interesting to note that the years 1978-1980 where production is lowest are also the years where productivity

Table 10. Actual Change in Production  
Average Annual Percentage Change

<u>1973-77</u>	<u>78-80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84/83</u>	<u>85/84</u>	<u>86/85</u>
8.8	-2.5	8.7	5.1	9.0	9.3	5.7	10.5

is lowest. This is a clear example of how changes in productivity and production are correlated. So far, a macro-economic analysis of productivity clearly shows that there have been clear differences in productivity before and after 1980. Now let us examine labor and capital productivity in Turkey more closely.

#### A Comparison of Turkish Labor and Capital Productivity

In this section, an analysis of labor and capital productivities will be examined and the Turkish experience will be compared to some other countries from the same region; namely Balkan states of Albania, Bulgaria, Greece, Romania and Yugoslavia.

Average productivity of labor, which is measured by the ratio of output to labor input, varied from \$2,000 per worker in Turkey to around \$7,000 in Greece, Romania and Yugoslavia. The rate of productivity growth—the annual increase in output per worker—also differs greatly from country to country.

This annual increase in production per unit of labor is important because real income of the worker as well as the general growth of the economy is expected to increase in proportion to productivity.

Table 11. Annual Rates of Productivity of Labor

	<u>1961-70</u>	<u>1971-77</u>	<u>1961-77</u>
Albania	1.6	3.9	2.4
Bulgaria	3.1	2.2	2.7
Greece	8.8	3.5	6.8
Romania	6.3	9.5	7.7
Turkey	4.1	6.1	4.8
Yugoslavia	4.0	1.7	3.1

Source: Nicholas V. Gianaris. *The Economies of Balkan Countries*. Praeger, 1982.

According to a United Nations report these rates are among the highest in the world, with only Japan enjoying such high productivity rates in these years.<sup>14</sup>

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<sup>14</sup>Gianaris, Nicholas. "The Economics of Balkan Countries." Praeger. 1982.

The allocation of resources, including labor, to the most efficient sectors and industries and their combination in the right proportion increases overall productivity. Changes in the efficiency with which labor and other inputs are converted into outputs may result from managerial skills, work experience and education (learning curves), economic organization, and changes in technology. Technological improvement usually results in higher production, better quality of products, more leisure and better working conditions.<sup>15</sup> New scientific inventions are responsible for increasing the wealth of nations, including that of the Balkan nations.

Technological improvements can be achieved by providing incentives for investors and managers through reducing risks and uncertainties that retard innovations and slow growth. The key to improved technology is capital formation. Moreover, increased spending for research and development increases the capacity to innovate and encourage technical advances.<sup>16</sup>

Capital formation and work incentives play a vital role in the development of all countries. Assuming the same amount of capital per worker, productivity can rise through stimulation of work incentives and improvement of skills. More importantly,

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<sup>15</sup>Malkiel, B. "Productivity—The Problem Behind the Headlines." *Harvard Business Review*. May, June 1979. Pp. 81-91.

<sup>16</sup>Kuznets, S. "Quantitative Economic Research. Trends and Problems." *National Bureau of Economic Research*. 1972.

productivity has been known to increase at the same rate as the rise in capital investment per worker.

Part of the productivity growth in Balkan countries has been due to their improvement of export performance, which has given these economies the benefit of market growth abroad. Another important reason for productivity growth is due to a shift of labor from agriculture to industry.

Inefficiency and low productivity are common in the public sector of Greece and Turkey, where civil servants cannot be dismissed or demoted without serious cause, and only after extensive legal procedures. Such employees are usually given other government jobs at the same level but which may not fit their training and acquired skills. As governments change, new teams take over and pack the ministries. As a result some highly capable employees may leave, but most of them remain. The end result of this is that labor productivity declines, while payrolls remain swollen. The same thing can be observed in public enterprises where a great degree of political patronage exists. The most harmful effect to productivity is the policy of accommodating herds of workers regardless of their efficiency. This effort to alleviate the unemployment problem greatly reduces the productivity of labor. Lack of proper skills, arriving late, extensive breaks, and leaving early are additional reasons for low productivity. A popular story that circulated in Turkish newspapers was about some politician's cronies who were on the

payroll of this or that SEE, but nobody has ever seen them except when they came in to pick up their paycheck.

To keep productivity from falling, some relaxation of controls and the introduction of market mechanism seems to be occurring in these countries. In Turkey, market rules and competition in all industries seemed to have gained a momentum under Mr. Turgut Özal. Also the introduction of technical methods and computerization into decision making is expected to reduce bureaucracy and increase productivity in these countries.

For higher productivity, it is not enough only that new investment incorporates technical improvements, but also that disinvestment happens by closing obsolete facilities and industries that no longer enjoy comparative advantage. Such structural changes are needed to utilize resources in more productive industries.

#### Capital Productivity

Since the population density has increased and land per laborer has declined in all Balkan countries, especially Turkey, an increase in output per worker calls for an increase in capital. Capital, which Eugen von Bohn-Bawerk defined as the intermediate products that appear in several stages of the roundabout journey

of production,<sup>17</sup> helps labor to increase the annual product of its country. As Adam Smith pointed out, this can be achieved through the improvement of machines and instruments that facilitate the division of labor, and thereby increase productivity.<sup>18</sup>

As the quality of capital keeps improving, new capital to increase the capital stock or to replace that which is old and depreciated has a superior efficiency from a technological point of view.

Table 12. Supply and Use of Resources  
Percentage Volume Change Over the  
Previous Year

	<u>1975</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>
Manufacturing	8.1	9.8	7.3	3.6	-5.3	-5.4	8.7	5.1	9.0	10.3

Source: OECD. Turkey. May 1985.

In this table we again see the trend of the years 1977-78 and 1980 where there is a marked decline.

Table 13 shows the investment/efficiency ratios for all Balkan countries; these figures are the inverse of the incremental capital/output ratio (ICOR). When a further analysis is made adjusting the labor ratios, there is a marked change in

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<sup>17</sup>Von Bohm-Bawerk, Eugen. "The Positive Theory of Capital." Macmillan. London. 1891. P. 22.

<sup>18</sup>Smith, Adam. "Wealth of Nations." E. Cannan, ed. Modern Library. N.Y. 1937. P. 326.



Table 13. Investment/Efficiency Ratios  
( GDP/GFCF, constant prices)

	<u>1951-60</u>	<u>1961-70</u>	<u>1971-77</u>	<u>1951-77 average</u>
Albania	27.2	32.6	24.7	28.2
Bulgaria	52.8	38.1	33.6	41.5
Greece	32.5	27.6	18.4	26.2
Romania	30.6	23.1	25.4	26.4
Turkey	31.5	35.5	34.7	33.9
Yugoslavia	22.5	19.4	16.2	19.4

Source: OECD. National Accounts. U.N. Yearbook of Statistics.

the figures. On the above table Turkey came in second after Bulgaria in investment and efficiency ratios. If we take the labor adjusted ratio we can clearly see that Turkey is in first place as the next table shows.

Table 14. Labor Adjusted Investment/Efficiency Ratios

	<u>1951-60</u>	<u>1961-70</u>	<u>1971-77</u>	<u>1951-77 Average</u>
Albania	5.4	8.5	15.8	9.9
Bulgaria	-1.6	19.0	8.4	8.6
Greece	28.2	31.4	14.3	24.6
Romania	N.A.	18.8	24.4	21.6
Turkey	N.A.	27.6	32.4	30.0
Yugoslavia	5.3	15.2	4.6	8.4

Source: OECD. U.N. Statistical Yearbooks.

In Turkey's case, the ratio simply means that for every 100 TL invested in, an increase of 30 TL in production or output was realized.<sup>19</sup>

Although investment helps improve labor productivity, it also increases capital stock, which in turn may slow down innovations and make changes difficult. It may also lead to low capacity utilization or excess capacity.

Productivity usually increases through training of workers and use of more efficient machines. In both cases investment is needed either in intangible human capital or in tangible capital equipment. Consumption does little to provide a foundation for future jobs and production. However, too much emphasis on the production of capital goods, through large investment in heavy industry, may mean severe sacrifices for consumers, a phenomenon common to all planned economies.

A comparison of Turkish productivity would not be complete without comparing it to the most productive societies in the international context. A comparison to the industrial giants should render it possible to see where Turkish industry stands compared to them. (Table 15)

#### Factors That Influence Productivity

In Turkish manufacturing organizations many factors affect productivity. In a recent survey by Atilla Tezeren of the

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<sup>19</sup>Gianaris, Nicholas. Ibid.

Table 15. Yearly Productivity Figures for Manufacturing Industries

<u>Countries</u>	<u>Yearly Increase (%)</u>
Turkey	1.90
Hong-Kong	2.29
South Korea	3.47
Taiwan	3.50
Singapore	3.75
Norway	3.50
Japan	3.66
Italy	3.75
United States	2.90

Source: A. O. Krueger, B. Tuncer. "An Empirical Test of the Infant Industry Arguments." American Economic Review, December 1982. (The percentages are for the 1960's for the Far East and 1970's for the industrialized countries.)

National Productivity Center of Turkey, eight factors directly influence the productivity picture. (Table 1)

These eight major areas all fall in management's domain. The effective utilization of proper methods to increase efficiency in these areas would certainly help in increasing the productivity of the firm. For this thesis, the four areas of product quality, operations research techniques, inventory policies and manpower planning will be analyzed.

## Quality

The intensified competition between industries and nations, and the lack of growth in economies has shifted the interest of producers and consumers markedly away from quantity to quality.<sup>20</sup> This is particularly apparent for consumer goods where various factors appear to have shaped new attitudes and expectations of consumers. But similar forces are at work with regard to intermediate and investment goods, which are important means of creating productivity gains and transmitting them between different production sectors of the economy.

These developments which exist in different degrees in all industrialized countries have made industry realize that quality has become a major determinant not only for competitiveness but also for productivity and profitability.

Although the pressure for higher quality is present in all industrialized countries, the debate about the phenomenon and, in particular, about the effects of poor quality on productivity and about industry's responses to it has been conducted mainly with regard to the United States and Japan as the two poles in the current situation.

The Magnitude of the Productivity Impact of Product Quality. Lack of attention to quality at the level of the manufacturing process can be expensive and have significant

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<sup>20</sup>OECD Report on Productivity in Industry. OECD. Paris. 1986. P. 51.

adverse effects on total costs; conversely, high quality performance can yield substantial benefits in terms of cost reduction and productivity. Research in this area has brought about a series of impressive findings.

For example, United States automobile industry sources estimate that as much as 25 percent of the price of a car is attributable to poor quality, namely scrappage, reject parts, inspection and repair, and warranty costs.<sup>21</sup> For the United States semiconductor industry, it has been estimated that lack of vigorous quality control reduces the average percentage of good chips on a silicon wafer to one-half to one-third of that of Japanese companies, implying enormous cost and productivity disadvantages.<sup>22</sup> At Hewlett-Packard it was found that as much as 25 percent of manufacturing assets were tied up in dealing with quality problems.<sup>23</sup>

There is thus wide room for cost improvement through higher quality and companies which have attacked the problem have come up with impressive results. For example, at Hewlett-Packard, producing a particular electrical device with defect-free parts

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<sup>21</sup>See, for example, Takewchi, Hirotaka, and John A. Quelch, "Quality is more than making a good product." Harvard Business Review. July-August 1983.

<sup>22</sup>See "In Semiconductors, Perfection is the Goal." Business Week. November 1, 1982.

<sup>23</sup>See "Quality: The Competitive Strategy." Science. November 4, 1983.

resulted in manufacturing time being reduced by a factor of 10, inventory cut by half, and field failure rates cut by a factor of 3 to 5, compared with the previous generation product for another product, which was designed from the quality perspective, two-thirds fewer parts were required and the company achieved 60 percent labor cost economies, a halving of total production cost and field failure rates that were 3 to 5 times lower than before.<sup>24</sup>

A comprehensive several-year comparative study conducted in 1980/82 by Harvard Business School<sup>25</sup> on quality differences between United States and Japanese manufacturers of a typical mass assembly line product, air conditioners, has come up with impressive findings. These showed not only the magnitude of the existing gap in quality but also the effects which the quality differences had on the performance of the companies. As to the quality gap, it was found that the quality level of the best (i.e., Japanese) product was between 100 to 1000 times that of the worst (i.e., United States) manufacturer. Even the poorest Japanese companies had more than double the quality of the best United States producers; and this with manufacturers using a simple assembly line process and essentially the same manufacturing equipment.

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<sup>24</sup>Ibid.

<sup>25</sup>Garvin, David A. "Quality on the Line." Harvard Business Review, September-October 1983. Pp. 65-75.

The study also arrived at some other interesting conclusions: the highest quality producers also showed the highest productivity (output per man-hour). Further, higher quality led to lower total unit costs; the reason for this is that cost of preventing defects are generally much lower than warranty costs.

The impact of higher quality on competitiveness and productivity is not limited to the above cases; it rather appears to be an industry-wide phenomenon; for example, a recent survey of United States companies in the manufacturing sector,<sup>26</sup> quality costs amounted to about 5.8 percent of sales, considered high by experts and implying a high potential for productivity improvement. There are other studies which examined the effect of product quality on such company goals as market shares and return on investment: they revealed a strong positive effect of high quality on returns on investment and on market shares.<sup>27</sup>

Operations Research Techniques. An analysis of the production process over a period of time clearly shows that advances in productivity can be the result of different strategies which management has chosen to follow and which depend on a number of factors such as the nature of the production process, the kinds of products produced, the evolution of the market and, not the

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<sup>26</sup>Ibid.

<sup>27</sup>Ibid.

least, application of O.R. techniques applied to bring about the productivity increase.

Quality of management increasingly concerns its relations with labor, its long term vision, and its experience and familiarity with the technical base of the respective manufacturing sector. Serious deficiencies in these qualities appear to have evolved in the past in a number of industries and countries as a result of particular situations and circumstances; this has been a major cause of weakness in longer term productivity performance.

Restoring the conditions that are propitious to longer time horizons of management, where this is required, is therefore of major importance. This involves the business community with its expectations about industry's financial performance, but also companies themselves as regards to the use of modern management techniques.

In a survey of 123 major manufacturing companies in Turkey, respondents replied that the application of modern production management techniques would increase their productivity 32 percent. Operations research techniques were considered the most important technique to improve productivity.<sup>28</sup> In the same survey, respondents were asked about the factors that inhibit

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<sup>28</sup>Tezeren, Atilla. "Productivity in Turkish Manufacturing Industry." National Productivity Center, Ankara, 1985.



productivity growth in their companies. The results are in Table 16.<sup>29</sup>

Table 16. Factors That Inhibit Productivity Growth

- 1 - Market problems
- 2 - Low capacity utilization
- 3 - Economic problems and inflation
- 4 - Financial difficulties
- 5 - Production techniques
- 6 - Labor training
- 7 - Manpower planning problems
- 8 - Others

Source: Atilla Tezeren. 1985. P. 43.

As can be seen from the above table, production techniques play an important part in productivity improvement programs.

Inventory. As the Japanese companies are always ready to tell. "Inventory is the root of all evil."<sup>30</sup> Inventory has a direct effect on the productivity of a firm.

Aggregate plans take a general overview of operations for a time horizon that is far enough in the future to provide for efficient use of resources. These plans determine the expected

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<sup>29</sup>Ibid.

<sup>30</sup>Schoenberger, Richard J., "Japanese Manufacturing Techniques—Nine Hidden Lessons in Simplicity." MacMillan Publishing Co., Inc. London. 1982.

future rates of production, capacity of available employees, and the extent to which finished goods inventory is used. As aggregate plans are implemented, more specific decisions must be made. Which items will be produced? When? In what sequence will the jobs be performed? Which items will be held in inventory? How much of each item should be left? When and how much material should be purchased to support the planned rate and mix of outputs?<sup>31</sup>

Both the necessary material inputs and the necessary capacity must be available before transformations can be performed to provide goods or services. An organization needs to know when materials will be available before it can accurately schedule use of capacity. The objective in materials management is not simply to make sure that plenty of raw materials and supplies are available for inputs and plenty of finished goods available for output. The objective should be to have the right amount as needed.

The importance of materials management to the overall productivity is tremendous. Japanese companies have instituted a Just-In-Time type of system to handle inventory and increase their productivity. Companies such as Toyota and Harley-Davidson have all reported productivity gains by efficient use of inventory planning.

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<sup>31</sup>Dilworth, James B., "Production and Operations Management." Random House. New York. 1979.

In Turkey, problems in materials management have decreased productivity growth by 10.3 percent.<sup>32</sup> Considered a major area in need of improvement by Turkish manufacturing companies, materials management has been an important factor in productivity improvement plans of organizations. Some companies which have instituted new techniques such as Material Requirements Planning (MRPII), have reported a 7 percent increase in the overall productivity of their organizations.<sup>33</sup>

Manpower Planning. Labor force constitutes a sizable percentage of the cost of production, and efficient planning and use of manpower should help in productivity gains in organizations. Some of the important topics included in manpower planning techniques are:

- (a) Job design
- (b) Work methods
- (c) Work measurements.

If we consider a particular production process as a closed loop system, there are three things that are most important for the productivity of the system. These are: (a) inventories, (b) machines, and (c) labor. Labor is the most important factor that closes the gap between inventory and machines. Once a product is received it has to be carried to the first machine by workers,

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<sup>32</sup>Tezeren, Atilla. Ibid.

<sup>33</sup>Ibid.

then to the second machine as the work-in-process and then to the warehouse as the finished goods inventory. Japanese companies have done a remarkably good job in increasing productivity by utilizing the worker more efficiently. The next step in filling this gap is by industrial robots; however, the flexible manufacturing systems are still very expensive to be feasible by many companies. Therefore, the content of labor in the production process is extremely important.

In Turkey, the percentage of productivity loss in manpower planning is 11 percent.<sup>34</sup> And, if properly applied, the productivity gain is around 12 percent.<sup>35</sup> Some other factors that are important in labor productivity are shown in Table 17.

Of course, these figures may be different from firm to firm. However, the most important factor to consider here is that, labor's content in productivity growth is very important.

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<sup>34</sup>Ibid.

<sup>35</sup>Ibid.

Table 17. Factors that Affect Productivity of Labor

<u>Factors</u>	<u>Percentage Affect</u>
Manpower Planning	14
Management Style	12
Pay Rate and Incentive Systems	11
Working Conditions	10
Attendance Factor	10
Training	9
Job Security	8
Relations with Others	7
Turnover Rates	3

Source: Atilla Tezeren. 1985.

## CHAPTER FOUR

### PRODUCTIVITY IMPROVEMENT METHOD IN TURKISH MANUFACTURING INDUSTRY BEFORE AND AFTER 1980

#### Quality

Quality is a relative term that means different things to different people. The consumer who demands quality may be talking about a totally different concept than the production manager who demands quality. The consumer is concerned with service, reliability, appearance—fitness for use. The manager's primary concern is that the product or service standards are achieved—fitness to standards.

Every country that is industrially advanced realizes fully well that quality has to be satisfactory both to the production manager as well as the user. The example of a country that has achieved speedy industrialization through a total commitment to quality is Japan. Japanese products have come a long way from the days of "Made in Japan" poor quality days and are now showcased as having the best quality in the world—both from the manager's and user's viewpoint.<sup>1</sup>

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<sup>1</sup>Lee, Sang, Schwendiman, Gary. "Management by Japanese Systems." Praeger Publishers. New York. 1982. Pp. 65-66.

Turkish official development plans and other government publications clearly indicate that quality and its control is one of the most important areas in increasing productivity of Turkish firms.<sup>2</sup> In addition to this, Dr. Fevzi Ercan, Assistant Dean of Gazi Engineering University of Ankara, in his report states that by upgrading the Turkish Quality Control system in manufacturing industries alone would save 14.2 billion Turkish liras per year (almost \$25 million).<sup>3</sup> When the total Gross National Product of manufacturing industries is about 536,925 billion TL's a year, a savings of 14.2 billion is important.

The history of quality control in Turkey can be divided into three time periods.<sup>4</sup> The first period would be from 1923 to 1960. In this era, quality was nominal because of the infant industry stage. Therefore, we can label this era as "nominal quality" era.

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<sup>2</sup>State Planning Organization. "Fifth Five-Year Development Plan. 1985-1989." Ankara. 1984.

<sup>3</sup>Ercan, Fevzi. "Quality Control Structure of Selected Industries in Turkey from the Standpoint of Staff, Organization, Tasks, and Techniques—A Case Applied by Research in Quality Control." In EOQC Quality. April, 1986. Pp. 12-14.

<sup>4</sup>"Quality in Turkey." Ankara: National Center for Productivity. 1982.

Second era would be from 1960 to 1980 when strong and effective planning and recognition by the central government made quality control mandatory in every public sector enterprise. The private sector, on the other hand, was following standards set by foreign companies, since 95 percent of all patents were of foreign origin. Quality control procedures were pushed on the Turkish manufacturers from foreign patent holders through the use of periodic inspection tours.<sup>5</sup> A label of "top-down quality" might be appropriate to define this period.

The last period is from 1980 to present. Under the new free-market orientation of Prime Minister Özal, Turkish companies—public and private—have to fight for every sale they make. Quality has been a life saver for these companies. Another important factor in this time period is the internationalization of Turkish industry through exporting quality as well as quantity.<sup>6</sup> "Quality-consciousness" may be a fitting nomenclature for this period.

In the formative years between 1923 to 1960 of the Turkish Republic, the central focus was on building of industries—

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<sup>5</sup>U.N. Statistical Yearbook. "Patents of Foreign Companies." 1985.

<sup>6</sup>Faulkner, Thomas. "Industrial Expansion Fastest in OECD." International Herald Tribune. April 30, 1987. P. 8.



creation of capacity—rather than the quality of the product.<sup>7</sup> Many Western industries between 1920 to 1940 also emphasized quantity rather than quality. However, in the World War years, the war effort made it necessary to be quality conscious. Turkey not being a belligerent in World War II still practiced quantity rather than quality. Even after a particular industry was well established, emphasis stayed on the quantity aspects of production. The quality aspects came afterward.

The companies that began their operation in this period were mainly heavy industries, for example continuous processes such as mining and sugar. The major quality concern of these industries was the adherence to process standards set by the manufacturer of the machines used.<sup>8</sup>

There were two major factors for nominal quality in this period. One was the total absence of any standard criterion by any authority. Secondly, the importation of machines and processes from different countries which made standardization across the same industry almost impossible.

To a great degree, the basic policy of creating capacity in manufacturing industries was quite successful between 1923 to 1960. Many State Economic Enterprises (SEEs) that are in

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<sup>7</sup>Hale, William. "The Political and Economic Development of Modern Turkey." Croom Helm. London. 1981.

<sup>8</sup>Ibid. P. 4.

operation today have their roots in this period.<sup>9</sup> Quality, however, has not developed as much as the numerical growth of industry.

The private sector in this period plays a minor role in the economy. The basic areas in which private sector functioned was in traditional handicrafts, where quality by its very nature is a function of craftsmanship in making carpets and copperwares, for example. There were a few large private enterprises; however, the only quality control procedure utilized by these enterprises was simply to make sure that the process stayed as close to manufacturer's specifications as possible.

As the economy shifted to industrialization after the Second World War, companies shifted their emphasis, and fitness to standards became an important factor. Turkey being a non-belligerent in the war had a chance to export many of its products. This caused them to compete with the standards of products expected from foreign companies. One example may be the chromium industry of Turkey. During WWII, chrome was a monopoly of Turkey and many United States engineers came to Turkey to insure a quality product for their own use.<sup>10</sup> Naturally this had led to a recognition of the importance of quality by Turkish manufacturers.

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<sup>9</sup>Hale, William. Ibid.

<sup>10</sup>Hershtag, Z. Y., "Turkey. The Challenge of Growth." Leiden. E. J. Brill. 1968.

The overall quality of the Turkish products in this period was summarized extremely well in the First Five-Year Development Plan of the Post-war era. The authors of the plan clearly acknowledged that the period from 1923 to 1960 has been a disappointment in terms of quality of its products.<sup>11</sup>

The most important conclusion of this plan was to create a government standards body to achieve better quality of Turkish products.

#### 1960-1980

The period of 1960's saw many important changes in the quality area of production. The most important macro-economic policy affecting quality in production was the import-substitution policy espoused by the government. This policy was to bring in a product or a new process from outside and slowly start interchanging the parts with the locally produced ones. A classic example of import-substitution policies is the automobile industry. When Fiat cars were first produced under Turkish license, they were sent in kit forms which were later assembled in Turkish plants. This process was called montage industry and varied from cars to pharmaceuticals. By 1987, the percentage of

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<sup>11</sup>S.P.O. "First Five-Year Development Plan. 1963-1967."  
Ankara. 1962.

Turkish parts in Fiat (Turkish name Murat) has increased to 83 percent.<sup>12</sup>

Another important change was the setting up of an institute to set standards for the industry by the government. Turkish Standards Institute (TSE) was established in 1960 to function as an autonomous public institution.<sup>13</sup> The general assembly is the main decision making organ of the institution and is composed of representatives of the public and private sectors, universities, and scientific bodies. Once a year, the General Assembly reviews the activities of the Institution, elects the president and the board of governors, and approves the work programme and the budget for the next term. Its board is selected from many fields, and studies and approves standards prepared by Turkish experts. Today, TSE issues approximately 300 standards per year, covering such areas as electricity, chemistry, textiles and organic matter. Under contract from private companies, TSE labs are also used for testing of goods for granting of the TSE mark of quality.<sup>14</sup>

During this period the assistance of foreign experts was sought with a great degree of success. United Nations International Development Organization (UNIDO) together with the

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<sup>12</sup>Financial Times. November 13, 1986.

<sup>13</sup>European Organization for Quality Control (EOQC). February 1982.

<sup>14</sup>Ibid.

State Planning Organization (SPO) brought up-to-date quality control systems to Turkey. Among training programs were; (a) quality certification systems, (b) seminars on the process improvement technique of Evolutionary operation methods for industrial and research institute personnel, (c) training courses on the principles and techniques of quality control, and (d) setting up a university course on quality planning and analysis.<sup>15</sup>

In a study done by Kenneth S. Stephens of UNIDO after extensive visits to Turkish manufacturing companies, the following areas were found to be in need of improvement in quality.<sup>16</sup>

(1) The seller's market in Turkey was fed by large demands and limited supplies, including restricted imports and operations at only a fraction of installed capacity. There was still concern for quality—especially as it related to meeting product specifications (either company, national or international standards and/or customer requirements). Many industrial companies are suppliers to other industrial users, instead of to end-point consumers and the industries are more discerning and exacting customers for judging and requiring equality in supplies. There has been a lack of technical assistance to suppliers to improve their quality; however, many companies intended to develop this kind of assistance.

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<sup>15</sup>Stephens, Kenneth. "Quality Control Training in Turkey." In *Quality Progress*. Vol. 15. No. 1. January, 1982.

<sup>16</sup>*Ibid.*

(2) While many companies have a basic concern for meeting specifications on final product (Turkish government only tests the final product rather than intermediate), this is often accomplished by a final inspection of the finished product at the final or near final stage in the production. Too often this has resulted in a great deal of scrap and/or products requiring repair or rework operations at excessive costs and reduced efficiency of production—an inspection orientation to quality control causing low productivity.

As an example given by Mr. Stephens, one of the ceramic companies was incurring monthly scrap losses equal to approximately one-half of their annual profits in 1979—a situation allowing for considerable cost reduction. Additionally, the distribution of product quality among low, medium and high quality grades was very unsatisfactory allowing for considerable product improvement.

(3) In some companies, the quality control department usually headed by an engineer, came under the auspices of the operations manager of the firm. The drawback of this type of a set-up was obvious, i.e., the conflict of interest between the production manager who wants to push products out the door and quality control people who want to make sure all products are of good quality.

(4) In many instances, there was strong evidence of top management interest in the quality control effort. On a number of visits taken by Mr. Stephens, top management personnel took a very

active interest in the discussions. There were many constraints on the Turkish industries before 1980;—shortages of raw materials, spare parts and components; short term orders causing excessive pricing to recover costs of design, tooling, factory layout, and others, over a short period; run-away inflation on materials, parts and supplies; under-capacity production; long duration stoppages due to strikes and lack of materials and/or parts; intermittent stoppage due to electric power cuts, etc. The importance for Turkish industries to make the most optimum use of available materials, manpower, machines, capital, and others. Quality control organization and implementation are, therefore, essential.<sup>17</sup>

(5) Among the factories visited, there was good evidence of some benefits to Turkish companies of the adaptive transfer of quality technology through licensee agreements, technical assistance programs, consultants, etc.

(6) Many operations and products represented in a quality control seminar involved filling operations by weight and volume. Such operations are almost always worthy of process capability studies to determine the short-term, long-term and filling machine (head) variability. These operations often represent places where significant cost savings are possible by better control of the average level of variability, among filling machines and/or

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<sup>17</sup>Ibid.

filling heads, to achieve a balance between fair packaging for the consumer and cost savings for the company.

An example of a brief process capability study of a filling operation on soap detergent revealed a short term variability with a standard deviation of approximately 1.4 grams (on a 395 gram fill). However, monthly summaries of product samples show a deviation of 9 or 10 grams. Potential savings are enormous. A second characteristic, namely, percent of active matter, shows similar potential for improvement. A further example involving filling of 500 gram packages of macaroni products revealed potential savings by reducing the variability of fill, which when expanded over a year's production involved a multiplication factor of 84 million units.

(7) A complete lack of university training courses on quality control. Through the encouragement of UNIDO at least two courses were started to train engineers on quality.

In a summary of the Quality Control in Turkish industries between 1960 and 1980, four areas are important enough to mention again. These are:<sup>18</sup>

(1) The widespread belief on the industrialist's part that quality is expensive and adds a very high extra cost on the final price of a product.

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<sup>18</sup>In an interview with the head of the Turkish Standards Institute (TSE), published in Hürriyet newspaper. February 9, 1987.



(2) The monopoly conditions of many industries where the product is bought whatever its condition, is a seller's market.

(3) The general acceptance of poor quality by the consumer.

(4) The inability of TSE to bring quality consciousness to the public.

(5) The habit of testing for quality at the final stage of production—an inspection orientation.

It is clearly evident from these studies that the public as well as industries have paid a high premium for the lack of quality control.

In 1980, with the introduction of Mr. Ozal's widesweeping January 1979 reforms affecting the entire business community, a great many changes occurred in the way businesses operate in Turkey. Subsidies to inward oriented industries were withdrawn and the export orientation was encouraged.<sup>19</sup> The internationalization of Turkish products and opening up of the home market to foreign products have made quality as the niche for Turkish products.

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<sup>19</sup>Gonensay, Emre. "From Bankruptcy to Revival: The Turkish Experience with Restructuring Economic Incentives, 1980-84." In *Economic Incentives*. ed. Bela Balassa, Herbert Gierszh. Macmillan Press Ltd. London. 1986.

1980 - present

Recent emphasis on export promotion in Turkey, with import credits and tax incentives, places even more emphasis on quality, pricing and delivery to meet international marketing requirements and programs of quality control to achieve these results.

In a recent study by Mehmet Karafakioğlu of Istanbul University's management faculty, poor quality of Turkish products was a major reason for the slow growth of export performance. Other major factors were strong international competition and lack of marketing knowlege.<sup>20</sup> The last two factors were outside the companies' production realm, but quality was one of the most important factors within company control. Again, in the same study, out of the 108 companies surveyed 12 percent of them complained about the low quality of their products. However, very large manufacturers registered only 10 percent in their complaints.

An analysis of the present quality control programs in Turkish industries would clearly show the changes that have been accomplished.

On a study by Dr. Fevzi Ercan of Gazi University, 490 companies that produce 15 percent of GNP of production industries, were asked in a questionnaire about quality and quality control

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<sup>20</sup>Karafakioğlu, Mehmet. "Export Activities of Turkish Manufacturers." In International Marketing Review. Winter 1986.

(QC) as a manufacturing process.<sup>21</sup> The respondents to the questionnaires were all directors of QC and have at least a B.S. in Engineering. In the organization of QC each company was found to have their own QC organizational chart, one different from the other, depending on the size and production method. The organizational chart is mostly applied by electrical-mechanical and automotive-mechanical industries. The larger and modern companies organize their QC so that they can make decisions freely, without being influenced by other departments.

On the different tasks performed, the most frequent task marked was to achieve the quality agreed upon in the contract throughout the whole production process to the least frequent task--which is to check the quality reports coming from subcontractors to make sure they adhere to standards. Clearly a definite departure from checking only the final product for quality of the previous era. On the techniques of measurement used to check for quality the most frequent technique was measuring the lengths of parts by various measuring tools to the least frequent technique of checking the various properties of materials by resonance-vibration method. Engineering metrology is the most frequently applied technique by electrical-mechanical and by automotive-mechanical industries. Testing of materials is most frequently used by automotive-mechanical and by rubber plastics

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<sup>21</sup>Ercan, Fevzi. Ibid.

industries. Statistical QC, on the other hand, has been most frequently employed by cement-ceramics-glass and by textile-fibers industries.

In another study by the Turkish National Productivity Center, 123 manufacturing enterprises were asked about QC techniques, and the resulting effect of quality on productivity.<sup>22</sup> The most important finding of the survey was the high degree of importance given to quality as the means of increasing productivity.

The directors of the 123 companies also felt that low quality input materials were a major factor in their quality problems. Seventy-five percent felt that the low quality of the inputs was a major factor in the low productivity of the industry. According to the results, low quality inputs decreased productivity in the order of 14 percent in the overall industry. The effect among the different sectors shown in Table 18 was also substantial.

The effect of quality control as a factor to increase productivity has been found to be 11 percent overall. Table 19 shows how it affects different sectors.

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<sup>22</sup>Tezeren, Atilla. "İmalat Sanayiinde Verimliliği Etkiliyen Faktörler." National Productivity Center. No. 5. Ankara. 1985.

Table 18. Effect of QC on Low Productivity  
in Different Sectors

<u>Sector</u>	<u>Percentage</u>
Iron-Steel	23
White-Goods	18
Machine Manufacturing	15
Textiles	11
Cement	9

Source: Tezeren, Atilla. 1985.

Table 19. QC Effect in Increasing Productivity  
in Different Sectors

<u>Industry</u>	<u>Percentage</u>
Casting Industry	20
Machine Manufacturing	12
Cement	12
Iron-Steel	10
Textiles	8

Source: Tereren, Atilla. 1985.

According to the survey, many companies have installed quality control programs even if they do not affect the productivity picture.

Some companies have made their long-term plans based on the quality improvements that could be achieved. As an example, one of the largest fertilizer manufacturers has planned to increase their annual production from 60 to 90 percent after

putting in a rehabilitation project. This project entailed increasing capacity and increasing quality (productivity) of the final product. According to first results achieved since its implementation in 1983, there has been at least a 20 percent increase in productivity.<sup>23</sup>

Another example of increasing productivity through increasing quality is the giant paper mills of SEKA in Caycuma. Instead of using the normal kraft paper, they have increased the production of the more elastic clupac. Since the breakage rates were naturally decreased, productivity was increased 6 percent.<sup>24</sup>

Another important point that came out of the report was the ability to insure quality through the modernization of the process and the rational usage of production material. In some factories, the importance of quality to the productivity has been clearly acknowledged. Also the by-product of better sales and increased capacity has been pointed out as the result of better quality. However, some firms still stressed that the need for extra investment was the basis for increased productivity through quality. Different methods to deal with quality problems have resulted in different percentage increases in productivity. For

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<sup>23</sup>Ibid.

<sup>24</sup>Ibid.

example, the productivity increase in the automotive sector has been 20 percent through better quality.<sup>25</sup>

Some industries have put in incentives to increase quality and productivity performance. One new system being tried is to reward the employees based on increased productivity. Under this scheme, the incentive pay of the worker would be based strictly on the number of good quality parts produced. One example of a company that started using this is İzdal Casting Industries.<sup>26</sup> The results, to this day, have not been published on the outcome of these newly installed plans.

Among the firms studied as shown in Figure 5, 21 percent did not have any study towards increasing quality, therefore productivity, 8 percent has just started forming quality control units. Starting with inputs and checking for quality throughout the process is being done in 5 percent of the companies and the firms using quality control circles is 2 percent of the total.

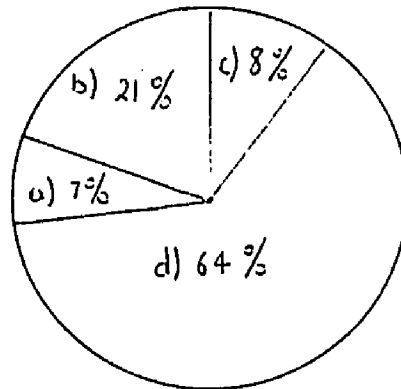
Another approach towards quality control has been the utilization of OR techniques along with computers since 1980. On a study done by Kemal Kurtuluş the usage rank of OR techniques in

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<sup>25</sup>Ibid.

<sup>26</sup>Ibid.

quality control has been listed as following in order of importance as shown in Table 20.<sup>27</sup>



- (a) Increasing productivity through better quality planning in companies.
- (b) No study towards increasing productivity through quality.
- (c) Companies started quality control units.
- (d) Employing quality because of other reasons than increasing productivity.

Figure 5. Percent Usage of Quality Control to Increase Productivity

Table 20. OR Techniques Used in Quality Control

<u>Techniques</u>	<u>Rank</u>
Sampling	1
Canonical Correlation	1
Discriminant and Factor Analysis	1
Linear Programming, others	2

Source: Kemal Kurtulus. 1983.

<sup>27</sup>Kurtulus, Kemal. "Computer Usage and Employment of Operations Research Techniques in Turkish Industrial Firms: a Survey Study." European Journal of Operational Research. Vol. 14. 1983.



### Operations Research Techniques

Management has come to be recognized as a science, particularly with regard to the management of the production process, and emphasizing technical competence to bring about improvements in products and processes. Operations managers in particular have come to depend on a number of techniques to guide them in selecting, designing, operating, controlling, and updating productive systems. Some of these techniques are: linear programming, decision models, PERT/CPM, inventory models, simulation, regression correlation techniques and sampling-hypothesis testing.<sup>28</sup>

Operations research techniques, when utilized efficiently would have a great affect on productivity improvement. Many countries that are industrially advanced take full advantage of management techniques in improving their product, process and planning. Japan for example has become a world class producer by not only implementing these techniques but also discovering new methods such as JIT, Kanban systems.<sup>29</sup>

Turkey, being a newly industrialized country, has also recognized the importance of operations research techniques to the productive system. In a 1985 study by Atilla Tezeren of the

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<sup>28</sup>Chase, Richard, Aquilano, Nicholas. "Production and Operations Management." Third Edition. Irwin, Inc. Illinois. 1981.

<sup>29</sup>Lee, Sang, Schwendiman, Gary. Ibid.

National Productivity Center of Turkey, application of operations research techniques was considered a major factor in the overall productivity of the firm by 78 percent of the directors surveyed.<sup>30</sup> In the same survey, the directors felt that if management utilized these techniques efficiently, the manufacturing industry would gain a productivity growth of 14 percent.<sup>31</sup> By not applying these techniques a productivity drop of 13.7 percent was realized in these firms. Therefore the importance of operations research techniques to the overall productive performance of manufacturing organizations is extremely high. Utilization of these techniques in Turkey has been a recent phenomenon because of environmental constraints imposed upon qualified personnel, lack of quantitative analysis skills, lack of computer facilities to use, government policies impeding competition and some others.<sup>32</sup>

In Turkey, actual use of management techniques by managers can be divided into two periods. The first period would be before

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<sup>30</sup>Tezeren, Atilla. "İmalat Sanayinde Verimliliği Etkileyen Faktorler." National Productivity Center Publication No. 319. Ankara. Turkey. 1985.

<sup>31</sup>Ibid.

<sup>32</sup>Kurtuluş, Kemal. "Computer Usage and employment of operations research techniques in Turkish industrial firms: a survey study." European Journal of Operational Research. Vol. 14. 1983. Pp. 329-334.

1980, when the economy was a closed one and firms operated in a sellers market. The second period would be after 1980, when the economy was opened up for international competition inducing firms to increase utilization of state-of-the-art management techniques for maximum profit.

At the present time, the impact of technological and other environmental developments renders it nearly impossible to diagnose and to solve the complex problems encountered in dynamic organizations by traditional approaches and intuitional methods. There is an ever-growing need for obtaining quantitative information, data collection and evaluative techniques in every stage of problem solving procedures. This chapter will analyze to what extent and in which areas, operations management techniques are used in Turkish industrial firms before and after 1980.

#### The Existing Stage of Management Before 1980

According to a study by İlhami Karayalçın of Istanbul Technical University, the existing stages of management in Turkey before 1980 are:<sup>33</sup>

- (a) Management is in a developing stage,
- (b) There are not yet universal management laws,
- (c) The application of principles vary from case to case,

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<sup>33</sup>Karayalçın, İlhami. "A practical academic cooperative system to increase the efficiency of management application." AİİE Technical Papers. 1972. Pp. 315-326.

- (d) Management processes and phenomena are not properly classified,
- (e) Skill and experience are still playing the major roles in the efficiency of management methods.
- (f) The education, training and application of management are not standardized.
- (g) Advanced research work in the areas of operations research, Systems Engineering, Systems Analysis and Data Processing, Industrial Engineering, Management Sciences are not properly coordinated.
- (h) Priorities and weights to be used in the same process are not determined across the industry.

Along with the state of management principles, managers also play an important role in increasing the productivity of an organization. In Ilhami Karayalcins study, a clear analysis of the state of managers in Turkey before 1980 is given. Some of these factors are:

- (a) Managers are oriented to individual work,.
- (b) Managers come to their positions without having up-to-date management education and training.
- (c) Managers usually do not continue in self-improvement.
- (d) Managers are experienced in a single area and specialty. (Table 21)
- (e) They are not used to work with many people, to do team work, or to delegate authority.
- (f) Some of the managers who are for team work are not trained in methods of team work.
- (g) Although newer management methods require team work, they can not form suitable teams.
- (h) Most of the managers are not familiar with quantitative management methods. (Table 22) A sample of 110 companies in Turkey clearly supports this view.
- (i) Most of the managers are from technical backgrounds. As an example, in a study by Karayalcin of 110 companies, 40 percent of the managers came from engineering backgrounds and the rest from non-technical backgrounds. (Table 23)
- (j) Managers did not employ specialists who know needed techniques. In the face of lacking sufficient management knowledge (Table 24), use of experts should be widespread.

Table 21. In How Many Different Jobs Managers Work (%)

<u>Division Managers</u>	Number of Jobs					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Accounting, budgeting	50	30	15	4	2	
Finance	60	30	5	5		
Marketing	70	20	10			
Purchasing	65	20	10	5		
Research and Development	60	30	5	5		
Technical Planning	50	30	10	5	3	2
Plant Engineering	60	35	5			
Operations, Production	70	25	5			
Personnel	65	30	5			

Source: Karayalçın. 1972.

Table 24 clearly shows what is valued in a Turkish manager by companies. Based on the survey, companies want a highly authoritative manager who has good external relations, has leadership qualities and is a specialist. However, chances for success in higher positions clearly indicate generalists who have leadership abilities and team work orientation are clearly the more successful ones.

(k) Managers who advance are usually from technical backgrounds. As will be shown in Table 25, most of the managers that advance to higher positions come from quantitatively skilled people.

Table 24. The Degree of Knowledge of Managers on Some Modern Management Methods and Techniques (Estimation based on 110 companies surveyed) (Percent)

<u>Management Methods</u>	<u>Has General Idea</u>	<u>Knows Basic Things</u>	<u>Has Complete Theoretical Knowledge</u>	<u>Has Experience and Able To Apply</u>
Linear Models and Programming	70	15	10	5
Dynamic Programming	80	10	7	3
Simulation	65	20	12	3
Industrial Dynamics	90	5	3	2
Data Processing	55	30	10	5
Waiting-Line Models	80	12	5	3
Game Theory	80	12	5	3
Hypothesis Testing	90	5	3	2
Regression and Correlation Analysis	60	20	15	5
Production Planning and Inventory Models	60	20	15	5
Control Charts	60	25	10	5
Organization Criteria	45	30	15	10
Job Evaluation	25	50	30	15
Break-even Analysis	35	25	15	10

Source: İlhami Karayalçın. 1972.

Table 23. Manager's Backgrounds in Non-Technical Areas

<u>Educational Backgrounds</u>	<u>At the Factory Manager Level (Percent)</u>
Economics	20
Law and Social Sciences	10
Business Administration	5
Military	5
Other	10

Source: I. Karayalcin. 1972.

In Table 25, A is the percentage of managers that advance to top positions, and B is the years it takes to come to top positions. Technical planning and production are the major suppliers of Turkish directors with very little time spent in the firm. Lastly,

(1) Management people are working under strong short-term profit pressure dictated by the owners, thus they neglect the proper long-range planning that is crucial to productivity growth.

Based on the data in Table 25, the application of management techniques seems to be not wide-spread before 1980. There are some sectors which utilize management techniques; however, these vary greatly from one area to the next. In a survey of usage of management techniques in different sectors before 1980, we can see the discrepancy between different users. (Table 26)

Table 24. A Survey on the Basic Managerial Characteristics of Managers and Their Performances (%)

<u>Managerial Characteristics</u>	<u>Chances of Promotion</u>	<u>Chances for Success in Higher Positions</u>
Research	5	30-50
Study Man	15	40-60
Knows Classical Management Methods	35	30-50
Knows Modern Management Methods	15	50-70
Has Leadership Qualifications	40	70-90
Specialist	40	35-50
Team Work Oriented	20	70-90
Generalist	20	70-90
Short Term Planners	35	20-40
Long Term Planners	20	50-70
Having Good External Relations	40	30-50
Highly Authoritative	60	20-40
Good Human Relations	20	40-60

Source: İlhami Karayalçın. 1972.



Table 25. Manager Development Rate

<u>Areas-Departments</u>	<u>A</u>	<u>B</u>
Quality Control, Research and Development	5	8-10
Technical Planning	35	3-5
Marketing	15	3-5
Purchasing	2	8-10
Plant Engineering	5	4-6
Production	25	4-6
Finance-Accounting	12	6-8
Personnel	1	8-10

Source: Karayalcin. 1972.

Based on the survey in Table 26, universities and research institutes are Class-A users and business owners are the worst users. This points out that the knowledge in the research and university community has not been properly transferred and put into actual use.

In summarizing, the factors that were barriers to proper and efficient utilization of operations research techniques before 1980 were: lack of management development training in newer techniques; reaction of the older, established managers to new methods; and the attitude of the owners in profit-above-else policy. Under these circumstances management techniques have not been utilized as a productivity growth method.

Table 26. Usage of Management Techniques in  
Different Sectors (%)

<u>Management Areas</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
Management Laws and Principles	50	70	20	30	50	40	30	50	30
Management Approaches and Rules	50	70	30	40	60	50	40	60	30
Management Systems	60	90	30	40	60	70	50	70	40
Qualitative Management Methods	70	90	30	50	70	50	40	70	50
Quantitative Management Methods	60	80	10	50	30	70	80	50	40
Management Techniques	60	90	20	30	40	70	80	60	50
Management Tools	50	80	10	30	30	70	80	60	60

A-Government and State Institutes  
 B-Universities and Research Institutes  
 C-Business Owners  
 D-Professional Societies  
 E-Top Management  
 F-Technical Managers  
 G-Technical-middle Managers  
 H-Non-technical Managers  
 I-Non-technical Middle Management

Source: Karayalçın. 1972.

1980 to Present

Since 1980, there has been a discernible increase in the utilization of management techniques.<sup>34</sup> The opening of the economy by the Prime Minister Özal to international competition has forced Turkish manufacturers to reevaluate their priorities. The end-result of free-market policies has forced manufacturers to

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<sup>34</sup>Financial Times. May 19, 1980.

adopt up-to-date management methods in order to survive in the world market.

In a survey of 300 firms listed in Istanbul Stock Exchange by Kenal Kurtulus of Istanbul University in 1983, the newly acquired usage of quantitative models is a clear indication of the importance given to this topic.<sup>35</sup> Table 27 shows the usage rank of each OR technique.

Relative frequency of usage in Linear Programming is 90 percent, PERT/CPM 83 percent, inventory models 67 percent in these various firms surveyed.

Linear programming is the most frequently employed technique in the area of production planning, while PERT/CPM in investment planning. Regression-correlation techniques in marketing research and inventory models in stock and inventory control. (Table 28) Overall evaluation has indicated that the most extensively used areas are: production planning, marketing research, inventory control and investment planning. The scale used for Table 28 is, 1 for most frequently used to 12 least frequently used.

In addition to this information respondents were asked to specify those areas they think OR techniques should be utilized.

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<sup>35</sup>Kurtulus, Kemal. Ibid.

Table 27. Usage of OR Techniques

<u>Name of Technique</u>	<u>Rank of Use</u>
Linear Programming	1
PERT/CPM	2
Regression-Correlation Techniques	3
Inventory Models	4
Sampling, Hypothesis Testing	5
Decision Models	6
Simulation	7
Dynamic Programming	8
Factor Analysis	9
Covariance Analysis	9
Canonical Correlation	10
Discriminant Analysis	10
Other	11
Quadratic Programming	12
Markov Analysis	12
Multidimensional Scaling	12

Source: K. Kurtuluş. 1983.

As can be seen in Table 29, the areas most proposed are production planning and inventory control.

The responses to the question dealing with those OR techniques that have been found unsatisfactory and, therefore eliminated have revealed that a very limited number of firms

Table 28. Usage Rank of OR Techniques

OR Techniques	Areas Used								
	Production Planning	Quality Control	Stock Control	Cost Accounting	Marketing Research	Investment Planning	Personnel	Other	General
Linear									
Programming	1	5	4	5	4	2	4	2	1
Dynamic									
Programming	1	-	2	-	3	-	-	-	8
Quadratic									
Programming	-	-	-	-	-	-	-	-	12
Decision Models	1	-	2	2	1	2	2	-	6
Markov Analysis	-	-	-	-	-	-	-	-	12
PERT/CPM	2	-	4	-	4	1	-	3	2
Inventory Models	3	-	1	2	-	-	-	-	4
Simulation Models	2	-	3	-	-	3	-	1	7
Regression-									
Correlation	5	5	4	-	1	-	3	2	3
Sampling	2	1	-	-	2	-	-	3	5
Multidimensional									
Scaling	-	-	-	-	-	-	-	-	12
Canonical									
Correlation	-	1	-	-	1	-	1	1	10
Discriminant									
Analysis	-	1	-	-	1	-	1	1	10
Factor Analysis	-	1	-	1	1	-	1	1	9
Covariance									
Analysis	-	2	-	-	2	-	2	1	9
Other	-	-	-	1	-	-	-	-	9
General	1	5	3	6	2	3	5	4	-

Source: Kurtuluş. 1983.

Table 29. Priority of the Proposed Application Areas

<u>Areas</u>	<u>Order of Importance</u>
Production Planning	1
Inventory Control	2
Cost Accounting	3
Marketing Research	4
Investment Planning	4
Quality Control	5
Personnel	6
Other	7

Source: K. Kurtuluş. 1983.

(7 percent) have abandoned such techniques as PERT/CPM, Simulation, Linear Programming and Inventory Models.<sup>36</sup>

Another finding revealing a break with past history is the way new personnel are recruited. Data indicates that 40 percent of the managers have an engineering background as in the Karayalçın study. However, qualifications preferred for new personnel have shifted to a business administration degree with a knowledge of OR. (Table 30)

This clearly indicates that quantitative management methods are now an overall concern to the companies. They want

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<sup>36</sup>Ibid.

Table 30. The Qualifications Preferred for New Personnel

<u>Professional Qualifications</u>	<u>Order of Preference</u>
Business Administration + OR	1
Engineering + OR	2
Engineering Base	3
Computer	4
OR + Industrial Engineering	5
Statistics Base	6

Source: Kurtuluş. 1983.

their managers to be qualitatively and quantitatively prepared to face the competition.

Because of the implementation of modern management methods, there has been a 14 percent productivity growth in the Turkish manufacturing industry.<sup>37</sup> Different industries have reported different percentage gains in productivity to the National Productivity Center of Turkey. (Table 31)

A significant development in the usage of techniques has been observed by K. Kurtuluş in Turkey during the recent years.<sup>38</sup> Although most of the applications of techniques were found in traditional and routine areas, new application possibilities were also observed with the utilization of computer power.<sup>39</sup>

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<sup>37</sup>Tezeren, Atilla. Ibid.

<sup>38</sup>Kurtuluş, Kemal. Ibid.

<sup>39</sup>Ibid.

Table 31. Productivity Growth Through Management Techniques Application

<u>Industries</u>	<u>Percentage Growth</u>
White Goods	32
Cement Industry	14
Casting Industries	13
Machine Manufacturing	11
Iron-Steel	11
Textiles	9

Source: Atilla Tezeren. 1985.

The most important outcome of K. Kurtulus' survey is the belief by managers in the use of management techniques to solve real-life problems.<sup>40</sup> Four-fifths of the respondents to Kurtulus' survey stated that their belief in applying management techniques to real-life problems were positive. Their proposition was "obtaining reliable data in time to determine complex problems and finding the solution by the aid of an interdisciplinary approach and "increasing efficiency in allocation of resources to increase productivity." Those that held the opposite negative belief (1/5 of the respondents) that operations research techniques are not very helpful gave such reasons as "the structure of problems and lack of qualified personnel" and "sectoral and organizational structure."

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<sup>40</sup>Ibid.



Since 1980, there has been a tendency toward utilizing better management techniques in Turkey. Based on the data above, it is clearly evident that management techniques are considered a major operating tool in Turkish manufacturing organizations.

### Inventory

The manufacturing industries in Turkey, because of the import-substitution policies of the pre-1980 governments, have come to depend a great deal on raw materials and machines imported from abroad.<sup>41</sup> According to State Planning Organization (SPO), the percentage of raw materials imported from abroad are extremely high.<sup>42</sup> During late 1970s the figure was as high as 63.17 percent as shown in Table 32.

Table 32. Percentage of Imported Inventories in the Manufacturing Sector

<u>Year</u>	<u>Percentage</u>
1978	63.17
1983	61.20
1984	59.73
1984-estimate	59.79

Source: SPO. 1985.

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<sup>41</sup>Balassa, Bela. "Turkey. Industrialization and Trade Strategy." World Bank. 1982.

<sup>42</sup>"Fifth Five-Year Development Plan." SPO. Ankara. 1985.

With such a high percentage of imported materials that are very expensive, the efficient use of sound inventory planning techniques should contribute towards increasing productivity in the manufacturing sector.

The history of inventory planning policies can be broken into two time frames. Before 1980, when the government planned and allocated resources for raw materials and spare parts, inventory decisions were made by a special governmental authority. In the post-1980 years, where the importation liberalized. Inventory decisions have been pushed down to the individual factory level. The result of this has been a better planning of inventory by the individual firms.

#### Pre-1980

Before 1980, the need to protect foreign exchange reserves necessitated a very complex and burdensome allocation system developed and administrated by the government with the aid of the State Planning Organization. This system not only covered the importation of consumer goods and capital equipment, but also of raw materials and spare parts.<sup>43</sup>

According to this system, the SPO periodically estimated the import requirements for the entire economy on the basis of its own macro-economic projections. These import needs were then

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<sup>43</sup>Dilber, Mustafa. "Management in the Turkish Private Sector Industry." Ph.D. Thesis. University of Minnesota. 1967.

broken into production, investment and consumption requirements, and the available foreign exchange was allocated to these three areas based on a predetermined priority.<sup>44</sup>

The decree also contained three different lists of commodities which were used by the industrial sector. The first list, called "liberalised," had no quantity limits imposed. The second list had a restriction on the quantity imported. The third list was negative, where those goods could not be imported unless an emergency situation existed. In order to prevent a critical break-down in the industrial sector, however, the Secretary General of the Union of Chambers of Commerce had the authority to allocate one million U.S. dollars worth of foreign exchange every six months which was applied exclusively to items on the negative list.

The distribution of the various raw materials and other items over these three lists varied according to the existing economic and foreign exchange regulations.<sup>45</sup>

All firms needing imported materials and equipment had to apply to the local Chamber of Commerce within thirty days after the government decree was issued. They had to submit an estimate for a one shift capacity and a 300 day production schedule as well as past production records together with their requests for imported goods. The requests were screened by the regional

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<sup>44</sup>Ibid.

<sup>45</sup>Ibid.

Chambers of Commerce and sent to their national headquarters in Ankara. About two and a half months after the decree was issued, national headquarters in a general meeting allocated the available foreign exchange to the regional organizations. Finally, each regional Chamber of Commerce divided its share among the applicants in a special meeting. After the firms received a certain share of the foreign exchange they had to apply to a commercial bank together with a stated guarantee deposit within a period of three months. The commercial bank forwarded the request to the Central Bank of Turkey which in turn sent it back to the regional Chamber of Commerce for confirmation. Following this, permits could be issued for the allocated foreign exchange and orders could be placed with foreign suppliers. The average time involved in this procedure for all firms was four and a half months. (Figure 6) While this was the legal procedure which no firm could avoid, there was more to this burdensome process.

Because of the desire to allocate the foreign exchange to as many firms as possible, the quotas allocated to individual firms were at times not enough to buy even one unit of the needed material or equipment. Thus, manufacturers many times pooled their allocations or tried to supplement them in the black markets. These flourishing black markets were organized by opportunistic businessmen who maintained dummy firms and who knew their way around the bureaucracy. Needless to say, there were fierce fights and allegations between the various industrialists.

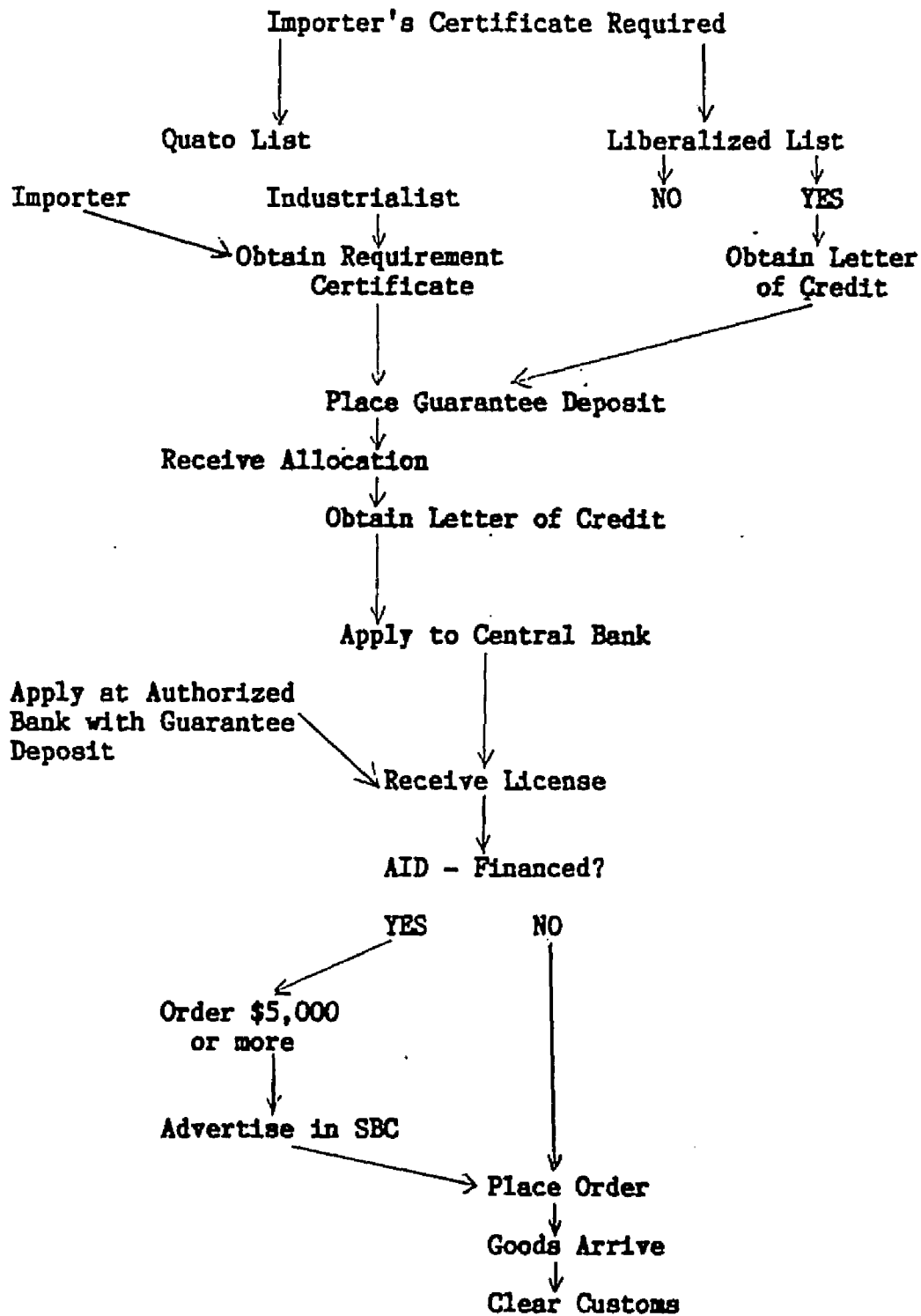


Figure 6. Summary of Import Procedures

Source: Dilber, Mustafa.

The effects of this import system on the performance of the planning function in many firms manifested themselves first of all in a high degree of uncertainty as to the availability, quantity and time of arrival of the needed raw materials and equipment. Since shortly after the licenses were issued, all foreign suppliers were approached at the same time with urgent requests for materials or equipment, the delivery lead times agreed upon were not very reliable. Generally, the suppliers also had difficulties providing their usual services on a short notice. If this involved technicians for the installation of equipment, there was a time lag of several weeks, sometimes even months.

Under these conditions, it was very difficult to engage in systematic planning, because the managers of the firms could never be sure how long items they needed would be kept on an open list. They also could not estimate the amount of foreign exchange available. While the government tried to be consistent and attempted to supply the most often needed goods and materials on a continuous basis, it was not possible for the managers concerned to rely on import policies of the government for more than six months. Since under these conditions, the utilization of plant, equipment, supplies and manpower was not a function of demand for the products manufactured but rather on the unpredictable import system, comprehensive planning in all phases of the operations was not really possible.

The managing director of a Turkish firm stated that during the summer of 1967, faulty ball-bearings in three of his machines needed urgent replacement. Since the Secretary-General of the Chamber of Commerce did not authorize the use of the emergency foreign exchange fund, he had to go through the previously described burdensome procedure to obtain the needed parts. It was only after three months that he knew he would get the foreign exchange allocation and from the time of the discovery of the problem until the foreign supplier was able to ship the needed parts, he did not even know whether he would be able to continue full production or would have to close down part of his plant.<sup>46</sup>

For another example, a U.S. vehicle manufacturer in Turkey had a successful first year.<sup>47</sup> The operation was based on the importation of 85 percent of the parts required. Foreign exchange had been guaranteed by the Turkish government. But, economic conditions deteriorated and foreign exchange became unobtainable. For four years, the United States manager and his staff of eight American department heads decided to mark time, conducting only maintenance and clean-up work while they tried to gain government support to acquire foreign exchange.

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<sup>46</sup>Ibid.

<sup>47</sup>Farmer, Richard. "International Management." Dickenson Publishing Company, Inc. California. 1968.

After this failed, they attempted to make and sell several simple agricultural and road-construction products which required no imported parts. This proved somewhat less than successful. Marketing the new products was difficult, and production delays owing to vendor inadequacies, scrap, low production efficiency, and inventory losses further hampered results. One by one, the Americans returned home discouraged and antagonized by everything Turkish.

A new American plant manager, reflecting the views of the home office, called a halt to most of the attempts to develop new products and take in subcontracting, saying, "I do not want to run a variety store." A policy vacuum developed. No final decision was made to what the plant should be doing. The plant was only two days away from closing when foreign loans to Turkey made exchange available again for vehicle production.<sup>48</sup>

These two cases illustrate the importance of environmental factors on inventory planning in Turkey. It is clearly evident that the import policies have led to widespread inefficiencies. As a result of resource uncertainty, planning in any firm becomes extremely hard. Therefore, all firms had to keep an inventory of imported raw materials and parts in excess of what they would have needed under different conditions.

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<sup>48</sup>Ibid.



The import regime also led to excess inventory costs.<sup>49</sup> Costs such as not being able to attain the desired stocks of imported goods based on need. There were cases where low inventory holdings led to excess production costs due to plant shutdowns or production delays, and other firms incurred the costs of holding higher inventories than they would have under a liberalized import regime.

Thus it was not simply the aggregate level of inventories of imported goods, but the composition of the inventories which led to excess cost. Sometimes very high costs were incurred as a penalty for inadequate inventories. In several cases reported by Anne Krueger, bulky materials such as carbon black and copper tubing were air-freighted into Turkey after special permission had been obtained to do so, a month or more after the plant had ceased production. Resorting to the black market was fairly frequent and entailed not only the costs of production delays but also those of inferior quality items and non-standardization inputs.

There is no means of quantifying the costs incurred by firms whose inventories of imported inputs were suboptimal. However, holding excess inventory usually countered shortage costs. As a comparison, a West European producer would hold inventories adequate for about two month's production, at an

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<sup>49</sup>Krueger, Anne. "Turkey." Columbia University Press. N. Y. 1974.

average cost of 8 percent. The Turkish counterpart, by contrast would hold inventories adequate for an average six month's production, at an average cost of 14 percent.<sup>50</sup>

The cost of the inefficiencies from the firm's point of view was not as high as it was first assumed. No doubt, the higher inventories tied up badly needed and expensive capital. However, due to the moderately competitive, or outright seller's market conditions, a large part of the resulting costs would be recouped in the form of higher prices for the consumer. In a study made by Doğan Avcıoğlu<sup>51</sup> a comparison of automobile prices clearly shows the effect of inventories and higher costs.

(Table 34) The only brand which had the same price was Mercedes, because they had gotten special privileges to import whatever was needed without getting a special permission as other manufacturers.

From Society's point of view these inefficiencies, however, had a very high cost. Excess inventories, plants operating below capacity and probably unnecessarily high prices for many manufactured products put a heavy burden on the Turkish consumer.

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<sup>50</sup>Ibid.

<sup>51</sup>Avcıoğlu, Doğan. "Türkiyenin Düzeni-İkinci Kitap." Tekin Yayınevi. İstanbul. 1979.

Table 33. A Comparison of Automobile Prices  
in TL. 1968 Prices

<u>Brands Produced In Turkey</u>	<u>Sales Price for Locally Manufactured Automobiles</u>	<u>Imported Sales Prices</u>
Anadol (Ford)	43,500	21,000 (Cortina)
Renault	60,000	22,000
Fiat	57,000	18,000
Ford Minibus	65,000	35,000
BMC Minibus	65,000	35,000
Mercedes Bus	475,000	475,000
BMC Truck	105,000	52,000
Ford Truck	120,000	60,000

Source: Dogan Avcioglu. P. 886.

On the shop-floor a more scientific approach to problem solving in inventory handling was achieved. Since the firm had a direct control of its resources, once it was on the shop-floor they could apply operations management techniques to solve inventory problems. Inventory control techniques such as ABC inventory control method and economic order quantities were applied. Once a particular raw material or part was on the shop floor a schedule of operations necessary to manufacture a product was made. In Turkey, this process is named the "Part Montage Schematic," which really is no more than a master production schedule. Also, the use of Gantt charts to schedule machines was

and is still widely used.<sup>52</sup> Therefore, the techniques used in many factories were comparable to the standard world usages of that time period.

One thing that was particularly interesting was the basic acceptance by many Turkish experts in the field that complex systems were not desirable in inventory planning. The emphasis was toward using as simple a system as possible in the factory with the minimum amount of bureaucracy.<sup>53</sup>

The biggest problem of inventory planning before 1980 was the intervention of the government in the raw materials procurement area.

The inefficiency of this raw material procurement scheme was evident by 1979, when the government was experiencing a severe foreign exchange crisis.<sup>54</sup> Until 1980, the government did not spare any capital for raw material needs of the manufacturing firms. There was widespread panic in the industry and the black market operations flourished. Economy for all practical purposes came to a halt save for black market purchases.

After this period, the government started to liberalize the import regime. The three lists mentioned above were wiped out

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<sup>52</sup>"Endüstride Produktivite Semineri." National Productivity Center. Ankara. 1968.

<sup>53</sup>Ibid.

<sup>54</sup>"Gönensay Emre. "From Bankruptcy to Revival." In Economic Incentives. ed. Balassa, Bela. Macmillan, Inc. London. 1986.

for all practical purposes and firms were encouraged to do their own importing with their own financial resources.

#### Post 1980

The immediate effect of import-liberalization policies was to put individual firms in charge of their own raw material procurement needs. Inventory planning once again became an important function of the production process. The benefits of increased inventory control and inventory reduction benefits such as increased cash flow and carrying cost savings were realized. Other things such as bringing out the various scheduling, quality and process problems and increased handling and storage costs suddenly became a major concern for managers.<sup>55</sup>

There has been a renewed effort to apply up-to-date quantitative methods for inventory control. In a study by Kemal Kurtuluş of İstanbul University, the use of different methods as well as their importance ranking is listed in Table 34.

Again in the same study, respondents were asked to specify those areas they thought OR techniques are most useful. Inventory control was in second place after production planning.<sup>56</sup>

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<sup>55</sup>Kurtuluş, Kemal. "Computer Usage and Employment of OR Techniques." *European Journal of OR*. Vol. 14. 1983. Pp. 329-334.

<sup>56</sup>Ibid.

Table 34. Usage Rank of OR Techniques  
in Turkey

<u>Techniques</u>	<u>Rank</u>
Inventory Models	1
Decision Models	2
Dynamic Programming	2
Simulation Models	3
Linear Programming	4
PERT/CPM	4
Regression-Correlation	5

Source: K. Kurtulus. 1983.

In another study by Dr. Karayalcin, the difference of applying inventory models before and after 1980 shows that there is more rigorous attention paid to inventory control.

(Table 35)<sup>57</sup>

Table 35. Knowledge of Managers on  
Inventory Control

	<u>Has a General Idea</u>	<u>Knows Basic Things</u>	<u>Has Theoretical Knowledge</u>	<u>Has Experience and Able to Apply</u>
Inventory Models	60	20	15	5

Source: Ilhami Karayalcin. 1972.

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<sup>57</sup>Karayalcin, Ilhami. "A practical academic cooperative system to increase the efficiency of management application." In AIEE Technical Papers. 1972.

In a study by the National Productivity Center of the same survey the difference is very clear. It seems that 80 percent of the managers are aware of inventory models. Thirty-five percent know basic things, 40 percent have theoretical knowledge and 30 percent have experience and are able to apply inventory modeling to their daily applications.<sup>58</sup>

One other change in the production planning and inventory control has been the application of Material Requirements Planning techniques in some manufacturing organizations.<sup>59</sup> Companies that have adopted MRP techniques were in metal goods, machinery and automotive industries. Not surprisingly these industries also had 96 percent computer utilization rates.<sup>60</sup> Some of the benefits that were realized through the implementation of MRP were: reduced sales price (to compete in the world economy), reduced inventory (at least 20 percent decrease reported), reduced idle time, and better response to market demands.<sup>61</sup> However, there were some problems associated with utilizing MRP techniques such as increased lead times and the nervousness of the system because of the unreliability of raw material lead times. In a study of

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<sup>58</sup>"Envanter Planlaması." National Productivity Center. Ankara. 1986.

<sup>59</sup>"Malzeme İhtiyaç Planlama Sistemi." National Productivity Center. Ankara. 1986

<sup>60</sup>Kurtuluş, Kemal. Ibid.

<sup>61</sup>"Malzeme İhtiyaç Planlama Sistemi." NPC. Ankara. 1986.

the finished goods inventory in white goods manufacturers after implementing MRP is a good indicator of the success of MRP in reducing inventories.

From Figure 7, it seems that white goods production has benefitted a great deal in its inventory planning from MRP.

In the area of other techniques such as Just-In Time and OPT, there seems to be an industrywide lack of implementation. None of the references cited mentioned anything about improving MRP or utilizing newer techniques. Satisfaction with MRP seems to stem from the idea that it is better than any other technique utilized thus far, and it has brought them great savings in planning.

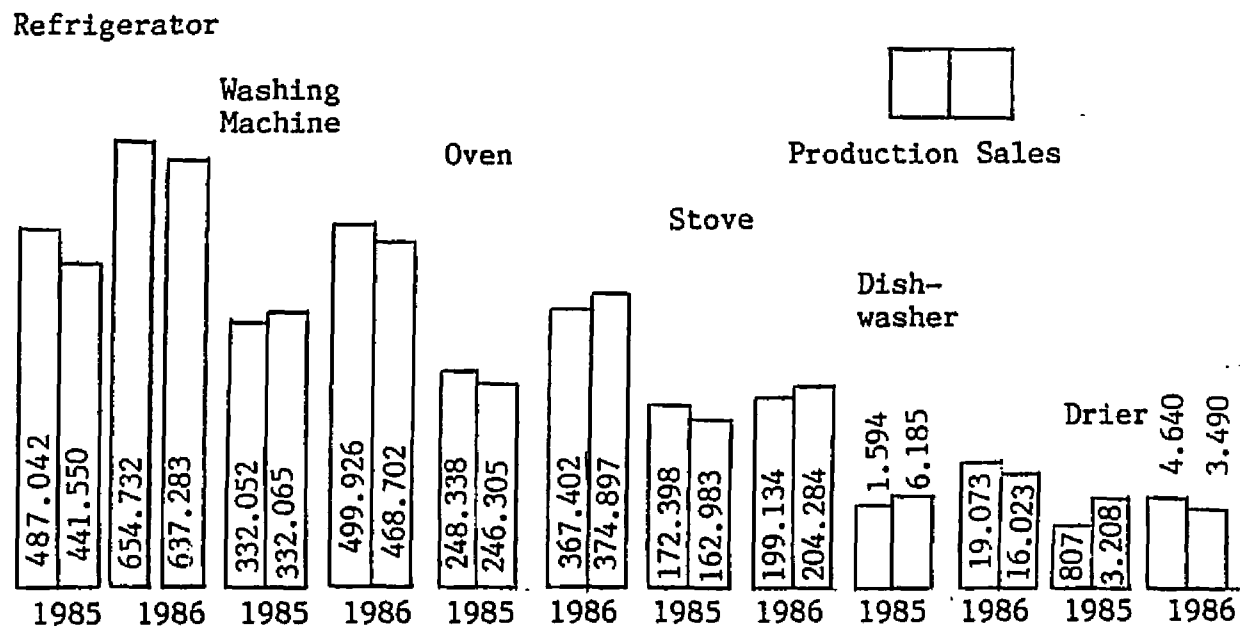


Figure 7. White-Goods Inventory  
Source: Ekonomik Bulten. February, 1987.



### Manpower Planning

The direct labor force accounts for a sizeable percentage of the cost of production and as such represents a major concern in the design and operation of a production system.<sup>62</sup> Furthermore, manpower planning also has a tremendous effect on the productivity of a firm. Any productivity improvement program should consider manpower planning as an important tool to increase productivity. As in any other productivity conscious firm, Turkish firms also consider manpower planning as an integral part of productivity improvement programs. In a recent survey of 123 major manufacturing organizations in Turkey, respondents felt that the lack of proper manpower planning accounted for an 11 percent productivity loss in their organizations.<sup>63</sup> As shown in Table 1, manpower planning ranked fifth in the overall factors that affect productivity growth in the surveyed organizations.

Most of the problems stated in Table 1 are connected with outside sources. However, the approach of management to these problems could very well be the solution to high productivity losses. Therefore, a detailed study of how management handled manpower planning problems before and after

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<sup>62</sup>Chase & Aquilano. "Production and Operations Management." Third Edition. Irwin.

<sup>63</sup>Tezeren, Atilla. Ibid.

1980 should give us a good understanding of the achievements and setbacks of Turkish management.

#### Pre-1980

The beginning of formal manpower planning methods could be traced back to 1930s, when many foreign experts were invited by the government to implement a rapid industrialization plan for the infant industries of the young Republic.<sup>64</sup> These experts not only applied modern management planning of manpower, but also taught them to the Turkish managers in the manufacturing sectors.

Initially, the manpower planning area was divided into six basic areas such as: environments, inputs, influences on inputs, the organization and its processes, and fall-out from the system and outputs. Environments included areas such as technical, where new technologies indicated where: (a) new skills are required and training needed, (b) business environments such as the future condition of the company, (c) the changes in the capacity and capital investment will be required, and (d) government constraints such as labor laws.

Inputs are the people (numbers), skills, experience and effectiveness of the individual and organizational performance.

Influence on inputs is concerned with training, recruitment, job study, job design.

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<sup>64</sup>Krueger, Anne. "Turkey." Columbia University Press. New York. 1974.

The organization and its processes involve the production and other activities which go to make up the business.

Fall-out from the system includes workers who leave and redundancies (extra workers not needed), but also people whose skills are no longer appropriate to meet the environment of the company.

Finally, outputs which include the effectiveness of corporate and individual performance when compared with competition or some measurement such as added value.

Among the six areas of the system, influence on inputs were considered the main objective of management in manpower planning. Therefore, a great deal of attention was paid to detailed job study, training, recruitment to effectively manage manpower.

The job-study function in Turkey has been divided into two areas: job analysis and job design.<sup>65</sup>

Job analysis initially involved visual inspection of the job and how the job should be performed. Additionally, a survey was taken of what was expected and what was needed to be done as well as personal communication with the workers on the line about their opinions. Once all the information was collected, job description and job specification documents were prepared. Job description documents contained needs of the job, tools needed,

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<sup>65</sup>"Productivity in Industry Symposium." National Productivity Center. Ankara. 1969. Pp. 528-535.

skills required, responsibility, and labor needs. Job specification document contained only the necessary skills required from the worker.

Job evaluation contained four basic methods that were in wide use before 1980. There were: (a) Ranking, (b) Classification, (c) Factor Comparison, and (d) Point Rating.

Ranking methods were usually used in small organizations because of its simplicity. This method would analyze all the different jobs and rank them according to their importance by a commission. The lowest number under  $\bar{X}$  would be the most important job to be done.

On Table 36, Job M would be in the first place, K second, and E third. I and J on the other hand would be listed as the last in importance. This system also helped in analyzing the labor wages. (Table 37)

Problems with this method were:

- (1) The degree of knowledge of the commission members about the jobs ranked.
- (2) Other costs in the process that would change the ranking order.
- (3) As the number of jobs increases, it gets increasingly harder to put them in rank.

Classification method involves dividing the jobs into groups based on their specification. This classification scheme would also help in deciding the wages to be paid. In job

classification schemes, Westinghouse classification methods were widely used.<sup>66</sup>

In Factor comparison, a method developed by Eugene Benge was utilized. The difference of factor comparison with the other methods is that factor comparison looks at the different factors in the particular jobs. Somewhat like the ABC classification

Table 36. Factor Comparison

<u>Job Name</u>	<u>Member</u>	<u>Member</u>	<u>Member</u>	<u>Member</u>	<u>Member</u>	<u>X</u>
A	9	9	10	10	10	9.6
B	4	4	5	3	2	3.6
C	5	5	4	5	5	4.8
D	6	7	6	8	7	6.8
E	3	3	2	4	3	3.0
F	11	11	11	12	11	11.2
G	10	10	9	9	9	9.4
H	13	13	14	14	13	13.4
I	14	14	13	13	14	13.6
J	14	14	13	13	14	13.6
K	2	2	3	2	4	2.6
L	8	8	7	6	6	7.0
M	1	1	1	1	1	1.0
N	12	12	12	11	12	11.8

Source: Endustride Produktivite. 1969

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<sup>66</sup>Erdiller, Ozten. "Is Degerlendirme ve Tatbikat."

Table 37. Wage Analysis

<u>Ranking</u>	<u>Job Name</u>	<u>Wage (T.L.)</u>
1	M	2.95
2	K	2.75
3	F	2.70
4	B	2.65
5	C	2.60
6	D	2.50
7	L	2.30
8	E	2.00*
9	H	1.95*
10	A	1.85*
11	G	1.80*
12	N	2.05*
13	I	1.70*
14	J	1.80*

\*Wages that need to be readjusted.

Source: Industrial Productivity Symposium. 1969.  
P. 531.

method, different jobs were grouped together based on their factor comparisons. Some of the factors used were: (a) amount of thinking needed, (b) skills required, (c) physical output needed, (d) responsibility, and (e) working conditions. The pay of the worker would depend on how much he/she utilized these skills on a particular job. A committee would determine how much money should

be paid for each activity, and the final wage would be an addition of all these factors. (Table 38)

The basic drawback of this system is the amount of time required to classify all the different jobs.

Point rating system, another method used, looks at a single job rather than the comparison method of the previous systems. Many large companies utilize this plan which consists of giving points to different factors on a job and basing the rate of pay on the number of points. A typical plan used by the State Railways Company used six different factors, such as:

(a) responsibility, (b) skills, (c) knowledge of work, (d) training needs, (e) physical exertion, and (f) working conditions.

In State Railways Company, the weights given to different factors are shown in Table 39.

Table 38. Total Wages to be Paid

<u>Job A</u>	<u>Pay-Rate</u>
Thinking Needed	90 TL/hr
Skills Required	50 TL/hr
Physical Output Needed	73 TL/hr
Responsibility	45 TL/hr
Working Conditions	<u>30 TL/hr</u>
Total Wages to be Paid	288 TL/hr

Source: Productivity in Industry Symposium. 1969.

Table 39. Point System in Turkish Railways

<u>Factor</u>	<u>Weight %</u>	<u>Point</u>
Responsibility	25	250
Skills	30	300
Knowledge	12	120
Training	8	80
Physical Exertion	10	100
Working Conditions	<u>15</u>	<u>150</u>
Totals	100	1,000

Source: Erdiller, Ozten. 1969.

Once this point system is applied, a wage rate would be calculated and a trend line would be drawn. The higher the points, the higher the pay scale.<sup>67</sup>

The methods cited above have served their purpose well during that era and some of them like Westinghouse method and point rating methods are still in wide use today.

During the early 1970's, different methods were starting to gain in importance in manpower planning. With the extensive use of computers, usage of quantitative methods had gained in importance to forecast manpower needs. Some of the techniques used in manpower planning, in order of importance are:

(a) Canonical correlation, (b) discriminant analysis, (c) factor

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<sup>67</sup>"Productivity in Industry Symposium." NPC. Ankara. 1969.



analysis, (d) covariance analysis, (e) decision models, and (f) linear programming.<sup>68</sup> In a study of the Turkish Electrical Authority (TEA), which generates and transmits 90 percent of electricity consumed in Turkey, use of renewal methods to forecast manpower losses produced good results.<sup>69</sup> In comparison to actual results, this method was off only one standard deviation. Therefore, the trend towards the end of 1970's has been towards more quantitative and realistic planning techniques in forecasting manpower needs.

One outstanding feature of the pre-1980 manpower planning is the overmanning situation that had existed in most manufacturing organizations. A 1970 study by an international textiles consultant referred to earlier clearly states that productivity in Turkish textiles were equal to only about a quarter of the corresponding productivity of the U.S. workers using the same equipment, because of "the excessive number of workers employed, lower machine efficiencies, too large a product mix, and poor utilization of finishing equipment."<sup>70</sup>

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<sup>68</sup>Kurtulus, Kemal. Ibid.

<sup>69</sup>Sirvanci, Mete. "Forecasting manpower losses by the use of renewal models." European Journal of Operational Research. No. 16. 1984. Pp. 13-18.

<sup>70</sup>Study by James Nannery & Associates. (July 1970). World Bank and Turkish Industrial Development Bank.

In a comparison of the manpower requirements of cement plants in the OECD countries points to a similar conclusion. (Table 40)

It is clearly evident from Table 40 that Turkey ranked highest in the number of staff and workers among all the other OECD countries listed. It is also interesting to note that Turkish Cement Corporation, which is in the state sector, has recorded higher requirements compared to the private sector cement companies.

Another example is the banking sector as shown earlier. Two Turkish banks were among the top 500 banks in the world in a survey by The Banker Magazine. (Appendix C) Turkish Agricultural Bank which placed 320th had 36,973 employees with 42% profits on assets. The bank ranked 319th, had only 4,970 employees and made more profits per employee. Turkish Is Bank which is a private bank placed 42nd with 22,384 employees, considerably less than the State owned Agricultural Bank. Nevertheless it still showed very high employment numbers. Among the rest of the Top 500, only one bank had higher numbers. Turkish banks placed second and third in the number of people employed.<sup>71</sup>

The underlying reason for this overmanning situation is the public policy of governments to use state companies as a safety valve against very high unemployment rates

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<sup>71</sup>Banker. July 1986. Pp. 149-159.

Table 40. Manpower Requirements of Cement Plants in OECD Countries, 1972 (Staff and workers per thousand tons of cement a year)

<u>Country</u>	<u>Staff</u>	<u>Workers</u>	<u>Total</u>
Germany, Federal Republic of	0.09	0.31	0.40
Belgium and Luxembourg	0.14	0.40	0.54
Netherlands	0.08	0.27	0.34
France	0.15	0.29	0.44
Italy	0.11	0.57	0.68
Austria	0.13	0.55	0.68
Norway	0.16	0.50	0.66
Portugal	0.20	0.62	0.82
Spain	0.11	0.49	0.60
Ireland	0.20	0.54	0.74
Turkey           Aggregate	0.21	1.06	1.27
Turkish Cement Corporation (SEE)	0.25	1.34	1.59
Other Plants	0.17	0.59	0.79
Average OECD	0.13	0.42	0.55

Source: Walstedt, Bertil. P. 156.

15 to 20 percent). Another reason is the policy of paying back the constituents through placing them in public enterprises. Interference of politicians on manpower planning completely nullified the manager's role of planning. The end result of these policies have made many manufacturing firms very unproductive because of extreme overstaffing.

Therefore the situation in Turkey before 1980 can be summarized as follows: managers had knowledge of modern management techniques in manpower planning; however, environmental factors such as political interference had kept them from implementing these methods.

After 1980

Recognizing the problem of overmanning, one of the initial policies of the 1980 regime was to put a freeze on all hiring in every public sector organization in Turkey. Many people were asked to retire early and some took this opportunity. The 1981 Program decree also froze the number and structure of positions for existing operations in each State Economic Enterprise at the level of November 30, 1980.<sup>72</sup> According to this Plan, new factories opened by a SEE must first draw on existing staff of that SEE, and in any case new hiring may not exceed 50 percent of the workforce of the new plant. Furthermore, SEEs could not apply to the Ministry of Finance for new positions as in previous years, while vacant posts could only be filled with the permission of the Ministry.<sup>73</sup> In ten SEEs accounting for 44 percent of total State Economic Enterprise employment in 1980, 50 percent of the positions becoming vacant through resignations, retirements or

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<sup>72</sup>"Turkey. Industrialization and Trade Strategy." World Bank. Washington. 1982.

<sup>73</sup>Ibid.

deaths were automatically cancelled. These steps had cut operational SEEs total employment by 6 percent in 1981, following a 1 percent fall in 1980. This policy also led to a more functional and rational approach to manpower planning in the state sectors.

The private sector, for all practical purposes, was never affected by political interference; therefore, its manpower planning has not shown a drastic change since 1980.

One important change since 1980 has been the use of manpower planning by the SEEs as well as private sector as a strategic tool. Many companies have hired experts to build special decision support systems (DSS) for competitive strategy formulation.<sup>74</sup> Such a model prepared for Turkish Glass Works, which ranks as the 9th largest in the world, has helped the firm to gain competitive advantage over most of its rivals.<sup>75</sup>

The effects of rational manpower planning policies to increase productivity have been positive. In a 1985 study by Atilla Tezeren, respondents to a survey indicated that they increased their productivity 12 percent by employing effective

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<sup>74</sup>Oral, Muhittin. "A DSS Design Framework for Competitive Strategy Formulation." *European Journal of OR.* No. 28. 1987. Pp. 132-145.

<sup>75</sup>*Ibid.*

manpower planning policies.<sup>76</sup> Different sectors have reported different gains as shown in Table 41.

As can be seen from Table 41, manpower planning had a strong effect on the overall productivity growth of an organization. Some other sectors that have gained increases in productivity through manpower planning are white-goods (23 percent), and casting industries (14 percent).<sup>77</sup>

During the 1980's, organizations have become aware of manpower planning to the overall productivity of organizations. With the environmental constraints decreasing in manpower planning decisions, the tendency seems to be towards using more state-of-the-art quantitative operations management techniques to increase productivity.<sup>78</sup>

Table 41. Productivity Growth Through Manpower Planning

<u>Sector</u>	<u>Percentage Gain</u>
Machine Industry	17
Textiles	9
Iron-Steel	15

Source: Atilla Tezeren. 1985.

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<sup>76</sup>Tezeren, Atilla. Ibid.

<sup>77</sup>Tezeren, Atilla. Ibid.

<sup>78</sup>Ibid.

## CHAPTER FIVE

### CONCLUSIONS

The main purpose of this study has been to present an analysis of the effects of quality, operations research techniques, inventory, and manpower planning on the productivity of Turkish manufacturing industries.

The emphasis on these four areas has been because of Japan's example, of going from a third-world producer to a world-class economic power through better implementation of these techniques. Not only are Japanese companies highly productive, but they are also an important element in the economic development of Japan as a country.

The emphasis on companies as an engine of development, as well as productive users of input is an important theory of economic development. Once the individual firm is accepted as an engine of development, the determinants of its behavior and the relationship between it and the society must be identified. The former is needed because it is not the individual but the industry as a whole that is important; the latter because the interactions between the firm and its environments are an important factor in the productivity quest.

One basic problem in seeking comprehension of the firm and its environments is the hazard of getting lost in a sea of detail, or "not seeing the forest for the trees." To reduce this danger, only the four factors relevant to the discussion have been studied in detail while others that may have significant bearings to issues either have been touched briefly or omitted completely. A different problem is the order of presentation. The mutual interaction among the different elements in an organization precludes an order based on casualty. The order of importance is far from being perfect, for it requires subjective value judgments; its use, nevertheless, was unavoidable. However, the order of the four factors are all considered major reasons in productivity growth of organizations.

The break-down period of 1980 also has some problems with it. No country in the world has gone through an abrupt change in their systems without a considerable carryover of the old to the new system. In Turkey also, this has been the case.

The policies of Turgut Ozal have made great inroads in the policy orientation of a market controlled economy from a government controlled economy. However, all of the decisions taken have not or could not be implemented overnight. Some of the decisions taken are still on shaky grounds. However, the time period seemed to be appropriate because of the newly gained importance of manufacturing organizations in their own long-term plans. Based on this time spread, the application of operations



management principles is shown to be consistent with what could be expected. Following is a summary of observation derived from the data examined.

### Quality

It is clearly evident from the data that quality has been an increasing concern for Turkish manufacturers as a means of increasing productivity.

In the period between 1960 and 1980, quality seems to be of secondary concern to quantity because of the sellers market prevailing in Turkey. The quality of raw materials inputs of firms was poor. The public sector which produced these raw materials were considered a low quality producer then as now.

The position of quality control departments in the organizational structure came directly under the operations management line of authority, which sometimes hindered quality effort. Another drawback of the pre-1980 period was the inability of high level management to inform the line workers about the importance of quality.

There were some achievements in this period. A government Standards Institute was founded, and foreign experts were hired to analyze and recommend actions toward better productivity. According to Edward Schrock,<sup>1</sup> one of the first experts to go to

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<sup>1</sup>Schrock, Edward. "ASQC Fellow Aids Turkish Firm." In Quality Progress. Vol. IX. No. 10. October, 1976.

Turkey in this period, "They've (Turks) just begun to find out what quality is about." Therefore, this period has been a quality enlightenment era for Turkish industries.

With the emphasis on exports under P. M. Turgut Ozal since 1980, companies have been competing fiercely both abroad and at home. The natural outcome of this has been the search for ways of increasing productivity by increasing quality.

Since 1980, quality has been more than a buzzword in Turkish manufacturers' lexicon. In order to make better quality products, they have reorganized their organizational structures to give authority to quality control experts. Another important change has been the use of a variety of measures to control quality. One of the measures of awarding the worker for only the good work done is clearly a departure from the old habits of paying for all the parts produced—good or bad. Another important outcome of better quality is in the export performance of manufacturing organizations. They exported 75 billion Turkish Liras (TL) worth of products in 1979; by 1986 it had jumped to 4,495 billion TL.<sup>2</sup>

One problem area still evident is the quality of inputs. Although some of these raw material producing companies produce high quality material, most of them are still low quality producers.

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<sup>2</sup>TUSIAD. "Dis Ticaret Raporu." Istanbul. 1987.

Another important aspect in increasing productivity through quality education has played an important role in industry. Many new courses are now taught on quality control at the universities. Also, the public relations effort of the government to bring quality awareness to the public through the media.

Therefore, the acceptance of the first issue is a sound decision. If the quality shown in Turkish products since 1980 persists, there seems to be no reason that Turkey will not become the "Japan" of Europe and the Middle East.

#### Operations Research Techniques

Operations research techniques have an important place in any productivity improvement effort. In the period before 1980, knowledge and utilization of up-to-date management techniques was minimal. From the data in Chapter Four, it is clearly evident that environmental factors had an impeding effect on the utilization of operations research techniques. Barriers to development of management in industry have been analyzed in the previous chapters. In an overall evaluation of this period, it seems clear that productivity gains through efficient utilization of techniques have not been accomplished.

After 1980, the developmental impact of technological and other environmental factors render it nearly impossible to solve complex problems without the application of new methods. The age of intuitive and traditional methods are behind a modern manager.

The realization by companies of the change have caused them to try to solve this problem, either by educating their own personnel, and/or hiring qualified people. The end result of these policies, coupled with the free market competition, have made industries more efficient in applying these methods. Very high productivity growth percentages (Table 32) were realized because of these new policies.

#### Inventory

Inventory planning has always been a great problem in Turkish industry. In a survey of managers of manufacturing industries, 71 percent of the managers felt that problems in inventory planning decreased the firm's productivity 10.3 percent.<sup>3</sup>

Based on the analysis of the inventory problems, the biggest factor that affected productivity before 1980 was environmental factors such as the import policies of the government. Inventory planning was highly dependent on the policies of the government, which were usually beset by problems such as foreign exchange shortage, red tape and others.

After the liberalization of the import procedures in 1980, most companies became directly in charge of inventory decisions, and purchasing priorities. The obvious result of this has been

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<sup>3</sup>Tezeren, Atilla. "Productivity in Turkish Manufacturing Industry." National Productivity Center. Ankara. 1985.

better planning, more capital to work with and the dependence on a firm's own resources to handle inventory and production planning problems.

Research clearly indicates that inventory planning has improved to a great degree under the present government's liberalization policies. A touch and go policy of the pre-1980's have left its place to much sounder use of quantitative planning environment.

#### Manpower Planning

The strength and competitive advantage of any firm comes in part by how well it handles its manpower planning. Turkish companies have recognized this fact for many years and they have been trying to implement policies for rational manpower planning techniques. Before 1980 many methods such as Westinghouse method were and still are implemented to a great degree of success.

Companies that have been most successful in manpower planning area are private sector companies which decide how to utilize each method depending on the problem. Public sector on the other hand, because of centralized manpower planning policies dictated by the central government, have experienced low productivity gains.

Since 1980, a new program was put into effect which made each manager responsible for his own firm in terms of manpower policies. Even though some restrictions are still dictated by the central government, there is no direct political interference by

the government. Although there has been no quantitative research on the results of this policy, the tendency seems to be toward utilization of better manpower planning techniques.

#### Recommendations For Future Research

Turkish industry has recently started to open itself to international competition. This new change in the outlook of individual firms might have very important long term policy effects. How these policies effect the long term productivity of manufacturing firms should be an excellent area of research. Future studies may address issues such as the productivity of Turkish firms as compared to their competitors--national and/or international--and the effect of economic decision on individual firms.

Another research area could be the state of productivity gains in different companies in different maturity stages, as well as a study of similar product manufacturers in different maturity stages.

One other action taken by the government recently has been trying to sell-off state firms to the private sector. This should give the researcher an excellent opportunity to study the productivity changes in these firms going from the state sector to private sector.

In this descriptive study, major focus was placed on the applications of operations management techniques in increasing productivity in individual firms. Future studies may address

other issues of importance and add additional insights on management motivation, knowledge and desire to promote productivity through the application of operations management techniques, and the resulting needs of Turkish manufacturers.

## APPENDIX A

## TURKEY'S MAJOR INDUSTRIAL GROUPS

<u>Name</u>	<u>Principal Area of Activity</u>	<u># of Companies in the Top 500</u>	<u>Profit</u>	<u>1984 Exports</u>	<u>Sales (TL. bn)</u>	<u>Employees</u>
KOC	Motor industry, white goods, banking, etc.	23	59.1	249.9	1,083	29,643
SABANCI	Banking, plastics, textiles, cement, machinery, etc.	15	68.8	184	1,116	28,000
YASAR	Paint, chemicals, banking, food and dairy products, brewing	11	7.6	100	152.8	8,500
ANADOLU ENDUSTRI	Machinery, metals, shipping, brewing, motor, food	8	6.8	176	200.7	7,000
CUKUROVA	Banking, textiles, construction, machinery, steel, chemicals	8	n.a.	314	n.a.	45,000
SISE-CAM	Glass and bottles	7	2,096	133	142.1	15,945
ENKA	Contracting, machinery, foods, banking, marketing	6	n.a.	343	416.0	22,000
BORUSAN	Electronics, white goods	5	1,821	54.0	48.0	1,650
PROFILO	Pipes, cables, tubes	4	6,441	15	92.8	6,800
ECZACIBASI	Ceramics, pharmaceuticals, medical products	4	n.a.	n.a.	n.a.	n.a.
ITEMA	Motor industry, tractors, gears, transmissions	4	n.a.	6.4	10.0	1,300

Source: Financial Times. November 4, 1985.



## APPENDIX B

## LEADING STATE ECONOMIC ENTERPRISES

<u>Name</u>	<u>Line of Business</u>	<u>1981 Sales (TL m)</u>
IPRAS	Petroleum refining	506,602
TPAO	Petroleum production	338,182
TKI	Coal mining and marketing	92,533
TDC	Iron and steel production	80,811
Eregli Demir ve Celik	Iron and steel production	75,568
T. Seker Fabrikalari	Sugar production	85,328
Petkin Petrokimya	Petrochemicals, plastics	55,788
Seka	Paper and board	51,756
Cay Kurumu	Tea	47,173
Azot Sanayi	Nitrates and fertilizers	26,679
Et e Balik Kurumu	Meat and fish marketing	26,208
IGS Istanbul	Fertilizers	19,431
Petrol Ofisi	Petroleum marketing	17,076
Seydisehir Aluminum	Aluminum production	14,638
T. Cimento Sanayi	Cement production	12,048
Karadeniz Bakir	Copper production	10,216
Yem Sanayi	Animal feed production	8,360

Note: Ranked according to the size of production.

Source: Financial Times. December 19, 1983.

APPENDIX C

TOP 500 BANKS

Rank	Rank	Bank and Head Office	Assets Less Contra Accounts	Total Deposits	Capital and Reserves	Net Interest Income	Pre-tax Profits	Pre-tax Profits on Assets (%)	Pre-tax Profits on Capital (%)	Capital Assets Ratio (%)	Net Interest on Assets (%)	Number of Employees
85	84											
323	303	Florida National Banks <u>Jacksonville</u>	5,981 <u>11.6</u>	4,991 <u>14.1</u>	383 <u>26.4</u>	218 <u>18.0</u>	130 <u>210.6</u>	2.29 <u>0.94</u>	37.86 <u>14.64</u>	6.40 <u>5.66</u>	3.85 <u>4.15</u>	4,700 <u>-14.2</u>
324	354	Gotabanken <u>Stockholm</u>	5,964 <u>15.6</u>	4,220 <u>19.1</u>	344 <u>40.4</u>	100 <u>0.8</u>	79 <u>64.3</u>	1.41 <u>1.01</u>	26.63 <u>20.19</u>	5.77 <u>4.75</u>	1.80 <u>2.10</u>	2,452 <u>-0.3</u>
325	278	National Bank of Abu Dhabi <u>Abu Dhabi</u>	5,944 <u>-3.1</u>	5,320 <u>-3.3</u>	501 <u>1.3</u>	102 <u>-13.8</u>	14 <u>-57.8</u>	0.24 <u>0.56</u>	2.89 <u>6.89</u>	8.44 <u>8.07</u>	1.69 <u>1.93</u>	1,185 <u>-17.5</u>
419	...	Aomari Bank <u>Aomori</u>	4,321 <u>4.0</u>	3,592 <u>4.3</u>	132 <u>5.0</u>	9 <u>-13.6</u>	19 <u>-18.1</u>	0.45 <u>...</u>	14.78 <u>...</u>	3.07 <u>3.04</u>	0.22 <u>...</u>	2,219 <u>-0.5</u>
420	445	International Commercial Bank of China <u>Taipei</u>	4,315 <u>30.8</u>	2,704 <u>56.7</u>	256 <u>47.7</u>	73 <u>11.5</u>	42 <u>-3.1</u>	1.09 <u>1.40</u>	19.45 <u>26.29</u>	5.92 <u>5.24</u>	1.91 <u>2.12</u>	2,013 <u>6.2</u>
421	446	Luzerner Kantonalbank <u>Lucerne</u>	4,298 <u>5.3</u>	2,813 <u>3.9</u>	198 <u>0.5</u>	34 <u>9.4</u>	12 <u>-2.6</u>	0.30 <u>0.32</u>	6.31 <u>6.52</u>	4.60 <u>4.82</u>	0.80 <u>0.77</u>	852 <u>1.3</u>
422	403	Turkiye is Bankasi <u>Ankara</u>	4,287 <u>44.6</u>	3,676 <u>46.8</u>	232 <u>42.4</u>	21 <u>-67.1</u>	42 <u>30.1</u>	1.17 <u>1.34</u>	21.36 <u>21.31</u>	5.42 <u>5.50</u>	0.59 <u>2.68</u>	22,384 <u>-0.2</u>
423	...	Sovac <u>Paris</u>	4,262 <u>11.5</u>	89 <u>27.7</u>	308 <u>14.4</u>	...	104 <u>10.6</u>	2.57 <u>...</u>	35.98 <u>...</u>	7.24 <u>7.05</u>	...	1,945 <u>0.5</u>
424	412	Commercial Bank of Greece <u>Athens</u>	4,257 <u>33.5</u>	3,029 <u>24.2</u>	127 <u>20.4</u>	32 <u>90.6</u>	33 <u>86.1</u>	0.89 <u>0.64</u>	28.57 <u>17.87</u>	2.98 <u>3.30</u>	0.87 <u>0.61</u>	6,778 <u>8.3</u>
425	425	Nassauische Sparkasse <u>Wiesbaden</u>	4,246 <u>1.2</u>	4,016 <u>0.8</u>	126 <u>6.9</u>	118 <u>1.7</u>	22 <u>2.4</u>	0.51 <u>0.53</u>	17.71 <u>19.22</u>	2.97 <u>2.81</u>	2.80 <u>2.91</u>	... <u>...</u>

Figures on first line in \$ millions (Columns 1-5) or percentages (columns 6-9) or numbers (column 10); second line shows percentage growth in local currency in past 12 months (columns 5-9) or previous year's ratios (columns 6-9) or percentage growth (column 10).

Rank	Bank and Head Office	Assets Less Contra Accounts	Total Deposits	Capital and Reserves	Net Interest Income	Pre-tax Profits	Pre-tax Profits on Assets on Capital		Capital Assets Ratio (%)	Net Interest on Assets (%)	Number of Employees	
85	84						(%)	(%)	(%)	(%)		
314	336	Norddeutsche Genossen- schaftsbank Hanover	6,206 3.4	5,527 5.6	232 16.0	76 -9.2	...	...	3.74 3.34	1.24 1.43	1,047 -2.9	
315	294	Huntington Bancshares Columbus	6,176 11.5	4,762 14.2	384 20.9	221 7.3	68 21.6	1.17 1.06	19.50 17.73	6.22 5.73	3.77 3.88	4,382 3.1
316	315	Banco Itaú São Paulo	6,151 295.5	3,455 336.2	621 282.9	319 223.7	266 345.2	6.90 5.99	67.98 58.37	10.09 10.42	8.27 9.87	87,436 15.3
317	320	Toho Bank Fukushima	6,147 8.2	5,350 6.3	248 6.5	141 0.1	42 -6.6	0.70 0.82	17.31 19.85	4.03 4.09	2.39 2.60	2,626 4.6
318	377	Sparekassen SDS Copenhagen	6,133 18.8	4,838 18.2	515 29.2	213 7.6	226 427.5	4.00 0.31	49.43 3.77	8.39 7.72	3.77 4.11	4,026 2.9
319	355	Chang Hwa Commercial Bank Taipei	6,069 40.1	3,860 11.1	142 3.4	46 29.1	22 2.8	0.43 0.54	16.07 15.59	2.34 3.17	0.89 0.90	4,970 1.1
320	301	T. C. Ziraat Bankasi Ankara	6,019 44.7	3,803 66.0	257 88.4	88 73.3	21 101.7	0.42 0.31	10.92 8.21	4.27 3.28	1.73 1.50	36,973 0.8
321	344	Banque du Caire Cairo	5,993 4.0	4,881 11.8	610 13.3	124 16.1	59 -5.2	1.04 1.26	10.23 11.94	10.18 10.24	2.20 2.17	7,553 -6.1
322	341	San-in Godo Bank Matsue	5,984 4.6	5,213 13.8	241 6.6	134 1.2	38 -9.2	0.68 0.85	16.33 19.74	4.02 4.32	2.39 2.68	2,210 -0.3

Figures on first line in \$ millions (Columns 1-5) or percentages (columns 6-9) or numbers (column 10); second line shows percentage growth in local currency in past 12 months (columns 5-9) or previous year's ratios (columns 6-9) or percentage growth (column 10).

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