MIDDLE EASTERN TECHNOCRATS' ATTITUDES
TOWARDS U.S. TECHNOLOGY TRANSFER CONTROLS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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* * * * *

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To My Parents, Robert and Ann
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MIDDLE EASTERN TECHNOCRATS' ATTITUDES TOWARDS U.S. TECHNOLOGY TRANSFER CONTROLS

ABSTRACT

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Middle Eastern technocrats represent a vital link between their countries and the global economic order. Their attitudes and priorities towards U.S. technology transfer policies and controls embody the main objectives of this study.

The attitude assessments of the selected Middle Eastern technocrats are based upon 84 in depth interviews utilizing a structured questionnaire and open-ended discussions. The sample was drawn from the following three groups: Group One consisted of 28 Middle Eastern embassy officials, economic attaches, and spokespersons in Washington D.C. Group Two consisted of 28 financial, economic, and corporate individuals residing in the Middle East who are active in strategic alliances with U.S. based firms. Group Three consisted of 28 Middle Eastern analysts, intellectuals and opinion-makers residing in the Middle East.

Middle Eastern technocrats' attitudes and concerns regarding the U.S. technology transfer process entails two overarching issues. The first dimension pertains to
external (U.S. supplier) related concerns such as U.S. Government export controls and policies, U.S. national security concerns, and U.S. Government assistance programs related to U.S. firms' export competitiveness in technology trade. The second dimension relates to internal (Middle Eastern recipient) countries' technology absorption capabilities.

Regression analysis revealed the significance of the aforementioned dimensions which affects the process of attitude formation and policy preferences of Middle Eastern technocrats. The results of the study validate the importance of the three external (supplier) export control dimensions and the internal (recipient) absorption capabilities of Middle Eastern countries relating to indigenous factors and constraints such as: available resources and oil revenues, human resources and skill formation, and social structure and modernization. Finally, the study highlights the importance of harmonizing OECD countries' export controls and creating local Middle Eastern Technology Mediating Centers to better facilitate U.S. technology transfer to the Middle East.
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CHAPTER I
INTRODUCTION

PROBLEM DESCRIPTION

Trends toward globalization are emerging and facilitating competitive opportunities for Western nations to transfer technology and trade to newly industrializing economies. Successful technology transfers from Western Europe, Japan, and the U.S. to the Middle East have the potential to enhance economic development, improve productivity, and raise the material standard of living of the region. (Ajami, 1989) The economic development priorities of the Middle East afford Western corporations opportunities to export know-how and to transfer technology to this region.

International business scholars and students as well as policy makers are beginning to recognize that the future direction of the international economy is being shaped by technocrats and leadership groups who are transforming their domestic and traditional societies into modern industrial systems. The technocrats’ policy orientations and visions coupled with the role of technology in economic growth and transformation are essential elements for successful
technology transfers from highly industrialized economies to newly industrializing economies.

The supplier and recipient nations' ability to manage the technology transfer process is part of this inquiry. This study specifically addresses the technology transfer relationship between the U.S. and a number of selected Middle Eastern nations. The challenge corporate America faces in penetrating the Middle Eastern market will be exacting. U.S. government policies regarding technology trade and transfer to the Middle East could be restraining the competitiveness of U.S. corporations. U.S. public policies are traditionally far more restrictive than other Western nations'. Politics appear to be jeopardizing U.S. corporations' trade potential to the Middle East. European and Japanese policies are far less restrictive. Thus, they are the forerunners in providing developmental assistance and combining governmental leadership and economic diplomacy.

The U.S. Office of Technology Assessment (OTA) reported that U.S. government programs designed to promote the representation of U.S. business abroad, including both high-level trade missions and routine representation by the Foreign Commercial Service, have been comparatively weak when compared to other OECD programs. Furthermore, the report states that U.S. policies affecting technology
transfer are distinguished from those of other Western supplier nations by the expansion of controls on exports. (CTA, 1984) National security and nuclear nonproliferation controls have been effective in eliminating exports of military equipment and slowing nuclear weapons proliferation, but there is less agreement regarding controls on nonmilitary transfers. i.e. commercial transfers. It is feared that controls on nonmilitary technology or dual-use technologies may have a crippling effect on U.S. exporters and could serve to further inhibit trade to the Middle East.

The challenges confronting the Middle Eastern recipient nations are equally vexing. Technology acquisition is a mechanism through which the Middle Eastern economies are able to expand their limited indigenous technological base. Technology transfer linkages with the West serve as the springboards which can thrust the lagging Arab economies into the modern global economic and industrial global system. However, the availability of this technology is subject to a host of export controls set by supplier nations. Furthermore, the technology transfer acquisition process is limited by a set of indigenous factors relating to the oil sector, the skill of the labor force, and the process of modernization and social change.
The Middle Eastern technocrats act as mediators between their societies, economies and Western commercial exporters. The technocrats' ability to explain the outside world and the place of their society in it naturally varies for different countries, but the more "open" a society is, the more constraints there are for the technocrats in defining a legitimate set of foreign economic policies. On the other hand, a relatively "closed" society augments the technocrats' strengths and abilities to bring about economic growth and development. It is also important to note that the technocrats do not stand completely apart from their societies. Their views are shaped and formed by images rooted in their cultural environment and should not be viewed in total isolation from those of the rest of the citizenry.

PURPOSE

Assessment of Middle Eastern technocrats' attitudes (i.e. Middle Eastern economic, business, and governmental decision-makers and Middle Eastern intellectuals and opinion-makers) towards technology transfer to the Middle East is the focus of this study. For the purpose of this study, the Middle Eastern region has been limited to Arab speaking and newly industrializing countries of the Middle East. Therefore, the following countries are included:
Egypt, Tunisia, Libya, Algeria, Morocco, Jordan, Syria, Kuwait, Saudi Arabia, Oman, Lebanon, United Arab Emirates, Qatar, and Bahrain. Iran and Turkey have been excluded since neither are Arabic speaking countries. Israel has also been omitted since it is an industrialized county that is more technologically advanced than its neighbors.

The purpose of this study is to explore, describe and to present an assessment of the Middle Eastern technocrats' attitudes towards: U.S. federal export controls on technology transfer to the Middle East, U.S. national security measures, U.S. government assistance programs and local Middle East technology absorption capabilities.

The fundamental research question guiding this study is whether Middle Eastern technocrats believe that technology trade and U.S. goods and services exports are successfully penetrating the Middle East market. (Saudi Arabia, Kuwait, Egypt, among others) The purpose is to ascertain whether or not U.S. policies and controls are negatively impacting the growth of economic and commercial trade between the U.S. and the Middle East. The technology transfer process to the Middle East is impacted by external factors to the region (i.e. U.S. Government exporting controls and licensing procedures) as well as by internal constraints and bottlenecks of the selected Middle Eastern countries (i.e. the oil sector, human resources availability, and
modernization and social change.)

JUSTIFICATION OF THE PROBLEM

The research is significant because it fills a void in the literature on technology transfer. Prior research on technology transfer has focused on economic growth factors, but only in the context of the recipient country. This study maps out the restrictions set forth by the supplier governments as well as the indigenous and local constraints of recipient Middle Eastern countries.

The results of this research could allow for the shaping of a new policy framework for U.S. government controls as they relate to and impact Middle Eastern recipient nations and corporate America. It could further shed light on the emerging notion of joint support for corporate policies by the federal government. The new framework could embrace synergistic linkages between U.S. federal controls and regulations as well as U.S. corporate policies and technology in global industries. The study has policy implications for U.S., European, and Japanese policy-makers as well as Middle Eastern technocrats as they attempt to regulate and promote international economic linkages through technology trade, investment and strategic alliances in the Middle East.
The research is timely in that Japanese and European multinationals are impacting the competitive position of U.S. based multinationals in the Middle Eastern market; a region of significant importance as a source of energy supply to the United States. The Middle East, with Saudi Arabia and Egypt leading in imports, is a major importer of machinery and equipment; and the U.S. is the region’s primary trading partner. Japan is the next largest trading partner to the Middle East region. (The European community collectively accounts for the largest share after the U.S.) It is important to note that the Middle Eastern countries are major importers of farm products, telecommunications, and computer equipment. Thus, exports to the Middle East account for a substantial portion of total U.S. exports. U.S. exports to the Middle East in 1991 amounted to $19 billion. (Stork, 1991) At its zenith, during the mid to late eighties, U.S. exports to Arab countries were as high as $23 billion. Total Middle East trade increased at an average annual rate of 15% from 1973 to 1984; as opposed to 5% for world trade.

Currently, 66% of proven oil reserves are within OPEC’s thirteen mostly Arab states. The three Arab countries with the largest proven reserves are Saudi Arabia, Iraq and Kuwait with 255, 100 and 94.5 billion barrels respectively. In contrast, U.S. oil reserves are estimated at 42.4 billion
barrels. In 1991, U.S. daily oil consumption stood at 17.2 million barrels daily, whereas domestic oil production only accounted for 7.3 million barrels daily. U.S. oil import dependency, estimated at 58% in 1991 is likely to increase to over 70% by the mid 1990s. The ability of Arab oil producers to significantly expand oil production in a short period of time further highlights their importance, particularly to a petroleum dependent country such as the United States.

As the world economy grows, so will the need for Middle Eastern oil. In order to keep up with the market demand, the present OPEC oil production of 20 to 21 million barrels daily will have to reach 33 million barrels daily by 1995. Non-OPEC oil production cannot fill this demand; thus oil prices and revenues are likely to rise again which will in turn fuel the growth of technology trade. Therefore, it is clear that the Middle East is of vital commercial and strategic interest to the U.S; not just for oil, but for its export market potential as well.

RATIONALE FOR TECHNOCRATS' ATTITUDE ASSESSMENT

The role and importance of technocrats in global economic linkages is a theme which has been explored by the following international business scholars: Vernon, Fayerweather, and Ajami among others. Vernon, in the
Over the Multinationals, writes that the subject of global economic linkages:

"Engages the values, the fortunes, and the psyches of some of the most powerful leadership groups in the modern society—businessmen, politicians, intellectuals, and poets" (Vernon, 1977)

Similarly, Fayerweather emphasizes that the future evolution of the global economy:

"Will depend to a large degree on the policy decisions of host nations made essentially by leadership groups." (Fayerweather, 1972)

Ajami further articulates the importance of technocrats' leadership positions in managing their societies' economic growth and transition:

"The central and strategic role played by elites highlights the importance of their attitudes: the images they hold of the outside world, the policies that they favor, and their conception of what an efficient and working economic system looks like." (Ajami, 1979)

Studies by social psychologists have long established the relevance and significance of attitude research. Attitude measurement is but one research tool by which researchers can begin to understand how individuals and societies resolve conflict, exercise values, and view others. Harry Triandis, a social psychologist, extends a compelling rationale for conducting research in the affective domain:
"We form and develop attitudes in order to understand the world around us, to protect our self-esteem, to adjust in a complex world, and to express our fundamental values." (Triandis, 1971)

Triandis also comments that if we are to live in harmony and have the capability of solving contemporary global problems, we must learn to bridge the barriers which create conflict. (Triandis, 1971) Attitude research serves as a building block in understanding and probing this phenomena.

This research emerged out of four basic beliefs that:

1. The understanding of attitudes is meaningful especially in an increasingly interconnected and interdependent world. The attitudes of select groups, in this case Middle Eastern technocrats, can influence the global economic options and choices of Middle Eastern society.

2. The potential future increase of global international linkages, especially in newly industrializing economies, is subject to the values, beliefs, and orientations of technocrats.

3. Research on Arab technocrats’ attitudes is reasonable and worthy given the influence the Arab oil producing states have over energy resources which are needed by both developed and less industrialized economies.

4. In order to manage and sustain their society’s economic productivity, growth, and transformation, the Arab technocrats must balance the aforementioned external (supplier-related) and internal (recipient-related) issues governing the technology transfer process.
A study of Middle Eastern technocrats’ attitudes will provide a data measurement of their values and beliefs which can guide and perhaps shape future technology transfer policy issues relating to economic transformation and growth. Furthermore, to the best of my knowledge, the literature on the Middle East does not treat these issues in any systematic fashion.

RESEARCH QUESTIONS AND TENTATIVE PROPOSITIONS

In trying to assess Middle Eastern technocrats’ attitudes towards and knowledge of U.S. technology transfer policies and constraints, the study explores the following issues:

1. The process of attitude formation among Middle Eastern technocrats and its principle sources, i.e. U.S. federal export control policies, U.S. national security concerns, U.S. government assistance programs, and technology absorption capabilities.

2. The population’s (Middle Eastern technocrats) knowledge of U.S. Government export control policies which restrict technology transfer to the Middle East.

In order to probe the first issue, the study pursues a measurement and interpretation of the weight and importance of four variables to the process of Middle Eastern technocrats’ attitude formation toward U.S. technology transfer to the Middle East. The following variables are explored and described:
1. U.S. federal export control policies
2. U.S. national security concerns
3. U.S. government assistance programs
4. Technology absorption capabilities of the Middle Eastern recipients

It is postulated that these variables are significant in determining the Middle Eastern technocrats' attitudes towards U.S. technology transfer to the Middle East.

In order to explore the second issue concerning the technocrats' knowledge of U.S. export policies and controls regarding technology transfer, a set of true/false questions was constructed and administered. The knowledge test produced a hard-data measurement of the population's knowledge of U.S. government export controls which restrict technology transfer to the Middle East. (A score of five out of eight on the true and false test indicates a significant knowledge of the issues surrounding technology transfer to the Middle East.)

It is postulated that the population is well-informed (based on the true/false questionnaire) and therefore has an informed knowledge-based attitude towards U.S. policies and controls regarding technology transfer to the Middle East. The knowledge items were derived from a review of the literature on United States-Middle East technology transfer linkages.
The variables were chosen based upon a review of the literature on technology transfer to the Middle East. The OTA report suggests that technology transfers raise important policy issues for two reasons, first, because supplier governments sponsor programs involving transfer and therefore have an interest in their efficient operation, and second, because decisions about transfer taken by private firms could sometimes run counter to broader national foreign policy goals. Supplier firms may use their revenue from technology trade to increase their production capacity, begin new marketing endeavors, and expand R&D efforts. These exports benefit U.S. firms and the American economy. (OTA, 1984)

TENTATIVE PROPOSITIONS

Proposition One:

U.S. federal export control policies have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

Proposition Two:

U.S. national security concerns have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.
Proposition Three:

U.S. government assistance programs have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

Proposition Four:

Middle Eastern societies' technology absorption capabilities and limitations have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

DEFINITION OF TERMS

Attitude is constitutively defined as a description of a person's complex set of beliefs, feelings, and behavioral tendencies about another person or thing. (Norland, 1991) Prushansky defined attitude as: "A structured psychological tendency toward" some object which consists of cognitive, affective, and behavioral components. (Prushansky et al, 1965) Smith defines attitudes as, "Inferred positions around which an individual's thoughts, feelings, and action tendencies toward an object are organized." (Smith, 1968) Thurstone advanced the definition of attitude as, "The sum total of a man's inclinations and feelings, prejudices or bias, preconceived notions, ideas, fears, threats, and convictions about a specific topic." (Thurstone, 1928)
Attitude, for the purpose of this study, is operationally defined as an individual’s mean score on a 16 item five point Likert-type scale.

**Knowledge** is constitutively defined as:

"A structure of concepts and relations built by reflective thought out of information received. Any experience of participation, observation, reading, or thinking can become part of a person’s knowledge. It will become part of that knowledge if he or she thinks about it, and understands it." (Ebel, 1990)

The cognitive domain includes: knowledge, comprehension, application, analysis, synthesis, and evaluation. (Bloom, 1984) The cognitive domain includes the recall or recognition of specific facts, procedural patterns, concepts, and universals that serve in the development of intellectual abilities and skills. (Wolansky, 1985)

Knowledge is operationally defined as the total score on an eight item true/false test.

**Technology Transfer** is defined by the OTA as a process involving a supplier and recipient; whereby, the recipient attains, as a result, an improved capability to operate an industrial production facility or service system.

Technology transfer involves:

1. Technology trade—the provision of technology by supplier to a recipient through commercial transactions.
2. Technology absorption—the use of technology by the recipient; e.g. in operating and maintaining a manufacturing facility. (OTA, 1984)

U.S. Export Controls towards the Middle East reflect two themes: Ensuring oil supplies to the West and promoting the economic and social development of Middle Eastern countries. According to the U.S. Office of Technology Assessment, U.S. policies have placed increasing emphasis on military and security issues rather than on commercial interests during the last two decades. (OTA, 1984)
RESEARCH APPROACH AND METHODOLOGY

THE POPULATION STUDIED

The population in this study is representative of the following three groups:

1. **Group One** consisted of: Middle Eastern Government policy-makers and their representatives, economic attaches, and spokespersons from the Middle East.

To measure the attitudes of this group, the sample consisted of twenty-eight Middle East embassy officials in Washington, D.C. Two representatives from the following fourteen embassies are represented:

The Gulf Cooperation Council (GCC):

- United Arab Emirates
- Kuwait
- Bahrain
- Saudi Arabia
- Qatar
- Oman

North Africa:

- Morocco
- Libya
- Tunisia
- Algeria
- Egypt

As well as:

- Jordan
- Lebanon
- Syria
2. **Group Two** consisted of: Financial and economic experts, bankers, and Middle East business persons and entrepreneurs as well as corporate spokespersons of Middle East companies who are linked in a joint venture or strategic alliance to a U.S. based firm.

To measure the attitudes of Group Two, the sample consisted of twenty-eight individuals residing in the Middle East who are active in joint ventures or strategic alliances. The sample was drawn through content analysis of *Middle East Economic Digest* for the years 1987, 1988, 1989, 1990, and 1991.

3. **Group Three** consisted of: Middle Eastern intellectuals, opinion-makers and analysts at regional Arab economic organizations. i.e. The Arab League and Arab Universities.

To measure the attitudes of Group Three, the sample consisted of twenty-eight participants who were selected through content analysis of *Who’s Who in the Arab World*.

**INSTRUMENTATION**

The attitude assessment of the eighty-four participants was generated through the administration of a cross-sectional survey which was based on the completion of a structured questionnaire and in-depth interviews in Washington D.C., Jordan, Tunisia and Egypt. The purpose was to elicit the population’s feelings, concerns, and knowledge about the salient issues surrounding policy controls affecting technology transfer to the Middle East. This was accomplished by giving each respondent a 16 item questionnaire which was assembled by relying upon the review
of literature on U.S. policy controls and technology transfer. To measure attitude, the respondents were asked to indicate whether they disagree or agree with the following scales: U.S. federal export controls, U.S. national security, U.S. government assistance, and technology absorption. The cognitive measure of knowledge of U.S. export controls was obtained through an eight item True/False test.

The three sites in the Middle East were chosen for the following reasons: Egypt is the most populous Arab state and Cairo is the headquarters of the Arab League. Egypt is also a relatively open society where researchers can probe and ask questions and expect answers. Amman, Jordan and Tunis, Tunisia are also open societies which are quite receptive to researchers' questioning. Other important Middle Eastern countries such as Saudi Arabia, Kuwait, and Libya are less receptive to researchers attempting to probe into salient economic, social and political matters.

The questionnaire is written in both English and Arabic. The Arabic questionnaire was produced using back translation and 96 percent of the respondents answered using the English version. Furthermore, after the administration of the structured questionnaire, the respondents were asked to freely comment on the issues and concerns in an open-ended fashion. "Arab norms of hospitality and the general
orientation of the culture toward face-to-face exchange and discussions are important factors that no researcher can overlook. Individuals hesitant to express their honest reactions on paper will be much more open in personal discussions." (Ajami, 1979)

The construction and refinement of the 16 item attitude assessment scale utilized the Delphi technique method. Eight knowledgeable experts on Middle East economic development represented the pool of participants who supplied 25 items. The participants were asked to rank order these 25 items according to salience and importance. Consensus emerged regarding the 16 items employed in this study.

STATISTICAL METHODS

Multiple regression was utilized to test the proposed relationships for any significance of the four determinants on the technocrats' attitude toward U.S. technology transfer controls and policies. In addition, frequency distribution tables were tabulated to trace dispersion and convergence among the population.
SCOPE OF THE STUDY

The study consists of five chapters. Chapter one is introductory and sets the tone, establishes the parameters, maps out the assumptions, and justifies the significance of the study. It underscores the importance of Middle Eastern technocrats’ role in international business, gives a rationale for attitude research and postulates the tentative propositions. Chapter two comprises a literature review where the US-Middle East technology transfer process and its significance for the global economy is examined. It also contains an overview of the internal and external factors relating to economic and socio-political issues governing the technology transfer process. Chapter three consists of a review of the literature on attitude research and expands on the methodology used in this inquiry. Chapter four presents the findings and interpretations of the attitudes of Middle Eastern technocrats towards U.S. technology transfer policies and constraints. Chapter five concludes the study and offers recommendations for future research.
CHAPTER II

LITERATURE REVIEW AND TECHNOLOGY TRANSFER ISSUES

Economists and international business scholars, Chenery (1955), Hirschman (1958), Rostow (1960), Kuzents (1973), Johnson (1975), Galbraith (1979), Brooks (1980), Porter (1985), and Hughes (1991) among others, have long established that technology accompanied by an inflow of finance, organizational skills, and knowledge stimulates industrialization and global economic growth and development.

Hughes attributes between 40 to 60 percent of economic growth to technology—defined to include organizational change as well as new products or processes. He also suggests,

"For many developing countries, the impact has been even far greater as new techniques were inextricably tied up with the development of markets, new economic institutions, and government bureaucracies." (Hughes, 1991)

In his work, Competitive Advantage of Nations, Michael Porter states:

"A firm, as a collection of activities, is a collection of technologies. Technology is embodied in every value activity in a firm and technological change can affect competition
through its impact on virtually any activity." (Porter, 1985)

There is a general consensus that technology transfer accelerates the process of import substitution and export promotion more efficiently than indigenous entrepreneurs could achieve on their own. Gee suggests that technology diffusion enhances technological innovation by creating opportunities for these products to be applied to new uses; increases the utilization of the existing scientific and technological base, lowers technical and commercial risks associated with innovation by expanding the potential market for them; and shortens the time frame for further innovations. (Gee, 1981)

Technology transfer is notably a decisive element in the industrialization process since it allows developing economies to leap-frog into a modern and global industrial system. Newly industrializing economies are restricted in the ways in which they can secure new technologies. Often times, these economies are limited by indigenous constraints relating to inadequate core industrial and technical bases, low volumes of domestic demand, and unskilled technical and managerial human resources. Furthermore, the modest size of their markets makes it economically infeasible to design products or to support research and development on a large scale. Thus, the only sound choice technocrats have in gaining new technologies—when inventions are not possible—
is to buy it or borrow it.

Increased access to technology alone, however, does not directly lead to economic growth. Baranson writes:

"Undeveloped areas find themselves in the basic dilemma of neither being able to utilize foreign technology effectively, nor having the resources and capabilities necessary for conversion [of foreign technologies]." (Baranson, 1969)

Technology transfer is usually analyzed in the context of four interrelated themes: inappropriateness of technology—in relation to factor endowments, restricted availability of technology, the cost of technology, and technological dependence.

The "inappropriateness" of imported technologies to newly industrializing economies, given relative factor endowments, the limited infrastructures for substituting labor intensive for capital intensive technologies, and socio-cultural barriers to adapting to technological innovations all contribute to the inability of developing economies to reap the potential benefits of imported technology. (Ajami and Arch, 1990; Baranson, 1969; Doe, 1984; and Bienfield, 1984)

The inappropriateness of technology arises from what Helleiner has termed "technological fixity" or factor substitution inflexibility in the production process; which leads to a relatively higher level of capital intensity than warranted given the factor endowment of the developing
country. (Helleiner, 1975)

The issue of technological dependence is surrounded by skepticism because it is feared that technology transfer will result only in a marginal gain in the recipients' scientific and technical proficiency.

Galbraith further cautions that technology and economic growth come at the expense of ideology. He states in his work, *The New Industrial State*, "The imperatives of technology and organization, not the images of ideology, are what determine the shape of economic society...We are becoming the servants in thought, as in action, of the machine we have created to serve us." (Galbraith, 1979)

In contrast, Brooks advances a broader view of technology which echoes Galbraith's concerns but not his tone:

"It has been traditional to define technology in terms of its physical embodiments, as novel physical objects created by man to fulfill certain human purposes...this is too limited a view and one that is becoming increasingly obsolete...technology must be sociotechnical rather than technical, and a technology must include the managerial and social supporting systems necessary to apply it on a significant scale." (Brooks, 1980)

The following framework advances a conceptualization of the technology transfer process which captures the prevalent duality which exists between U.S. technology suppliers and select Middle Eastern recipients.
ECONOMIC GROWTH AND COMPETITIVENESS

TECHNOLOGY TRANSFER

<table>
<thead>
<tr>
<th>INTERNAL (recipient)</th>
<th>EXTERNAL (supplier)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous factors &amp; constraints</td>
<td>Technology transfer and availability</td>
</tr>
<tr>
<td>1. Available resources &amp; funds (oil) revenues</td>
<td>1. Supplier conditions &amp; restrictions (export policies &amp; controls)</td>
</tr>
<tr>
<td>2. Human resources - skill formation</td>
<td>2. Linkage strategy i.e. licensing</td>
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<tr>
<td>3. Social structure &amp; modernization</td>
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</table>

Figure 1: Economic Growth & Competitiveness
An integrated global economy could create export opportunities and provide access to technology and capital for newly industrializing economies. The conditions and terms under which that access can be secured and successfully negotiated, necessitates balancing internal and external technology transfer factors. The process of bargaining and negotiating for technology need not weigh on the unevenness of power between suppliers and recipients. The technology transfer process is not a hopeless match for Middle Eastern technocrats nor should it be an area of contention for the U.S.

The technology transfer process requires striking an accommodating balance between the parameters set by the industrializing nation’s own internal social, political, and economic infrastructure and the external limits and constraints which the supplier-nations or firms must adhere to. Integrating both internal (recipient-related) and external (supplier-related) issues could create obstacles, barriers, and misunderstandings in the technology transfer process which both sides ultimately have to manage and overcome.

Successful technology transfer has significant implications for the supplier nation’s competitive position in the global economy and the recipient nation’s economic productivity and development strategies.
TECHNOLOGY TRANSFER MECHANISMS & DEVELOPMENT STRATEGIES

The channels through which technology is transferred are diverse. Hughes writes, "A great deal of technology has come through foreign trade, licensing agreements, and foreign direct investment. Particularly in the case of foreign direct investment, technology came in the forms of know-how, manufacturing techniques, and organization." (Hughes, 1991) Beyond these three channels lie at least two more mechanisms through which technology is transferred. They include, strategic alliances and turn key operations. All five forms of global technology transfer are outlined below.

1. **Technology Trade**—Through importing and exporting, technology is "embodied" in these transferred products and services from supplier countries and firms to recipient ones. The "embodied" technology could be difficult to disassemble or "unpackage"—for some countries—given the recipients limited commercial and technological infrastructure. Furthermore, supplier firms are often limited as to what they can export due to export regulations and controls set by their home government.

2. **Licensing**—The recipient or purchaser of technology gains the right to operate or market a process or product technological innovation. Frequently these contractual
agreements are characterized by many restrictions and limitations.

3. **Turnkey Operations**—The foreign company starts up a production facility in the host country and then turns its operation and technological know-how over to the host country nationals to control and operate.

4. **Foreign Direct Investment**—A foreign firm begins production using its technologies in a host country and maintains considerable control over all aspects of the operation. Johnson highlighted three areas where the foreign multinational can spur significant economic growth for the host nation. First, through the training and development of technical, skilled, and professional human resources; second, through "input-output" activities or "backward-forward" linkages with local producers and users; and third, through the "spill-over effects" which, despite being uneven in impact, are likely to result in economic and technological growth for the host country. (Johnson, 1975)

In any event, the corporation must assume responsibility to the social system in which it operates, and must consider many strategic and social issues.
5. **Strategic Alliances**—A contractualized linkage is formed between a foreign company and local, private or public sector entities. A value added chain is created when foreign multinationals bring in technology know-how and a host recipient supplies other needed factor inputs. Technological transfer and know-how is acquired by the host country participants over the life of the strategic alliance.

These technology transfer mechanisms and development strategies have no prescribed formula for success. There are general areas of conflict and convergence between technology suppliers and recipients. These define and establish the broad context within which U.S. technology suppliers and Middle Eastern technology recipients find themselves.

The next section focuses on specific aspects of U.S. export controls and constraints which impact U.S. trade competitiveness. Secondly, technology transfer policies are examined and related to the external trade position of the newly industrializing economies of the Arab world. Arab economic development is examined from the perspective of the region's economic opportunities and constraints. The variables related to the region's economic growth and prospects are conditioned by the ability of Arab economies and societies to absorb the acquired technology (internal)
which in turn will be influenced by U.S. government technology transfer policies and controls (external).

**U.S. TECHNOLOGY TRANSFER CONTROLS AND REGULATIONS**

The U.S. government employs a host of controls and regulations which restricts the sale of certain products to countries designated as proscribed. The U.S. Department of Commerce oversees export controls which regulate the transfer of goods and services which are both commercial and military in scope.

The Bureau of Export Administration (BXA) within the U.S. Department of Commerce, administers controls on "dual-use" products and technology. The term "dual-use" refers to commercial goods which have potential military applications i.e. chemicals, computers, fertilizers, and machine tools. The BXA’s list of export controls is authorized through the Export Administration Act (EAA). Though the EAA expired in September 1990, it is still being sustained under the authority of the International Economic Emergency Powers Act (IEEPA) until it is renewed.

**Historical Overview: U.S. Technology Transfer and Export Control Actions and Policies—since World War II**

**1949—The Export Control Act of 1949**  
Congress authorized the President to regulate exports for reasons of foreign policy, national security or short supply. **NATO**-formed to defend and protect Western Europe
1950—COCOM—The Coordinating Committee For Multilateral Export Control
The United States and 6 European countries: Belgium, France, Italy, the Netherlands, Luxembourg, and the United Kingdom formed COCOM--an informal, non-treaty organization.

COCOM was instituted as a mechanism for cooperation on embargoes. All COCOM rules required unanimous consent and all COCOM information was confidential. For example, the COCOM embargo lists. Exporters had to rely on their governments for information on what could be sold to embargoed nations i.e. China, USSR. Exporters often evaded the COCOM regulations which caused serious gaps in national enforcement practices (Luks, 1987)

1951—The Battle Act
The U.S. enacts the Battle Act which denied aid to any nation permitting exports of strategic materials to Eastern Bloc countries.

1953—The Export Control Act: Modified
Congress extended and modified the Export Control Act of 1949. Congress gave the U.S. Department of Commerce the primary regulatory authority for controlling exports. Eventually, most departments within the executive branch became involved with export controls. (Good, 1991) Luks points out that the multitude of agencies involved in export controls gives the Executive Branch an in-depth expertise, but it also causes delays, uncertainty and a lack of accountability. (Luks, 1987)

1969—The Export Administration Act of 1969
The Export Administration Act (EAA) was implemented to control exports of dual-use high technology products and commodities. The Act was updated and amended in 1979, 1981, and 1985 and expired in 1990. The EAA established the authority of the President to limit exports of technology for reasons of national security and foreign policy. (OTA, 1984)

1974—Increased Control for The Department of Defense
Congress expanded the Department of Defense’s role in export control regulation in response to the U.S. government’s reservations about technology transfer to the Eastern Bloc.
1976—Arms Export Control Act
This act authorizes controls over the commercial export of defense related products, services, and data described in the U.S. Munitions List*. These controls are primarily aimed at promoting world peace and national security. The act also reinforces certain foreign policy controls, such as withholding Munitions List items from countries that the Secretary of State has identified as repeatedly supporting acts of international terrorism.

*The U.S. Munitions List, published by the State Department describes the types of arms, and munitions, and implements of war; as well as, related services and technical date subject to export controls. (General Accounting Office, April 1991)

This act gives the President sweeping authority to regulate international economic transactions to deal with threats to national security, foreign policy or economy of the U.S. The act has been directed primarily at six countries—Iran, Iraq, Nicaragua, South Africa, Libya, and Panama. (General Accounting Office, April 1991)

1978—Nuclear Nonproliferation Act
The Nuclear nonproliferation Act of 1978 is the principal authority for controlling the export of nuclear-related items. The Department of Commerce licenses dual-use items that may have nuclear applications, the State Department licenses items related to nuclear weapons. The nuclear regulatory Commission licenses exports of nuclear facilities as well as materials and parts that have unique nuclear applications. Finally, the Department of Energy authorizes the provision of technical assistance and information for nuclear technology to foreign countries. (General Accounting Office, April 1991)
1979—The Export Administration Act of 1979
This act as amended, expired in September 1990, but its provisions are continued by the Presidential Executive Order) "Under these provisions, the president is authorized to establish export controls on dual-use items for national security and foreign policy reasons. (General Accounting Office, April 1991)

1980—Congressional Hearings on Export Controls
The congressional hearings revealed a lack of coordination and resources in the enforcement of export controls. This set the precedent for a dramatic overhaul of the licensing system. During the Reagan Administration, export controls were expanded on high technology items in the interest of national security. (Good, 1991)

1981—COCOM Modifications
COCOM revised the International Control List and instituted an ongoing export control review process aimed at technology transfer and commodities.

1985—Export Administration Amendments Act of 1985 (EAAA)
This act represents a compromise not a consensus between government and business. Alexander Good, in his chapter in Technology Transfer in International Business, outlines the guidelines set by the EAAA.

1. It strengthened the decontrol process for commodities found to be available in face and in quantity to the Warsaw pact. This was done by creating the Office of Foreign Availability within the Department of Commerce and by giving decontrol authority to the Secretary of Commerce;

2. It established that non-COCOM countries with a control system "comparable in practice" to COCOM should be accorded COCOM equivalent status in export licensing matters;

3. It established tighter deadlines for the processing of license applications, especially for COCOM countries; and
4. It attempted to clarify jurisdictional boundaries within the Executive Branch, for example, giving U.S. Customs authority to investigate alleged violations of export controls overseas. (Good, 1991)

1987 - Bureau of Export Administration (BXA)
The BXA was established as part of the U.S. Department of Commerce to give high-level direction, focus and framework to carry out a comprehensive national export control policy. (Bureau of Export Administration, 1988)

1987 - Executive Order 12591 of April 10, 1987
"Facilitating Access to Science & Technology"  
The order includes provisions for establishing a technology-sharing program, an exchange of scientists and engineers between the private sector and federal laboratories, basic science and technology centers, and guidance with respect to international science and technology transfer. (General Accounting Office, May 1991)

1990 - Expiration of the Export Administration Act
The EAA expired on September 30, 1990. Until it is renewed, BXA controls are being maintained under the authority of the International Economic Emergency Powers Act (IEEPA)

The U.S. Department of Commerce maintains the authority to restrict exports, to establish licensing systems and to enforce the controls. (Stillman and Connaughton, 1991) The two foremost categories of controls which The U.S. Department of Commerce authorizes are:

1. **National Security Controls** - Items which can make a profound contribution to the military potential of certain "controlled countries" to the detriment of U.S. national security. (Stillman and Connaughton, 1991) Controlled countries have included the former U.S.S.R., the Peoples Republic of China, Iran, and Iraq. Periodically, the controls have been extended to free world countries as well. Dual-use items are often routed to controlled countries by way of intermediaries.
2. **Foreign Policy Controls** - These controls are designed to further U.S. foreign policy interests or to fulfill international obligations. Examples of controlled items include: missile technology, chemical weaponry, and aircraft. Most foreign policy controls relate to the broad issue of human rights, anti-terrorism, regional stability, and chemical and biological warfare. (General Accounting Office, April 1991) Table 1, (pg.37) describes the foreign policy controls applicable to Middle Eastern countries in 1990.

**THE U.S. DEPARTMENT OF COMMERCE**

The U.S. Department of Commerce is the main regulatory agency for controlling U.S. exports and reexports -- A controlled commodity previously exported from the United States to a foreign destination that is to be reexported from the foreign country requires approval from the U.S. government. (General Accounting Office, April 1991)

The U.S. Department of Commerce applies the national security controls and foreign policy controls in conjunction with a review of the Commodity Control List when they receive an application for export. The U.S. Department of Commerce considers the current foreign relations with the purchasing nation before granting an application and has full authority to revise any of its recommendations according to changes in the foreign policy of the importing nation. see Table 2, pg 38) This table reveals that the value of approved licenses for the exports of dual-use items to the seven Middle Eastern nations depicted decreased from $1.3 billion in 1987 to $8.9 million in 1990. A decrease in
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Table 2
Extent of Approved Applications for Exports of Dual-Use Items to Selected Middle Eastern Countries (Oct. 1987-1990)

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<tr>
<td>Approved</td>
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<td>307</td>
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<td>1,246</td>
<td>1,013</td>
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<td>Dollar Value</td>
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<td>$1,367,237</td>
<td>$1,181,317</td>
<td>$885,176</td>
<td>$4,895,199</td>
</tr>
</tbody>
</table>

the value and number of approved licenses occurred for Egypt, Jordan, Kuwait, Yemen, and Saudi Arabia.

Other government agencies have the authority to restrict and monitor technology in the areas in which they have specific expertise. These agencies include: The U.S. government—for exports of all munitions and military equipment, the Department of Defense, the Department of State, and the Department of Energy. (OTA, 1984)

**Departments Within the U.S. Department of Commerce:**

**Bureau of Export Administration (BXA)**

The U.S. Department of Commerce strives to make its export policy more clear and more effective for U.S. exporters. Therefore, in 1988, the Bureau of Export Administration (BXA) was created within the U.S. Department of Commerce to "...improve the federal government’s management of export laws, reduce administrative burdens on exporters, and enhance America’s export competitiveness." (Freedenberg, 1988) The General Accounting Office indicates that the BXA’s Office of Foreign Availability monitors foreign technology to identify domestic export controls that are no longer effective because comparable technologies are available in foreign countries. Furthermore, the Bureau’s Office of Industrial Resource Administration monitors foreign technology to assess the impact of:
1. Imports on national security
2. Foreign investments on defense-related industries
3. Department of Defense’s agreements on the U.S. industrial base, and
4. Foreign weapon development on defense preparedness (General Accounting Office, March 1990)

One of the most significant actions of the BXA is that it, unlike the previous system, distinguishes between export promotion and export control. Export promotion programs are governed by the Assistant Secretary for Export Administration, who is responsible for export licensing, technology and policy analysis and foreign availability determination.

The Assistant Secretary for Export Enforcement supervises the enforcement of technology transfer items. This department’s responsibilities include investigating possible law infractions, assessing diversion risks and enforcing anti-boycott provisions of the Export Administration Act. (Freedenberg, 1988)

National Technical Information Service (NTIS)

The NTIS collects and disseminates foreign scientific technical information regarding new research and developments obtained through agreements with hundreds of organizations. The monitoring is global and the information is used as a source for new ideas and to keep professionals abreast of the latest research in their fields. (General Accounting Office, March 1990)
International Trade Administration (ITA)

The ITA contains the following five offices which monitor foreign technology:

1. **The Office of Telecommunications**—monitors foreign technology to expedite the export of U.S. telecommunications equipment and services. The main focus is in fibre optics, digital switching, and cellular phones. The results are published in *U.S. Industrial Outlook*. The information is used in domestic and trade policy formulation and promotion.

2. **The Office of Aerospace**—monitors foreign technology in order to eliminate trade barriers and increase export opportunities for the U.S. aerospace industry. The information is used to measure trade performance and to help gauge U.S. industrial competitiveness. The information is published in *U.S. Industrial Outlook*.

3. **The Office of General Industrial Machinery**—monitors markets and promotes foreign trade efforts undertaken by the U.S. metal working industry. The technologies include computer controlled machine tools, metal cutting tools, welding and robotics. The information is used to support and enhance trade development and government activities i.e. Voluntary Restraint Agreements and the President’s Domestic Action Plan. The information is published in *U.S. Industrial Outlook*.

4. **The Office of Computers and Business Equipment**—supports trade analyses and promotion efforts undertaken by the U.S. computer and business equipment industry. The technologies include computer hardware and software. Market studies are available from the U.S. Government Printing Office and NTIS.

5. **The Office of Microelectronics and Instrumentation**—supports increased exports of electronic devices and instruments. Global monitoring efforts track the following technologies: microelectronics, semiconductors, medical equipment, and scientific instrumentation. Competitive assessments are published in *U.S.*
Industrial Outlook. The information is used for policy formation and trade promotion. (General Accounting Office, March 1990)

The Office of Antiboycott Compliance (OAF)

Since 1978, the OAF has enforced the antiboycott program which prohibits U.S. companies from:

- Taking or knowingly agreeing to take...actions with intent to comply with, further or support any boycott fostered or imposed by a foreign country against a country which is friendly to the United States and which is not the object of any form of boycott pursuant to United States law or regulation. (OTA, 1984)

Closely related to this provision is the Foreign Corrupt Practices Act (FCPA) which makes it unlawful for companies to pay bribes to foreigners while conducting business. (Aronoff, 1991) The OAF and the FCPA are two examples of how the U.S. links its foreign policy to its economic trade policies. U.S. businesses often cite these provisions as obstacles to sustaining international trade and economic competitiveness.

GAPS IN TECHNOLOGY COVERAGE AND COORDINATION

The General Accounting Office found that coordination among agencies and departments is limited and therefore many agencies are collecting similar information. Additionally, there is no central source which assesses all potentially significant technologies; thus, this situation allows gaps to occur in technology monitoring which can in turn impede
important developments and progress.

A final recommendation made by the GAO report is that more information on foreign technology policy should be made available to other agencies. Currently, there are projects underway to improve access to technological information, but they are modest in scope and limited in resources. One such technological advance is called gateways, which facilitates data retrieval. The report further suggests the separating of restricted and unrestricted information i.e. classified from unclassified and proprietary data from public information. (General Accounting Office, March 1990)

COCOM

In addition to the restrictions set forth by the U.S. Department of Commerce, U.S. exporters also must comply with the multilateral export control group known as COCOM or the Coordinating Committee for Multilateral Export Controls. COCOM formed in 1949 to restrict the availability of strategic Western technology to controlled countries. COCOM member nations include the United States and its NATO allies except for Iceland, Australia and Japan. (Stillman and Connaughton, 1991)

For forty years COCOM has controlled technology sales to the former Eastern bloc, but its mission is changing in order to restrict what administration officials view as the
new global threat: the spread of technology to make missiles and nuclear, chemical and biological weapons to countries such as North Korea, Libya and Iraq. (Auerbach, 1992) This shift in position is in response to improving East-West relations the strained North-South relations. In light of the hopeful events that have swept Eastern Europe and the former soviet Union, COCOM members have trimmed the controlled items list for these countries by 30 items and eased control on 19 other items. Furthermore, COCOM members are assembling a "core list" of controlled goods and technologies to replace the current one. The new list will only include items which are deemed critical to maintaining the strategic position of COCOM members. As of 1988, the House of Representatives consented to give Industry a representative voice in COCOM. The Omnibus Trade and Competitiveness Act of 1988 was amended by adding the following:

"For purposes of reviews of the International Control List, the President may include as advisors to the United States delegation to the Committee representatives of industry who are knowledgeable with respect to items being reviewed." (House of Representatives, 1988)

COCOM changes become effective when they are published in the Federal Registrar. (General Accounting Office, May 1990) The "core list" shows COCOM's commitment to relaxing controls on many export items. This, in turn, will help U.S. firms' exporting capacity as well as overall U.S.
competitiveness.

Stuart Auerbach reports that COCOM is expanding to include the former Soviet Union and its new aim is to widen the number of nations that will restrict the spread of advanced computers, machine tools, measuring devices and telecommunication equipment to countries that might use them in weapon or missile programs. Controlling chemical and biological weapons programs is more difficult because many of the materials and weapons used in their manufacture also are used to make everyday products such as fertilizers. (Auerbach, 1992)

Other potential new members include Poland, Hungary, and the Czech and Slovak Federal Republic; with COCOM membership these countries will be granted more favorable licensing treatment if they consent to COCOM's approved safeguards regarding the sale of strategic technologies. Gradually, COCOM members are easing controls on technology sales to their former adversaries in the East, but there is still controversy over the relaxing of controls on advanced computers and fiber optics for telecommunications networks. (Auerbach, 1992)

A serious weakness of COCOM is the actual enforcement of its controls. The U.S. Department of Commerce indicates that there has been a problem of weak enforcement of priorities set by COCOM. (Bureau of Export Administration,
1988) The United States is committed to instituting equivalent restrictions and penalties in all COCOM nations. Equivalent restrictions will prevent member COCOM nations which employ less and weaker restrictions from circumventing COCOM's overall mission of curbing strategic technology exports. The U.S. is also seeking the assistance of non-COCOM nation in the fight against technology transfer to unfriendly nations. (Bureau of Export Administration, 1988)

OTHER MULTILATERAL EXPORT CONTROL ORGANIZATIONS

The Australia Group is an organization consisting of twenty countries whose mission is to restrict the proliferation of chemical and biological weapons. The member nations share information on nations that are suspected of developing chemical or biological weapons. The Australia Group singles out individual countries as weapons producing countries where as the U.S. Department of Commerce does not. Instead of targeting individual nations, the U.S. targets regions in order to avoid the possible political ramifications which could ensue when indicating a certain country. (Farnsworth, 1991)

In addition to the Australia Group, there are two analogous associations which attempt to curtail the proliferation of technology that could enhance the development of weapons of mass destruction. These
organizations are the 12-nation Missile Technology Control Regime (MTCR) and the 14-nation Nuclear Suppliers Group (NSG).

TECHNOLOGY POLICIES RELATING TO FOREIGN DIRECT INVESTMENT

U.S. technology which is transferred through foreign direct investment (FDI) is subject to minimal restrictions. However, for national security reasons, FDI is prohibited or severely limited in such areas as nuclear power generating and broadcasting. Recent concerns over the growing amount of FDI in high-technology sectors prompted congress to enact the "Exon-Florio" provision (1989) as part of the Defense Production Act. The provision gives the President power to investigate proposed or pending mergers, acquisitions, and takeovers, by or with, foreign persons to determine their effects on national security. The President also has the authority to block takeovers of domestic industries by foreign entities. The Committee on Foreign Investment in the United States (CFIUS) has been delegated the authority to investigate on the President’s behalf. (Watson, 1991)

Underlying the issue of technology transfer controls and regulations towards the Middle East is an aberrant tension between political and economic interests within the U.S. as well as in the recipient Arab nations. U.S. policy-makers should strive to advance a comprehensible and
explicit policy which takes into account the mutual benefit of technology transfer to the Middle East. Under such a policy, the U.S. would be able to sustain its technological edge by engaging in international technology exchange and the Middle Eastern recipients and technocrats would be able to focus on technology absorption as an integral component of economic development.

**INTELLECTUAL PROPERTY PROTECTION**

The U.S. and most OECD countries have stringent enforcement of patent laws. Under the Paris Convention—for the protection of Industrial Property (1883), the U.S. along with 100 other nations agreed to set minimum standards of protection.

Its negotiation involved standardizing intellectual property rights in countries which had vastly different legal traditions i.e. Anglo/American, Latin/French and Germanic systems. At the onset, the varied legal systems wrangled over fundamental questions as to the acquisition of rights by foreigners and the recognition and enforcement of rights acquired abroad. (Ladas, 1930)

The convention ultimately negotiated to employ international property rights protection in areas where agreement could be reached without encroaching on municipal laws. This gave rise to the term "national treatment" which
has come to mean that a convention country will not discriminate against foreigners in granting patent or trademark protection. Rights may be greater or less than those provided under U.S. law, but the rights given will be the same as those which a country provides its own citizens. (Patent and Trademark office of the U.S. Department of Commerce, 1991)

The "Right of Priority" provides the inventor with an alternative to simultaneously filing applications in several member countries. The applicant is granted one year from the date of the first application filed in a convention country (six months for a design or trademark) in which to file in their home country. The Assembly of the International Patent Cooperation Union is implementing a number of changes to the regulation under the Patent Cooperation Treaty (PCT) which became effective July 1, 1992 in an effort to standardize, simplify and streamline the patent process. The standardized procedures are helping to maintain the inventor’s right to lay legal claim to his/her work on a world wide basis.

Another assembly designed to facilitate intellectual property rights is the Berne Convention for the Protection of Literary and Artistic Works. It has 80 member countries working together to address international copyrights. The U.S. became a member on March 1, 1989. Under the Berne
Convention, works created by a national of a member country are automatically eligible for protection in all member countries, without any additional registration. Computer programs are considered a literary work in the U.S. and several other countries. Unfortunately, many countries are not members which leads to an exorbitant volume of international pirating. (Patent and Trademark office of the U.S. Department of Commerce, 1991)

In order to block transfer of sensitive technology to proscribed countries, the U.S. prohibits filing patents outside the U.S. without first obtaining a foreign filing license from the Patent and Trademark Office. Applications are inspected for technologies that are on COCOM’s Commodity Control List.

The challenge for the future will be to bring newly industrializing nations’ legal systems into greater accord with the indispensable standards of the Paris Convention and the Berne Convention. Though stated in 1973, the following quote by a U.N. authority still represents an adequate description of the present dilemma:

"Accepting the fact that countries which are still in a state of industrial development cannot hope to be in the forefront of technological progress and innovation, the question is what system is most likely to be conducive to encouraging cooperation with countries which have years of mature development behind them." (United Nations, 1973)
U.S. GOVERNMENT ASSISTANCE PROGRAMS

The majority of U.S. assistance programs are administered through the Agency for International Development (AID) and the World Bank whose missions are to ensure that newly industrializing economies are able to sustain basic human needs. Development areas which are frequently granted assistance include: agriculture, rural development, population planning, health, medical service, education and nutrition.

The Official Development Assistance Programs (ODA) are typically a combination of loans and grants whereby the grant portion can be as high as 80% of the program value. The U.S. government enforces restrictions on how the funds can be employed; for example, the recipient country must use the funds to procure only goods and services from the U.S. (OTA, 1984) The assistance can be used towards the purchase of a wide range of commodities including agricultural products and strategic weapons among others.

Another example of a U.S. government supported assistance program is the Trade Development Program (TDP). This program is directed at middle-income developing nations. Its funds contribute to the recipient nation’s engineering, construction, and commercial design sectors as well as the design of feasibility studies and project planning services. TDP is a rather small program, but it is
one of the few which combines the goals of facilitating development assistance with trade promotion. The TDP policy only allocates assistance where the U.S. is internationally competitive, but where U.S. commodities are unlikely to be purchased without TDP intervention. The majority of assistance is granted in the industrial and agricultural sectors. (OTA, 1984)

Since Title V, on science and technology, and U.S. diplomacy, was introduced into the Foreign Relations Authorization Act of 1978, Congress has put forth a distinct effort in promoting U.S. assistance programs involving science and technology. The law stipulates that the President must report annually to congress as to the progress of science and technology programs and agreements. The legislation is designed to advance programs involving science and technology transfer as an component of U.S. foreign policy. (OTA, 1984)

U.S. assistance programs to the Middle East have typically made contributions in the areas of general products and agriculture with little emphasis going to technology transfer in the industrial and service sectors. (OTA, 1984) Most U.S. assistance to the Middle East is facilitated through the Economic Support Fund (ESF). ESF programs are designed to provide immediate assistance and may also be used for balance-of-payments support, financing
of infrastructure and capital projects, and commodity imports. Additionally, Public Law 480 is a U.S. government assistance program used to finance U.S. food exports; Egypt is the major recipient of these funds.

The U.S. has few policies designed to promote technology transfer in the private sector, but there are two which are noteworthy. First, the Overseas Private Investment Corporation supports loan guarantee programs; and second, the International Trade Administration (ITA) of the U.S. Department of Commerce, gives support primarily in the form of information to private industries that wish to penetrate and enter foreign markets. (Stillman and Connaughton, 1991)

In summary, it is evident that there is no consistent strategy for U.S. assistance programs in the area of technology transfer. Further U.S. assistance programs should be refocused to reflect a multilateral global effort. Vernon shares this view:

"The implications of the fact that technology cannot be easily locked onto any single national turf have not been assimilated in the minds of science policy makers anywhere in the world...If the fruits of our technological efforts must inevitably be shared, however, there is a case for encouraging joint national programs in the stimulation of technology rather than unilateral national efforts." (Vernon, 1987)
Furthermore, U.S. government assistance programs should embrace promotional programs to support exports by U.S. firms to the Middle East. This will help stimulate the developing economies in the Middle East and improve U.S. firms’ competitive position in the global market.

Government policy-makers and corporate decision-makers must begin to rethink the "ends sought" from the technology transfer process. A more encompassing understanding of the far-reaching ramifications of this process will uncover a mission statement which is two-fold. First, these two entities must jointly work to boost exports by removing or clarifying export constraints and barriers which are either government or corporate imposed. Second, the U.S. government and U.S. suppliers of technology must join the technology recipients in conceptualizing a comprehensive development strategy which considers the recipient nation’s current economic, social and political infrastructure as well as the long-term consequences of the technology transfer.

RELATIVE IMPORTANCE OF THE MIDDLE EAST MARKET

The nations of the Middle East indisputably have a unique political and economic influence on the United States--this includes both the state of Israel and the Arab oil states. In 1943, President Franklin D. Roosevelt
declared, "The defense of Saudi Arabia is vital to the defense of the United States." The underlying premise of his declaration implies that the purpose of any government is to defend and protect its national interests. Roosevelt’s decree also echoes of his recognition and understanding of the Middle East’s strategic importance in oil production for the industrialized world. Worldwide, 65 million barrels of oil are consumed daily. Furthermore, of the 17 million barrels daily that the U.S. imports, 59% comes from the OPEC nations with Arab OPEC supplying 3.1 million barrels. (Oil & Gas Journal, July 29, 1991) Energy requirements thus significantly impact technology transfer decisions to the Middle East. Several presidential administrations, Truman, Eisenhower, Nixon, Carter and recently Bush, prescribed "doctrines of intervention" aimed at the oil rich nations of the Middle East. "Two years after Iraq’s invasion of Kuwait, the United States has deepened its commitment to defending the oil-rich Arab states of the Persian Gulf through bilateral security agreements and is maintaining its largest-and most visible- peacetime military presence in the gulf." (Murphy, September 5, 1992) These measures were enacted to ensure and safeguard the United States’ interest in an uninterrupted supply of oil--coming from a region of political instability. The political, economic and social instability
of the Middle East creates policy complications for the U.S. which in turn complicates international trade with that region. Thus, the changing nature of U.S. Government policies on export controls needs to be continuously reassessed. The tremendous purchasing power concentrated in the oil producing nations of the Middle East highlights the importance of that region as a strategic trading partner for U.S. firms and economic entities.

Traditionally, the Middle East states have a balance of payment surplus and exercise few import controls. This renders the Arab nations as a potential, viable and fruitful export market for Western nations--namely Japan, Western Europe and the U.S. The United States’ exporting position to the Middle East is being challenged by other OECD nations. Historically, the U.S. has not aggressively pursued export markets; only 13% of the U.S.'s $5.5 trillion GNP is related to an outward oriented exporting policy (WSJ, March 12, 1991) and U.S. exports to the Middle East accounted for 3.47% of total exports in 1990. (compiled from the National Trade Data Bank-The Export Connection) U.S. export promotion programs are less extensive than competing OECD supplier nations--not only in terms of funding, but also in carrying out government-business linkages or agendas which nurture trade related "economic diplomacy." (OTA 1984)
The antecedents which govern technology transfer with the Middle East continue to shift over time. Conflict, within the region and outside the region provokes skepticism regarding economic linkages. Emery et al. substantiates this claim by stating:

"The pressure of regimes with widely varying ideological and political orientations, from revolutionary and fundamentalist Iran to radical Libya to the conservative monarchist states of Saudi Arabia and the Gulf, will continue to generate conflict both within and between nations...The realignment of relations with outside powers also is a potential source of discontinuity in trade and technology transfer." (Emery, et al., 1986)

U.S. technology transfer policies and linkages to the Middle East can be labeled as restrictive or regulative-promotional.

<table>
<thead>
<tr>
<th>ARAB COUNTRY TYPOLOGIES</th>
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<tbody>
<tr>
<td>ALGERIA</td>
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<tr>
<td>JORDAN</td>
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<td>LEBANON</td>
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| POLICY ALTERNATIVES | RESTRICTIVE | REGULATIVE-PROMOTIONAL |

Figure 2: U.S. Public Policy Controls on Technology Transfer Toward Middle Eastern Recipient Countries
Egypt, Tunisia, Morocco, Bahrain, Qatar, Oman, Saudi Arabia, Kuwait, and the United Arab Emirates could be labelled regulative-promotional whereas Iraq, Jordan, Libya, and Syria among others are considered restrictive. However, whatever the U.S. policies are, including the most restrictive group of countries, the transferred technology is nevertheless playing an essential role in the process of technological development and technological transformation; a process which is to propel the Arabs into an industrial age. (Ajami, 1986)

**ISSUES IN TECHNOLOGY TRANSFER**

Technology transfer is an issue which has received extensive treatment in the literature of both international and world development over the last two decades. Technology transfer includes the movement, licensing, sale, or technological agreement of goods or services of "higher" technology based countries to a recipient which can be either a newly industrializing country or an OECD country. For example, a Japanese car production technology sale to U.S. industrial plants is as much a technology transfer as a plant fertilizer sale by a U.S. company to Saudi Arabia. For the purpose of this study, sales or transfers between the U.S. and the newly industrializing states of the Middle East will be emphasized.
Before examining the variety of issues involved, it is important to understand the role technology is believed to play in the process of development. Most of the developing countries, especially in the Arab Middle East, are involved in a process of economic transformation and are deliberately pursuing the goal of rapid industrialization. From this position, they hope to achieve technological "self reliance" or technological "self sufficiency." There is an added push for the Arab Middle East States to acquire technology because of their dependence on oil—a depletable commodity. When oil eventually diminishes for some, or the demand for it by Western importers declines, the technocrats of these Middle Eastern nations do not want to see their economies grind to a halt. To achieve profuse growth from technology transfer alone, is placing a great deal of faith in technology transfer; such faith could complicate the relationship and long-term commitments and interactions between the supplier and recipient. Furthermore, the ability of alternative technology sources from OECD countries i.e. Japan and Germany vis a vis the United States, could add to policy choices and complications which often affect U.S. competitiveness in export markets.
TECHNOLOGY TRANSFER: CONCEPTUAL DEFINITIONS

In defining technology transfer, the Office of Technology Assessment (OTA) suggests that "technology is the knowledge needed to design, create, or implement a production process or the services related to the process." Furthermore, "technology is the specific application of scientific and technical knowledge to the production of goods and services." (OTA, 1984) In this study, technology transfer refers to a process involving two entities, a recipient and a supplier, whereby the recipient gains the capacity to improve the design of products, to operate a production site, or a service system. Technology trade refers to the provision of technology by a supplier to a recipient, whereas, technology absorption refers to the ability of the recipient to apply the technology in service or manufacturing operations. (OTA, 1984)

According to Gee, technology transfer is the application of knowledge to a new use or new user for economic gain. (Gee, 1981) Agmon and Glinow conceptualize technology transfer as being product-embodied, process-embodied, or person-embodied. That is, "technology transfer can be said to occur through the specific transfer of products, processes, or people." (Agmon and Glinow, 1991) This conceptualization goes beyond to suggest organizationally based dimensions--both governmental and
multinational firms. Thus the role of multinational firms as well as government policies of both recipient and supplier nations become intertwined and could significantly impact the technology transfer process.

Central to the concerns of both OECD suppliers and Middle Eastern recipients are political, economic, cultural, and global competitive factors. Resolving these issues will determine the success of the technology transfer process.

According to Emery et al., "technology transfer in the broadest sense must encompass indigenous technological capabilities sufficient to sustain economic performance in line with the host country’s goals." (Emery, et al., 1986) The successful transfer of technology necessitates nations to have comparable levels of technological advancement. Erdilek states, "The Middle East consists entirely of less developed countries...therefore, it is indisputable that the [Middle East’s] indigenous science and technology are relatively insignificant. (Erdilek, 1986) The nations of the Middle East are distinctive among less industrial nations in that they hold the majority of the world’s oil reserves. The oil revenues have generated substantial earnings for these nations to swiftly acquire sophisticated technologies and contemporary infrastructures. Their oil revenues have been the catalyst for unprecedented technological advancement. Emery et al. also recognize the
importance of oil to this region’s economic well-being. "The current economic climate in the [Middle East] is to a great extent a product of the past decade’s experience with surplus oil revenues. The economic transformation of most states in the region has been dramatic and rapid." (Emery et al., 1986)

Erdilek employs a two-part classification system using oil reserves and population size to contemplate the technology flows between Middle Eastern nations. Nations with an abundance of oil reserves and small populations include Kuwait, Bahrain, Libya, Oman, Qatar, United Arab Emirates (UAE), and Saudi Arabia. Technology transfer to these countries is capital and energy intensive with an emphasis on oil and petrochemical based industries. The economies of the oil producing states have relied to a large extent on imported expertise; both regional and international. These nations have historically used oil revenues to strategically invest in the foreign countries which they receive technology from.

The nations on the opposite end of the spectrum, those with scant oil reserves and large populations, include: Jordan, Lebanon, Syria, Yemen, and Egypt among others. Technology transfer to these countries has traditionally focused upon light manufacturing and agriculture.
Nations with large populations and large oil reserves usually follow a combination of the technology transfer schemes aforementioned.

Kaynak suggests that the receptiveness to technology transfer by Middle Eastern nations can be further classified by examining stages in market development. (Kaynak, 1986) Countries such as Saudi Arabia and Kuwait have well developed markets and are a stage one category. These nations are limited only by their absorptive capacities. In addition, the private sector plays a more important role in the technology transfer process.

The intermediate stage includes Iraq and Syria. These countries prioritize and emphasize industrial and infrastructure development rather than consumer market development. Government involvement in the technology transfer process with these countries is often high.

The growing stage countries include Egypt and Jordan. These countries lack the oil wealth necessary for rapid development. They also depend heavily on aid from other Middle Eastern and Western nations.

Technology transfer implementation is essential for the Arab states in order for them to successfully enhance economic development, improve productivity, and raise the material standard of living of the recipient. It is imperative, however, that the developing nation has an
infrastructure capable of absorbing the new technology. If not, they run the risk of severe imbalances within their social and economic systems.

**CONTEXT OF TECHNOLOGY TRANSFER**

OECD exports to the Middle East have fluctuated from a high of $101 billion in 1982 down to $47 billion in 1987 and $61 billion in 1991. OECD trade with the Arab Middle East has been subject to a great deal of fluctuations. The phenomenal growth rate of Middle Eastern imports following the oil price increases of the 1970s and 1980s has subsided. The late 1980s and early 1990s trade statistics indicate a relative decline in the Middle East economies’ abilities to sustain the large level of imports of the prior two decades. The three major suppliers have historically been the U.S., Germany, and Japan. The American export share to the Middle East for 1991 is $19 billion. The following figure reflects the distribution of Middle Eastern trade. See figure 3, pg. 66. As a result of the oil boom of the 1970s and 1980s, trade between Western economies and the Arab Middle Eastern nations has grown more rapidly than trade with any other developing region of the world. Total Middle Eastern expenditures increased at an average annual rate of 15% from 1973 to 1984, as opposed to 5% for world trade as a whole. Machinery and equipment exports of the major industrial
countries rose from less than $5 billion in the mid 1970s to about $44 billion by 1984.

Overall, Middle Eastern expenditures from OECD imports since the mid 1980s through 1991 have grown at an annual average rate of 6%. Currently, OECD exports to the Middle East are growing at a lower rate, but still remain higher than the average annual growth rate of world trade. During the early to mid 1980s, 1984 for example, Japanese exports to the region accounted for 11% of all Japanese exports. OECD exports to the Arab Middle East have often come to account for a meaningful share of the total exports of some of the major Western European economies.
MAJOR OECD SUPPLIERS TO THE MIDDLE EAST
(In Billions $)

United States $23
Germany $22
Japan $21
UK $10
France $10
Italy $15

Total Value: $101 Billion 1982

United States $19
Germany $12
Japan $11
UK $8
France $6
Italy $5

Total Value: $61 Billion 1991

Figure 3: Major OECD Suppliers to the Middle East
Source: Compiled by author from MEED, Middle East Insight, US Dept of Commerce
U.S. exports to the Middle East in 1990 and 1991 accounted for 3.47% of total U.S. exports and 4.03% respectively. The sectors of trade include: satellite communications, medical technologies, pharmaceuticals, aircraft and military goods.

The percentage distribution is comparable for other major OECD countries. It is widely estimated by the U.S. Department of Commerce that each $1 billion of exports accounts for 30,000 jobs. Therefore, approximately 570,000 Americans were dependent on Middle Eastern trade for their livelihood in 1991. Prior to the Gulf war, Germany and Japan have become two of the Middle East region’s major suppliers of industrial and consumer goods over the last two decades. In 1991, total exports from Germany to the Arab Middle East amounted to approximately $12 billion.

OECD trade with the region of the Middle East has been concentrated in Saudi Arabia and Pre-revolutionary Iran. The Arab market has been Germany’s largest export market outside the E.C. over the last decade with principle exports comprised of vehicles, machinery, and electrical goods. Japanese total exports to the region amounted to $21 billion in 1982. Japanese exports have continued to include industrial plant machinery, vehicles, and consumer electronics; whereas, U.S. exports have concentrated in advanced technology sectors i.e. satellite communications,
medical technology, pharmaceuticals, aircraft, and military goods.

THE WORLD OIL MARKET

Concentration of World's Oil Reserves

The present oil market represents a precarious oil imbalance. The Middle East's share of world oil and gas reserves stand at 66% and 31% respectively. The following table illustrates the region's overwhelming concentration of oil energy reserves.

Table 3
Oil vs. Gas
Who Has The Most

<table>
<thead>
<tr>
<th>Share of World Reserves In...</th>
<th>OIL</th>
<th>GAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East</td>
<td>66%</td>
<td>31%</td>
</tr>
<tr>
<td>Latin America</td>
<td>12.5%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Russia &amp; Eastern Europe</td>
<td>5.9%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Africa</td>
<td>5.9%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Asia*</td>
<td>4.5%</td>
<td>7.1%</td>
</tr>
<tr>
<td>North America</td>
<td>4.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Western Europe</td>
<td>1.8%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

*Includes Australia and New Zealand
Source: Fortune September 10, 1990
The proven oil reserves of the Middle Eastern countries are estimated at 660 billion barrels, with Saudi Arabia, Iran, Iraq, and Kuwait holding the dominant share. As of 1991, Saudi Arabia’s proven reserves are at 255 billion barrels. Iraq’s are at 100 billion barrels and Kuwait’s are estimated at 94.5 billion barrels. In contrast, U.S. reserves stand at 42.4 billion barrels and Russia and the Common Wealth of Independent States’ share accounts for 59.9 billion barrels. (see figure 4, pg 70)

World Oil Production

It is not surprising that the large concentration of oil reserves would also account for a significant share of world oil production. Saudi Arabia’s oil production output for 1991 was estimated at 8.5 million barrels daily. Their level of oil production was second only to that of Russia and the Common Wealth of Independent States which produced 9 million barrels daily--prior to the current upheavals in the Common Wealth of Independent States. Currently, Saudi Arabia is the number one global oil producer at 8.5 million barrels daily. The U.S. accounts for 7.3 million barrels daily. Iran stands at 2.9 barrels daily followed by Iraq and Kuwait at 2.8 and 1.6 million barrels daily. (Iraq’s and Kuwait’s oil output figure is pre Iraqi-Kuwaiti War) (fig.5)
WHERE THE OIL IS

Figure 4: Where The Oil Is
Proved reserves at year-end 1990, in billions of barrels

Figure 5: Major Oil Producers

*Pre Iraq-Kuwait war

**Compiled from Oil & Gas Journal and MEED
U.S. Dependency On Foreign Oil

Another feature of the oil imbalance is an increasing U.S. dependency on foreign oil imports from the Middle East. (See Figure 6, pg.73) U.S. foreign oil imports currently represent approximately 59% of our U.S. daily oil consumption (industrial and consumer sectors) which stands at 17.0 million barrels daily. By the year 2000, this figure is expected to rise to 65%. (Ajami, 1990)

Figure 7 measures the United States’ dependence on foreign oil imports from 1970 to 1991. (See Figure 7, pg.74)

Energy independence for the U.S. becomes less attainable as the nation continues to consume more oil, while producing less. Figure 8 (pg.75) illustrates the rise in U.S. oil consumption and the decrease in U.S. oil production. U.S. oil output stood at 11 million barrels daily during 1980 and has consistently declined since then.

Lower OPEC oil prices have forced out the marginal producers in the United States who can no longer compete with Middle Eastern producers whose average oil production costs are $2.00 per barrel where as U.S. oil production costs are about $10.00 per barrel.
WHERE THE U.S. GETS ITS OIL
Daily Average in Millions of Barrels of Crude
1991

Figure 6: Where the U.S. Gets Its Oil
Source: Compiled from U.S. Dopt. of Energy & MEED
U.S. DEPENDENCE ON IMPORTS

U.S. crude oil imports as a percentage of total domestic demand

Figure 7: U.S. Dependence on Imports

Source: American Petroleum Institute
Figure 8: The Oil Gap Widens

Source: Fortune, September 10, 1990 Up to 1989; 89-92 (first 6 months) compiled by author.
Furthermore, oil exploration and drilling activities by U.S. based oil multinationals have declined significantly in the U.S. The increasing U.S. oil dependency is painfully manifested by U.S. oil companies shifting their oil exploration and drilling activities to foreign sources. Between 1983-1987, the number of drilling permits issued per year have dropped 43% from 92,563 to 39,603. (Ajami, 1990)

Recently, from 1990-1991, there has been a partial increase in oil exploration in the U.S. measured by rig count. From 1986 to 1991, the numbers have increased from 610 active oil rigs doing oil exploration to roughly 1800. (Lippman, 1992) This increase, however, is well-below its high of 4,000 during the early 1980s.

Oil Prices

The present oil market is characterized by overproduction by OPEC members in the face of stable demand for oil. As a result, oil prices have fallen from their peak during 1980-1981 of $49 per barrel to a present level of $21 per barrel. (See Figure 9, pg.77) Continued stabilization of oil prices will depend to a large degree on the ability of OPEC countries to adhere to their quotas. The current overproduction in the oil market is a temporary phenomenon. In the long-run, demand will increase and prices will resume to their upward trends. The dependency of the U.S., the
U.S. CRUDE OIL IMPORT PRICES IN 1991 DOLLARS

Figure 9: U.S. Crude Oil Import Prices

largest single oil consumption market in the world, will continue to worsen.

The following table illustrates the dependency of OECD countries on imported OPEC oil, particularly the U.S., Japan, Germany, Italy and France.

Table 4

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OECD Countries</td>
<td>82</td>
<td>76</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Developing Nations</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Net Oil Exporters</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Net Oil Importers</td>
<td>11</td>
<td>13</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: compiled from OECD publications and BP Statistical Review of World Energy, various years

This dependency further heightens the risky nature of the oil imbalance between producers and consumers. In turn, it could increase the Middle East’s oil producers ability to influence and affect U.S. and OECD policies toward technology transfer to the region.

The imbalance in the oil market is likely to once again thrust OPEC oil producers into center stage in the world oil market. The OPEC oil producers, with the majority of them in the Arab Middle East, hold over 66% of known oil reserves and have the capabilities of expanding oil production from
its current level of 23 million barrels daily to about 32 million barrels daily within a short period of time as the following table indicates.

Table 5
OPEC Capacity
1990-2000
(million barrels a day)

<table>
<thead>
<tr>
<th></th>
<th>1990¹</th>
<th>2002²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>8.0</td>
<td>10</td>
</tr>
<tr>
<td>Iraq</td>
<td>3.5</td>
<td>3.5-5.0</td>
</tr>
<tr>
<td>Iran</td>
<td>3.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Kuwait</td>
<td>2.5</td>
<td>3.0-3.5</td>
</tr>
<tr>
<td>UAE</td>
<td>2.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Qatar</td>
<td>0.4</td>
<td>0.55</td>
</tr>
<tr>
<td>Libya</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Algeria</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>24.4</td>
<td>30.15-32.15</td>
</tr>
</tbody>
</table>

¹Figures for Kuwait and Iraq are pre-Gulf crisis
²Projected. Differences depend on oil price levels

Source: MEED, October 18, 1991

Significant oil finds outside the Middle East are highly unlikely within the next decade given present technology of the industry and the cost structure. Oil revenues of the Middle Eastern oil producers are likely to increase, thus allowing these countries to continue to purchase OECD technology and products.
Opec Oil Revenues and Prices

During the 1970s and early 1980s, oil prices increased dramatically as a result of OPEC’s position as the primary supplier of petroleum. In 1973, the benchmark price for Saudi Arabian light crude was $4.72. By 1974, it had risen to $19.52 and peaked in 1984 at $49. The price structure up until 1984 resulted in a large flow of revenues to OPEC members. For example, Saudi Arabia’s current account balance rose from $71 million in 1970 to $45.1 billion in 1980 and by 1983 had peaked at $62 billion. Revenues peaked in 1981-1983 along with the benchmark crude price which has since declined to an average of $19-$21 in August 1992. Saudi Arabian revenues have declined from $109 billion to $30 billion while total OPEC income has fallen from $247.6 billion down to $154 billion from 1981 to 1983. Saudi Arabia’s 1992 revenues are likely to be about $50 billion. Present oil price trends are expected to continue until the mid 1990s as major petroleum suppliers contend with an over supply of crude oil. The reentry of Iraqi oil as well as Kuwaiti oil will exasperate the over supply of crude oil prevalent in the oil market. However, by 1995, oil prices are likely to resume a more moderate and upward trend as discussed in the previous section.

The major factors which have contributed to declining oil prices over the last five years are: First, a worldwide
economic slow down during 1989-1991 severely impacted demand for oil; Secondly, a less noticeable and more long-term reduction in oil needs has resulted from conservation efforts among major Western industrial consumers; Thirdly, increased exploration and development of new petroleum sources in non-OPEC nations. New net oil producers over the last ten years have included China, Oman, Egypt, Zaire, and particularly the North Sea oil fields; and finally, the inability of OPEC to limit its production and over supply.

The cheating of OPEC members prior to the 1990 Iraqi invasion of Kuwait remains persistent and continuous. The result is an over supply of an average of 2 million barrels daily on the spot market for crude petroleum. The softness in oil prices has not allowed OPEC member countries a growing source of revenues--similar to the late 1970s and early 1980s time periods.

OPEC nations, as of 1992, are supplying only 1/3 of all oil sold in the free world; this is down from 2/3 in 1975-1983. As a result, they are no longer able to control petroleum prices. The downward price pressure on crude oil is expected to stabilize around $19-$21 per barrel throughout the early 1990s. The period from 1995 through the year 2000 clearly portends oil price increases. Declining oil discoveries in the U.S. have resulted in increased U.S. dependence on foreign oil particularly from
the Middle East. U.S. dependency on Middle Eastern oil will significantly increase.

The current economic situation of individual OPEC members is also changing the balance of power within the world oil markets. Saudi Arabia which holds the largest oil reserve base is capable of playing a significant role in determining oil prices within the short and medium term. Saudi oil production over the last ten years has fallen from 10 million barrels in 1980 to 2 million barrels in 1985 and is up to 8.5 million barrels now. Saudi Arabia will continue to play a key role in world oil production and politics, but the Saudis are facing some economic constraints. The Saudi budget has shown a deficit each year since 1982. In other parts of the world, the debt service of many of the oil producing countries such as Venezuela, Nigeria, and Algeria is likely to exert some strain on government budgets in these countries. The rebuilding of the economies of Kuwait, Iraq and Iran is likely to prevent oil prices from rising above $25-$28 a barrel over the next three years.

Oil and Economic Development

The huge budget surpluses resulting from higher oil revenues during the last two decades, enabled OPEC countries to undertake massive internal economic developmental
programs. Led by the public sectors, countries such as Saudi Arabia, Kuwait, Iran, Iraq, and the United Arab Emirates invested in major infrastructural development in the areas of telecommunications, transportation networks, health care, and education. In addition, some of these governments also provided for the establishment of petrochemical plants, refineries, and steel companies etc... Finally, efforts were also made to create an indigenous agricultural base in order to reduce the reliance on external food supplies.

These efforts in agricultural development folded as a result of rapid industrialization. Demand for labor resulted in higher wages in urban areas and therefore, the labor supply shifted away from the agricultural sector.

Furthermore, the developing economies of the Middle East have not been successful in applying the capital-intensive agricultural methods of North America. Saudi Arabia and Egypt are striving to minimize their reliance on foreign food supplies, but it is uncertain whether they will become "self sufficient" and independent in agriculture. Saudi Arabia still remains highly dependent on foreign agricultural imports; with the exception of wheat. In 1987, these imports amounted to $3.4 billion. In 1984, wheat farmers received $1.5 billion in government subsidies, but it is uncertain whether Saudi Arabia can continue to support
these subsidies given the decline in oil revenues.

U.S. firms will benefit from the Arab States' position as major food importers, regardless of the region's diminished oil revenues. The governments of the Arab States have demonstrated that when oil revenues decline, agricultural commodity imports continue to increase.

Dependency on food imports is costly; the Arab States' food import costs for the years 1984-1986 reached $20 billion, with the U.S. as the prime supplier. Further opportunities exist for U.S. firms to supply food processing machinery, refrigeration, fast-food technologies, and technical expertise in marine resources such as fish stocks and distribution. (Ajami, 1989)

By 1991, the major infrastructural projects were completed and the Gulf States as well as Iran and Iraq (prior to the Iran-Iraqi conflict and the 1990 Iraq-Kuwait War) had moved away from a construction led economy. For Iran, Iraq and Kuwait the current emphasis is being placed on the continuing rebuilding and reconstruction of their war torn economies. However, for Egypt, Syria, and Jordan, the current emphasis is on the development of an agricultural and industrial base capable of satisfying the basic economic requirement of the region. The present oil income decline has led many countries in the region to re-think and substantially revise their domestic and regional expenditure
priorities. The region’s overall decline in agricultural development is apparent and there are no trends pointing to a rise in the manufacturing sector. Ajami notes, "The rapidity and magnitude of the manufacturing programs, along with the fact that the whole process began virtually from the ground up, has led to a substantial reliance on the West." (Ajami, 1989) Though there has been a regional decline in both the agricultural and manufacturing sectors, there has been a surge in the service sector. Unfortunately, without the sustained growth of agricultural and industrial development, growth in the service sector will lead to continued dependency on the West.

Essentially oil exporting nations have become caught in a cash squeeze between lower petroleum prices and desired economic and social program objectives. As a result, some countries are cutting back on public expenditures and are refocusing the role of government in economic development. In the future, the private sector will have to shoulder most of the burden of building a consumer-based industrial sector.

The sharp decline in oil revenues has also highlighted another important aspect of economic development for the countries of the region. In what may turn out to be a blessing in disguise, governments were forced to come to terms with the realities of a petroleum based economy. The
reliance, up until the mid to late 1980s, on a single commodity as the sole source of foreign exchange has left the economic transformation programs in the oil producing states dependent upon price fluctuations in the world oil markets. Accordingly, the oil producing states are presently pushing for diversifying their economic base. For example, Saudi Arabia is encouraging "offset" programs with the participation of foreign multinationals and private investments and strategic alliances with OECD country-based firms in such diverse areas as automobile assembly, pharmaceutical, textiles, manufacturing, and steel and aluminum production. In addition, there has been attempts at agricultural development and the introduction of bio-tech agriculture. Finally, the countries of the region have moved into petrochemical development in order to have a greater degree of vertical integration. Industrial processes are accounting for an increasing share of GNP throughout the region, and employs a growing percentage of the labor force.

Saudi Arabia is one of the region's more advanced nations--among the Arab states--in terms of industrialization. For the last two decades, the government has been the mainstay of the Kingdom's attempt at economic modernization. Infrastructure and heavy industry development have been carried out primarily through the
public sector. However, in light of the sharp decline in oil revenues during the past five years, the government started to implement programs and policies which allow for a greater role for private Saudi enterprise in cooperation with foreign multinationals. In 1989, the non-oil private sector accounted for over 50% of the Kingdom’s dollar gross domestic product.

The government of Kuwait, on the other hand, up until the Iraq invasion of Kuwait, has chosen to diversify through an ambitious program of international investments in the U.S. and in other OECD countries. Accordingly, by 1990, Kuwait’s investment position was estimated to range from $110-120 billion with the bulk of these funds used to purchase equity-based positions in leading industrial enterprises i.e. Santa Fe Drilling Company in the U.S. and Q-8 in Europe. The generated revenues for the oil producing nations, has enabled the countries of the region to undertake rapid infrastructural development along with the development of a more diversified, international economy. The stabilization of oil prices is likely to continue for the next three years and will force a re-assessment of economic priorities by the governments of the region and bring forth a higher degree of participation by the private sector. This will create opportunities for a significant number of strategic alliances between OECD multinationals
and the newly industrializing economies of the Middle East.

**Arab Investment in the West**

The domestic economies of the petroleum-rich nations were by and large incapable of absorbing all of the revenues generated by the oil price increases of the 1970s and early 1980s. Therefore, surplus funds were invested in foreign countries, namely the United States and Germany. Gulf holdings in Western nations were, prior to the 1990 invasion of Kuwait, extremely high; with Kuwait accounting for $110-$120 billion. The level of Kuwait's and other Gulf government's investment activity has partially declined throughout 1990-1992.

Considerable data exists on the Kuwaiti investment program, and it will be worthwhile to explore it in some detail. Traditionally, Kuwait has invested abroad in order to diversify its economic base. It has not industrialized as extensively as its neighbors; most likely because of its small population. Approximate 1990 holdings in foreign countries amount to $110-$120 billion, with $70 billion in the U.S. and another $15 billion in Germany. The majority of these assets consist of equity positions in industrial enterprises where the return on investment would seem to amount to a notable source of income.
Kuwait’s foreign investment strategy is targeted at acquiring worldwide oil production and distribution proficiency. During the last eight years, the government increased its degree of vertical integration and has moved downstream through the purchase of local refining and distribution channels. It has concentrated its efforts in the distribution, marketing, and retailing of its refined petroleum products and has acquired entire national networks in Northern Europe comprised of filling stations, oil terminals, and refineries. The petroleum giant Q-8 is an example of such an investment strategy.

By contrast, Saudi Arabia focuses on its indigenous industry base to diversify its earnings. The government has invested extensively in petrochemicals in hopes of earning considerable revenues from this sector. It is important to note that this industrial sector will only produce between $5 billion and $7 billion when it is fully operational. (Ajami, 1989)

Though data is lacking on Saudi Arabia’s foreign investment strategies, it is highly plausible and reasonable to believe that they have not engaged in foreign investment to the same extent as Kuwait. The Saudis tend to be consolidating the majority of their surplus earnings on the industrialization of the domestic economy.
THE LABOR FORCE

It is natural to begin an analysis of the Middle East’s work-force with an overview of demographic trends. The Arab states vary in terms of population size and distribution. For example, the 1992 population estimate for Saudi Arabia and Kuwait is 16.1 million and 1.4 million respectively. On the other extreme, Egypt has an estimated 55.7 million people.

Table 6
Population Estimate

<table>
<thead>
<tr>
<th>Country</th>
<th>Population Estimate mid 1992 (millions)</th>
<th>% Population under age 15</th>
<th>% Population age 65 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>26.0</td>
<td>44</td>
<td>4</td>
</tr>
<tr>
<td>Egypt</td>
<td>55.7</td>
<td>41</td>
<td>4</td>
</tr>
<tr>
<td>Libya</td>
<td>4.5</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Morocco</td>
<td>26.2</td>
<td>41</td>
<td>4</td>
</tr>
<tr>
<td>Tunisia</td>
<td>8.4</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>120.8</td>
<td>42.8%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Table 6 (continued)

<table>
<thead>
<tr>
<th>Country</th>
<th>Population Estimate mid 1992 (millions)</th>
<th>% Population under age 15</th>
<th>% Population age 65 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahrain</td>
<td>.5</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Jordan</td>
<td>3.6</td>
<td>48</td>
<td>3</td>
</tr>
<tr>
<td>Kuwait</td>
<td>1.4</td>
<td>45</td>
<td>1</td>
</tr>
<tr>
<td>Lebanon</td>
<td>3.4</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>Oman</td>
<td>1.6</td>
<td>47</td>
<td>3</td>
</tr>
<tr>
<td>Qatar</td>
<td>.5</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>16.1</td>
<td>45</td>
<td>3</td>
</tr>
<tr>
<td>Syria</td>
<td>13.7</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>2.5</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>Yemen</td>
<td>10.4</td>
<td>49</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>53.7</td>
<td>42.1%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>


A further review of the Arab states' population demographics indicates notable differences in age distributions. For example, 47% of the Saudi's population is under 25 years old, with a skewness towards nine years old or younger; 35% out of 47% are nine years or younger. (J.S. Birks and C.A. Sinclair, 1988) On the other hand, Qatar, Bahrain, and the United Arab Emirates have a more middle-aged population distribution.

The size of the labor force also varies with the country under consideration. For example, Saudi Arabia's working population is estimated at 1.7 million, whereas, Egypt's amounts to over 14 million; and of the 14 million
working Egyptians, somewhere between 1.7 and 2.2 million work abroad. (Roy, 1991)

Looney, points out that Saudi Arabia has by far the largest percentage of nationals in its labor force. Demographic trends in the Kingdom indicate that more than 720,000 Saudi Arabians, representing almost 9% of the population, will reach the age of 20 during the period 1988-1992.

Table 7


<table>
<thead>
<tr>
<th>Age</th>
<th>1987</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>percent</td>
</tr>
<tr>
<td>0-4</td>
<td>1,386,300</td>
<td>20.1</td>
</tr>
<tr>
<td>5-9</td>
<td>1,077,100</td>
<td>15.6</td>
</tr>
<tr>
<td>10-14</td>
<td>868,200</td>
<td>12.6</td>
</tr>
<tr>
<td>15-19</td>
<td>722,600</td>
<td>10.5</td>
</tr>
<tr>
<td>20-24</td>
<td>614,300</td>
<td>8.9</td>
</tr>
<tr>
<td>25-29</td>
<td>500,000</td>
<td>7.2</td>
</tr>
<tr>
<td>30-34</td>
<td>391,600</td>
<td>5.7</td>
</tr>
<tr>
<td>35-39</td>
<td>317,000</td>
<td>4.6</td>
</tr>
<tr>
<td>40-44</td>
<td>251,200</td>
<td>3.6</td>
</tr>
<tr>
<td>45-49</td>
<td>200,300</td>
<td>2.9</td>
</tr>
<tr>
<td>50-54</td>
<td>158,300</td>
<td>2.3</td>
</tr>
<tr>
<td>55-59</td>
<td>138,600</td>
<td>2.0</td>
</tr>
<tr>
<td>60-64</td>
<td>115,000</td>
<td>1.7</td>
</tr>
<tr>
<td>65+</td>
<td>164,100</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>6,905,000</td>
<td>100.0</td>
</tr>
</tbody>
</table>

In the same period, the total number of Saudis in the labor force is expected to rise by just over 220,000. The shortfall is due to the fact that only 120,000 women or about 6% of Saudi women aged 15-60 are projected to be working in 1992. (Looney, 1991)

Table 8

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Increase (%)</td>
<td>Number</td>
</tr>
<tr>
<td>1987</td>
<td>1,343,100</td>
<td>-</td>
<td>101,600</td>
</tr>
<tr>
<td>1988</td>
<td>1,384,000</td>
<td>3.0</td>
<td>105,200</td>
</tr>
<tr>
<td>1989</td>
<td>1,424,500</td>
<td>2.9</td>
<td>108,700</td>
</tr>
<tr>
<td>1990</td>
<td>1,464,600</td>
<td>2.8</td>
<td>112,300</td>
</tr>
<tr>
<td>1991</td>
<td>1,505,400</td>
<td>2.8</td>
<td>115,900</td>
</tr>
<tr>
<td>1992</td>
<td>1,548,600</td>
<td>2.9</td>
<td>120,000</td>
</tr>
</tbody>
</table>

Source: J.S. Birks and C.A. Sinclair, Saudi Arabia into the 90s (University of Durham: Mountjoy Research Centre, 1988).

During the past decade, the Arab countries have experienced a surge of growth in the domestic labor force coupled with structural changes requiring greater diversification. Unfortunately, the Arab states are also troubled by a shortage of professional and technical personnel to meet the demands of rapid economic development. The majority of the region’s population is associated with agricultural production even though the percentage of
workers involved in this sector has been declining over the last twenty years. Currently, professional and technical workers account for a small portion of the entire labor pool.

Technical Training and Human Resource Shortage

The availability of human resources is a critical issue relating to Middle Eastern nations' economic development plans and strategies. Charles Issawa states:

"Because of the nature of contemporary technology, the main constraint nowadays is no longer energy or other physical resources but the degree of development of human resources."

He asserts that in order for Middle Eastern nations to sustain economic development, they must have access to technology.

"In this respect the Middle East is lagging badly, and it is toward the building of its human capital through education, health and the emancipation of women that its efforts must now be directed." (Issawa, 1991)

Middle Eastern technocrats are acutely aware that economic development requires striking a balance between dependence on foreign or imported labor and the technical training of the local labor force. The labor issue is most pronounced in Saudi Arabia and Kuwait where there is a shortage of both skilled and general labor.

Egypt, on the other hand, generates a large pool of skilled and professional labor and has many educational institutions. However, the challenge of Egyptian labor
emigration poses a threat to the country’s economic
development and infrastructure. With rampant unemployment
in its overcrowded cities, Egyptian workers find it more
profitable to migrate to the oil-rich states; and the
government offers little incentive for the work force to
stay in the home market. Thus, there is no effective
utilization of the highly educated and skilled labor force
within Egypt.

Future educational development plans should improve the
region’s number of scientific and engineering personnel.
Table 9

Educational Distribution: Teachers and Students

ALGERIA 1990/91

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-primary</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>151,262</td>
<td>4,189,152</td>
</tr>
<tr>
<td>Middle</td>
<td>82,741</td>
<td>1,423,316</td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>44,283</td>
<td>752,264</td>
</tr>
<tr>
<td><strong>Teacher training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>6,138</td>
<td>153,360</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>284,424</td>
<td>6,518,092</td>
</tr>
<tr>
<td>% of Population</td>
<td>1.1%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Table 9 (continued)

EGYPT 1987

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>4,067</td>
<td>152,371</td>
</tr>
<tr>
<td>Primary</td>
<td>235,586</td>
<td>7,034,617</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>155,941</td>
<td>3,123,233</td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>65,639</td>
<td>901,271</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>31,809</td>
<td>770,221</td>
</tr>
<tr>
<td>Others</td>
<td>2,014</td>
<td>104,812</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>495,056</td>
<td>12,040,614</td>
</tr>
<tr>
<td>% of Population</td>
<td>.88%</td>
<td>22%</td>
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</table>
Table 9 (continued)
JORDAN 1987

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>1,595</td>
<td>37,910</td>
</tr>
<tr>
<td>Primary</td>
<td>19,133</td>
<td>570,795</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>19,265</td>
<td>323,942</td>
</tr>
<tr>
<td><strong>Teacher training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>2,029</td>
<td>29,235</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>1,553</td>
<td>34,994</td>
</tr>
<tr>
<td>Others</td>
<td>1,105</td>
<td>30,985</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>44,680</td>
<td>1,027,861</td>
</tr>
<tr>
<td>% of Population</td>
<td>1.24%</td>
<td>29%</td>
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</table>
Table 9 (continued)

KUWAIT 1989

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>2,289</td>
<td>35,078</td>
</tr>
<tr>
<td>Primary</td>
<td>7,259</td>
<td>118,120</td>
</tr>
<tr>
<td>Middle</td>
<td>9,134</td>
<td>120,770</td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>1,152</td>
<td>95,692</td>
</tr>
<tr>
<td><strong>Teacher Training:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>464</td>
<td>1,939</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>20,298</td>
<td>371,599</td>
</tr>
<tr>
<td>% of Population</td>
<td>1.5%</td>
<td>27%</td>
</tr>
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</table>
### Table 9 (continued)

#### LIBYA 1985

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>1,051</td>
<td>15,028</td>
</tr>
<tr>
<td>Primary</td>
<td>41,515</td>
<td>788,780</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>30,524</td>
<td>373,374</td>
</tr>
<tr>
<td>Teacher training</td>
<td>3,051</td>
<td>30,511</td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>2,250</td>
<td>27,000</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>n.a.</td>
<td>30,000</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>78,391</td>
<td>1,264,693</td>
</tr>
<tr>
<td>% of Population</td>
<td>1.7%</td>
<td>28%</td>
</tr>
</tbody>
</table>
### Table 9 (continued)

**SAUDI ARABIA 1989**

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-primary</strong></td>
<td>4,375</td>
<td>68,426</td>
</tr>
<tr>
<td><strong>Primary</strong></td>
<td>105,937</td>
<td>1,694,394</td>
</tr>
<tr>
<td><strong>Middle</strong></td>
<td>36,807</td>
<td>494,862</td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General</strong></td>
<td>16,011</td>
<td>244,226</td>
</tr>
<tr>
<td><strong>Teacher Training:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vocational/Technical</strong></td>
<td></td>
<td>17,095</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Universities</strong></td>
<td>9,631</td>
<td>115,006</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>172,761</td>
<td>2,634,009</td>
</tr>
<tr>
<td><strong>% of Population</strong></td>
<td>1.1%</td>
<td>16%</td>
</tr>
</tbody>
</table>
Table 9 (continued)

THE UNITED ARAB EMIRATES 1989

<table>
<thead>
<tr>
<th></th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>1,989</td>
<td>44,555</td>
</tr>
<tr>
<td>Primary</td>
<td>10,785</td>
<td>197,869</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>4,749</td>
<td>84,866</td>
</tr>
<tr>
<td><strong>Teacher Training:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational/Technical</td>
<td>259</td>
<td>720</td>
</tr>
<tr>
<td><strong>Higher:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>460</td>
<td>7,428</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>18,242</td>
<td>335,438</td>
</tr>
<tr>
<td>% of Population</td>
<td>.72%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Table information compiled from:
Ministère de l'Éducation
UNESCO, Statistical Yearbook

Educational enrollments are rising and the portion of the age group enrolled in secondary schools has doubled between 1960 and 1990. In 1990, the portion of the age group enrolled in secondary schools amounted to 85% in Kuwait and 68% in Egypt. However, educational training has lagged in the labor-importing countries. Twenty percent of Saudi Arabia’s population aged 20-24 was enrolled in higher education establishments, in comparison to 29% in Egypt.
Indigenous scientific and technical manpower is expected to increase in the long-run, but presently, there exists wide disparities among the Middle Eastern countries. Moreover, the variation among countries is acutely observed in the technical and vocational fields. In Egypt, 20% of all students enrolled in secondary levels of education or above, were attending vocational schools. This compares with 8% in Saudi Arabia, 7% in Kuwait, and 4% in Algeria. (OTA, 1984 and Middle East and North Africa, 1992)

The technical training issue generates many challenges for the technocrats. For example, they are faced with finding ways to attract indigenous personnel to the technical sectors. This is not an easy task since most of the work force is concentrated in the government or service sector of the economy. The shortage of technically trained workers is widespread because low wages and incentives prevail in the technical fields. Furthermore, there is a general aversion to industrial and manual labor and a general feeling that technical jobs are not prestigious. (OTA, 1984) The technocrats are also finding it difficult to lure all study abroad students back home after their sojourn.

Some potential solutions for maintaining a technically trained indigenous labor supply is for the government to offer monetary incentives, in the form of educational
stipends, to study technical and scientific fields. In order for this to work, the government may have to reduce the number of stipends in the humanities and administration. In addition, the government could set up university-business linkages.

Appropriate levels of education and training are mandatory for the establishment of a reasonably large and highly trained labor force that is capable of operating and maintaining key sectors of a highly modern and diversified economy. The consequences of the technical human resources shortage often draws less attention than might be expected.

Foreign Sources of Manpower-Labor Migration

Differences in the size and quality of labor forces combined with the massive infrastructure programs undertaken by the oil-rich economies, have led to high levels of migration in the Middle East up until the 1990 Iraqi-Kuwaiti War. As the demand for labor increased in the petroleum-rich nations, wages increased, and workers responded accordingly by moving from the low to the high wage areas. The migration included both skilled and unskilled workers who crossed Middle Eastern borders as well as various borders across the world.
The rise in the number of migrants grew throughout the boom years of the 1970s and 1980s. By the early 1980s, approximately one-quarter of Yemen's labor force and nearly one-third of Jordan's was employed in other Arab countries. By the mid 1980s, the number of Egyptians working in other Arab nations increased from 1.7 to 2.2 million. (Roy, 1991) Moreover, the inflow of personnel from Western nations increased during this period; namely in the higher skilled professional and technical positions.

By the mid 1980s to 1989, oil exporting nations became largely dependent upon foreign expatriates. Generally, foreign workers are concentrated in either technical or lower skilled occupations. On the other hand, indigenous workers are mostly employed in managerial positions or in service industries. However, throughout the 1970s and 1980s, both Saudi Arabia and Kuwait became increasingly dependent on foreign workers in the managerial, technical, and professional sectors. By 1990, in Kuwait, Egyptians and Jordanians accounted for a large percentage of professional and technical employees, while native Kuwaitis were more concentrated in the managerial and clerical sectors.

Saudi Arabia and Kuwait have become especially reliant on foreign workers for construction, manufacturing, and commerce. In Kuwait, 95% of the construction sector and nearly 90% of the manufacturing sector are comprised of
foreign nationals. By 1975, the oil-rich states imported 1.6 million workers or 17% of the total labor force. (OTA, 1984) This figure rose to 4.3 million or 28% by 1985. Thus, Nationals in Kuwait, Qatar and the United Arab Emirates became minorities in their own countries.

Many Arab nations have instituted labor policies in order to provide job security and incentives to the indigenous labor force. For example, the Saudi Labor and Workmen Law which is commonly referred to as the "Labor Law" was implemented in 1969. This law stipulates that a firm's workforce in Saudi Arabia must be 75% Saudi and at least 51% of its payroll must be paid to Saudis. Unfortunately, this requisite is often ignored because there is a shortage of skilled and technically trained Saudis. (OTA, 1984)

Other Arab countries with similar labor laws include Egypt, Kuwait, Iraq, and Algeria. However, the shortage of local technicians creates pressures for the technocrats to find loopholes whereby the labor policies become ill-defined and less binding.

The Middle Eastern labor migration issue is two fold with trade-offs for both labor exporting countries i.e. Egypt, Jordan and Algeria and labor importing countries i.e. Saudi Arabia and Kuwait. For the labor exporting countries the trade-off is between the "brain drain" and the foreign exchange gained from remittances of those working abroad.
For the labor importing nations, the trade-off is between the immediate need for foreign expertise and the potential negative social or political effects. (OTA, 1984)

It is clear that Arab labor migration is not a "zero sum game" with the benefits and/or costs to the hosts equally balancing those of the exporter. (Burki, 1984) The benefits to both sides are often highlighted, but it is equally important to emphasize the disadvantages—especially for the poor labor exporting nations. These countries become dependent upon the good-will of the oil-rich labor importing nations which can easily attract foreign workers from a number of sources. Therefore, the capital poor exporting nation is put in a position with little or no leverage. A more obvious disadvantage for the labor exporting country is the depletion of the domestic skilled labor force. Many times their best talent is lost to the rich-oil states which are able to pay higher wages.

Similarly, the labor dependency issue poses challenges for the labor importing country. Labor migration is causing native dependency on foreign manpower; not only in quantitative, but also qualitative terms. (Looney, 1991) Continued dependency on imported labor could intensify an already low level of job commitment and low productivity in the labor importing nation. Arab technocrats caution that continued labor imports may lead to reduced development of
local human resources. This in turn may cause unemployment for the national work sector. The influx of migrant workers may also be curtailing the modernization process for the nationals who continue to be deeply rooted in a traditional society. Thus, the technocrats in the labor importing Arab states are being forced to reassess their reliance on imported labor.

A migrant's decision to seek economic and social mobility in the oil-states is usually self-imposed so the most entrepreneurial and ambitious citizens of the poor-states are typically the first to leave their home countries (Serageldin and Socknat, 1983)

The outward migration of labor is intended to alleviate unemployment and overcrowding in the major cities, but it actually lowers the quality of education and creates an intellectual gap which will ultimately weaken the labor exporting country's ability to manage economic transformation development and global technological linkages.

Egypt's emigration "Open Door Policy" is such an example where little thought was given to the full ramifications of outward migration. The technocrats only sought to address Egypt's short-term problem of mass unemployment and to generate foreign exchange (labor is one of Egypt's main exports) to service its external debt and to
buy badly needed imports. However, the technocrats quickly realized that the exported skills were in short supply within Egypt itself.

Analysts are divided as to the future extent of labor migration and the changes that may take place regarding the Middle East's human resources. One view holds that the decline in oil prices, along with a decline in domestic development programs will result in a lower demand for labor. The other line of reasoning accepts this scenario for the long-run, but contends that a reduction in economic growth will have little impact in the short-term. This view is primarily based on the fact that capital intensive investment programs such as those currently in progress, require numerous years until assets are completed and operational.

MODERNIZATION & SOCIAL CHANGE

Definitions

In World Modernization: The Limits to Convergence, Wilbert Moore suggests that modernization is in fact a rationalization of the way life and activities are organized in a society. Moore contends that the modernization process is limited by the following three conditions:

1. The Logic Limit, or the criteria used in choosing the procedures used to reach a stated goal or objective.
2. **The Bio-Psychological Limit**, or the human tendencies toward emotion, ethical convictions and sentiment.

3. **The Sociological Limit**, or the form of legitimate power which coordinates the differentiated units within the society.

According to Moore, these three limits can hinder the evolutionary process of modernization. (Moore, 1979)

In *The Dynamics of Modernization*, C.E. Black defined modernization as, "the process by which historically evolved institutions are adapted to the rapidly changing functions that reflect the unprecedented increase in man’s knowledge, permitting control over his environment, that accomplished the [ongoing] scientific revolution"  (Black, 1966) Black’s definition of modernization emphasizes the effects of increased control over the environment and the growth of knowledge; these two effects on historical institutions lead to development--economic or political.

Rustow, in *A World of Nations: Problems of Political Modernization*, refers to modernization as "the rapidly widening control over nature through closer cooperation among men."  (Rustow, 1967)

Marion J. Levy defined modernization as, "the greater the ratio of inanimate to animate sources of power and the greater the multiplication of effort as the application of tools, the greater is the degree of modernization."  (Levy, 1966)
The shortcomings of Rustow's and Levy's definitions are that they do not consider disproportionate supplies of natural or national resources, shortages of technical skills and labor, and political dissension. Under Levy's definition of modernization, a densely populated nation which uses more manpower than automated machinery remains outmoded even though the utilization of unskilled manpower results in greater employment.

Inkles and Smith, assert that in order for a nation to modernize, it must first industrialize. The existence of factories represents their unit of industrialization. They define a factory as a:

Large scale productive enterprise, bringing together large numbers of men in one work place, systematically ordering their relation one to the other according to rational considerations expressed in formal rules, relying on concentrations of inanimate power and the innovative applications of technology and guided by hierarchy of authority largely resting on technical skills and administrative competence...[which does not] inherently violate the important taboos of any religious group, major or minor." (Inkeles and Smith, 1974)

The above definitions do not fully address the difficulty of separating modernization from westernization. They are far from being universal and are rather parochial
in nature. A less cumbersome definition of modernity which could be realized in any society would be more pragmatic. In the broadest sense, modernization is merely the injection of new ideas into a society; these new ideas can be accepted or rejected and they can emanate from outside the society or from within it.

Furthermore, modernization is a gradual process which is economic, political, and cultural in scope. It is a process which entails borrowing technology which can be adapted to suit the demands of a society. It is also a process which must blend tradition with modernity. In the words of James A. Bill, "All societies are amalgams of the traditional and the modern. Few societies can live and prosper when one heavily overbalances the other. In general...Islam has demonstrated a vital blend of these ingredients in history." (Bill, 1979).

Modernization and Westernization: Conflict and Convergence in the Middle East

The Middle East is experiencing an extraordinary process of economic transformation and growth whereby the issues surrounding multinational corporate linkages and technology transfer to the Arab Middle East are continuously being reassessed by Arab technocrats, policy makers, and decision makers.
Instituting complimentary economic and social reform strategies will be no easy task for the oil technocrats. Yet, overall, the Arab technocrats show continued commitment to economic growth as well as to technological transformation.

Development in many societies emerged from a substantial agricultural base, but given the aridity of the Middle Eastern deserts, the standard of living and quality of life of Arabs depended on oil revenues. Thus, finite oil reserves serve as the primary motivation for the Arab states to modify their economies. The following sentiments accentuate the Arab technocrats' economic concerns:

"What should we do when the oil runs out, go back to our camels?"

"Either Saudi development plans work, or its back to the desert in unairconditioned tents." A Saudi Government Official

Dr. Mana Said Al-Otaiba  
Former OPEC Secretary-General  
and Minister of oil for the United Arab Emirates

"We have finite hydrocarbon resources which we want to exchange for development...Economic development is a long-term process and it needs time to convert developing countries into developed ones."

Ali Jaidah, Former Secretary-General of OPEC; and Director of Qatar General Petroleum Corporation

Painfully aware that the process of economic transformation is arduous and fraught with bottlenecks, the Arab economies are now scrambling to discover viable
economic alternatives. In doing so, the Arab technocrats are faced with securing a delicate balance with their own traditional society and with western industrial modernity. Western value systems represent a challenge to the technocrats and boundary spanners. This perilous imbalance between tradition, social change, and economic transformation has for the last two decades resulted in socio-economic tensions.

The Arab technocrats' role in the process of economic transformation was heightened as a result of the boom in the oil industry. Typically, having journeyed beyond their borders, the technocrats have often acquired Western views and philosophies which could clash with their traditional Arab norms and values. Pitted against the traditional order, the technocrats venture to lead their societies into a more modern, global, and interdependent marketplace.

The transition from a predominately oil-based economy to a more technologically diverse economy requires the recognition of several growth phases. Douglas S. Paauw suggests that each phase entails more modification of the current system and greater progress towards the conditions required for economic infrastructure and growth. He estimates that a society's growth process will take approximately four to five decades. (Paauw, 1970)
For the Middle East, the growth phase will include a move away from dependency on oil to a more diversified and technologically oriented economy. According to Moore, technology is "the product of human ingenuity, and without human purpose behind it, it is not the cause of anything." (Moore, 1979) This reflects Bill and Leiden's concern that as a society begins to acquire modern technology, the political elites will use the technology to maintain or increase their power base. (Bill and Leiden, 1979) In addition, Moore explains that traditional religious and family values will fray and be replaced by more secular views of the world. (Moore, 1979)

The technocrats believe that both Islam and economic reform will triumph. By instituting international business practices, the technocrats are beginning to successfully link Arab society to the international market place. This global reach is slowly being recognized by some Arabs as an effective way of securing basic economic needs in Arab countries. At the same time, modernization and social change, according to the technocrats, are being guided by the moral principles of Islam. This will ensure that Arab society will modernize but not necessarily westernize. Hence, the technocrats and reformers are giving Islam a place in today's technologically advanced world.
During the seventies, the Arab technocrats set out to depoliticize the oil issue and the associated issues between the Arab states and the OECD economies. This intensely volatile relationship heightened the technocrats difficult task of increasing the Arab States’ bargaining power vis a vis the oil consuming countries.

Traditional and radical elements at home often interfered with the technocrats’ ability to institute a new and viable economic system. The traditionalists had to be persuaded that engaging the international system on balanced and equal terms was an option worth exploring. The challenge of negotiating with the outside western world was equally vexing. The technocrats encountered multinational corporations and oil consuming nations which often boasted far more skills and resources than the technocrats had on their side of the bargaining table. The Arab technocrats were well aware that the multinational corporations’ know-how and expertise, if properly harnessed, could mean the difference between economic success or failure.

The success of the technocrats is marked by the improved fortunes of OPEC and OAPFC--the organization of Arab Petroleum Exporting Countries--and by the much improved terms of trade between the oil producers and oil consumers.
The conflict between the economic and political imperatives facing Middle Eastern decision-makers is as powerful as the one cited by Doz and Prahalad in *The Multinational Mission*. (Doz and Prahalad, 1988) Arab technocrats, caught by societal pressures, yet sensitive to the corporate imperative, had to manage the delicate process of economic transformation. Bill and Leiden further illustrate this point, "It can be assumed that there will always be a gap between the demands that accompany [economic and technological] modernization and the political system’s ability to satisfy these demands. In this sense, it is easier to generate change than to absorb it." (Bill and Leiden, 1979)

The technocrats’ ability to acquire the needed flexibility from the traditional leadership comprised of dynastic monarchies, principalities, oil-style politicians, and Muslim fundamentalists coupled with their ability to withstand the assault of the traditionalists and ideologues came to play in the late seventies and throughout the eighties. The skills with which this was managed and the manner in which diverse cultures, notions, and sensibilities were propitiated by this group speaks to the technocrats’ high degree of professionalism. The technocrats can be credited with introducing professionalism into an environment which had previously lacked it. The
technicalization of oil in all matters regarding the international political economy was accomplished by a group of technocrats or "organization men." Still, the interactions between traditional Arab societies and the Western multinational entities are tenuous and subject to a complex duality which, if mismanaged or misunderstood, could facilitate potential conflict. The Economist, captures this concern:

"...In theory they [the Islamists] disdain western products; in practice they use them. Even Iran, where extremists exploded to power in 1979, is nowadays busy seeking western investment." (The Economist, April 4, 1992)

This duality also exists for the supplier of products and technologies as the following suggests:

"Westerners who have brought out the old cold-war vocabulary to express their feelings on Islamic extremism forget that they recently fought a war for, and scramble to sell goods to, the most fundamentalist country of all. Saudi Arabia is the one Muslim country that has consistently applied sharia criminal justice; Saudi women have far fewer rights than Iranian women..." (The Economist, April 4, 1992)

While the traditional Arab societies continue to industrialize to "catch up" to the West, modern institutions and social values will be superimposed upon the traditional system of values and beliefs.

Higgins, 1977, relates that:

"The result is a patchwork quilt consisting of modern and traditional social and economic institutions."
A schoolgirl in Morocco advises that the options facing Muslims include "a future without authenticity or authenticity without a future." She prefers the second choice since at least Muslims will be on firm ground. *(The Economist, August 1, 1992)*

Equally skeptical is A.B. Zahlan, organizer of a UN committee seminar on technology transfer to the Middle East, who suggests that:

"Nations that import turn-key technologies may in turn become turn-key states with turn-key cultures." *(Zahlan, 1981)*

Furthermore, Islamic fundamentalists are influential and cannot be ignored. Their angry suspicion of the western world must not only be understood by technocrats and westerners, but in the name of economic transformation and growth, it must also be reconciled. The Al Shaah, an Egyptian Islamic weekly, captured the following quote:

"The West harbors within itself an incurable enmity for Islam." *(The Economist, August 1, 1992)*

This view is also evident in the following:

"Islam is the only force capable of filling the spiritual vacuum in the West, so [westerners] are afraid of the great Islamic revival...We must arise...so that the Muslim generation that will liberate the Islamic world can break out from its prison of assault by culture, Christian proselytisation, secularization, economics and politics..." *(The Economist, August 1, 1992)*
An analogous and grave remark by Adel Hussein, the editor of Al Shaah, further delineates the fundamentalists' discontented view toward economic growth and their seemingly perilous fight for cultural virtuerness. He suggests that cultural pollution is a threat to Arab society.

"We cannot accept imperialist invasion in the sphere of economics, culture or anything else. Unfortunately, many governments in the Muslim world have allied themselves with the invaders. These governments, corrupted by western culture, confuse it with progress." (The Economist, August 1, 1992)

Mr. Hussein also added:

"We are not against western culture, in the sense that we are superior and we should defeat it. We simply say that we are different. We have a different background, a different history. Accordingly, we have the right to different futures. (The Economist, August 1, 1992)

In contrast, Caryle Murphy reports the sentiments of a 27 year-old Arab school teacher:

"Our countries need to be modernized. There is a technological revolution happening in the world. I don't think we have succeeded yet in combining this with the indispensable part of our life, which is Islam." (Murphy, April 27, 1992)

Western industrialization evolved gradually and sequentially overtime, but the Arab states face a hurried and more concentrated industrialization process. Levy, 1966, reflects this disparity:

"[In Western Industrialization] there were thousands of steps of this sort in the process—all of them quite gradual by contrast with the vast majority of those facing members of any relatively non-modernized society. The first steam engines could be constructed, and were constructed out of the metals available. This
kind of direct conversion of the materials and skills by hand is often out of the question in many cases for late-comers." (Levy, 1966)

In addition, Ajami indicates that:

"Rapid economic growth and social change often destabilize value systems and established ways of life, thus causing individual conflict and dissonance. Overwhelmed individuals respond by retrenching into their culture and into familiar established ways of life, often rejecting the source of change." (Ajami, 1986)

Accordingly, in order to preserve the social fabric of Arab society and to meet the elevated expectations of Arab technocrats, decision-makers, and policy-makers, imported technology cannot be directly released into an environment without adequate preparation and care. In order for Arab countries to sustain their culture and sovereignty, their technocrats must make technology transfer a participative process which will contribute to both economic reform as well as other socio-religious dimensions.

CONCLUSION

The issue of economic development of the region is inextricably linked to the question of dependency on the West. The rapid pace of modernization along with the predominance of the oil sector are likely to increase Arab economic linkages to the West. The infrastructure development over the last 15 years has been carried out largely by the foreign multinationals. For example, the
total dollar value for all the contracts awarded in the Middle East for the period 1979-1982 amounts to about $186 billion. Of this $186 billion, $110 billion or 59% went to six major industrial countries as opposed to only 22% for local firms. While the overall data from 1983-1989 shows a rise in local contractors increasing their shares to around 40%, this rise still reveals a significant reliance on foreign firms; particularly when the data shows the local firms still relied on some sub-contracting to non-national firms. The ability of Middle Eastern economies to develop a significant degree of manufacturing capabilities has resulted in changing the nature of dependency. The petrochemical related industry which has grown significantly in the region and accounts for approximately 71% of manufacturing output is highly reliant upon the OECD market for their outputs. Furthermore, the relative decline of the agricultural sector has no corresponding rise in the manufacturing sector. The oil-rich states have instead become highly service oriented economies. This is not to imply, however, that the Arab States are not attempting to increase their manufacturing capabilities. The Saudi industrialization and "off-set" program is a clear indication of the desirability to move beyond a crude oil exporting economy. Success of Arab industrialization and transformation will rest largely on the issue of human
resource development and the acceptance of social change in a devoutly Islamic milieu.

The ability to compete on a global basis, along with providing for the increased expectations of the domestic society, depends to a large degree on a country’s ability to develop its human resources. We have seen that Middle Eastern nations are making increased attempts to educate their peoples to face the demands of the modern world. They still must address the following: How many scientists do we have and what kind are being turned out each year? What degree of computer literacy is present?

Moreover, education is a long-term process that can take decades before significant results are attained. It might well be into the 21st century before the Middle East catches up to the West.

Furthermore, even given a substantial short-term improvement in the level of education, it is doubtful that the process of technology transfer can be significantly altered in favor of the host countries in the immediate future. The gap is simply too large at the moment, and we will have to wait until the next decade.
CHAPTER III

METHODOLOGY AND PROCEDURES

This chapter examines the literature on attitude research and the implications of this stream of research towards the issues explored in the previous chapters; particularly it will survey Arab technocrats’ attitudes of U.S. technology transfer policies and constraints. Furthermore, the chapter considers triangulation methodology and its relevance to attitude research and measurement. The chapter also outlines the relevant methodological issues: conceptualization of technocrats, data collection, statistical methods, and questionnaire design.

ATTITUDE RESEARCH

Attitudes are intricate and complex constructs which embody a multitude of definitions. Rokeach defines attitudes as, "Beliefs about an object or situation predisposing an individual to respond in some preferential manner." (Rokeach, 1968) Chein suggests attitude formulation entails "a disposition to evaluate certain objects, actions, and situations in certain ways." (Chein,
Newcomb states that attitudes are derived from, "viewing [a phenomenon] with some degree of favor or disfavor." (Newcomb, 1943) Thurstone’s definition of attitude, to reiterate, is "The sum total of a man’s inclinations and feelings, prejudices or bias, preconceived notions, ideas, fears, threats and convictions about a specific topic." (Thurstone, 1928) The above conceptualizations reveal the complexity which surrounds the process of defining attitudes.

Rosenberg took this process a step further and devised the "two-factor" model which provides a framework for defining and measuring attitudes. This model defines attitude as a construct consisting of two dimensions: beliefs and evaluative beliefs. (Rosenberg, 1960)

A belief is any conscious or unconscious proposition by an individual which is preceded by the phrase "I believe that..." He also adds that, "the content of a belief may describe the object as true or false and evaluate it as good or bad." (Rokeach, 1968) Furthermore, Fishbein defines beliefs as cognitions or bits of information which describe a relationship between the belief and some other object or concept. (Fishbein, 1967)

On the other hand, evaluative beliefs refer to bits of information about an object which portray a connotative meaning of that concept as the goal object. Therefore,
evaluative beliefs only portray the object as leading toward relevant goals and valued outcomes.

Rosenberg hypothesized that a person’s attitude toward an object is "accompanied by a cognitive structure made up of beliefs about the potentialities of that object for attaining or blocking the realization of valued states." (Rosenberg, 1956) Moreover, the more positively related an outcome by that object, the more the likelihood of a positive attitude toward that object. The "two-factor" model indicates that the score of an individual’s attitude toward an object is the summation of the measured evaluative beliefs.

In differentiating between the affective, cognitive and behavioral components of attitudes, psychologists often suggest that the affective component is based upon a cognitive process and is a precursor to human behavior. The affective component is a person’s feelings toward an object, or a concept, revealed either emotionally or through verbal expressions of like, dislike, approve, or disapprove. (Secord and Backman, 1964 and Krech et al, 1962) The cognitive component is an individual’s knowledge or beliefs about an object, manifested through the expression of descriptive statements such as good or bad. Statements of belief often exhibit the individual’s feelings of likes and dislikes. Thus, there is little consensus among scholars
regarding this classification; some suggest beliefs of this kind should be part of the affective component of attitudes, while others suggest that these verbal expressions are part of the cognitive component. (Krech et al., 1962) The behavioral component of attitude consists of a person's "action tendencies" toward that object (Secord and Backman, 1964)

Many psychologists agree that, through selective exposure and retention of certain information about an object, individuals often select beliefs that are inconsistent with their feelings toward an object; these individuals will either change over time or forget their beliefs, or alter their feelings by forming a new attitude which will become consistent over time. (Krech et al, 1962, Rosenberg, 1960 and McGuire, 1960) Psychologists agree that if inconsistency arises, it is the behavioral components or action tendencies that are most likely to be inconsistent with the affective and cognitive components rather than the affective and cognitive components with each other. (Rokeach, 1968; Festinger, 1964; and Weinstein, 1972)

Homeostaticity of attitudes is another view of consistency. This notion implies that the three components are related to each other by suggesting consistency among different attitudes. (Festinger, 1959 and Heider, 1967)
Psychologists believe that the three components of attitudes: beliefs, feeling and action tendencies, may be captured separately; that is to say that a person may develop his/her feelings of like or dislike toward an object without having acquired supportive beliefs or he/she may take favorable or unfavorable action toward it prior to developing beliefs and feelings. (Katz and Stotland, 1959)

ATTITUDE MEASUREMENT

Since attitudes are tendencies of likes or dislikes, scholars suggest that the easiest way to discover a person’s attitude toward an object is to ask the individual to express his/her feelings about it through verbal expressions or opinions. (Thurstone, 1928) A person is asked to indicate his/her reaction to a series of statements by indicating to what degree--favorably or unfavorably he/she agrees with the object of inquiry. An attitude measurement scale is constructed by placing the items on a graduated interval scale marked as "agree" or "disagree"; or "good" or "bad." One view suggests that an individual’s attitude can be measured along a continuum from positive to negative and that there is a zero point of neutrality. (Krech et al. 1962)

The above proponents of attitude measurement agree that it is a useful research tool, but a researcher who is about
to engage in this research must also heed caution from the critics. For example, Oppenheim illuminates some of the constraints of attitude measurement:

"Attitude scales are relatively crude measuring instruments, and we must not expect too much from them. Their chief function is to divide people roughly into a number of broad groups, with regard to a particular attitude." (Oppenheim, 1966)

In summary, an individual’s attitude toward an object is based upon an affective component; one’s feelings toward the object which in turn is based upon one’s beliefs, which leads a person to react toward that object. Furthermore, attitudes can be consistent, relatively enduring, and systematic.

METHODOLOGY-TRIANGULATION

Social science research complexity is subject to a great deal of debate regarding proper methodological approaches. The debate focuses on the relative importance of quantitative vis a vis qualitative methodologies to explain socio-economic phenomena.

The quantitative-qualitative debate is, however, subsiding and giving way to "hybrid" methodologies known as triangulation. Triangulation is broadly defined by Denzin as, "The combination of methodologies in the study of the same phenomenon." (Denzin, 1978) In international business, research scholars such as Bartlett and Ghoshal, Managing
Across Borders: The Transnational Solution; and Porter, *The Comparative Advantage of Nations*, among others are beginning to incorporate multifaceted methodologies into their work.

"The demand that an inquirer be "either/or" has been replaced by the injunction to employ both approaches in combination or to draw on both styles at appropriate times and appropriate amounts." (Cronbach, 1980)

In his article, "Mixing Qualitative and Quantitative methods: Triangulation in Action," Jick traces the use of triangulation back to Campbell and Fiske (1959) who developed the idea of "multiple operationalism." They contend that more than one method should be used in the validation process to ensure that the variance reflected that of the trait and not the method. (Jick, 1979) Jick also quotes Bouchard who says that the convergence or agreement between two methods "enhances our belief that the results are valid and not a methodological artifact." (Bouchard, 1976)

Jick summarizes the quality of triangulation by stating that it allows researchers to be more confident of their results, it stimulates the creation of inventive methods and new ways of capturing a problem to balance with conventional data-collection methods, and it can lead to the synthesis or integration of theories. (Jick, 1979)
Smith and Heshusius trace the evolution of the quantitative-qualitative debate and suggest that it can be divided into three phases. The first phase, which only recently ended, was characterized by claims of fundamental differences in both assumptions and procedures as well as by an attitude which often approached mutual disdain. The second phase, or transitional phase, was characterized by an acceptance of, but a minimal concern over pragmatic differences, an increased emphasis on procedural issues, and an attitude of detente. The third, and current phase, is marked by minimal concern over the assumptions, and differences are primarily in the area of procedures. The overall attitude is one of compatibility and active cooperation. (Smith and Heshusius, 1986)

Rist states, "A set of accommodations is emerging whereby the various approaches ...are recognizing the right of peaceful coexistence." (Rist, 1977) He also adds that complete synthesis will not be immediate and will require serious analysis.

Authors such as Cronbach et al., 1980; Miles and Huberman, 1984; and Reichardt and Cook, 1979; and Jick, 1979 among others forcefully claim that quantitative and qualitative paradigms can be mixed. Miles and Huberman state, "...it seems that few working researchers are not blending the two perspectives." (Miles and Huberman, 1984)
Moreover, Mintzberg is an advocate of qualitative or what he terms "direct research." He states:

"For while systematic data [quantitative] create the foundation for our theories, it is the anecdotal data [qualitative] that enable us to do the building. Theory building seems to require rich description, the richness that comes from anecdote. We uncover all kinds of relationships in our "hard" data, but it is only through the use of this "soft" data that we are able to "explain" them, and explanation is, of course, the purpose of research. (Mintzberg, 1979)

Miles also supports the use of qualitative data by stating:

"Qualitative data are attractive for many reasons: they are rich, full, earthy, holistic, "real"; their face validity seems unimpeachable; they preserve chronological flow where that is important, and suffer minimally from retrospective distortion; and they in principle, offer a far more precise way to access causality in organizational affairs than arcane efforts like cross-lagged correlations." (Miles, 1979) "[qualitative data] tend to reduce a researcher’s trained incapacity, bias, narrowness, and arrogance..." (Smith, 1978)

Miles and Huberman further note that qualitative data are attractive. They are a source of well-grounded, rich description and explanation of processes occurring in local contexts. (Miles and Huberman, 1984) With qualitative data, one can preserve chronological flow and assess local explanations..."Finally, qualitative findings have a certain undeniability (Smith, 1978) that is often far more compelling to a reader than pages of statistics and numbers."
Triangulation and qualitative methods are not without criticisms. Critics of triangulation are quick to point out the weaknesses and problems associated with this methodology. They claim the process is highly labor-intensive, generates much stress, the qualitative data overloads the researcher, and their are no clear conventions. (Jick, 1979)

Miles and Huberman reveal that there are few agreed-on canons for analysis of qualitative data, and therefore the truth claims underlying such work are uncertain. They also state... "we don't know much about what other qualitative researchers are actually doing when they reduce, analyze, and interpret data." (Miles and Huberman, 1984)

The issue of generalizability is also a point of contention between qualitative and quantitative researchers; skeptics of qualitative research claim that the results are usually obtained from a small sample of subjects who were chosen by selective means. Thus, qualitative research results are not able to lead to generalizations about the population.

Personal bias is often cited as another pitfall of qualitative research. Caution should be exercised by the researcher to minimize subjectivity by determining self-opinions, conceptions, and ideas a priori. Replication is also a shortfall of qualitative research. It is exceedingly
difficult and has usually been omitted, but quantitative researchers believe that it is a crucial step in scientific research and should not be eliminated.

Finally, Smith and Heshusius wish to close down the debate over qualitative-quantitative research by saying that making the unjustified claims of compatibility and cooperation is the wrong move at the wrong time. (Smith and Heshusius, 1986)

Fortunately, there are now far more respectable researchers who interpret socio-economic phenomena relying on triangulation. Miles and Huberman, to counter the earlier criticism, state, "We have begun the task of assembling both. We believe that qualitative data analysis, while demanding and complex, are not arcane, obscure or ineffable." (Miles and Huberman, 1984)

The process of triangulation will only be de-mystified when researchers comprehend what Mills stated:

"Only by conversations in which experienced thinkers exchange information about their actual ways of working can a useful sense of method and theory be imparted..." (Mills, 1959)

The methodology of this study employs triangulation and the use of attitude research in determining the attitudes of Middle Eastern technocrats towards U.S. technology transfer policies to the region.
CONCEPTUALIZATION OF TECHNOCRATS

The conception of technocrats in this study closely parallels Suzanne Keller's (1963) "functional" view of elites which portends that elites arise in different sectors of society to fulfill specific functions in which they excel. That is to say, technocrats are chosen based on achievement oriented criteria and not on conspirational decisions or tradition ascription. Keller’s study, Beyond the Ruling Class: Strategic Elites in Modern Society, examines the functional and specific roles of elites and recognizes that, "Strategic elites consist of the minority of individuals responsible for keeping the organized system, society, in a working order, functioning so as to meet and surpass the perennial collective crises that occur."

The identified sample of technocrats chosen for this study emanated from three methodological approaches. Twenty-eight Middle Eastern embassy officials (two from each selected Arab country) in Washington D.C. constituted the first sub-sample. These Arab embassy representatives were asked to suggest and name other informed technocrats residing in the Middle East. The recommended technocrats from the Middle East constituted the second sub-sample. The technocrats did cut across the following sectors of the Arab Middle East:
Group One: Financial and Economic experts, bankers, and Middle East business persons, entrepreneurs, and corporate spokespersons of Middle East companies who are linked in a joint venture or strategic alliance to an OECD based multinational firm.

Group Two: Middle Eastern intellectuals, opinion-makers and analysts at Middle Eastern Universities and regional Arab economic organizations and think-tanks.

Content analysis of *Middle East Economic Digest*, *Middle East*, *Middle East Journal*, *Who's Who in the Arab World*, *Journal of Gulf and Arabian Peninsula Studies*, and *Oil and Arab Cooperation* for the years 1987, 1988, 1989, 1990, and 1991 was further used to identify informed technocrats.

These informed technocrats came from the University of Jordan, the Royal Jordanian Scientific Society, American University of Cairo, The University of Tunisia and L’Institute du Monde Arabe, Paris, France. (The Institute for the Arab World) The following criteria for selecting the informed sample of technocrats was utilized: A Middle Eastern technocrat’s name had to be suggested by at least an embassy official in Washington, D.C., and also appear in one of the above mentioned Middle Eastern publications or journals, or appear at least once on lists suggested by other informed technocrats being interviewed.
From the comprised list of technocrats coming from the above sources, fifty-six informed technocrats residing in the Middle East were identified and added to the selected twenty-eight embassy officials in Washington D.C. for a total sample size of eighty-four. Two embassy officials from the following fourteen embassies were represented: United Arab Emirates, Kuwait, Bahrain, Saudi Arabia, Qatar, Oman, Morocco, Libya, Tunisia, Algeria, Egypt, Jordan, Lebanon, and Syria.

With the help of the embassy officials in Washington, D.C., in the form of advanced introduction and advance phone calls, interviews were arranged with the fifty-six technocrats, twenty-eight from group one and twenty-eight from group two listed above. Additional criteria for selection took into account the individual's education—economic and business backgrounds and training as well as institutional affiliation.

This methodology is similar not only to Keller's but Kadushin's as well. Kadushin demonstrated that a reliable list of intellectuals and economically instrumental people in U.S. political and economic circles can be produced by identifying leading intellectual and professional journals and those who write for them. (Kadushin, 1972)

The research strategy for this study relied on mixing quantitative methods with qualitative procedures. A
structured Likert-type questionnaire was employed to determine Middle Eastern technocrats attitudes. This measure constituted the quantitative part. Secondly, open-ended interviews based on the written questionnaire was an added qualitative dimension to the study which allowed the Middle Eastern technocrats an opportunity to respond freely to each issue. Individuals reluctant to express their reactions fully, to what they may construe as a limiting structured questionnaire, were much more open and revealing in their oral responses.

**RELIABILITY AND VALIDITY**

Reliability is a precondition for validity. If an instrument is not measuring anything consistently (reliability), then it can’t possibly be measuring the right thing (validity). (Mueller, 1986)

There was a desired reliability of .80. Mueller suggests that well-constructed attitude scales exhibit reliability coefficients in the .80s or even in the .90s. (Mueller, 1986)

A pilot test was conducted with a subsample of the population (n=11) A Cronbach’s alpha was used for reliability since the scale is not dichotomous. If the reliability coefficient was less than .80, the items deemed as not contributing to the measure, were reviewed for
content and wording.

Furthermore, the instrument was tested for content and face validity. Content validity was checked by a panel of experts to ascertain the representativeness of the instrument content as related to the entire domain of content desired. There is no statistical index of content validity. The panel of experts consisted of two faculty members familiar with the content, two professors who assessed research measurement, and three persons representative of the population—-one from each population segment. A field test was administered to determine the clarity of the instrument. It was taken by a subsample of nine members of the population; again one person from each population segment. These respondents were not included in the actual study.

Face validity suggests that the instrument looks like it is measuring what it is supposed to be measuring. Face validity was tested during the field test.

**DATA COLLECTION**

A cross-sectional survey was administered by using a questionnaire to collect data on Middle Eastern technocrats’ attitudes towards U.S. technology transfer policies and constraints. The purpose was to elicit the population’s feelings, concerns and knowledge about the salient issues
surrounding the technology transfer process to the Middle East. Each respondent was asked to indicate whether they agree or disagree with the 17 items on the Likert-type questionnaire. The questionnaire was assembled by relying upon a review of literature on U.S. federal export control policies, U.S. national security concerns, U.S. government assistance programs, and technology absorption capabilities of the Middle Eastern recipients.

\[ Y = \text{Do you agree that U.S. technology trade and exports are not successfully penetrating the middle east market (Saudi Arabia, Kuwait, Egypt among others)?} \]

\[ X_1 = \text{U.S. export policies regarding technology transfer to the Middle East are far more restrictive than other Western nations and Japan.} \]

\[ X_2 = \text{U.S. Government policies toward trade with the Middle East are restraining U.S. Corporation's competitiveness.} \]

\[ X_3 = \text{The U.S. Government is imposing tighter restrictions on technology transfer to the Middle East.} \]

\[ X_4 = \text{The United States is slow to disseminate export policy changes to U.S. corporations.} \]

\[ X_5 = \text{The current export policy controls to the Middle East are unnecessary to insure U.S. national security.} \]

\[ X_6 = \text{The U.S. Government should not reduce flows of military technology to countries whose foreign policies run counter to those of the U.S.} \]

\[ X_7 = \text{U.S. firms' export competitiveness is as important as U.S. National Security.} \]

\[ X_8 = \text{The U.S. Government needs to design specific programs to subsidize corporate U.S. exports.} \]

\[ X_9 = \text{Government funds should subsidize promotional programs to support exports by U.S. firms to the Middle East.} \]
X10 = The private sector alone should not finance technology transfer to the Middle East.

X11 = Middle Eastern countries have limited local technological capabilities to absorb technology from the U.S.

X12 = Western technology exported to the Middle East will speed economic growth in the Middle East.

X13 = Western technology exported to the Middle East will not clash with Middle Eastern traditions.

X14 = The recipient nation in the Middle East knows what technology to ask for.

X15 = U.S. technology transfer to the Middle East will decrease Middle Eastern nations' technological dependence.

X16 = Middle Eastern oil revenues are being used to purchase advanced technology so the oil-rich countries will not be solely dependent on oil.

The cognitive measure of knowledge of U.S. export controls was obtained from the eight item True/False test.

1. T   F  Iraq, Syria, Libya, and Yemen have been subject to stricter export controls than other Middle Eastern countries.

2. T   F  The value of approved licenses for the export of dual-use items to the Middle East is increasing.

3. T   F  Total U.S. exports to the Middle East average 20% of total annual U.S. exports.

4. T   F  Controls set up by the Coordinating Committee on Multilateral Export Controls (COCOM) are becoming tighter.

5. T   F  Saudi Arabia is the third largest export market for the U.S.
6. T F COCOM information is designated as classified for national security reasons.

7. T F Other COCOM countries treat COCOM information in a more liberal manner than the U.S.

8. T F The U.S. Department of Commerce’s export licensing decisions are published in the United States.

STATISTICAL METHODS

Multiple regression was applied to test the proposed relationships for any significance of the four determinants on the technocrats’ attitude towards technology transfer controls and constraints.

Mueller cautions, however, that studies in which attitude measure (frequently a Likert, Thurstone, or semantic differential scale) is used to predict a particular behavior vary in success from zero to moderately good. He cites three reasons for the low to average success rate of attitude measures. First, the reliability of the attitude measures is sometimes quite low; second, people don’t always behave in accord with their attitudes; and third, there is sometimes dissimilarity in the attitudinal and behavioral objects studied. (Mueller, 1986)

According to Palumbo, regression analysis enables researchers to examine the relationship between several variables simultaneously because it is possible to:
1. Determine the simultaneous impact of several independent variables on a single dependent variable.

2. Find out the predictive accuracy of the independent variables combined.

3. Determine the amount of variance in the dependent variable.

4. Discover the relative contribution of each independent variable.

5. Write a regression equation that will enable us to predict the dependent variable from various values of the independent variable. (Palumbo, 1977)

Chapter four presents the findings and interpretations of the Middle Eastern technocrats’ attitudes towards U.S. technology transfer policies and constraints.
CHAPTER IV

RESULTS, FINDINGS AND INTERPRETATIONS

The results of this study are presented in two parts. The first part employed multiple regression analysis of sixteen independent variables, relating to U.S. federal export control policies, U.S. national security, U.S. government assistance programs, and Middle Eastern technology absorption capabilities, with the dependent variable measuring the Middle East technocrats’ overall attitudes and perceptions regarding U.S. technology trade and export controls.

The second part consists of descriptive statistics which tabulate the frequency distributions for each of the sixteen independent variables. Next, the results of the true and false statements measuring respondents’ knowledge of the issues pertinent to U.S. technology export controls and policies are presented. Lastly, the demographic dimensions of the eighty-four respondents are summarized and presented.
PART ONE: MULTIPLE REGRESSION

The regression analysis enables us to test the advanced propositions and to determine the degree of association between independent variables and the dependent variable so as to ascertain the salience of these variables for explaining the technocrats' overall attitudes towards U.S. technology controls.

The dependent variable \( Y \) is regressed against the independent variables \( X_1, X_2 \ldots X_{16} \) so as to determine which variables explain the variance--measured by the multiple correlation coefficient \( R^2 \)--in the technocrats' attitudes and perceptions.

\[
Y = \text{Do you agree that U.S. technology trade and exports are not successfully penetrating the Middle East market (Saudi Arabia, Kuwait, Egypt among others)?}
\]

\[
X_1 = \text{U.S. export policies regarding technology transfer to the Middle East are far more restrictive than other Western nations and Japan.}
\]

\[
X_2 = \text{U.S. Government policies toward trade with the Middle East are restraining U.S. Corporation's competitiveness.}
\]

\[
X_3 = \text{The U.S. Government is imposing tighter restrictions on technology transfer to the Middle East.}
\]

\[
X_4 = \text{The United States is slow to disseminate export policy changes to U.S. corporations.}
\]

\[
X_5 = \text{The current export policy controls to the Middle East are unnecessary to insure U.S. national security.}
\]

\[
X_6 = \text{The U.S. Government should not reduce flows of military technology to countries whose foreign policies run counter to those of the U.S.}
\]
X7 = U.S. firms' export competitiveness is as important as U.S. National Security.

X8 = The U.S. Government needs to design specific programs to subsidize corporate U.S. exports.

X9 = Government funds should subsidize promotional programs to support exports by U.S. firms to the Middle East.

X10 = The private sector alone should not finance technology transfer to the Middle East.

X11 = Middle Eastern countries have limited local technological capabilities to absorb technology from the U.S.

X12 = Western technology exported to the Middle East will speed economic growth in the Middle East.

X13 = Western technology exported to the Middle East will not clash with Middle Eastern traditions.

X14 = The recipient nation in the Middle East knows what technology to ask for.

X15 = U.S. technology transfer to the Middle East will decrease Middle Eastern nations' technological dependence.

X16 = Middle Eastern oil revenues are being used to purchase advanced technology so the oil-rich countries will not be solely dependent on oil.

The effect of the independent variables jointly upon the respondents overall attitude was determined by multiple regression. The regression of the independent variables X1, X2, ..., X16 yielded the following regression equation and table:

\[ Y = -0.410 + 0.444x1 + 0.142x2 - 0.0412x3 + 0.277x4 - 0.073x5 + 0.220x6 + 0.0776x7 - 0.0474x8 - 0.0709x9 + 0.154x10 + 0.040x11 + 0.461x12 + 0.0973x13 - 0.0714x14 + 0.0830x15 - 0.0413x16 \]
Table 10
Regression

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coefficient</th>
<th>St. Dev.</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.4102</td>
<td>0.5760</td>
<td>-0.71</td>
</tr>
<tr>
<td>X1</td>
<td>0.44372</td>
<td>0.08247</td>
<td>5.38</td>
</tr>
<tr>
<td>X2</td>
<td>0.142</td>
<td>0.1206</td>
<td>1.18</td>
</tr>
<tr>
<td>X3</td>
<td>-0.04124</td>
<td>0.07640</td>
<td>-0.54</td>
</tr>
<tr>
<td>X4</td>
<td>-0.2768</td>
<td>0.1013</td>
<td>2.73</td>
</tr>
<tr>
<td>X5</td>
<td>-0.0729</td>
<td>0.1311</td>
<td>-0.56</td>
</tr>
<tr>
<td>X6</td>
<td>0.22029</td>
<td>0.07319</td>
<td>3.01</td>
</tr>
<tr>
<td>X7</td>
<td>0.07759</td>
<td>0.06288</td>
<td>1.23</td>
</tr>
<tr>
<td>X8</td>
<td>-0.04742</td>
<td>0.06574</td>
<td>-0.72</td>
</tr>
<tr>
<td>X9</td>
<td>-0.07092</td>
<td>0.07056</td>
<td>-1.01</td>
</tr>
<tr>
<td>X10</td>
<td>0.15387</td>
<td>0.06949</td>
<td>2.21</td>
</tr>
<tr>
<td>X11</td>
<td>0.0405</td>
<td>0.1100</td>
<td>0.37</td>
</tr>
<tr>
<td>X12</td>
<td>0.4606</td>
<td>0.1852</td>
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<td>X14</td>
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<td>X15</td>
<td>0.08295</td>
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<td>1.33</td>
</tr>
<tr>
<td>X16</td>
<td>-0.04131</td>
<td>0.07079</td>
<td>-0.58</td>
</tr>
</tbody>
</table>

\[ S = 0.5990 \quad R\text{-sq.} = 58.9\% \quad R\text{-sq. (adj)} = 49.0\% \]

The regression yielded an \( R^2 \) of 58.9\%. This indicates that the variables \((x_1 - x_{16})\) explain 59\% of the variance in the respondents' overall attitudes.

Analysis of the T-Ratios for each of the Independent variables indicates that only variables \( X_1, X_4, X_6, \) and \( X_{12} \) have a significant effect on the technocrats' overall attitude at the 90\% confidence level which was set a priori.
Table 11

Regression Of Significant Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Computed T-Value</th>
<th>T-Ratio at 90% Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>5.38</td>
<td>1.64</td>
</tr>
<tr>
<td>X₄</td>
<td>2.73</td>
<td>1.64</td>
</tr>
<tr>
<td>X₆</td>
<td>3.01</td>
<td>1.64</td>
</tr>
<tr>
<td>X₁₂</td>
<td>2.49</td>
<td>1.64</td>
</tr>
</tbody>
</table>

The revised form of the regression equation is:

\[ Y = -0.101 + 0.453 \, X₁ + 0.186 \, X₆ + 0.245 \, X₄ + 0.398 \, X₁₂ \]

The questions, in order of significance, are as follows:

1. U.S. export policies regarding technology transfer to the Middle East are far more restrictive than other Western nations and Japan.
6. The U.S. Government should not reduce flows of military technology to countries whose foreign policies run counter to those of the U.S.
4. The United States is slow to disseminate export policy changes to U.S. corporations.
12. Western technology exported to the Middle East will speed economic growth in the Middle East.

The reduction in the number of variables from sixteen to only four lowered the \( R^2 \) from 58.9% to 49.0%. The tentative propositions, one, two, three, and four, given the high T-Ratios ought to be validated as acceptable.

**TENTATIVE PROPOSITIONS**

**Proposition One:**

U.S. federal export control policies have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.
Proposition Two:

U.S. national security concerns have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

Proposition Three:

U.S. government assistance programs have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

Proposition Four:

Middle Eastern societies' technology absorption capabilities and limitations have a significant effect on Middle Eastern technocrats' perceptions and attitudes towards successful technology trade and transfer by U.S. firms to the Middle East.

PART TWO: DESCRIPTIVE STATISTICS

Table 12

Frequencies of x1...x16 and Y

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<thead>
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<th>Y</th>
<th>Count</th>
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<tr>
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<td>84</td>
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<table>
<thead>
<tr>
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<th>Count</th>
<th>x3</th>
<th>Count</th>
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<th>Count</th>
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<td>44</td>
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<td>1</td>
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<td>2</td>
<td>27</td>
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<td>26</td>
</tr>
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<td>8</td>
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<td>4</td>
<td>10</td>
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Table 12 (continued)

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<table>
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<th>Count</th>
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<td>4</td>
</tr>
<tr>
<td>N=</td>
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<td>84</td>
<td>N=</td>
<td>84</td>
<td>N=</td>
<td>84</td>
</tr>
</tbody>
</table>

The purpose of this section is to present an item by item analysis of the questionnaire, hoping to detect skewness and central tendencies of the sample population’s collective responses. It can be shown that 90% of the respondents strongly believed that U.S. technology trade and exports are not successfully penetrating the Middle East market.

Items x1, x2 and x4 are skewed positively with 89%, 84%, and 87% respectively of the respondents agreeing that U.S. federal export control policies are restrictive. Item x3 showed some traces of central tendency with 37% responding neutral or negatively.

Items x5...x7 probed the respondents’ attitudes towards U.S. national security concern. Ninety-one percent of the respondents agree that the current export policy controls to the Middle East are unnecessary to insure U.S. national
security. On the other hand, the results of item x6 show little consensus among the selected Middle Eastern technocrats that the U.S. government should reduce flows of dual-use technology to countries whose foreign policies run counter to those of the U.S.; roughly half of the respondents answered this item neutral. Item x7 shows that the majority of sampled technocrats agree the U.S. firms’ export competitiveness is as important as U.S. national security.

Items x8...x10 refer to U.S. government assistance programs. The results of item x8 indicate that there is little consensus as to whether the U.S. government needs to design specific programs to help U.S. corporate exports. Furthermore, the responses for x9 were also distributed across the five point scale showing that it is not clear whether or not the U.S. government should subsidize promotional programs to support exports by U.S. firms to the Middle East. Item x10 shows that 73% of the respondents agree that the U.S. needs to supply U.S. exporters with more information regarding ways they can better penetrate the Middle East market.

The technology absorption scale includes items x11...x16. Roughly 90% of the Arab technocrats agree with item x11 that the Middle East countries have limited local technological capabilities to absorb technology from the
U.S. Furthermore, item x12 was strongly skewed revealing that 72 of the 84 respondents agree that Western technology exported to the Middle East will enhance their economic growth potential. Item x13 was evenly distributed with total lack of consensus. It is not clear whether Western technology will clash with Middle Eastern traditions. Item x14 shows some signs of central tendencies; roughly 23% agreed or disagreed that the Middle Eastern country knows what technology to ask for. Most of the selected technocrats agree that U.S. technology will decrease the Middle East’s technological dependence. Finally, 87% of the Middle Eastern respondents agree that oil revenues are being used to purchase technology which in turn will reduce their oil dependency.

Respondents’ Knowledge Scores

The purpose of this section is to show that the sample population of Middle Eastern technocrats (n=84) has an informed knowledge base of the issues surrounding U.S. technology transfer controls to the Middle East. The respondents true and false questions consisted of eight items. A score of five or above indicated significant knowledge of the explored issues in this study.

The percentage of respondents who answered the items correctly ranged from a high of 100% on item one to a low of
92% on item eight. The high scores validate that the respondents do, in fact, have a sound knowledge base of the issues explored in this study.

Table 13

Respondents' Knowledge score
(Based on 8 item true/false test)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Iraq, Syria, Libya, and Yemen have been subject to stricter export controls than other Middle Eastern countries. (T)</td>
<td>84</td>
<td>100</td>
</tr>
<tr>
<td>2. The value of approved licenses for the export of dual-use items to the Middle East is increasing. (F)</td>
<td>83</td>
<td>99</td>
</tr>
<tr>
<td>3. Total U.S. exports to the Middle East average 20% of total annual U.S. exports. (F)</td>
<td>82</td>
<td>97</td>
</tr>
<tr>
<td>4. Controls set up by the Coordinating Committee on Multilateral Export Controls (COCOM) are becoming tighter. (F)</td>
<td>82</td>
<td>97</td>
</tr>
<tr>
<td>5. Saudi Arabia is the third largest export market for the U.S. (F)</td>
<td>83</td>
<td>99</td>
</tr>
<tr>
<td>6. COCOM information is designated as classified for national security reasons. (F)</td>
<td>81</td>
<td>96</td>
</tr>
<tr>
<td>7. Other COCOM countries treat COCOM information in a more liberal manner than the U.S. (T)</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>8. The U.S. Department of Commerce's export licensing decisions are published in the United States. (F)</td>
<td>77</td>
<td>92</td>
</tr>
</tbody>
</table>
Respondent’s Demographics

The majority of the selected 84 technocrats came from Egypt, Jordan, and Tunisia. The balance of participants were evenly distributed from the remaining Middle Eastern countries. Furthermore, the majority of respondents were male. The few female respondents resided in Egypt or Jordan. The average age distribution was between 30-49 years old. The population sample’s level of education was quite high with 56% holding four year degrees and the balance holding graduate degrees.

Table 14
Respondent’s Demographics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
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<td>94%</td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
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<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
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<td>17</td>
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<td>30-39</td>
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<td>2%</td>
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<td>50 or older</td>
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<tr>
<td>Total</td>
<td>84</td>
<td>100%</td>
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Table 14 (continued)

<table>
<thead>
<tr>
<th>Citizenship</th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
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<tr>
<td>Bahrain</td>
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<td>2%</td>
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<td>Saudi Arabia</td>
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<td>2</td>
<td>2%</td>
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<td>Oman</td>
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<td>Morocco</td>
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<tr>
<td>Libya</td>
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<td><strong>Totals</strong></td>
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</tr>
<tr>
<td>4-year College Degree</td>
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</tr>
<tr>
<td>Some Graduate Work</td>
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<tr>
<td>Graduate Degree</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>100%</strong></td>
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</tbody>
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CHAPTER V

CONCLUSION AND
RECOMMENDATIONS FOR FUTURE RESEARCH

CONCLUSION

The results of the study unveil several salient issues surrounding U.S. technology transfer to the Middle East. The technology transfer process is governed by a complex duality of supplier country government controls and policies as well as recipient technology importer’s indigenous constraints and limitations. The Middle Eastern recipient’s constraints include: Human resource shortages and skill formation, and a skewed population base comprised mostly of young economically inactive individuals. The exclusion of women from the workplace further exacerbates this. The shortages in skilled personnel have resulted in labor importing strategies from regional and Western countries in the short-run, but remains a critical factor for economic development and technological transformation. In the long-run, the local scientific and technical cadre must, however, increase. A highly trained labor force must be developed and must become capable of operating and maintaining a diversified competitive industrial economy.

Modernization and social change are other limiting
factors in this process of economic and technological transformation. Traditionalists wary of westernization and the threat to indigenous culture and values could slow down the technology absorption process. The technocrats must be able to convince the traditionalists that the social and economic benefits far outweigh the cultural costs and dislocations of this process.

U.S. based firms and technology suppliers, on the other hand, find themselves subject to government controls and restrictions as well as concerns regarding U.S. national security. The lack of government assistance programs and export support enhancement programs combined with the absence of information dissemination and retrieval mechanisms further inhibits the technology transfer process and negatively impacts U.S. firms competitiveness.

It is apparent that the U.S. government lags in information dissemination on technology transfer when compared to other OECD governments. (Japan, Germany, England and France) The U.S. government’s slow approach to identifying and collecting information on how to transfer technological products and processes combined with its somewhat lackadaisical approach on information dissemination creates an unfavorable environment for U.S. industries’ global competitiveness.
The U.S. government must strike a balance between global economic competitiveness and national security concerns and come to terms with their regulative technology transfer positions. State and local governments must also become active partners with the federal government in promoting technology transfer schemes and global economic links. U.S. federal, state, and local governments should act jointly as a clearing house for information on technology transfer to certain countries. This will aid corporations and small and medium sized firms in their ability to access and easily retrieve pertinent information regarding growth markets and technology exports.

At a time when national security concerns are being defined in economic terms, it is necessary for supplier countries to refocus their regulative technology transfer positions in favor of increasing market share. Increasing market share in an oil rich region of the world is a pressing concern for the U.S., given its dependency on foreign sources of energy. (The U.S. is the largest single importer of oil.)

Building viable and competitive U.S. industries, which can generate and earn revenues in the Middle East ought to be a part of a new interpretation of U.S. national security. OECD countries which strive to understand the social, political, and economic options and idiosyncrasies of the
Arab Middle East will be better positioned to manage the technology transfer process to the region.

At 1990 production levels, America’s existing proven oil reserves could leave the U.S. without any indigenous oil producing capabilities by the year 2005. In contrast, major Arab suppliers are situated to be active oil producers well into the twenty-third century as the following table illustrates.

Table 15
Future Years Of Oil Production

<table>
<thead>
<tr>
<th>Years of Production* at 1990 levels</th>
<th>Years of Production* at 1990 levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East and N. Africa</td>
<td>Rest of World:</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>USA</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Canada</td>
</tr>
<tr>
<td>Neutral Zone</td>
<td>Mexico</td>
</tr>
<tr>
<td>Iran</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Iraq</td>
<td>Norway</td>
</tr>
<tr>
<td>UAE-Abu Dhabi</td>
<td>USSR</td>
</tr>
<tr>
<td>UAE-Dubai</td>
<td>Other Eastern</td>
</tr>
<tr>
<td>UAE-Sharjah</td>
<td>Europe</td>
</tr>
<tr>
<td>Qatar</td>
<td>China, People’s</td>
</tr>
<tr>
<td>Oman</td>
<td>Repub.</td>
</tr>
<tr>
<td>Bahrain</td>
<td></td>
</tr>
<tr>
<td>Syria</td>
<td>World Total</td>
</tr>
<tr>
<td>Algeria</td>
<td></td>
</tr>
<tr>
<td>Libya</td>
<td>43</td>
</tr>
<tr>
<td>Egypt</td>
<td></td>
</tr>
<tr>
<td>Tunisia</td>
<td></td>
</tr>
<tr>
<td>Yemen</td>
<td></td>
</tr>
<tr>
<td>Middle East and N. Africa total</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Including crude oil, shale oil, oil sands and natural gas liquids.

This further indicates the importance of the Arab oil states as technology buyers and major suppliers of oil to
the oil dependent OECD countries.

Moreover, conditions for facilitating consistent and even technology flows must also focus on some missing factors within the internal (recipient) countries of the Arab Middle East. Finding indigenous solutions to regional and local concerns could enhance technology creation and transfer.

"The post-Cold War retreat of the superpowers from the region offers its inhabitants a unique opportunity to take their destinies into their own hands," according to Murphy. She further quotes David Fromkin, a Middle Eastern historian, "The [virtual] disappearance of the great powers" has freed the peoples of the region "to do things on their own--for good or for ill." (Murphy, September 6, 1992)

It is up to the Arabs to find indigenous solutions to their current technological quandaries. It is not always opportune for technology recipients to simply buy "off the shelf" technologies with no suitable means for innovating them. In an age of "footloose" limited life cycle technologies, it is necessary for Arab technocrats to alleviate as many internal factor endowment constraints as possible in order to increase the free flow of technology and their innovative capabilities. Technological innovation refers to products or processes which increase the overall efficiency of producing new products or processes that
improve the "quality" of life for the consumers or recipients of the product and the society at large.

(Rosenberg, 1987)

Arab technocrats must move to strengthen internal mechanisms for studying and seeing how world class technologies could serve their unique endowments and socio-economic needs. The questionnaire in this study did not specifically probe Arab technocrats’ readiness to break down the technology process, but the technocrats’ responses to open-ended questions indirectly revealed technological skepticism and improvidence. The apprehensions and fears of technocrats are captured by the following:

"The new world order is decentralized, flexible, technological. And these [Middle Eastern] societies are the least able to adjust because of their state structures. Clearly, there is going to be some major transformation...

Conditioned for decades to believe that every event flowed from a grand "outside" conspiracy, Arabs could conveniently excuse themselves of responsibility for their actions. Washington and Moscow were the internal scapegoats for Arab inaction, misjudgment and rivalries...If you are left to your own devices, who is there to blame but yourself? That kind of psychological change is rather wrenching." (Murphy, September 6, 1992)
Recipient Middle Eastern countries desiring an enhanced and smoother technology transfer process, particularly the ones in the regulative-restrictive category, ought to design more liberal political and economic structures that are acceptable to U.S. and other OECD countries' technology regulators and policy-makers. The creation of a more open political and economic climate in the Middle East could make it easier for U.S. policy-makers to relax export restrictions. In turn, this will allow U.S. based corporations greater access to the Middle Eastern market. Middle Eastern countries classified as restrictive are denied access to U.S. based technological products and processes. As a result, these countries turn to other OECD suppliers; namely Germany, Japan, Italy, France and England.

On the supplier (external) side, it is recognizable that technology controls and restrictions by themselves are dysfunctional, especially for the U.S. It is recommended that OECD countries "harmonize" the controls and regulations embedded in the technology transfer process. This will create a level playing field that plugs current loopholes so that Middle Eastern countries labeled as restrictive will not be able to turn to other OECD suppliers for technologies. Under this arrangement, U.S. firms will not lose market share. Thus, if supplier OECD countries harmonize technology controls and regulations and recipient
Middle Eastern countries foster the proper climate for technology transfer on the inside, U.S. firms should become more competitive.

Furthermore, on the recipient (internal) side, Middle Eastern technocrats need to be cognizant not only of outside constraints blocking technology transfer, but of their own internal constraints as well. Looking for internal remedies presents the Arabs with a somewhat overwhelming psychological challenge.

To ease this burden and caveat, it is recommended that Arab technocrats establish Technology Mediating Centers (TMCs). These centers could link Middle Eastern industries with global sources of technology. Specifically, the role of such centers would be to:

1. Facilitate increased cooperation between supplier firms, OECD governments, and indigenous industries.

2. Sponsor indigenous technological research and development.

3. Adapt and innovate borrowed technologies.

The centers will strengthen technological capabilities by examining imported technologies in order to determine appropriate ones to be acquired or purchased. This will further enhance local innovations and the upgrading of imported technologies.
The establishment of Technology Mediating Centers will bring technology suppliers and recipients closer together. Representatives of local firms and foreign industry could work to speed up the transfer process. The overall task is to design and implement joint strategies in an interactive chain for managing the technology transfer process. Technology mediating centers will also strengthen technology diffusion throughout the Middle East, through shared information among Middle Eastern technology importing industries.

The inclusion of these two interactive mechanisms, harmonization and technology mediating centers, in the overall technology transfer process, allows for the reshaping of a new policy framework for OECD governments' controls as they relate to and impact Middle Eastern recipient nations and U.S. firms' competitiveness. Sustained viable economic linkages call for refinements and modifications in how both recipients and suppliers manage the technology transfer process. Harmonization of OECD controls as well as the establishment of local technology mediating centers could result in a more functional technology transfer process as the following figure illustrates.
Figure 10: Economic Growth and Competitiveness
Finally, U.S. technology suppliers will have to be competitive in price—which until recently has not been the case. The oil price increases of the 1970s and 1980s afforded the Arab oil producers the ability to purchase technology regardless of price. During the 1990s, competition will be keen and technology suppliers and recipients will both have to become more cost conscious.

LIMITATIONS OF THE STUDY

The limitations of the study reflect the following: Attitude research has limited predictive capabilities. Often times, people do not behave in accord with their attitudes and there could be disparity in the attitudinal and behavioral objects studied. (Mueller, 1986) Furthermore, attitudes are often temporary and changeable. (Remmers, 1954)

Secondly, the use of a purposive sample lends itself to questions of generalizability. Third, the inclusion of only Arab-speaking countries further limits the research. Moreover, Middle Eastern countries' turbulent political environments as well as some others' restrictive political culture makes it difficult to do "truly" objective socio-economic research.

Finally, the limitations of interviewing entail issues of validity and reliability; for example how well can other
researchers replicate the study and achieve the same results.

**FUTURE RESEARCH**

This study sheds light on the need for joint support programs among corporate America and the federal government. Assessing attitudes of U.S. corporate spokespersons and decision-makers (i.e. Presidents of international operations, international bankers and business persons) towards technology transfer to the Middle East is a potential area for future research. Tapping U.S policy-makers’ attitudes on technology transfer to the Middle East is also a significant research topic. Comparing and contrasting the results of the attitude assessments of these two groups will trace areas of convergence and divergence. Once this is known, the two groups could work together in finding common ground for future corporate-federal technology transfer and export policies to the Middle East.

This same kind of analysis could be done across industries, for example, aircraft, petrochemicals, pharmaceuticals. Another direction future research can take is to examine other OECD countries’ policies and attitudes (particularly Japan, Germany, France and England) towards technology transfer to the Middle East. Probing these dimensions will generate a more holistic view of economic
growth and the competitiveness process and the role technology transfer plays in this interdependent exchange. Furthermore, future research on technology transfer to the Middle East could focus on specific Middle Eastern countries, i.e. Saudi Arabia, Kuwait, Jordan, Egypt. Each country has unique internal dimensions which set them partially apart from the others. Understanding specific countries’ local perspectives will help OECD suppliers facilitate a more focused technology transfer process.

Finally, it would be beneficial to consider what it actually takes for a "restricted" Middle Eastern country to move to the promotional category. For example, what are the specific conditions, acceptable to U.S. regulators, which lead to this transformation?

These suggestions for future research are timely; given our increasingly interconnected world. Technology transfer is not a one-way process, but an interrelated and interactive phenomenon. A process, originally marred by mutual disdain, is beginning to show signs of accommodation on the part of both recipients and suppliers.
APPENDIX A

SURVEY QUESTIONNAIRE
PART 1

Briefly relate how you feel about U.S. technology transfer to the Middle East, and then respond to the following general statements.

Please indicate the degree to which you agree with each statement by circling one of the numbers following each statement.

**KEY**

<table>
<thead>
<tr>
<th>1 = Strongly Agree</th>
<th>2 = Agree</th>
<th>3 = Undecided or No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 = Disagree</td>
<td>5 = Strongly Disagree</td>
<td></td>
</tr>
</tbody>
</table>

**OVERALL:**

Do you agree that:

1. U.S. technology trade and exports are not successfully penetrating the Middle East market (Saudi Arabia, Kuwait, Egypt among others)

**FEDERAL CONTROL POLICY SCALE**

1. U.S. export policies regarding technology transfer to the Middle East are far more restrictive than other Western nations and Japan.

2. U.S. Government policies toward trade with the Middle East are restraining U.S. Corporation's competitiveness.
FEDERAL CONTROL POLICY SCALE

3. The United States is slow to disseminate export policy changes to U.S. corporations.
   Agree  Disagree
   1  2  3  4  5

4. The U.S. Government should take the initiative in organizing consortia on behalf of technology exporting firms to the Middle East.
   Agree  Disagree
   1  2  3  4  5

NATIONAL SECURITY

1. The current export policy controls to the Middle East are unnecessary to insure U.S. national security.
   Agree  Disagree
   1  2  3  4  5

2. The U.S. Government should not reduce flows of dual-use technology to countries whose foreign policies run counter to those of the U.S.
   Agree  Disagree
   1  2  3  4  5

3. U.S. firms' export competitiveness is as important as U.S. National Security.
   Agree  Disagree
   1  2  3  4  5

U.S. GOVERNMENT ASSISTANCE SCALE

1. The U.S. Government needs to design specific programs to help U.S. corporate exports.
   Agree  Disagree
   1  2  3  4  5

2. U.S. Government should subsidize promotional programs to support exports by U.S. firms to the Middle East.
   Agree  Disagree
   1  2  3  4  5
**U.S. GOVERNMENT ASSISTANCE SCALE**

3. The U.S. Government does not provide adequate information to potential U.S. exporters to assist them in penetrating the Middle East market.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>

**PART 2**

**TECHNOLOGY ABSORPTION SCALE**

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>

1. Middle Eastern countries have limited local technological capabilities to absorb technology from the U.S.

2. Western technology exported to the Middle East will speed economic growth in the Middle East.

3. Western technology exported to the Middle East will not clash with Middle Eastern traditions.

4. The recipient nation in the Middle East knows what technology to ask for.

5. U.S. technology transfer to the Middle East will decrease Middle Eastern nations' technological dependence.

6. Middle Eastern oil revenues are being used to purchase advanced technology so the oil-rich countries will not be solely dependent on oil.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>
### PART 3

Please read each of the following statements. Circle "T" if the statement is true, and "F" if the statement is false.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>T</td>
<td>F</td>
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<tr>
<td>5</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>6</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>7</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>
PART 4

To finish this survey, we would like to ask questions about you and your background. Please circle only one response for each question. All information is confidential.

1. Gender
   a. MALE
   b. FEMALE

2. How old are you?
   a. 20 TO 29 YEARS OLD
   b. 30 TO 39 YEARS OLD
   c. 40 TO 49 YEARS OLD
   d. 50 TO 59 YEARS OLD
   e. 60 YEARS OLD OR OLDER

3. In what country is your citizenship?
   COUNTRY__________________

4. What is your highest level of education?
   a. 2-YEAR COLLEGE DEGREE
   b. 4-YEAR COLLEGE DEGREE
   c. SOME GRADUATE WORK
   d. GRADUATE DEGREE.

Thank you for taking the time to complete this survey.
APPENDIX B

SELECTED INTERNATIONAL ORGANIZATIONS
League of Arab States

Address: Tahrir Square, Arab League Building, Cairo, Egypt.
Telephone: (02) 750511
Fax: (02) 775626

Members

Algeria  Oman
Bahrain  Palestine
Djibouti  Qatar
Egypt  Saudi Arabia
Iraq  Somalia
Jordan  Sudan
Kuwait  Syria
Lebanon  Tunisia
Libya  United Arab Emirates
Mauritania  Morocco

Cooperation Council for the Arab States of the Gulf (GCC)

Address: POB 7153, Riyadh 11462, Saudi Arabia.
Telephone: 482-7777.

Members

Bahrain  Qatar
Kuwait  Saudi Arabia
Oman  United Arab Emirates
Council of Arab Economic Unity

Address: POB 925100, Amman, Jordan
Telephone: 664326-9

Members

Egypt  Somalia
Iraq  Sudan
Jordan  Syria
Kuwait  United Arab Emirates
Libya  Yemen
Mauritania
Palestine Liberation Organization

Arab Fund For Economic and Social Development

Address: POB 21923, Safat, 13080 Kuwait.*
Telephone: 2451580.
Fax: 2416758.

*Temporary Address: (1991): POB 10915, Manama, Bahrain.
Telephone: 536300
Fax: 536583

Members

Algeria  Palestine Liberation Organization
Bahrain  Qatar
Djibouti  Saudi Arabia
Egypt  Somalia
Iraq  Sudan
Jordan  Syria
Kuwait  Tunisia
Lebanon  United Arab Emirates
Libya  Yemen
Mauritania  Yemen
Morocco  United Arab Emirates
Oman
Arab Monetary Fund

Address: POB 2818, Abu Dhabi, United Arab Emirates.
Telephone: 215000.
Fax: (9712) 326454.

Members

Algeria                  Palestine
Bahrain                  Liberation
Egypt                    Organization
Iraq                     Qatar
Jordan                   Saudi Arabia
Kuwait                   Somalia
Lebanon                  Sudan
Libya                    Syria
Mauritania               Tunisia
Morocco                  United Arab
Oman                     Emirates
                         Yemen

Organization of Arab Petroleum Exporting Countries (OAPEC)

Address: POB 20501. safat, 13066 Kuwait.
Telephone: 2448200.
Fax: 2426885

Members

Algeria                  Libya
Bahrain                  Qatar
Egypt                    Saudi Arabia
Iraq                     Syria
Kuwait                   United Arab
                         Emirates
Organization of the Petroleum Exporting Countries (OPEC)

Address: Obere Donaustrasse 93, 1020 Vienna, Austria.
Telephone: (01) 21-11-20.
Fax: (01) 26-43-20.

Members

Algeria
Ecuador
Gabon
Indonesia
Iran
Iraq
Kuwait
Libya
Nigeria
Qatar
Saudi Arabia
United Arab Emirates
Venezuela

OPEC Fund for International Development

Address: POB 995, 1011 Vienna, Austria
Telephone: (01) 51-56-40.
Fax: (01) 513-92-38.

Members

Member countries of OPEC.

Organization for Economic Cooperation and Development (OECD)

Address: 2 rue Andre-pascal, 75775 Paris Cedex 16, France.
Telephone: (1) 45-24-82-00.
Fax: (1) 45-24-85-00.

Members

Australia
Austria
Belgium
Canada
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Luxembourg
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
Turkey
United Kingdom
USA
International Energy Agency

Address: 2 rue Andre-pascal, 75775 Paris Cedex 16, France.

Members

Australia         Netherlands
Austria           New Zealand
Belgium           Norway
Canada            Portugal
Denmark           Spain
Germany           Sweden
Greece            Switzerland
Ireland           Turkey
Italy             United Kingdom
Japan             USA
Luxembourg

The Commission of the European Communities is also represented.

Islamic Development Bank

Address: POB 5925, Jeddah 21432, Saudi Arabia.
Telephone: 6361400.
Fax: 6366871.

Members

Afghanistan       Indonesia       PLO
Algeria           Iran           Qatar
Bahrain           Iraq           Saudi Arabia
Bangladesh        Jordan         Senegal
Benin             Kuwait         Sierra Leone
Brunei            Lebanon        Somalia
Burkina Faso      Libya          Sudan
Cameroon          Malaysia        Syria
Chad              Maldives        Tunisia
Comoros           Mali           Turkey
Djibouti          Mauritania     Uganda
Egypt             Morocco        United Arab Emirates
Gabon             Niger          Oman
The Gambia        Pakistan       Yemen
International Monetary Fund (IMF)

Address: 700 19th St., N.W., Washington D.C., 20431, USA.
Telephone: (202) 623-7430
Fax: (202) 623-4661

Members

Afghanistan          Libya
Algeria             Morocco
Bahrain            Oman
Cyprus         Qatar
Egypt              Russia
Iran             Saudi Arabia
Iraq                Sudan
Israel            Syria
Jordan             Tunisia
Kuwait            Turkey
Lebanon        United Arab Emirates
                Yemen

International Fund for Agricultural Development

Address: Via del Serafico 107, 00142, Rome, Italy
Telephone: (06) 54591
Fax: (06) 5043463

Members

Category I
OECD Members

Category II
OPEC Members

Category III
Recipient Developing Countries
World Bank

Address: 1818 H. St., N.W., Washington, D.C., 20433, USA
Telephone: (202) 477-1234
Fax: (202) 477-6391

International Bank for Reconstruction and Development (IBRD)

International Development Association (IDA)

International Finance Corporation (IFC)
(Separate legal entity in the World Bank Group)

Multilateral Investment Guarantee Agency (MIGA)
(Affiliate of World Bank--legally and financially separate from World Bank)

Members

Only members of the International Monetary Fund are considered for membership in the World Bank.

North Atlantic Treaty Organization (NATO)

Members

Belgium
Canada
Denmark
France
Germany
Greece
Italy
Luxembourg
Netherlands
Norway
Portugal
Spain
Turkey
United Kingdom
United States

Coordinating Committee for Multilateral Export Controls (COCOM)

Members

All NATO countries.
BIBLIOGRAPHY


