Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

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Project — Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

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This document has been prepared in co-operation of experts from the Republic of Korea and the Sultanate of Oman. They are Jaehoon Lee, Tai Hee Lee, and Chun-hong Park, and Sung-ho Choi in Seoul, and Nahla Abdulwahab Al-Hamdi, Evangelos Afandras, and Darwish Almoharby in Muscat.

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The authors assume full responsibility for any errors.

Preface

In the 21st century, knowledge is the key factor in determining a country's level of socioeconomic development. From this recognition, the Knowledge Sharing Program (KSP) was launched in 2004 by the Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI). The KSP is designed to contribute to the socioeconomic development of the target partnership country by sharing Korea's development experiences. The most distinguishing characteristics of the program are that it is demand-driven and participation-oriented. The KSP analyzes the problems from the perspective of the partnership country and provides policy implications that are not far-reaching but practically implementable in the environment of the partnership country.

In May 2007, H.E. Ahmed bin Abdulnabi Macki, Minister of National Economy of the Sultanate of Oman, visited Seoul and held meetings with high-ranking officials from the Ministry of Strategy and Finance of the Republic of Korea. During his visit, H.E. Minister Ahmed bin Abdulnabi Macki and the Ministry of Strategy and Finance agreed on sharing Korea's development experiences with the Sultanate of Oman to assist in enhancing its national capacity and further, to strengthen bilateral ties. As a follow-up to this agreement, in March 2008, the Ministry of National Economy of the Sultanate of Oman sent a written Demand Survey Form concerning its areas of interest for the KSP.

Hence, the KDI has been working with the Ministry of National Economy of the Sultanate of Oman since May 2008 on the KSP for Oman. The involved parties have agreed to work on three specific research topics, which were chosen through in-depth pilot studies on the demands of Oman, and also taking into consideration the specialization of the Korean development experiences. These are: 1) Oman's Economy Today and the Vision for Tomorrow, 2) Strategic Industries, the Institutions, and the National Development in Oman, and

3) Technology Transfer and Domestication.

I would like to take this opportunity to express my gratitude to the project manager Dr. Jaehoon Lee and the project consultants - Dr. Tai Hee Lee, Dr. Sung-ho Choi and Dr. Chun-hong Park - for all their work in successfully completing the KSP for Oman. My sincere thanks also goes to H.E. Ahmed bin Abdulnabi Macki, Minister of National Economy and all Omani officials and counterpart experts who actively supported the project. Lastly, I would like to thank the members of the Office for Development Cooperation (ODECO) of KDI for their dedication and contribution to the project.

Upon this occasion of publishing the results of the KSP for Oman, I have a strong belief that the results will be of great value for both Korea and Oman. I sincerely hope that through this Knowledge Sharing Program, the Omani Government and relevant lines of ministry personnels could benefit from the Korean experiences. I also hope that our final report, which sets out policy recommendations from various perspectives, could be used as a catalyst in bringing the Omani economy one-step closer in achieving a successful and sustainable economic development. The policy recommendations in this report, however, are based on the Korean experiences and are solely the opinions and recommendations of the authors.

Oh-Seok Hyun
President
Korea Development Institute

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Jaehoon Lee, Tai Hee Lee, Chun-hong Park, and Sung-ho Choi in Seoul and Nahla Abdulwahab Al-Hamdi, Evangelos Afandras, and Darwish Almoharby in Muscat

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3Ps, PPP	Public-Private Sector Partnership
BI	Business Incubator
CDMA	Code Division Multiple Access
DMB	Digital Multimedia Broadcasting
EPB	Economic Planning Board of Korea
ESC	Economic Strategic Committee
ETRI	Electronics and Telecommunications Research Institute (Korea)
FDI	Foreign Direct Investment
GCC	The Co-operation Council for the Arab States of the Gulf
GDP	Gross Domestic Product
GOK	Government of the Republic of Korea
GOSO	Government of the Sultanate of Oman
GRI	Government-Funded Research and Training Institute
HDI	Human Development Indicators
HRD	Human Resource Development
ICU	Information and Communications University (Korea)
IT	Information Technology
ITA	Information Technology Authority of the Sultanate
KOM	Knowledge Oasis Muscat
KOTRA	Korea Trade-Investment Promotion Agency
KOSDAQ	Korean Securities Dealers Automated Quotations
KRW	Korean Won (currency unit)
LE	Large Enterprise
M&A	Merger and Acquisition
MOCI	Ministry of Commerce and Industry of the Sultanate
MONE	Ministry of National Economy of the Sultanate

NIC	Newly Industrialised Country
OCCI	Oman Chamber of Commerce and Industry
OCIPED	Oman Center for Investment Promotion and Export Development
ODB	Oman Development Bank
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
PEIE	Public Establishment for Industrial Estates
R&D	Research and Development
RO	Omani Rial (currency unit)
SITC	Standard International Trade Classification
SME	Small- and Medium-Sized Enterprise
SQU	Sultan Qaboos University
TDX	Time Division Exchange
TKM	The Knowledge Mine
TRC	The Research Council of the Sultanate
UCC	User Created Contents
VAT	Value-Added Tax
WiBro	Wireless Broadband Internet

EXECUTIVE SUMMARY

Vision 2020 and Oman's Aspiration for Future Growth

Oman's national development strategy envisages the development of a dynamic private sector that will undertake a leading role in the nation's development. The strategy portrays the existence of a self-reliant private sector as a *sine qua non* of sustainable growth, while the Government of the Sultanate of Oman (GOSO) reasserts itself as a provider of "strategic guidance" in the development process. In short, the GOSO sees the private sector as the main thrust of the nation's future growth.

However, there are numerous challenges to the realisation of this vision. One of the most formidable challenges that Oman faces is dealing with rentier tendencies and dependency of the private sector resulting from the long-term dominance of the government in the economic sphere and the lack of private sector initiatives therein. Indeed, the government's dominance in the economic sphere tends to crowd out private sector initiatives.

It was inevitable that the GOSO assumed the role of the growth engine due to Oman's commodity-based economic structure. The problem, however, is that this economic structure did not produce sustained growth. Although Oman was successful in broadening private sector participation in its economic activities, as evidenced by the fact that the share of private investment almost doubled to 8.6% in 2000 from 4.4% in 1995, the growth was not sustainable.

While these facts elucidate the vision and the rationale of Oman's national development strategy of encouraging the private sector to take a more active role in future growth, they also call to attention an important question: "How can the GOSO consolidate the public and private sector capacities through which a momentum of sustained growth can be established?" This

question provides the point of departure for this project.

Taking into consideration Oman's socioeconomic reality that the private sector capacity vis-á-vis the public sector capacity is highly lopsided, this document looks into a new wave of economic development strategy based on a public-private partnership, which is to build a network of institutions, or a web of 'soft infrastructure.' In Oman's setting, this translates to setting up an institutional platform on which concerted efforts of the public and private sectors can be arrayed for national development. This logic can be re-emphasised as follows:

(1) PPP is a new wave of development paradigm which is consistent with the strategic framework of Oman's development strategy, Vision 2020, that places an emphasis on the fostering of private sector capacities and the encouragement of its participation in the national development process;
(2) In the context of Oman's national development, the PPP is meant to build a soft infrastructure, a web of efficient institutions, or an institutional platform;
(3) The development of strategic industries in Oman is a conduit to the achievement of the goals set forth in Vision 2020;
(4) Hence, the building of an institutional platform that serves as a support for the development of Oman's strategic industries is tantamount to how the PPP should be structured in Oman.

To this extent, this study puts forth an institutional platform that is structured to support the development of Oman's strategic industries. The main objective of this study is two-fold: (1) to propose an institutional platform that systematises private sector participation which integrates public and private sector capacities, and (2) to identify the roles and responsibilities of the respective elements in that platform for the development of Oman's strategic industries.

Oman, like most other GCC neighbours, depends highly on commodity revenue, especially from oil. This implies that Oman's economy is highly susceptible to external shocks. In addition, many in Oman are concerned about the declining oil production that began in 2001. Therefore, insulating its economy from external shocks and maintaining macroeconomic stability have become economic policy exigencies in Oman.

As the high reliance on oil is attributable to the economy's susceptibility, the GOSO is determined to ward off external shocks by diversifying the economic structure - the industrial structure in particular. Such a resolution is manifested by Vision 2020 - the overarching strategy for the future development of the Sultanate.

The idiosyncrasy of Oman's industrial fabric is that the service industry is by far larger than any others. This pattern of inter-industry disparity is also displayed within industries. For

instance, refined petroleum products account for nearly 60% of the value added in the manufacturing industry as a whole, implying that the dependency on oil and gas is also prevalent in the manufacturing industry. This means that the local manufacturing industry may also be susceptible to external shocks. Hence, it is imperative for Oman to diversify its industrial structure, thereby tapering off negative impacts on its economy from these shocks.

A comprehensive framework of Oman's industrial development, thus the economic development of the nation as a whole, is well documented in the "Future Industrial Strategy of the Sultanate" devised by the Ministry of Commerce and Industry. The document not only identifies the strategic industries of the Sultanate, but also delineates the areas in which the Sultanate has to lodge its developmental focus - i.e., finance, human resource development, digitalisation, and the like - in order to provide an impetus for the development of strategic industries. Furthermore, the document also suggests that the future socioeconomic structure of Oman should be driven by knowledge-based industries.

In this regard, it is interesting to note a World Bank report on the magnitude of a knowledge economy proxied by the Knowledge Economy Index. Oman is ahead of all its GCC neighbour countries in the economic incentive and institutional regime area, but lagging behind in the innovation, education, and ICT. Why is Oman lagging in other socioeconomic areas?

Perhaps Oman's institutional strengths are not translated enough to be the driving force for the promotion of other socioeconomic areas. Therefore, the uncovering and redressing of the bottlenecks, that hinder the flow of institutional strengths to other socioeconomic sectors in Oman becomes of the utmost importance.

Support Institutions, Policy Intermediaries, and the Three Pillars of National Development

As identified in the "Future Industrial Strategy of the Sultanate," the key to the post-oil diversification effort in Oman seems to be the activation of the country's manufacturing industry. The manufacturing industry in general brings forth two crucial benefits to an economy: (1) linkage effect and (2) innovation effect. Thus, it is not surprising that Vision 2020 has set an ambitious goal of increasing the contribution of the manufacturing sector to 15% of the GDP by 2020.

The institutional foundation plays a significant role in this regard. The institutional foundation consolidates the public and private sector's willingness to push forward with issues of national development and to amass their capacities accordingly. In addition, it acts as a pilot agency and a policy intermediary in the course of national development.

The development paradigm in Korea still pivots around the main pillars set in the early days of its development by the developmental elites of the public sector. Those are as follows:

(1) policy-making and intermediating organisational structure;
(2) industry support financial systems; and
(3) R&D and HRD systems to develop and foster innovation and entrepreneurship.

The institutions in Oman, regardless of belonging to the public sector, have developed well vertically but not horizontally. Therefore, there is an exigency of having no governmental entity that is responsible for co-ordinating organisational functions and responsibilities of the public and private sector institutions to prevent redundancy and inefficiency. It is recommended that:

- **Recommendation 1**: The GOSO create an inter-ministerial co-ordinating governmental body such as the Industrial Development Commission (IDC).

This commission will be mandated to co-ordinate and integrate policy resources and capacities of industrial development-related ministries as well as private sector institutions. One of the most important mandates of the IDC, will be monitoring and evaluating the progress of developmental policies/programmes at every stage.

It is quite ideal that the GOSO, via the IDC, confines its role to a pilot agency, concentrating largely on planning, monitoring, and evaluating activities. The role of a policy intermediary, the role of actually implementing the policies, is recommended to be delegated to quasi-governmental organisations, that are managed like profit-oriented enterprises by non-government managers. This structure highlights a division of labour between the GOSO as a pilot agency and quasi-governmental organisations as the policy intermediaries.

Then, an interesting question at this point would be: "What is the pertinence of the policy intermediary's presence?" The answer to this question is two-fold: specialisation and efficiency. Based on this postulate, it is also recommended that:

- **Recommendation 2**: The GOSO establish a policy intermediary to execute the industry support policies/programmes designed by the government especially for the SME sector.

The GOSO presently plans and delivers most of the industry support services. As mentioned above, it would be more effective if the support functions are divided between the GOSO and the policy intermediary. The policy intermediary will be a quasi-governmental organisation that is managed in a profit- and customer-oriented manner.

If the policy intermediaries represent public sector efforts in the private and public sector co-

operation, business associations are the institutionalisation of private sector efforts in the forging of the public-private co-operation. The main objectives of the business associations include aggregation and representation of business interests. As for the government, it will be able to effectively administer the policies/programmes when the dissemination is conducted by a collective body. For example, Korea encouraged the establishment of business associations to achieve similar objectives, as reflected in its Industrial Development Act. Therefore, the GOSO is recommended:

- **Recommendation 3**: To encourage the establishment of business associations in respective industries.

In Oman's environment, it would be plausible to establish business associations starting in such strategic industries as agriculture, fisheries, and tourism, and expand it to the ICT and other industries as they develop.

The financial support system, the public finance system in particular, is one of the most crucial elements in industrial development. It is often the case that public financing fills in the gap left by the private financial institutions, particularly by those companies that are usually shunned in financing, such as long-term, large-scale equipments/facilities or SMEs.

The financial system of Oman is generally well in place. The number of programmes established in both the public and private sector that support SMEs are not scarce. Nonetheless, it seems the absence of policy co-ordination among the programmes reduces their effectiveness. It would be ideal if the SME support schemes as well as the support policies are implemented by a leading organisation - perhaps the Oman Development Bank (ODB) - within the development framework set forth in Vision 2020, allowing the resources to be allocated to the SME sector in a structured manner, rather than being disbursed at random. Based on this argument, it is recommended that:

- **Recommendation 4**: The GOSO appoint the ODB as the co-ordinating body for existing financial support programmes for SMEs established both in the public and private sector, and allow the ODB to re-orient the programmes to support the objectives of Vision 2020.

The mode of financing for the SME sector requires special attention. For instance, direct financing of SMEs is difficult in Oman. Indeed, the default rate is extremely high, suggesting that there should be some corrective means adopted when financing new business ventures. The credit guarantee system, an indirect financing method, would be an appropriate mode that accommodates both of the needs - to ease the credit-supply for SMEs while enhancing the credit-rating system.

Korea has a history of utilising a government-backed guarantee system. Two main public guarantee institutions for SMEs were founded - the Korea Credit Guarantee Fund (KODIT) and the Korea Technology Credit Guarantee Fund (KOTEC). The accumulated amount of outstanding guarantees as of 2004 totalled as much as 6% of Korea's GDP for that same year. This amount also accounted for nearly one-third of the total lending to SMEs.

Based on this positive experience, it is recommended that:

- **Recommendation 5**: The GOSO introduce a credit guarantee system to meet the needs of new frontier start-up and venture SMEs in the strategic industries, while sharing the risks with the private sector.

It would be more appropriate if a policy intermediary were allowed to undertake the managerial responsibilities for the credit guarantee system. While commercial banks give loans directly to the businesses that meets the terms and conditions set by them, the policy intermediary takes care of the start-ups, ventures, and other SMEs by issuing credit guarantees. It is also worthwhile to consider of setting up a special division that deals only with SME financing within the ODB.

Stimulating entrepreneurship should be the first step in promoting national development. Given that entrepreneurship is driven by education, the entrepreneurial education in particular, it should be treated as a national priority. Nonetheless, a mismatch between education and employment poses a problem. One way to overcome this predicament would be to foster entrepreneurship in/around research institutes and/or universities, transforming accumulated knowledge and talents into tangible outputs as a result. This scheme can also be employed by business incubators that actively promote university-industry co-operation.

The focal point of the research-university-industry co-operation is to transfer knowledge produced in the academia to the industry, so that accumulated research outputs can be converted into some tangible yields in business - especially in the SME sector. The businesses, in turn, provide feedback information to the academia enabling it to enrich future research. Hence, the co-operation creates a win-win structure for both the academia and the industry.

In Korea, business incubators (BIs) have been introduced into numerous universities/colleges and GRIs since 1998. This attempt has been assessed as being quite successful. In 2007, some 260 BIs provided facilities and equipment to more than 5,000 companies over a three to five year period. And, about 84% of these BIs, or some 220 BIs, were in universities/colleges.

Based on proven successes of the BI programmes in Korea and their contribution in

enhancing SME's competitiveness, it is recommended that:

- **Recommendation 6**: The GOSO expand and strengthen research-industry/university-industry co-operation programmes including business incubators.

Human capital is the driving force of research, development, and innovation. Therefore, cultivating and nurturing research and innovation capacities, and linking them with entrepreneurship would be the most important industrial policy of the Sultanate. With TRC (The Research Council) acting as the supervisory body of research, the establishment of a government-funded research and training institute (GRI) in the area of science and engineering is highly recommended. The GRI and universities act as the nuclei of innovation and entrepreneurial activities including entrepreneurial education and training. In addition, they could also serve as the core of the so-called "science parks" in the future, which create returns from "knowledge externalities," utilising the "economies of agglomeration."

In order to effectively promote entrepreneurial education and training programmes for the young population in Oman starting at an early stage, it is recommended that:

- **Recommendation 7**: The GOSO establish a national organisation entrusted with the responsibility of initiating and implementing a comprehensive entrepreneurship development programme in Oman.

This could be a Centre for Entrepreneurship and SMEs which could co-ordinate all major entrepreneurship development programmes. This national organisation/centre can work closely with the Sultan Qaboos University in the education and training of selected entrepreneurs. In addition to offering courses in entrepreneurship and small business in undergraduate and graduate programmes, short courses such as the New Enterprise Programme and the Graduate Enterprise Programme should also be developed and offered. This will help create a new generation of educated and trained entrepreneurs who will create jobs not only for themselves but for others also.

Industrialisation and Government Policies for Technology Transfer and Domestication

Technology transfer and domestication is perhaps one of the most popular issues in developmental studies these days, for new technology is often exogenous to an economy that it has to be brought in from the outside. In this vein, the most efficient and effective method to enhance the level of industrialisation of a country that lags behind in technology compared to other countries is to obtain the needed technologies through a transfer from technologically and industrially advanced nations. In other words, the country may directly import the needed

technologies, like any other goods and services, from abroad. For example, Korea was a technology-lagging country that imported the needed technologies from abroad and successfully internalised them. Indeed, many attribute Korea's rapid growth to the successful technology transfer and domestication.

From an economic perspective, methods of technology transfer can be broadly classified into sales, licensing, and M&A. The respective categories in technology transfer have their own merits but also have concomitant requirements to be successful. These requirements vary according to the current stage of technological development as well as the various roles that the public and private sectors play.

In the early stage of technological development, it is inevitable that the public sector play a leading role. However, the private sector will assume the larger role in the later stages of development. The government needs to employ support measures, such as creating industrial complexes furnished with power, water, a network of roads, highways, and communication, in order to encourage the private sector to participate in the industrialisation process as well as to establish some grounds for attracting FDIs. The government should also be committed to provide low-rents in these industrial complexes.

Therefore, it is recommended that the GOSO provide the impetus for technology transfer by taking the following actions:

- **Recommendation 8**: Enhancing infrastructural capacities of the existing industrial complexes and expediting the creation of planned complexes.

To fulfil this, the GOSO may need to set its focus on the expansion phase of the Sohar Industrial Complex with respect to the infrastructure. By the same token, the establishment of the Dqum Industrial Complex also needs to be accelerated.

The government also needs to extend tax benefits such as exemption. For example, in corporate taxes, the exemption of VAT (value-added taxes) and similar taxes for companies that undertake technology transfer schemes. In conjunction with these benefits, it is recommended that a financial support system be created - i.e., support for technical fees or loans with a low-interest rate - to promote technology transfer. The financial support programmes that assist technology transfer should be implemented in addition to the financial support system. In this vein, the following recommendation seems pertinent in assisting the fostering of technology transfer in Oman:

- **Recommendation 9**: The GOSO establish a fund set aside for technology/knowledge transfer.

In practice, the technology transfer fund can be disbursed through the ODB upon the submission of adequate plans for technology transfer. The feasibility of the submitted plans may be evaluated by a committee comprised of the representatives of, for instance, MONE, MOCI, TRC (The Research Council), ODB and the OCCI (Oman Chamber of Commerce and Industry). The bank may also be mandated to monitor and supervise the entire transaction of the transfers.

In the case of Korea in the 1970s, the government selected some 100 export-oriented firms and offered differentiated financial support measures, i.e., loans with a substantially low rate of interest compared to the ongoing market rate at that time. This allowed the firms to increase their export through the technologies transferred from advanced sources abroad. As a result, Korea saw a huge drive towards export along with the emergence of large exporting enterprises in the 1970s. During the period of 1971-1980, export grew on average of around 35% annually.

With regards to the industrial aspect, successful internalisation of technology transfer may require a downstream linkage between large enterprises (LEs) and SMEs. Therefore, the first and the foremost step that the government needs to take is to create a supply-chain that enables local enterprises to acquire sustained market access. To this extent, the GOSO needs to re-evaluate the roles of the existing public sector LEs. It is recommended that:

- **Recommendation 10**: The GOSO review and re-evaluate whether the public LEs and agencies are strategically poised to support technology transfers and domestication, and advise them to adjust their strategic objectives and action plans in order to make technology transfer and domestication a priority.

Other important policy tools to promote technology transfer and internalisation include allowing local private enterprises to participate in government programmes such as the e-Government Project. This will offer them an opportunity to accumulate the needed technologies, which will enable them to apply the localised technologies to similar settings in the future.

In accordance, it is recommended that:

- **Recommendation 11**: The GOSO expedite the implementation of the e-Government Project. In the course of constructing the government's computerised network, the participation of local business entities must be ensured.

The e-Government Project could serve as a catalyst in the growth of the ICT industry. There can be some positive externalities by implementing such government project. For example, the Information Technology Authority could also support the Knowledge Oasis Muscat by bringing in more business ventures.

To that purpose, the GOSO needs to bring together a highly educated group of experts who are able to convert a roadmap for technology transfer and internalisation into action. To fulfil this end, it is recommended that:

- **Recommendation 12**: The GOSO establish a government-funded science and technology institute to act as a policy intermediary as well as a think-tank that trains and creates highly qualified manpower who will serve as a catalyst for the nation's technological development.

Given the present level of Oman's technology - seemingly on the borderline between a standardised and matured technological level - as well as the lack of an industrial base and the availability of manpower, OEM seems the most suitable method for Oman to adopt. Above all, priority must be given to the areas of food-processing and consumer electronics. Consumer electronics manufacturing through OEM has merits for Oman, as it will be quite effective in creating a supply chain. It establishes linkages that give rise to industries that produce moulds and parts for machinery, which can be sustained by a low or medium level of technology. Thus, it is worthwhile to consider the manufacturing of such IT technology-laden products on the OEM basis, such as TV, DVD, and DMB. This will serve as a starting point for building up the manufacturing industry in Oman.

Based on this postulate, it is recommended that:

- **Recommendation 13**: The GOSO designate a manufacturing complex and attract FDI in the area of OEM manufacturing.

As proposed above, the complex should be set up mainly for OEM manufacturing in the area of household electronic appliances as well as those IT-laden products. Since the products are intended for export, the complex has to be located near the port. However, the provision of manpower needs to be considered as the foremost priority on the agenda for the promotion of manufacturing technology.

Summaries and Some Final Thoughts

This study is based on the basic premise that Vision 2020 is Oman's overall strategy for national development, which views a dynamic private sector as a *sine qua non* of sustainable

growth. As such, Vision 2020 expects Oman's private sector to undertake the leading role in the nation's economic development, while the public sector, as a provider of strategic guidance, focuses more on the strategic planning and vision setting.

Thus, this study begins by asking the question, among others, "How can the Sultanate government consolidate its public and private sector capacities with which the impetus for sustained growth can be established?" The answer to this question is sought within the framework of a public and private sector partnership, which, according to the new development paradigm, is tantamount to a web of institutions or a soft infrastructure.

Taking into consideration the goals set forth by Vision 2020, which call for the development of the strategic industries identified by the Ministry of Commerce and Industry, this study proposes that the Sultanate Government set its focus on the establishment of (1) a pilot governmental agency and (2) policy intermediaries.

Based on the postulates, the GOSO is urged to establish a few policy intermediaries - business associations, a financial policy co-ordinator, and the Small and Medium Enterprise Promotion Corporation - which will serve as a conduit between the public and private sector. These institutions are intended to synthesise the public and private sector participation, particularly in the following three areas:

(1) industrial support institutional structure;
(2) financial support institutional structure; and
(3) institutional support structure for the promotion of human resource development and entrepreneurship.

By doing so, government agencies can focus more on the strategic planning and vision setting. A new institutional structure would enhance institutional capacities, both in the public and private sector, which would enable them to achieve specialisations, and subsequently efficiency.

It must be underlined that the institutional base in Oman is generally quite well developed. However, a co-ordination problem plagues organisational/institutional efficiency and effectiveness. In other words, the horizontal communication mechanism in both the public and private sector's institutional/organisational structure is rather weak in Oman compared to its institutional strength as a whole. To address this predicament, this study recommends that the GOSO establish a policy/strategy co-ordinating agency, possibly named the Industrial Development Commission (IDC). It will spearhead the synthesis of the public and private sector capacities by accommodating private sector participation and initiative beginning with the planning stages, as well as some other tasks.

The main organisational tasks of the IDC as a policy/strategy co-ordinating agency will include not only preventing/removing any redundancies and functional duplication in government policy support functions, but also being an effective channel of communication with the private sector. However, the commission's more important *raison d'être* is its mandate to monitor and assess the progress of the government's development policies and programmes. Through such functions, it can disseminate the development programmes it deems successful and allow for replication. In this way, some developmental models idiosyncratic to Oman may be collected and documented, and replicated if successful.

A critical issue relating to an exogenous growth factor - new technology - is treated in its own chapter in this study. Recently, technology transfer and successful internalisation has become a focal point of developmental studies, for technologies are not readily available factors of growth, that are yielded merely by reshuffling national capacities.

This study finds that the success of the national vision for technology transfer and domestication largely hinges on the quality of available manpower. Therefore, the provision of highly skilled manpower is the very first step for technology internalisation. Given that the quality of manpower is driven mainly by the quality of education, training and education becomes the utmost task of importance. The probe of this study reveals that the creation of an institution mandated with a programme co-ordinating function, in entrepreneurial education for instance, is deemed necessary.

The mere installation of institutions should not be construed as a means with a high probability of success in achieving the goals set forth in the national development strategy. However, its significance is profound to the extent that it synthesises the strengths that Oman's institutions have developed. Hence, creating a platform which consolidates the available institutional strengths in Oman becomes the task of utmost exigency.

Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

Chapter 01

Introduction

Chapter 01

Introduction

Jaehoon Lee, Market Economy Research Institute
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Oman's national development strategy envisages the development of a dynamic private sector that assumes a leading role in the nation's development.[1] The strategy identifies the existence of an efficient and self-reliant private sector as a *sine qua non* of sustainable growth of the nation. To fulfil this, the Government of the Sultanate of Oman (GOSO) has formulated numerous action plans to bolster the development of the private sector. Some of the plans include (1) provision of a stable macroeconomic framework, (2) adoption of free market mechanisms and encouragement of free competition, (3) human resources development, (4) provision of incentives and building of basic facilities, and (5) increasing the efficiency of the state administrative apparatus and the enactment of laws and regulations.[2] What the strategy envisions is highly consistent with a recent measure of the GOSO's attempt to reassert itself as the provider of "strategic guidance" in the development of the national economy. This implies that the GOSO sees the private sector as the main thrust of future growth.

There are numerous challenges to this attempt. One of the most formidable challenges that Oman faces is, as identified in Vision 2020, dealing with rentier tendencies and dependency of the private sector resulting from a long-term dominance of the government in the economic sphere and the lack of private sector initiatives therein.[3] Indeed, government dominance in the economic sphere tends to crowd out private sector initiatives.

1. Oman, the Government of (2007) "Private Sector Development Strategy, Approved Policies and Mechanisms for its Achievement," *Long-Term Development Strategy (1996-2000): Vision for Oman's Economy-2020*, Ministry of National Economy, p.129.
2. *Ibid*.
3. See Appendix 1 for the hierarchy of Oman's national development strategies.

Table 1-1 | General Government Final Consumption Expenditure (% of GDP): GCC and Selected Countries

	1980	1985	1990	1995	2000	2001	2002	2003	Average 1980-2003	Average GCC 1980-2003
Bahrain	13.03	22.78	24.21	20.85	17.55	18.47	18.53	18.43	19.23	21.91*
Kuwait	11.17	22.40	38.75	32.19	21.97	24.21	27.40	25.91	25.50	
Oman	**25.01**	**27.14**	**22.29**	**25.08**	**20.69**	**22.32**	**23.05**	**23.52**	**23.64**	
Qatar	n/a	n/a	n/a	31.85	n/a	n/a	n/a	n/a	n/a	
KSA	15.91	31.90	29.23	23.60	26.01	27.49	26.10	24.62	25.61	
UAE	10.92	19.64	16.28	16.45	15.38	16.33	15.19	14.16	15.55	
High Income OECD	17.49	17.92	17.42	17.12	16.80	17.18	17.70	17.95	17.45	
Korea	12.44	11.21	11.81	11.20	12.11	12.91	13.28	13.48	12.24	

Note: * This figure excludes Qatar.
Source: *World Development Indicators 2006, CD-ROM;*

Traditionally, the GOSO, like the governments of most Gulf Co-operative Council (GCC) countries, has been playing a leading role in economic activities. As reflected in the general government final consumption expenditure of Table 1-1, it has been the main provider of goods and services, accounting for on average 23.64 % of the GDP during the period between 1980-2003, as opposed to 17.45% and 12.24% in high income OECD countries and Korea, respectively. It has also been responsible for a large share of the nation's investment, 10.1% of the GDP in 1995, compared to 4.4% by the private sector (Table 1-2). The GOSO was the main agent of growth.

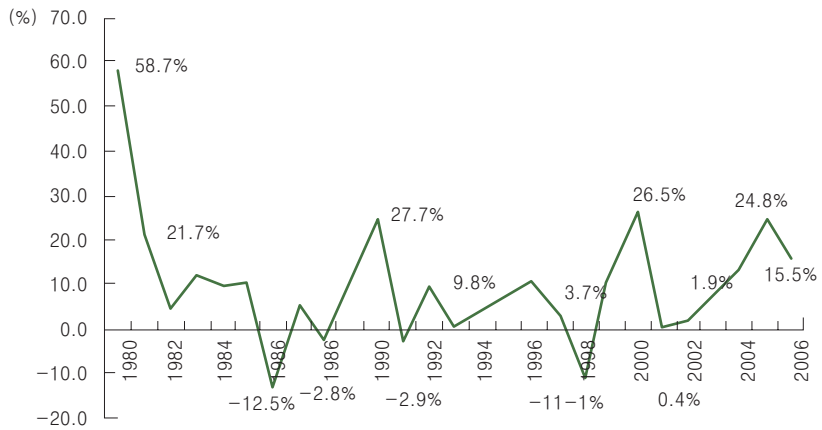
Table 1-2 | Oman's Investment Structure (% of GDP)

Description	1995	2000	2020 (Target)
Public Investment	10.1%	8.3%	3%
Private Investment	4.4%	8.6%	31%

Source: The Government of the Sultanate of Oman (2007) *Long-Term Development Strategy: Vision for Oman's Econom-2020*, Ministry of National Economy, p.62.

Nonetheless, such an economic structure did not produce sustained growth. Oman was successful in broadening the private sector participation in its economic activities, as shown by the fact that the share of private investment almost doubled to 8.6% in 2000 from 4.4% in 1995, but the growth was not sustainable (Figure 1-1).

Figure 1-1 | Oman's Economic Growth, 1980-2006



Note: Measured by the change in per capita GDP
Source: *IMF (2008) International Financial Statistics, On-line;*

This elucidates the vision and the rationale of Oman's national development strategy, which encourages the private sector to take more active role in future growth. This brings up the key question of: "How can the GOSO consolidate the public and private sector capacities through which a momentum of sustained growth can be established?"

1.1 The Third-Wave Development Strategies and the Public-Private Sector Partnership

Today, a new development paradigm, or a new "wave" of economic development strategies, is taking shape.[4] The focus of the developmental policy is now shifting to the "context for economic growth through public-private partnerships (henceforth referred to as the "PPP" or the '3Ps')."[5] This new paradigm is widely referred to as the "third-wave development strategies."[6]

Bradshaw and Blakely posit that the first wave, or "smokestack chasing efforts," gave way to the second-wave developmental strategies that placed much emphasis on "creating new

4. Bradshaw, Ted K. and Edward K. Blakely (August 1999) "What Are 'Third-Wave' State Economic Development Efforts? From Incentives to Industrial Policy," *Economic Development Quarterly*, v.13, n.3, pp.229-244.
5. *Ibid*., p.230. An acronym in parenthesis added.
6. *Ibid*.

businesses, increasing investment capital, developing incubators or providing technical assistance to help local businesses grow or expand."[7] The second-wave strategies are now giving way to the third wave. However, it must be observed that the third wave strategies do not abandon the use of the first- and the second-wave strategies, but adopt the techniques annexed to these strategies.[8]

What are the third wave developmental strategies? The gist of the third wave strategies lies within a network, or networks, that "leverage capital and human resources to increase the global competitiveness of a group of strategically linked firms."[9] Accordingly, the government efforts towards fostering national economic development should be focused on building networks, or a web of institutions, that are, as postulated by Blakely, the "'soft infrastructure' for economic revitalisation."[10]

In Oman's setting, it is of the utmost importance to build and manage a 'soft infrastructure' in a way in which the public and private sector capacities and efforts towards national development can be brought together. This attempt will not only synthesise national capacities towards development in array, but it will also provide a platform that assists the private sector to foster its capacities to meet the challenges of future growth.

1.2 The PPP in the Context of Oman's Development

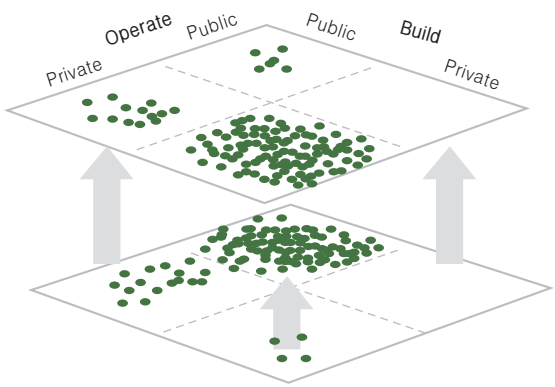
In general, there is no clear-cut definition as to what public-private partnership is about and how it should be. The use of PPP varies based on the purpose the partnership serves. Nonetheless, it can generally be defined as "any arrangement between a government and the private sector in which partially or traditionally public activities are performed by the private sector."[11] In other words, as Savas wittingly put it, PPP is a "less contentious" term than privatisation.[12]

Vision 2020 conceives that Oman's private sector will be capable and dynamic enough to play a leading role in providing most of the needed goods and services, which currently are

7. *Ibid*.
8. *Ibid*.
9. *Ibid*.
10. Blakely, Edward K. and Ted K. Bradshaw (2002) *Planning Local Economic Development: Theory and Practice*, (Thousand Oaks, CA: Sage Publications, Inc.). Quoted from Bradshaw and Blakely (1999), p.230.
11. Savas, Emanuel S. (2000) *Privatization and Public-Private Partnership*, (New York, US: Chatham House Publishers) p.4.
12. Ibid.

arranged mainly by the public sector. Figure 1-2 depicts a conceptualised view of such a shift. The dots in Figure 1-2 represent the goods and services needed. In Oman, such goods and services as well as the costs incurred from building and managing the process of this provision are borne by the public sector. The goals of Vision 2020 are intended to change this structure, so that the private sector will ultimately be able to provide for a much larger share of the goods and services than the public sector.

Figure 1-2 | Change in the Structure of the Provision of Goods and Services Envisioned by *Vision 2020*



In this context, a PPP means establishing a soft infrastructure for national development - a web of institutions that serve as a platform for the integration of the public and private sectors' efforts for development, while gradually increasing the magnitude of private sector participation.

1.3 Crafting a Web of Institutions in the Context of Development in Oman

A PPP in the context of Oman's development plans implies the crafting of a 'soft infrastructure,' or a web of institutions, to achieve the goals set forth in Vision 2020. A question of exigency would be: "How should a web of institutions be crafted so that it serves to fulfil the strategic goals set forth in Vision 2020, and to subsequently encourage private sector participation?"

It is crucial to craft a web of institutions that serve the purpose of supporting the development of Oman's strategic industries. The development of the industries, as portrayed by the GOSO, is the most effective and realistic means of providing the foundation for a sustained growth momentum as identified in Vision 2020. And, the existence of an effective and efficient order of institutions is a necessary condition. The ascension of East Asian economies, such as Korea, Japan, and Taiwan, to present economic powerhouses also illustrate that efficient institutional infrastructure is an important instrumental factor. Indeed, an efficient institutional platform synthesises the effectiveness of the governmental apparatus with the entrepreneurial vision, efficiency, and creativity of the private sector into positive pulses in economic performance.

1.4 Objectives of the Study

The focus of this study is hinged mainly on the (1) meaning of a PPP in the context of Oman's development plans as a new development paradigm, which is to build an institutional platform to support Oman's national economic development, and the (2) imperative of such platform for the development of Oman's strategic industries.

In short,

(1) PPP is a new wave of development paradigm which is consistent with the strategic framework of Oman's development strategy, Vision 2020, that places an emphasis on the fostering of private sector capacities and the encouragement of its participation in the national development process;
(2) In the context of Oman's national development, the PPP is meant to build a soft infrastructure, a web of efficient institutions, or an institutional platform;
(3) The development of strategic industries in Oman is a conduit to the achievement of the goals set forth in Vision 2020;
(4) Hence, the building of an institutional platform that serves as a support for the development of Oman's strategic industries is tantamount to how the PPP should be structured in Oman.

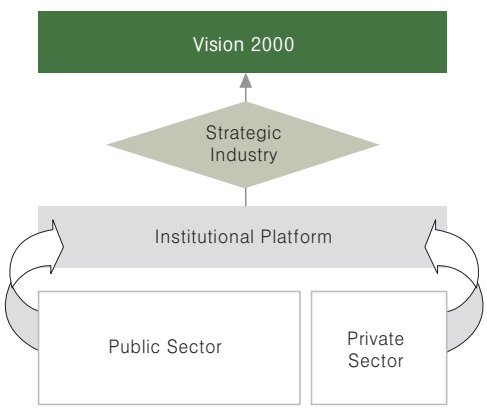
To this extent, this study will put forth an institutional platform that is structured to support the development of Oman's strategic industries. In doing so, it will explore the experiences of others - especially those of Korea - with respect to how they effectively set up an institutional infrastructure to integrate the public and private sector capacities, through which they have successfully developed strategic industries.

It should be noted that this study is not intended to merely place an inquiry on establishing the

relationship between institutions and economic performances. Rather it attempts to propose an institutional platform, which serves as a support for the development of Oman's strategic industries, as well as to espouse the fostering of private sector participation in the course of that development. This will be the very purpose the Oman's PPP model is meant to serve (Figure 1-3).

To reiterate, the main objective of this study is two-fold: (1) to propose an institutional platform that systematises the private sector participation, in order to integrate the public and private sector capacities, and (2) to identify the roles and responsibilities of the respective elements in that platform for the development of Oman's strategic industries.

Figure 1-3 | Schematised Diagram for Oman's Model of 3P's



This document is divided into several chapters. Chapter 2 presents the socioeconomic aspect of Oman, allowing one to fully understand the genesis of Oman's long-term national development strategy. Chapter 3 discusses the crafting of an institutional platform on which the public and private sector strengths can be incorporated to bring forth a synergetic impact on the development of strategic industries. Some critical factors of development being exogenous to an economy, such as new technologies, may not be readily available merely by a realignment of national resources or capacities. As a result, technology transfer and successful internalisation has become a focal point of developmental studies in the current era. Chapter 4 will shed some light on this issue. And, Chapter 5 summarises and concludes this study and presents some policy implications.

Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

Chapter 02

Oman's Economy Today and the Vision for Tomorrow

Chapter 02

Oman's Economy Today and the Vision for Tomorrow

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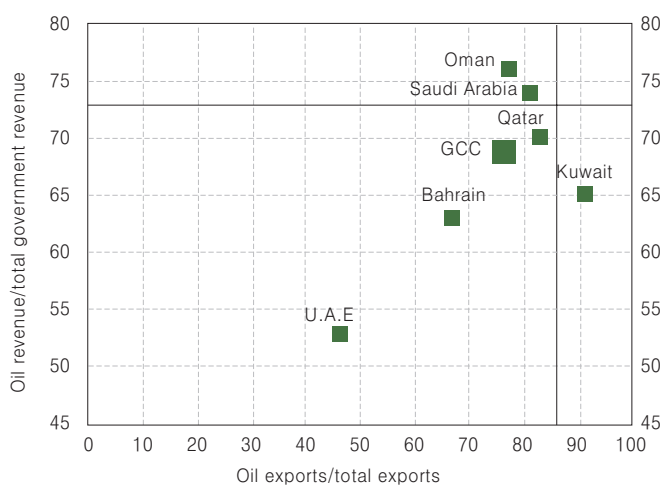
Oman's high dependency on oil revenue is nothing new. Among the GCC member countries, whose reliance on oil revenue is generally high, Oman's dependency has been the highest. It is well above the GCC average, followed by Saudi Arabia and Qatar (Figure 2-1). This suggests that Oman's economy is highly susceptible to the external shocks engendered by the international commodity price change (Figure 2-2).

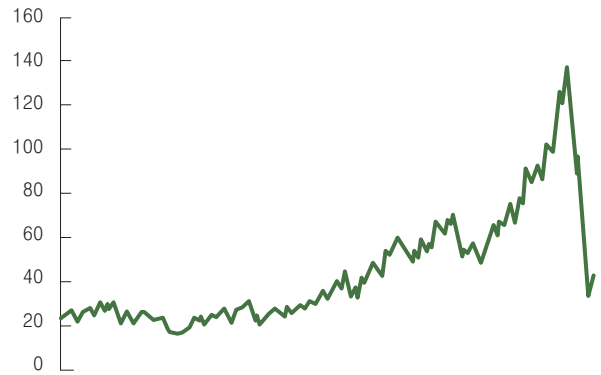
Figure 2-1 | Oil Dependency of the GCC Countries, Average in 1988-2002



Notes: Total government revenue includes investment income and total exports include re-exports.
Sources: Excerpted from Ugo Fasano and Iqbal Zubair (2003) p.2.

Figure 2-2 | All Countries' Weekly Spot Price for Oil, 2000-2009

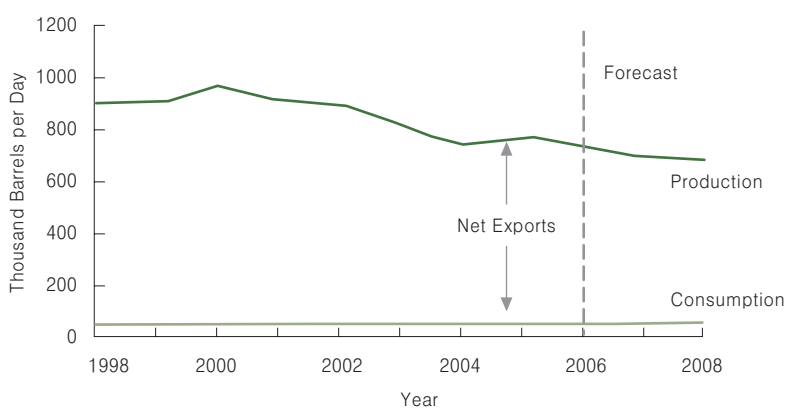
(Unit: USD/bb)



Notes: The data covers the period of January 2000-January 2009.
Reproduced chart. Source: Energy Information Administration, the U.S. Government (February 4, 2009)

Since 2001, oil production in Oman has been declining, which, in part, can be attributed to the periodic downturns in Oman's economy (Figure 2-3). The increasing natural gas production has been compensating the downtrend in oil production. Nevertheless, Oman's oil and gas reserves are only the 21st and the 26th largest in the world. The reserves and production of oil among the GCC countries are one of the lowest followed only by Bahrain (Table 2-1). The natural gas reserves and production is the second and third lowest respectively.

Figure 2-3 | Oman's Oil Production and Consumption, 1988-2008



Note: 2006 and onward is estimate.
Source: Energy Information Administration (March 2007), "International Energy Annual 2004: Short-Term Energy Outlook."

Table 2-1 | Reserves and Production of Oil and Natural Gas in GCC (2007)

Country	Oil		Natural Gas	
	Proved Reserves	Production	Proved Reserves	Production
	Billion barrels	Thousand barrels daily	Billion cubic feet	
Bahrain	0.125	48	3,250	390
Kuwait	101.50	2,613	56,015	456
Oman	**5.51**	**714**	**29,280**	**887**
Qatar	15.21	1,125	910,520	1,748
KSA	262.30	10,246	241,840	2,594
UAE	97.80	2,947	214,400	1,672

Source: Energy Information Administration (2007) Country Energy Profile

Oman, despite these adds, has been maintaining macroeconomic stability. From 1980 to 2005, the annual growth rate on average was around 7% and inflation was managed at a remarkable rate of around 0.37%.[13] Domestic price stability was the main contributing factor to Oman's impressive economic performances in this period. However, the recent price hike for imported goods has placed an upward pressure on the domestic price level as well as the wage level, threatening Oman's macroeconomic stability and adding more burdens on the GOSO's fiscal policy management (Table 2-2).

Table 2-2 | Major Indicators of Oman's Current Economy

Year	2005	2006	2007 (estimate)	2008 (projected)
Nominal GDP (in USD billion)	30.9	35.7	40.4	56.3
Real GDP Growth (annual change; in %)	6.0	6.8	6.4	7.4
Inflation (year average; %)	1.9	3.4	5.9	11.2
Real Effective Exchange Rate*	-0.9	-1.5	-0.4	1.1

Source: IMF (October 2008) Regional Economic Outlook; Note: * Positive numbers represent appreciation.

Preventing external shocks and maintaining macroeconomic stability has become economic policy exigencies in Oman. As the high reliance on oil is attributable to the economy's susceptibility, the GOSO is determined to insulate its economy from external shocks by

13. World Bank (2006). Computed only for the period 1990-2004 due to data availability.

diversifying the economic structure - the industrial structure in particular. Such resolution is manifested by Vision 2020 - the overarching strategy for the future development of the Sultanate.

2.1 Vision 2020 and the Economic Diversification

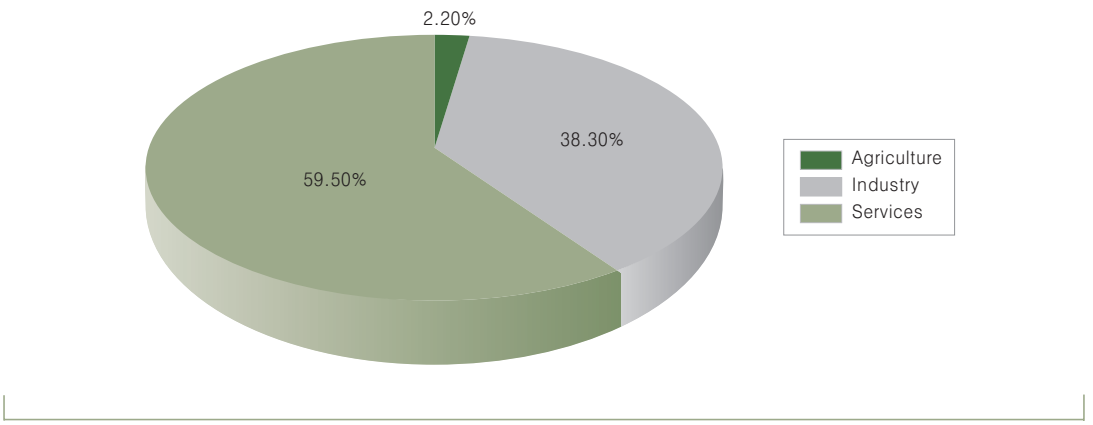
Vision 2020, as the fundamental development framework of the Sultanate, advocates that Oman's long-term development and prosperity should be driven mainly by (1) economic diversification, (2) private sector leadership in the course of development, and (3) development of human resources.[14]

The GOSO has been ambitiously pushing forward dynamic plans to transform the nation's socioeconomic structure. In the past three decades, Oman, like most of its GCC neighbours, has displayed remarkable socioeconomic changes. With macroeconomic stability and increased oil revenues, the GOSO has been focusing on the modernisation of the nation's infrastructure, the generation of employment, and the improvement of general welfare. In addition, the GOSO's efforts towards the promotion of open market, free trade system, and free capital flows, thereby making positive contributions to the consolidation of the liberal economy in the region, should not go unnoticed.

In Oman, the industry and service sectors are the main contributors to the nation's GDP (Figure 2-4). The idiosyncrasy of Oman's industrial fabric is that the service industry is by far larger than any others. This pattern of inter-industry disparity is also displayed within industries. For instance, as shown in Table 2-3, refined petroleum products account for nearly 60% of value added in the manufacturing industry as a whole, implying that the dependency on oil and gas is also prevalent in the manufacturing industry. It also suggests that local manufacturing industry may also be susceptible to external shocks. Hence, it is imperative for Oman to diversify its industrial structure, thereby tapering off negative impacts on its economy entailed by the shocks. Therefore, the objective of diversifying economic and industrial structure envisaged by Vision 2020 is highly consistent with the economic reality of Oman.

14. Al-Mugheiry, Mohammed Adil Said, et al. (December 2008) "Hosting the ESCWA Technology Center in the Sultanate of Oman," Paper submitted to the Executive Secretary of UN-ESCWA, The Research Council.

Figure 2-4 | Composition of GDP in Oman by Sector (2007 estimate)



Source: GlobalEdge (2009) "Oman: Statistics."

Table 2-3 | Value Added and Related Indicators by Industry in Oman (2006 at Current Prices)

Industry (ISIC Revision 3)	Value added			
	value (USD mill.)	share in output (%)	per employee (USD)	share in manufacturing industry (%)
Processed meat, fish, fruit, vegetables, fats	50	25	18,795	1.6
Dairy products	30	20	24,078	1.0
Beverages	40	39	24,593	1.3
Refined petroleum products	**1,754**	**40**	**1,390,727**	**57.2**
Basic chemicals	274	74	240,059	9.0
Other chemicals	59	38	35,993	1.9
Plastic products	39	25	17,884	1.3
Non-metallic mineral products, n. e. c.	367	67	45,923	12.0
Basic iron and steel	52	16	54,675	1.7
Metal products; tanks; steam generators	52	46	15,809	1.7
Other metal products; metal working services	30	45	25,455	1.0
Furniture	40	56	24,400	1.3
Total manufacturing	3,064	40	79,224	

Source: UNIDO (2008) "Industrial Statistics."

2.2 The Strategic Industries and the Vision for the Future

A comprehensive framework of Oman's industrial development, thus the economic development of the nation as a whole, is well documented in the "Future Industrial Strategy of the Sultanate" devised by the Ministry of Commerce and Industry.[15] The document not only identifies the strategic industries of the Sultanate, but also delineates the areas in which the Sultanate has to lodge its developmental focus - i.e., finance, human resource development, digitalisation, and the like - in order to provide an impetus for the development of strategic industries.

The document identifies Oman's strategic industries as knowledge intensive industries such as IT, software, e-business, as well as the biotechnology and petrochemical industries. It also includes the assembly and re-export, tourism, SMEs, as well as food-processing and engineering industries as Oman's future strategic industries.

Table 2-4 | Contribution of Oil and Non-Oil Industries in Oman's Economic Activities (% of GDP)

Year	1995	2000	2005
Oil Industry	37.6%	31.9%	48.7%
Non-Oil Industry	62.4%	68.1%	52.3%
Service Industry	51.3%	51.2%	39.0%
Non-oil/goods	11.1%	16.9%	13.3%
Total	100%	100%	100%

Source: Ministry of Commerce and Industry (2005), and Ministry of National Economy (2006), the Government of Oman

In sum, the ultimate objective of this proactive strategy is focused on the diversification of the Sultanate's industrial structure which currently relies heavily on oil and gas extraction and export, and other oil related industries (see also Table 2-5). Furthermore, the strategy also suggests that the future socioeconomic structure in Oman should be driven by knowledge-based industries.

15. Appendix 2: "The Future Industrial Strategy of the Sultanate."

Table 2-5 | Knowledge Economy Index, GCC Countries

Country	KEI (Global ranking)	Economic Incentive and Institutional Regime	Innovation	Education	ICT
Bahrain	6.02 (49)	6.84	4.2	5.82	7.22
Kuwait	6.01 (50)	7.01	5.05	4.87	7.13
Oman	**5.37 (62)**	**7.32**	**4.95**	**4.3**	**4.9**
Qatar	6.15 (45)	5.99	5.77	5.29	7.56
KSA	5.15 (65)	5.39	4.04	4.87	6.29
UAE	6.66 (42)	6.95	6.74	4.78	8.18
Korea	7.68 (31)	5.57	8.47	7.97	8.71

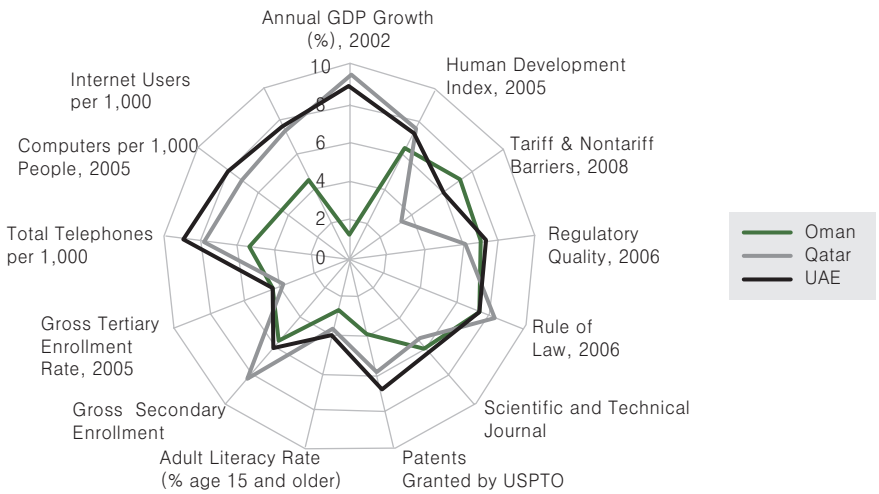
Source: World Bank (2008), "KEI and KI Index."

A World Bank report on the magnitude of a knowledge economy proxied by the Knowledge Economy Index as presented in Table 2-5 shows some interseting attributes. Oman is ahead of all the countries in the economic incentive and institutional regime area area, but lagging behind in the innovation, education, and ICT.[16] It suggests that Oman's institutional strengths are not translated enough to be the driving force for the promotion of other socioeconomic areas. This point is re-emphasised in Figure 2-5. The institutional attribute in Oman, as proxied by the capacity to control tariff and non-tariff barriers in this chart, is much greater than that of Qatar or the UAE. Why is Oman lagging in other socioeconomic areas? To answer to this, the uncovering and redressing of bottlenecks, that hinder the flow of institutional strengths to other socioeconomic sectors in Oman becomes of the utmost importance.

The knowledge-based industries are driven by high quality of human resources. One of the criteria for measuring human resource development is the Human Development Indicators (HDI) annually announced by the UNDP. The data classifies Oman in the high human development country group. Nevertheless, the data also reveal that continued efforts for the area of education are required, as the gross enrolment ratio in Oman comparatively lags behind most of the other GCC countries (Table 2-6).

This is also affirmed by a report published by the World Economic Forum.[17] As shown in Table 2-7, the area of health and primary education in Oman lags behind its neighbours in the region, while institutional strengths and macroeconomic stability is far ahead of others (Refer also to Figure 2-6). The area of higher education and training as well as technological readiness also falls behind, calling for policymakers' attention. All in all, the data suggest that education is the prime area in which the nation's resources should be concentrated.

Figure 2-5 | Knowledge Economy Index, Selected Countries



Source: Recomputed data. World Bank (2008) "Custom Scorecards (KAM 2008)"

Table 2-6 | Human Development Indexes of GCC Countries, 2007/2008

Country	Ranking	HDI Value	Life Expectancy at Birth	Adult Literacy Rate	Gross Enrollment Ratio	GDP Per Capita
		index	years	% ages 15 and older	%	USD (PPP)
Bahrain	32	0.902	75.4	88.3	90.4	34,516
Kuwait	29	0.912	77.4	93.3	72.6	46,638
Oman	**53**	**0.839**	**75.3**	**83.7**	**68.7**	**20,845**
Qatar	34	0.899	75.3	89.8	77.6	72,969
KSA	55	0.835	72.4	84.3	76.0	22,004
UAE	31	0.903	78.5	89.8	65.8	49,116
Korea	25	0.928	78.2	99	98.5	22.985

Source: UNDP (2008) "Human Development Report."

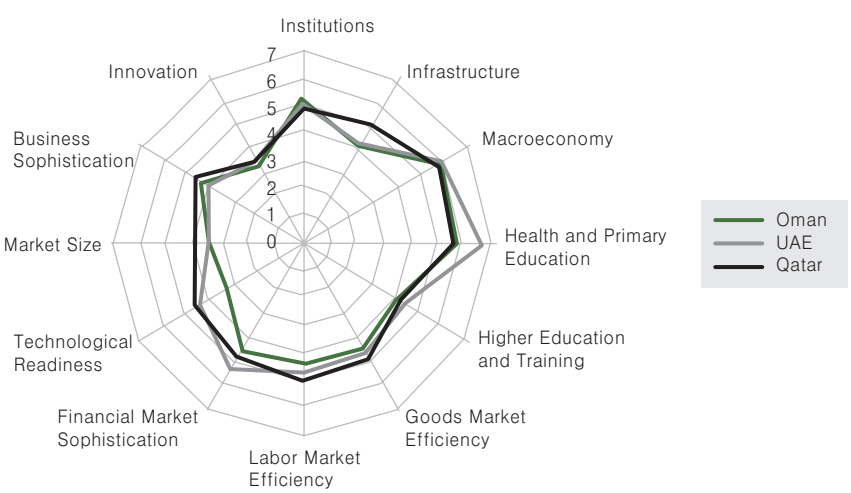
16. The Knowledge Based Economy (KBE) is defined as one that encourages its organisations and people to acquire, create, disseminate and use knowledge more effectively for greater economic and social development (Dahlman & Aderson, WBI, 2000), or one that is directly based on the production, distribution and use of knowledge and information (OECD, 1996) or one in which the generation and the exploitation of knowledge has come to play a predominant part in the creation of wealth (UK-DTI, 1998).
17. World Economic Forum (2008) The Global Market Competitiveness Report, 2008-2009.

Table 2-7 | Global Competitiveness Ranking, GCC Countries

Economy	Bahrain	Kuwait	Oman	Qatar	KSA	UAE
Global Competitiveness Index	37	35	**38**	26	27	37
Basic Requirement	28	39	**31**	21	34	17
Institutions	31	48	**19**	16	34	18
Infrastructure	28	49	**32**	35	41	14
Macroeconomic stability	20	1	**13**	19	9	24
Health and primary education	45	75	**80**	18	51	36
Efficiency Enhancers	46	52	**61**	31	45	29
Higher education and training	54	76	**66**	31	53	41
Goods market efficiency	32	53	**39**	38	34	25
Labor market efficiency	64	24	**44**	31	63	18
Financial market sophistication	14	51	**50**	22	73	41
Technological readiness	39	50	**68**	37	51	28
Market size	100	59	**75**	67	22	54
Innovation and sophistication factors	54	52	**48**	35	37	38
Business sophistication	44	38	**54**	45	41	30
Innovation	75	71	**44**	29	34	46

Note: Samples were drawn from 134 assessed economies.
Source: World Economic Forum (2008) The Global Market Competitiveness Report, 2008-2009;

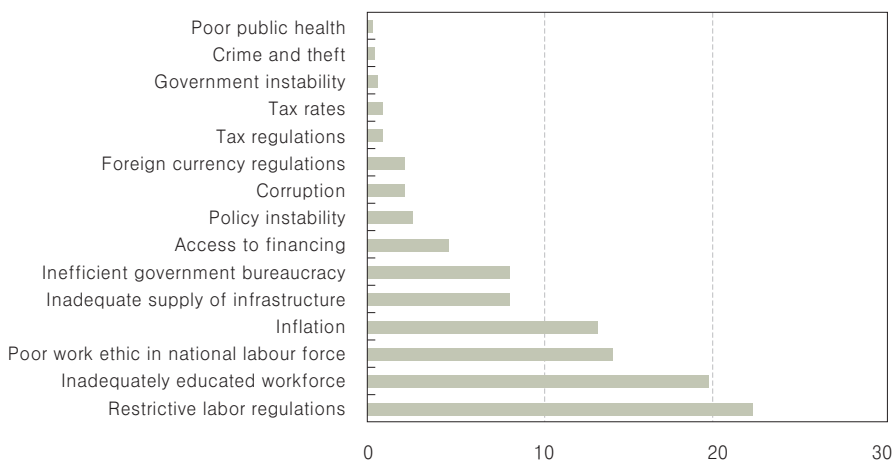
Figure 2-6 | GCI Score Diagram: Oman, Qatar, and the UAE



Source: World Economic Forum (2008)

The report also points out other areas of improvement for the Sultanate to be ready for global competition. For instance, restrictive labour regulations, inadequately educated workforce, poor work ethic in the national labour force, and inflation stand out as the most problematic factors for doing business in Oman, as presented in Figure 2-7.

Figure 2-7 | Most Problematic Factor of Doing Business in Oman



Source: World Economic Forum (2008) Note: Data evaluated on a 0-30 scale.

Despite all these, it is encouraging that the overall competitiveness of the Sultanate is appraised to be relatively high, ranking at 38th out of 134 assessed economies in the world. The GOSO's relentless efforts to redress Oman's shortcomings that stunt the nation's development should be given credit. Nevertheless, the GOSO's efforts should not stop, as there would be more challenges that the GOSO would face until it arrives at the *terminus ad quem* manifested by Vision 2020.

Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

Chapter 03

The Strategic Industries, the Institutions, and the National Development in Oman

Chapter 03

The Strategic Industries, the Institutions, and the National Development in Oman

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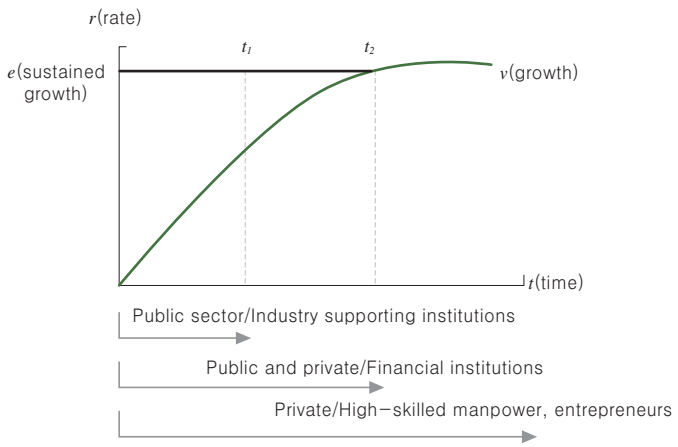
An institutional mechanism that synthesises and consolidates the public sector and private sector entrepreneurs is referred to as PPP. Being regarded as a new development paradigm, PPP is the driving force for a successful implementation of industrial policy and national development. In this respect, the strategic framework of Vision 2020, the national development policy of the Sultanate of Oman, is highly consistent with the contemporary paradigm of development.

When observing the trajectories of national development in East Asian countries, such as Japan, Korea, and Taiwan, a common trait emerges - the leading role in the economic development process was played by the state, especially in the early stage of the development. Numerous academic references attribute the rapid economic development in these countries to the leading role played by the state. An important insight in this so-called "state growth model" may easily be missed, if the growth of these countries is contemplated only from a dichotomous view of the state versus the private sector. Korea's economic success, for instance, is in part attributable to the harmonised efforts of both the government and private sector. Nonetheless, it is the Government of Korea (GOK) that should be credited for its efforts in laying down an institutional foundation on which the state and private sector capacities and efforts for national development were consolidated. Through the consolidation of the capacities of the two actors, Korea successfully developed its strategic industries and national economy as a whole.

Looking at the trajectory of the development in Korea from the perspective of the roles played by the state and private sector and the institutional change, there were two major junctures at which significant transitions occurred. This argument is presented in Figure 3-1.

Figure 3-1 | Roles of the Main Stakeholders and Institutions in Korea's Growth Path

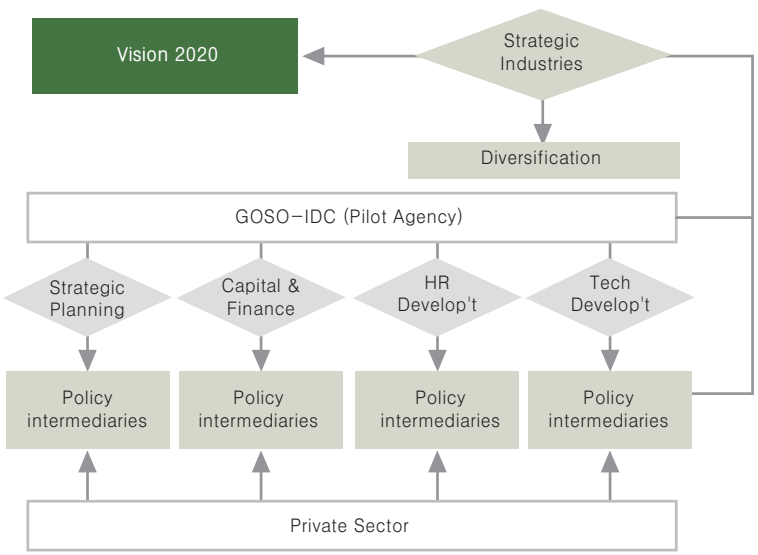


The state, or the public sector, played a leading role in the early stage of development. Then the private sector increased its role at time t_1 in Figure 3-1. Then the locus of national growth shifted to the private sector from time t_2 and thereafter.

From the institutional change perspective, the institutions that provided industry support were the focal point of the developmental elite's interest during the ascension of the country's manufacturing sector. As the momentum of development took off and the industries developed rapidly, the focal point of institutional roles shifted to financial institutions. And, finally, it moved to high-skilled manpower and entrepreneurs, as the magnitude of the development broadened.

This presents an important implication regarding the role of institutions in the course of development. The institutional platform is indeed an instrumental factor to the development of strategic industries in Oman. Thus, more attention should be paid to the establishment of an adequate institutional platform that is positioned to support the development of strategic industries. This proposition can be schematised as in the following diagram:

Figure 3-2 | Schematised Institutional Framework for the Development of Strategic Industries in Oman



The quintessence of the institutional framework for Oman is the GOSO acting as the "provider of strategic guidance." The implementation of action plans, and the subsequent policies and programmes, is recommended to be delegated to the policy intermediaries, which the GOSO will establish.

The ultimate purpose of establishing policy intermediaries is to lay down a foundation upon which public and private sector co-operation can be built. The arrangement of institutions in Oman in such a way will be the stepping stone for the development of the strategic industries, which, will serve as an effective instrumental means to attain the goals set forth by Vision 2020 (Figure 3-2).

3.1 The Industrial Strategy and the Manufacturing Industry in Oman

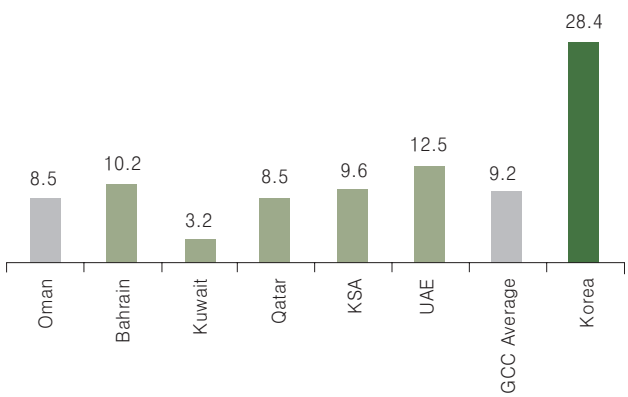
The key to the post-oil diversification effort is the activation of the country's manufacturing industry, which was emphasised in the Future Industrial Strategy of the Sultanate.[18] One may ask whether fostering the manufacturing industry is relevant in a country like Oman, whose

18. Appendix 2.

population barely exceeds 2.5 million. The size of the population may not constitute a sufficient market with which the manufacturing industry may sustain itself. In fact, the contribution of the manufacturing sector in Oman, like other GCC countries, has been insignificant (Figure 3-3). In 1970, the contribution of the manufacturing industry to the GDP, as estimated by the World Bank, was only RO0.2 million.[19] The sector's contribution remained at or below 0.3% of Oman's GDP until 1975.

However, in 2005 the manufacturing sector, other than oil and gas, contributed to almost 8.5% of Oman's total GDP. This noteworthy increase - some 20.8% over the 5-year period between 2001 and 2005 - is attributable to the implementation of economic diversification policies. The number of employees in the industrial sector also increased from 27,600 in 1997 to 33,000 in 2003, posting an annual growth of 3%.

Figure 3-3 | Contribution of the Manufacturing Sector to GDP (%) in 2005



Source: Ministry of Commerce and Industry (2007), Bank of Korea (2007)

The importance of the manufacturing industry to the national economy should not be minimised. The manufacturing industry brings forth two crucial benefits to an economy: (1) the linkage effect and (2) the innovation effect. Manufacturing is, the most dynamic and innovative sector in advanced economies and productivity in the sector is generally high. It accounts for a major portion of spending in research and development (R&D), employment of engineers and scientists, and transforms the findings from R&D activities into tangible products. The manufacturing sector in Korea, for instance, accounted for some 28.8% of GDP (the number of firms being about 340,000) and approximately 27% of the total number of

19. Omani Rial (currency unit). Approximately USD600,000 using the 2008 exchange rate.

employees in 2007.[20] Furthermore, manufacturing SMEs in Korea produced more than half of the manufacturing value added. They were also responsible for 42% of Korea's total exports in 2002, although this proportion fell to 32% in 2007.[21]

Manufacturing will be the only sector that can reap the benefits of the global market being created today, as a result of the growing awareness of global environment protection and greenhouse gas effects.[22] It creates a supply chain housing the inflow of goods and services from other industrial sectors, which stimulates further increase and enhancement of a nation's employment and entrepreneurship. It is not surprising that Vision 2020 has set an ambitious goal to increase the contribution of the manufacturing sector to 15% of the GDP by 2020.[23] Therefore, in a country that is determined to diversify its industrial structure like Oman, emphasizing the salience of the manufacturing industry is a very sound and rational strategy.[24]

The manufacturing sector of Oman should position itself to compete globally, as its productivity proxied by the manufacturing value added (MVA) lags behind even its GCC neighbours. As shown in Table 3-1, per capita MVA for Oman in 2006 was only USD575.8 compared to USD3,629.5 for Qatar and USD4,464.1 for the UAE. Although the figure is well above the average for developing countries, it suggests that the manufacturing sector of the Sultanate faces an urgent task of improving its productivity.

Therefore, private sector participation is essential. The private sector in Oman seems quite active in the nation's economic activities. The private sector investments made in the post-1998 period shows the potential of the private sector. When His Majesty Sultan Qaboos bin Said declared 1998 as the "Year for the Private Sector," and encouraged the private sector to invest in broad fields of businesses previously restricted only to the government, i.e., electricity generation and distribution, and airport management, the contribution of the private sector to the total investment increased to some 53.9% in the period of 2001-2005 (the Sixth Development Plan), compared to about 37.7% in the period of 1996-2000 (the Fifth Development Plan).[25] It evidences that the private sector in Oman is quite willing to take the roles ceded by the public

20. Mittelstadt, Axel and Fabienne Cerri (2009), "Fostering Entrepreneurship for Innovation," STI Working Paper 2008/5, Paris: OECD. p.25.
21. *Ibid*. p.27.
22. Scott, Robert E. (2008) "The Importance of Manufacturing: Key to Recovery in the States and the Nation," EBI Briefing Paper #211, February 13, 2008 (Washington DC: Economic Policy Institute).
23. Oman, the Government of (2007) "Annual Industrial Report, 1st Edition," Issue of 2007, Directorate General of Industry, The Ministry of Commerce and Industry, p.13.
24. It must be acknowledged that there is a controversy in Oman's academia and policy practitioners' circle that it is seemingly inefficient and implausible that a country like Oman - having a small market foundation - should distribute its scarce resources in such a low potential sector like manufacturing. However, it must also be pointed out that such a negative view is also vigorously rebutted.

sector. This outcome also suggests that such stimulating efforts as this must be institutionalised so that the momentum of the private sector participation in economic activities can continue systematically.

Table 3-1 | Industrial Performance, GCC Countries

	MVA, average real growth rate (%)	Per capita MVA (constant 2000 USD)	MVA as % of GDP (constant 2000 prices)
	2000-2006	2006	2006
Bahrain	7.94	1,977.60	13.33
Kuwait	10.58	1,617.44	8.02
Oman	**7.53**	**575.81**	**7.04**
Qatar	9.48	3,629.46	7.90
KSA	5.97	967.92	10.67
UAE	8.20	4,464.05	29.84
High Income Countries	5.98	2,844.41	20.53
Developing Countries	6.98	384.21	20.53

Source: UNIDO (2008) "Industrial Statistics"; Note: See Appendix 3 for the list of countries from which the data are derived.

3.2 Institutions and the Three Pillars in the Development Process

Why does the institutional foundation matter in the context of Oman's determination to develop its strategic industries? It is because the institutional foundation consolidates the public and the private sector's willingness to push forward the national development and to amass their capacities. In addition, it acts as a pilot agency and a policy intermediary of the national development.

The government, among other institutional components, is a pivotal element especially in the early stage of development. The governmental agencies, in particular, play crucial roles in the course of the development as a pilot agency. In Korea's initial stage of the development, the Government of Korea, played a partial entrepreneurial role. For instance, it established

25. Oman, the Government of (2005) The Omani Industry and 35 Years of Development, 120/2007, The Ministry of Commerce and Industry, pp79~80.

numerous public enterprises (i.e., POSCO, an iron and steel manufacturer which was later privatised) to supply strategic goods such as iron and steel sheets, of which a few later became global enterprises. It also exerted a decisive influence on investment decisions of the private enterprises, such as the heavy and chemical industries including the automobile and shipbuilding industries are the case examples.

The government also offered a new impetus to the R&D activities, as the private sector capacity fell short in the early phase covering only 2% of the nation's total R&D expenditure.[26] Universities in Korea, until that time, remained as mere educational institutions, undertaking little research.[27] To account for this shortfall in the R&D area, the Ministry of Science and Technology (MOST) was created to promote national research and development programmes in 1967.[28] The Korea Institute of Science and Technology (KIST), the first government research institute (GRI), was also founded in 1966 as an integrated technical center with the main objective of providing the skills and technologies and technical researchers required by the private sector.

Quasi-governmental institutions mainly acted as policy intermediaries along with the private sector institutions. For instance, the Korea Trade-Investment Promotion Agency (KOTRA) is one exmaple. KOTRA, a parastatal corporation, was created to promote the export of Korean goods and services. It has supported the development programmes by vigorously developing overseas markets, but also served as a conduit for the importing of advanced technologies and attracting of foreign investments.

The Korea International Trade Association (KITA), a private sector business association comprising of trading companies, also took a part in the development efforts by instituting various training programmes to create trade experts.

Today, the role of the government in the economic activities has diminished compared to its role in the early days, as the private sector has begun to spearhead the drive for the development of the Korean economy as it evolved. Yet, the government still remains as one of the most influential actors in Korea's economic activities, being responsible for, for instance, the macroeconomic vision of the nation. Especially, the development paradigm in Korea still pivots around the main pillars set in the early days of the development by the developmental elites of

26. Kim, Linsu (2001) " Crisis, National Innovation, and Reform in South Korea," Working paper, http://dspace.mit.edu/handle/1721.1/16570, MIT's Center for International Studies
27. Lim, Yooncheol (2000) "Development of the Public Sector in the Korean Innovation System," http://dspace.mit.edu/handle/1721.1/16570, International Journal of Technology Management, 20(5/6/7/8), pp.684~701.
28. *Ibid*.

the public sector. Those are, (1) policy - making and intermediating organisational structure, (2) industry supporting financial systems, and (3) R&D and HRD system to develop and foster innovation and entrepreneurship - even though their policy mix, or the combination of the components of the three pillars, has attered to account for the change in environment (Table 3-2).

Table 3-2 | Industrial Policy and Institutional Arrangement of Korea in the Development Stage

Development phase	1st	2nd	3rd
Strategic industries/ Policy objective	The import substitution policy; promoting the export through labour-intensive industries	Promoting HCIs*and other capital intensive industries	Promoting IT and other high-tech and knowledge-intensive industries
Pilot agencies and the policy intermediary system	EPB,** economic ministries and other policy intermediaries (industry supporting institutions)	The newly added: promotion agencies for SMEs, export insurance, industrial designs, HRD, energy conservation	The newly added: promotion agencies for IT and other high-tech industries
Industrial financing system	Public loans by specialised banks	Loans extended by commercial banks; The credit guarantee system instituted	Venture capital; equity investment
R&D and the HRD programme designed for engineers and entrepreneurs	R&D: Duplicative imitation	R&D: Creative imitation	R&D: Innovation
	HRD: general education by universities	HRD: Specialised education provided by research-oriented university (KAIST†, etc.)	HRD: basic research (universities) applied research (private firms)
	GRIs†† (i.e., KIST◆) leading role in the nation's R&D activities	KIST and specialised GRIs took the leading role in NRDP◆◆	Private initiatives in R&D are predominant; GRIs support for SMEs
	Training engineers & inducing researchers educated overseas	Furnishing the private sector with eligible researchers	New businesses created by researchers

Notes: * HCIs, heavy and chemical industries
**EPB, Economic Planning Board of Korea;
†KAIST, Korea Advanced Institute of Science and Technology;
††GRIs, government research institutes;
◆KIST, Korea Institute of Science and Technology;
◆◆NRDP, National R&D programmes

3.2.1 Policy-Making and the Structure of Mediating Organisation

In Oman, the organisational structure to foster the nation's development and industrialisation is composed by the following agencies: The Ministry of National Economy (MONE), which is responsible for the macro-level economic planning, the national development planning, and budgeting, while the Ministry of Commerce and Industry (MOCI), which evolved from the Ministry of Development, is in charge of promoting the manufacturing industry and developing the private sector. The two government departments are performing the roles of the policy-making and policy intermediary agencies responsible for the national developmental agenda.

However, the policy co-ordination function needs to be enhanced at the governmental level to account for the functional overlaps existing in the organisational structure. For instance, take the agendum of promoting innovation at the national level. The main contributing factors of the promoting innovation are education, or educated work force, and R&D activities. In accordance, the Ministry of Education is in charge of education of researchers and engineers, while the Ministry of Higher Education is responsible for university education and research promotion, with the MOCI supporting industrial innovations. As a result, some government functions and responsibilities are dispersed to a few different ministries. This functional duplication, and the overlapping duties and responsibilities, engenders bottlenecks in the process of policy implementation, notwithstanding the nation's institutional strengths.[29] In other words, the institutions in Oman, regardless of whether they belong to the public sector or not, have developed well vertically but not horizontally. This means that there is no organisational structure that functions as a conduit between/among institutions, and a serious lack of a horizontal communication and co-ordination mechanism. Therefore, there is an exigency in having no governmental entity that is responsible for co-ordinating organisational functions and responsibilities of the public and private sector institutions to prevent redundancy and inefficiency.

In the past, Korea had faced such predicament arising from inefficiency and redundancy, which led to the establishment of the Economic Planning Board (EPB), an inter-ministerial government agency, or a super-ministry, whose functions and responsibilities were mainly set on the planning and co-ordinating economic development policies across the government ministries. The contribution of this policy co-ordinating agency to the economic development of Korea is indispensable.

The EPB of Korea, chaired by the Deputy Prime Minister, had similar functions and responsibilities as the MONE of the Sultanate. It was referred to as a "super-ministry" because

29. Refer back to the discussion in the preceding chapter.

it retained the planning, budgeting, and external policy co-ordinating function with foreign governments, but most importantly, policy co-ordination responsibility across the government ministries. The inter-ministerial co-ordinating function is crucial, as dispersed responsibilities may blur the focus of the national development.

To this purpose, the following is recommended:

- **Recommendation 1**: The GOSO create an inter-ministerial co-ordinating governmental body such as the Industrial Development Commission.[30]

This commission will be mandated to co-ordinate and integrate policy resources and capacities of industrial development-related ministries as well as the private sector institutions (Refer to Figure 3-4). The commission, working as the core element of PPP, may embrace as many representatives of the private sector as possible, so that the vision for the national development is derived from a close association between the public and private sector. However, the issue of authority is yet to be resolved. Without an appropriate authority, the commission may not function as intended.

To this regard, it may be plausible that the Industrial Development Commission (IDC) be a part of, for instance, the Economic Strategic Committee (ESC). This means that the committee reports directly to the ESC. Preferably the IDC should be a working committee, primarily co-ordinating governmental policies. The IDC should consist of policymakers who are mandated with a considerable degree of decision-making authority.

The establishment of the IDC is not meant to add another government agency to the existing structure, but to systematise the channel for policy co-ordination and horizontal communication structure across the government agencies. The IDC is also expected to accommodate bilateral communication channel between the private and public sector.[31]

Aside from the co-ordinating authority, one of the most important mandates of the IDC will be the monitoring and evaluating of the progress of developmental policies/programmes at

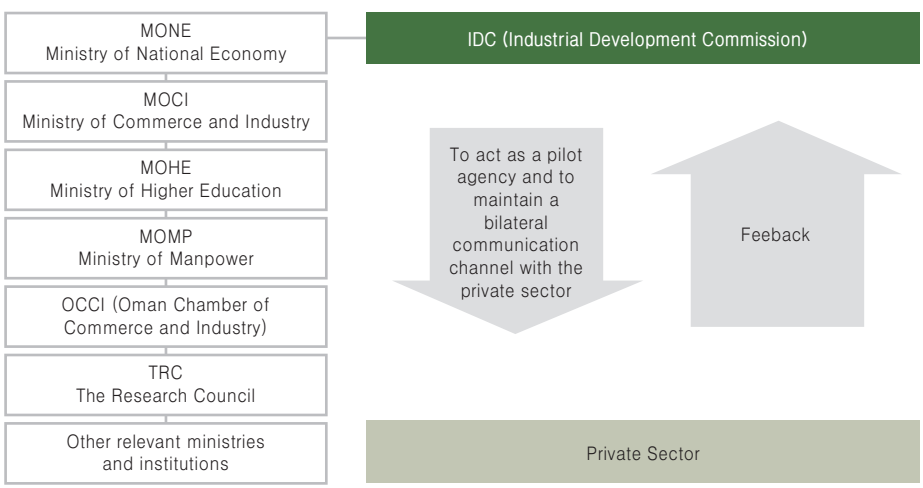
30. A proposed name only.

31. To serve the dual purposes of the policy co-ordination and the establishment of bilateral communication channel with the private sector so as to promote Korea's export, the GOK in the 1970s also instituted monthly Export Promotion Meetings to which the President, high-ranking government officials and private sector business leaders attended. Needless to say, the meetings were highly effective both in co-ordinating export promotion policies among government agencies and maintaining a bilateral communication channel between the public and private sector. (See also Jai S. Mah (March 2007) "Industrial Policy and Economic Development: Korea's Experience," *Journal of Economic Issues*, Vol. XLI No. 1, pp.77-92)

every stage. By doing so, the GOSO will be able to document and to aggregate the impact of the policies/programmes so that it will be able to disseminate and replicate the successful cases to where it is deemed applicable.

With respect to the structural set-up, a significance of the IDC is, as shown in Figure 3-4, lies in the fact that it embraces the private sector from the planning stage, so that the private sector's feedback can be integrated into the entire process of planning, monitoring, and evaluating.

Figure 3-4 | Conceptual Structure of the Industrial Development Commission

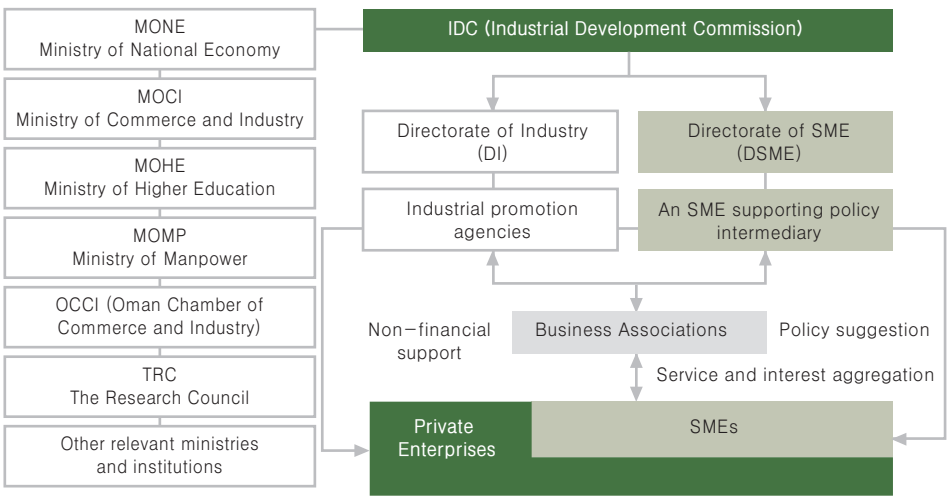


3.2.2 The Industry-Support Structure

In the early stage of industrialisation, the public sector assumes the leading role by allocating resources through policy interventions to the industrial sectors from which it expects the highest returns whether in the short- or the long-run. This means that efficiency and effectiveness matter. Therefore, it is essential that policymakers are free from the pressure from interest groups. In this respect, it is quite ideal that the GOSO, via IDC, confines its role to that of a pilot agency, concentrating largely on the planning, monitoring, and evaluating activities. The role of policy intermediary, which actually implements the policies, is recommended to be delegated to the quasi-governmental organisations, which are managed like profit-oriented enterprises by non-government managers. This structure highlights a division of labour between

the GOSO being a pilot agency and the quasi-governmental organisation being a policy intermediary (Figure 3-5).

Figure 3-5 | Schematic Diagram of the Institutional Framework for the Industry Support Structure in Oman



3.2.2.1 The role of policy intermediaries

As depicted in Figure 3-5, the IDC, acting through the Directorate of Industry (DI) of the MOCI, supports enterprises. It does not directly engage in the implementing process of industry support policies/programmes; however, the industrial promotion agencies (i.e., the Oman Center for Investment Promotion and Export Development or OCIPED, the Public Establishment for Industrial Estates or PEIE) do. Similarly, the Directorate of SME does not implement SME support policies/programmes directly. Support activities are performed by an industrial promotion agency specially mandated to the exercise of SME support activities entrusted by the Directorate of SME (DSME).

Then, an interesting question at this point would be: "What is the pertinence of the presence of the policy intermediary?" The answer to this question is two-fold: specialisation and efficiency. The two factors, specialisation and efficiency, are symbiotic in the sense that efficiency is ensured by specialisation. And planning is a highly specialised process that requires expertise. The implementation process is quite complex and also demands specialised

skills. Hence, the two processes are better separated and executed by different entities having different organisational objectives. The policy intermediaries, for instance, consolidate the government's administrative procedures and offer a "one-stop-service" to businesses that otherwise has to undergo complex and tedious administrative procedures often. This measure is especially beneficial for SMEs that possess relatively less organisational resources than LEs.

In the early stage of development, the Government of Korea (GOK) also established policy intermediaries based on the principle of separating the execution of policies/programmes from the planning. Accordingly, the Small Business Corporation, Korea Trade-Investment Promotion Agency, and Korea Export Insurance Corporation were established. As the effectiveness of such intermediaries was proven, the GOK has expanded the setup of the supporting intermediaries in the areas of R&D, infrastructure, and policy research (refer to Box 3-1).

Box 3-1 Policy Intermediaries in Korea - A Few Examples

● **General Industrial Promotion Agencies (The figure in the parentheses represent the year of establishment)**
- Korea Trade-Investment Promotion Agency (1962)
- Small Business Corporation (1979)
- Korea Export Promotion Corporation (1992)
- Korea Software Industry Promotion Agency (1998)
- Korea Health Industry Development Institute (1999)
- Korea Game Industry Agency (1999)

● **R&D Supporting Institutions**
- Korea Institute of Design Promotion (1970)
- Korea Institute of Science and Technology Evaluating and Planning (1999)
- Korea Institute of Industrial Technology Evaluation and Planning (1999)
- Institute for Information Technology Advancement (1999)
- Korea Institute of Environmental Science and Technology (2000)
- Korea Industrial Technology Foundation (2001)
- Korea Technology and Information Promotion Agency for SMEs (2002)
- Korea Materials and Components Industry Agency (2005)
- Korea Institute of Energy and Resources Technology Evaluation and Planning (2007)

● **Institutions for the Delivery of Infrastructure**
- Korea Productivity Center (1957)
- Korean Standards Association (1962)
- Korea Industrial Complex Corporation (1964)
- Korea Energy Management Corporation (1980)
- Human Resources Development Service of Korea (1982)
- Korea Institute of Nuclear Safety (1990)

- Korea Institute for Electronic Commerce (1999)
- Korea Power Exchange (2001)
- Korea Testing Laboratory (2006)

● **Public Policy Research Institutes**
- Korea Development Institute (1971)
- Korea Institute for Industrial Economics and Trade (1976)
- Korea Information Society Development Institute (1985)
- Korea Energy Economics Institute (1986)
- Korea Labor Institute (1988)
- Korea Institute for International Economic Policy (1989)
- Korea Environment Institute (1992)
- Science and Technology Policy Institute (1999)

In Oman's setting, the establishment of the SME support entity is especially exigent as SMEs play a highly significant role in the Sultanate economy. Indeed, they account for some 60% of the total number of businesses and generate about 50% of the employment. Hence, focus needs to be set on the development of the SME sector, as emphasised in the Future Industrial Strategy of the Sultanate.

To this extent, it is recommended that:

● **Recommendation 2**: The GOSO establish a policy intermediary to execute the industry support policies/programmes designed by the government especially for the SME sector.

In Oman, the GOSO presently plans and delivers most of the industry support services. As mentioned above, it would be more effective if the support functions are divided between the GOSO and the intermediary (for the sake of convenience, temporarily call it the "SME Promotion Corporation or SMEPC"). The SMEPC will be a quasi-governmental organisation that will be managed like profit-oriented business entities serving their clients - in this case the SMEs. This may be the only way with which the SMEPC will be able to survive, though it does not necessarily have to run on profit.

Box 3-2 Small Business Corporation

The Small Business Corporation (SBC) in Korea was founded in 1979 with the objective of implementing government policies and programmes that assists the development and growth of the SME sector. The SBC provides both financial and non-financial supports for SMEs in Korea. While its financial support is focused on innovative SMEs in high-tech low-carbon industries, the SBC's non-

financial support is concentrated more on supplementing SMEs' embedded weaknesses, such as the lack of access to information, market, management skills, human resources, and the like. The SBC's 2009 budget is about USD7.6 billion, comprising of USD95 million for capital investment, USD4.25 billion for various loan programmes, and USD42 million for non-financial support programmes.

Today it houses 761 employees in 18 departments at its headquarter, 23 regional offices around the country, and two overseas industrial technology co-operation centers. HRD is an important aspect of the SBC. It operates five Small Business Training Institutes around the country, training 70,000 workers annually, mostly from the SME sector, including top executives, managers, engineers, and plant workers.

3.2.2.2 The role of business associations

If the policy intermediaries represent public sector efforts in the private and public sector co-operation, business associations are the institutionalisation of the private sector efforts in forging such co-operation. Business associations are the aggregation of private sector businesses, normally formed by industries, performing the role of policy intermediaries for the industries as the quasi-governmental institutions do for the government. In Oman, although it has been dormant for the last couple of decades, the OCCI is a prime example of a business association.

The main objectives of the business associations include the aggregation and representation of business interests. A collective and organised entity promotes collective interests more effectively than an individual does. For instance, an individual Omani farmer is vulnerable to the terms and conditions set by the whole-sale businessmen in neighbouring Dubai who normally set the prices for the farmer's fresh produce. Consequently, the Omani farmer is frequently forced to sell his products below cost as his products are perishable goods. A problem of this sort can largely be overcome by organising a collective body of farmers. For instance, a farmers' cooperative can do things that are beneficial to the farmers that an individual farmer may not be able to do. A collective body of farmers may, for example, advise farmers on what to plant so that the amount of output can be controlled; it may also build storage facilities so that the amount of fresh product supplies can be controlled at an appropriate level.

As for the government, it will be able to effectively administer policies/programmes as the actual dissemination is done by the collective body. At the same time, the government can easily and closely identify any problems an industrial sector may have as it deals with only one channel of communications that aggregates and funnels through the interests of the particular industry. Having realised the effectiveness and the benefits from the presence of business associations in the country, Korea encouraged the establishment of business associations, as reflected in its Industrial Development Act. This act advocates that the business associations

should (1) place an effort on research activities focused on the general direction of the development of each industry, (2) represent and enhance the interests of each industry, and (3) strengthen competitiveness of firms in each industrial sector.

To this regard, it is recommended that:

- **Recommendation 3**: The GOSO encourage the establishment of business associations in respective industries.

In Oman's environment, it would be plausible to establish business associations starting from such strategic industries as agriculture, fisheries, and tourism sectors and expand it to the ICT and other industries as they develop.

Box 3-3 Private Sector Business Associations in Korea

- **The Big Five Major Business Associations (The figure in the parentheses represent the year of establishment)**

  - The Korea Chamber of Commerce and Industry (1884)
  - Korea International Trade Association (1946)
  - The Federation of Korean Industries (1961)
  - Korea Federation of Small and Medium Business (1962)
  - Korea Employers Federation (1970)

- **Sectoral Business Associations**

  - Korea Federation of Textile Industries (1967)
  - Korea Association of Machinery Industry (1968)
  - Korea Iron and Steel Association (1975)
  - Korea Electronics Association (1976)
  - The Korean Shipbuilders' Association(1977)
  - Korea Automobile Manufacturers Association (1988)
  - Korea Semiconductor Industry Association (1991)

3.2.3 The Financial Support Structure

3.2.3.1 On the need for policy co-ordination

The financial support system, the public finance system in particular, is one of the most crucial elements for industrial development. It is often the case that public financing fills in the

gaps left by the private sector financial institutions, particularly those companies/businesses that are generally not desirable to finance. A market failure of this sort arises from the very fact that the private sector is inclined to make "efficient investment decisions," which often let it "stave off" from taking risks such as financing long-term, large-scale equipments/facilities or SMEs. For this very reason, the public sector financial support system becomes essential in the development of such businesses in the early development stage such as start-ups, venture firms, SMEs, whose access to finance is difficult if not impossible. Hence, in the light of the fact that some strategic industries that the GOSO is placing its development foci on are yet in a nascent stage, the public financial support system in Oman would surely play a much important role in the development of the industries than any other developmental attributes.

The financial system in Oman is generally well in place, and commercial banks play a dominant role in the system. For large-scale business ventures, the banks provide long-term syndicate loans. Investment decisions of this kind used to be made by the MOCI, but are now made by the ODB, as the MOCI has transferred loan decision-making authority to it.

Table 3-3 | Financial Support Institutions/Programmes for the SME Development in Oman

Public sector	Private sector
• Oman Development Bank • Sanad Programme • Ministry of Social Development/Livelihood (RizGH) Resources Project	• Sharakah (the Youth Project Fund) • GroFin Oman • HSBC Bank Middle East, Ltd. • Bank Muskat • Sohar Bank • National Bank of Oman

For the start-ups, venture firms, and SMEs, there are numerous programmes that have been established to extend financial support (refer to Table 3-3). The ODB provides soft loans for projects of various volumes starting from RO5,000 to RO250,000, and larger at an interest rate of 3%. Sanad extends the loans up to RO5,000 per individual venture with a 2% administrative charge. On the other hand, private sector-led financial assistance programmes such as Sharakah provides start-up capital ranging between 25% and 50% with a 5-year tax exemption for a new venture project, but not exceeding RO1,000,000.

The number of programmes established in both the public and private sector that aim to support SMEs does not seem to be scarce in Oman. Nonetheless, it seems the absence of policy co-ordination among the programmes diminishes their effectiveness. Each programme is run and managed by each provider on its own terms and conditions without a uniformed vision for the future development of the SME sector.[32] It would be ideal if the SME support schemes as

well as the support polices are organised by a leading organisation - perhaps the ODB - within the development framework set forth in Vision 2020, so that resources could be allocated to the SME sector in a structured manner rather than being disbursed at random.

The GOSO's "policy-finance scheme" may serve as a good example to follow, in which the GOSO's allocation of funds suggests how financial resources should be set aside. As seen in Table 3-4, the GOSO's expenditure was funnelled through to channels that meant to serve the objectives of Vision 2020 - privatisation and private sector capacity building.

Table 3-4 | Structure of Government Expenditure, 2001-2006

(Unit: RO mill.)

Items	2001	2002	2003	2004	2005	2006 Budget
Total expenditure	2,860.2	2,939.5	3,188.9	3,809.9	4,273.0	4,237.0
Current expenditure	2,187.8	2,273.9	2,373.1	2,661.2	3,179.4	2,899.0
Investment expenditure	556.5	586.7	700.0	1,034.8	966.5	1,110.0
Equity investments and subsidy to private sector	115.9	78.9	115.8	113.9	127.1	228.0

Source: Data rearranged from "Table 5.1: Financing of Industries," Annual Industrial Report: 2007 Issue, (Original data source: Central Bank of Oman), Ministry of Commerce and Industry (2007), p.101.

The government's equity investment and direct subsidy to the private sector increased to RO228.0 million in 2006 from RO113.9 million in 2004, while investment expenditure remained at almost the same level - RO1,110.0 million in 2006 from 1,034.8 million in 2004.[33] The data suggest that the GOSO's expenditure pattern seems to be consistent with the nation's overarching development strategy - Vision 2020. Therefore, the SME support funds would be more meaningful if guided by co-ordinated and clear policy objectives.

Based on these postulates, it is recommended that:

- **Recommendation 4**: The GOSO appoint the ODB as the co-ordinating body for existing financial support programmes for SMEs established both in the public and private sector, and allow the ODB to re-orient the programmes to support the objectives of Vision 2020.

32. Almoharby, Darwish and Golam Mustafa Khan (2008) "Creating an Enabling Environment for Entrepreneurship in Oman: Some Policy Guidelines," Presentation paper.
33. Ministry of Commerce and Industry (2007) Annual Industrial Report: 2007 Issue (Original data source: Central Bank of Oman).

3.2.3.2 On the need for the introduction of a credit-guarantee system

The mode of financing for the SME sector requires special attention. For instance, direct financing to SMEs is difficult in Oman. The default rate has become extremely high, so much so the paid-in-capital of Sharakah, the only venture capital fund existing in Oman was nearly depleted.[34] This suggests that some corrective means should be adopted when financing new business ventures. Those can be:

(1) introduction of a new credit-rating system for SMEs, venture firms in particular; and
(2) introduction of indirect financing methods.

The introduction of a new credit-rating system means to strengthen the assessment on the viability and potential of new business ventures, abating the current default rate. As the performances of some SME support funds have displayed disappointing results, the introduction of a new system of credit-rating criteria has become a matter of urgency.[35]

However, the introduction of a new system must not injure or discourage venture and start-up activities. A balance between the fostering of SMEs by easing the credit constraint and the controlling of viable new business ventures must be observed.

The credit guarantee system, an indirect financing method, would be an appropriate mode that accommodates both of the needs - to ease the credit-supply for SMEs while enhancing the credit-rating. Korea has a history of utilising the government-backed guarantee system extensively. A great number of large-scale development projects financed by international bank loans were guaranteed by the GOK. As the Korean industries developed further, new frontier businesses in which high-risk was often embedded - such as the IT and software industry - called for a new mode of financing. As they were new to the market, the traditional credit, or

34. Al-Shaibani, Malak Ahmed (October 19, 2008) Personal interview, General Manager, Sharakah.
35. An example of the criteria for the credit-rating is as follows:

Criteria	Weight
1. Business Attractiveness	15
2. Marketing Capability	15
3. Technological Competitiveness	20
4. CEO and Management System	20
5. Future Financial and Debt Redemption Ability	30
Total	100

Source: Lee, Jaehoon and Jumi Kim (2007) "A Review Report on the *Financiamiento Innovador para Pequeñesy Medianas Empresas* (FINPYME)," Inter-American Investment Corporation, Inter-American Development Bank/Korea Small Business Institute.

liquidity, supply system could not deal with them appropriately. Consequently, the GOK had to take the risk, as it was determined to diversify these industries. The GOK supported the germination of the start-ups and venture firms in the industries as the first step.

In telatin to this, two main public guarantee institutions for SMEs were founded: the Korea Credit Guarantee Fund (KODIT) and the Korea Technology Credit Guarantee Fund (KOTEC). The main tasks of the KODIT, established in 1976 under the Korea Credit Guarantee Fund Act of 1975, were to provide credit guarantees to SMEs and to manage credit information. On the other hand, KOTEC, founded in 1989 under the Financial Assistance to New Technology Business Act of 1988, provides credit guarantees to SMEs but sets its focus on financing new technology-based enterprises and technologically competent SMEs.

Box 3-4 Korea Credit Guarantee Fund

The Korea Credit Guarantee Fund (KODIT) was established in 1976 to extend credit guarantees for loans and other liabilities to promising SMEs that, however, lacked tangible assets to offer as collateral or past business track records (as they were new ventures). As of December 2007, KODIT's total outstanding credit guarantee reached KRW28 trillion (about USD28 billion).

KODIT's credit guarantee services can be itemised into four broad categories in terms of the characteristics of liabilities it takes. The most important one is a guarantee for indirect financing, including a guarantee issued to commercial banks on bank loans or on a discount on commercial bills, and a guarantee on 'payment guarantee offered by the bank', of which the customer is usually the export/import companies. The second one is a guarantee for direct financing such as a guarantee on corporate bond issues, which is not so popular mainly due to the reason that bonds are not a common means of funding in Korea. In addition, the other two types of guarantee services are the B2B credit guarantee on the transaction between supplier and buyer, and a performance guarantee which is usually issued to construction companies.

The number of companies that newly benefitted from the guarantee system rose drastically - from 25,810 in 2006 to 31,592 in 2007. In 2007, the government proffered KRW130 billion to KODIT, and the banks contributed KRW694 billion. As a result, KODIT's fund capital reached KRW3,607 billion at the end of 2007.

KODIT announced its 'Hope-KODIT Vision 2011' - the business goals that focused on maintaining the default rate at the level of 4% through integrated risk management, supplying more than half of the guarantees to innovative SMEs, and providing customised support to SMEs based on their growth stage. KODIT actively employs the Enterprise Risk Management (ERM) system, integrating credit risk management, liquidity risk management and operational risk management.

In 2006, KOTEC provided guarantees totalling KRW931 billion (roughly USD931 million) to 7,314 firms and KRW90 billion (roughly USD90 million) to 348 enterprises at the incubation stage. KODIT issued credit guarantees amounting to as much as KRW28 trillion (USD28 billion) in the same year, the number of beneficiaries being 203,096 firms and enterprises. Both funds, serving as the bases for guarantee, are replenished regularly and enlarged as needed by a government budget endowment. The credit guarantees are on average valid for five years. The accumulated amount of outstanding guarantees as of 2004 amounted to as much as 6% of Korea's GDP for that same year. This amount also accounted for nearly one-third of the total lending to SMEs.

To stimulate industrial development, and thus economic growth, the business environment should be favourable enough for entrepreneurs to identify new business opportunities and to immediately commercialise them. In order for entrepreneurs to do so, they must have, among others, access to "risk-capital" from competent venture capitalists who understand the potential of new business ventures. However, in Oman, Sharakah is the only source meeting the needs for venture capital.

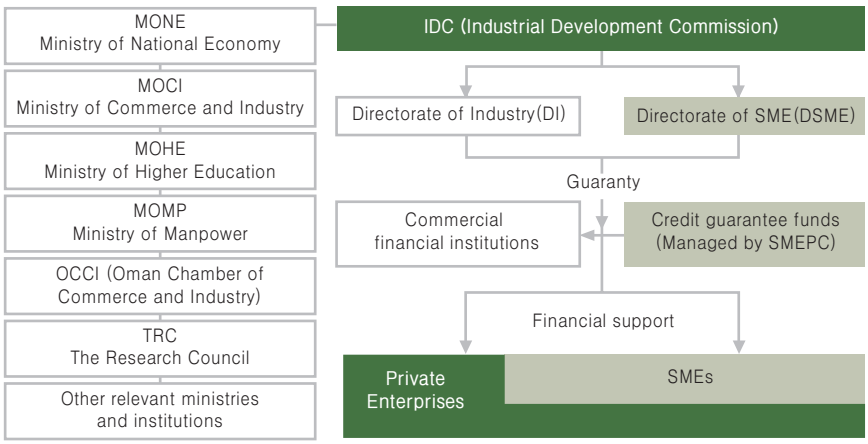
In the absence of competent venture capitalists, a guarantee system is a viable alternative, whereby the high risks associated with new business ventures are shared between the public and private sectors. Utilising the risk-sharing scheme, a partial public subsidy in reality, the credit guarantee system would ameliorate the entry barrier for new industries erected by the lack of capital, while possible "moral hazards" are filtered by the private sector.

Based on the preceding logic, it is recommended that:

- **Recommendation 5**: The GOSO introduce a credit guarantee system to meet the needs of new frontier start-up and venture SMEs in the strategic industries, while sharing the risks with the private sector.

As dictated by the goals of Vision 2020, the GOSO is not recommended to directly manage the credit guarantee system. It would be more appropriate if it would allow a policy intermediary such as the SMEPC to take the managerial responsibilities for the credit guarantee system, as schematised in Figure 3-6. While commercial banks extend loans directly to the businesses that qualify the terms and conditions for the loans set by them, the SMEPC takes care of the start-ups, ventures, and other SMEs by issuing credit guarantees.

Figure 3-6 | Schematic Diagram of the Financial Support System



As suggested earlier, SME financing is highly specialised and extraordinary, which requires extensive knowledge and experiences in the SME sector. It is also worthwhile to consider of setting up a special division that deals only with the SME financing within the ODB. The GOK rendered special attention to SME financing by establishing the Industrial Bank of Korea (IBK), formerly known as the Small and Medium Enterprise Bank (See Box 3-5). As the industries in Oman develop further, the "division of labour" may be considered by having the ODB deal with large-scale projects, while moulding the SME division into an independent entity solely dedicated to SME financing.

Box 3-5 Industrial Bank of Korea

The Industrial Bank of Korea (IBK), a specialised bank for SME financing, was established in 1961. It was then known as the Small and Medium Enterprise Bank of Korea. Based on its close proximity and relationship with its SME customer base, the IBK has truly been a "helping hand" to SMEs, providing comprehensive financial services for SMEs in Korea. The bank has been recording steady growth in spite of the fact that its major client base is the SME sector. Today, IBK employs some 9,000 staff and operates a retail network of 570 branches 10 of which are overseas. The bank has four subsidiaries: IBK Capital Corporation, IBK-SG Asset Management, IBK System Co. Ltd., and IBK Credit Information Corporation.

In 2007, IBK posted total assets of KRW124.3 trillion, a net income of KRW1.2 trillion while the total delinquency rate recorded at a mere 0.50%. The Bank for International Settlements (BIS) capital adequacy ratio for IBK continued to remain stable at 11.11%. In addition, a strategic alliance with the Korea Investment Holdings improved IBK's product competitiveness; the affiliation with the National Post Office promoted easy customer access to IBK banking services. IBK also enjoys the highest credit ratings from Moody's, S&P and Fitch Ratings among Korean companies.

3.2.4 The Human Resource Development Structure and Entrepreneurship

As stated earlier, Vision 2020 envisages the private sector as the engine of economic growth. In order to achieve it, the private sector would need appropriate manpower - such as entrepreneurs, researchers, scientists, and engineers - in every stage of the growth. The demand for specialised and skilled manpower would increase especially at the stage when Oman's economy is ready to move towards a knowledge-based one. However, developing countries in general, suffer from the lack of needed human capital both in quantity and quality. It is apparent that fostering human capital becomes the beginning step towards industrialisation and economic development.

The employment-education mismatch often poses a problem in this process. Highly educated individuals are not able to find jobs easily in the field of their expertise in developing countries or small-scale economies, as the countries lack sufficient and diverse industrial bases to accommodate such specialised manpower. This problem may also appear in Oman, as more than 95% of the SMEs operate in the commerce and trading areas, and hardly any in the manufacturing area. Hence, it is necessary to strategically design the future industrial structure and the number of university/college graduates by majors.

One way to overcome the predicament arising from the mismatch between the graduates and available employment, while preparing for the demand of the future strategic industries, is to foster entrepreneurship in/around research institutes and/or universities, thereby reproducing accumulated knowledge and talents into tangible outputs. In other words, encouraging start-ups is highly recommended. Since 2004, five universities in Korea have launched a five-year pilot entrepreneurship programme, called "Entrepreneur Graduate School," to train business start-up experts who can later help those graduates wishing to start their own businesses.

Promoting business incubation programmes in these institutions is also an effective policy tool that can utilise the industry-university co-operation scheme.[36] In Korea, business incubators (BIs) have been introduced into numerous universities/colleges and GRIs since 1998. This attempt has been assessed to be quite successful. In 2007, some 260 BIs provided facilities and equipment to more than 5,000 companies over a three to five year period. About 84% of these BIs, or some 220 BIs, were in universities/colleges.[37]

The GOK has enacted various laws to encourage these "on-campus start-ups." For example, in 1998 the GOK amended laws related to leave of absences/sabbaticals so that professors and

36. To this end, refer also to TRC's "Educational Innovation Assistance Program."
37. Mittelstadt and Fabienne (2008) p.37.

researchers in GRIs could take a leave of absence for a maximum of three years. This leave-of-absence option was later extended to six years. As a result, a large number of researchers and university professors went on to establish businesses, which paved the way to the rise of venture SMEs in the late 1990s. Government-funded assistance programmes - like the University-Industry-Research Consortium Programme championed by the Small and Medium Business Administration of Korea which was introduced in 1993 - apparently contributed to strengthening the technological competence of SMEs while converting research outputs into tangible business turnouts.

Based on proven successes of the BI programmes in Korea and their contribution in enhancing SME competitiveness, it is recommended that:

- **Recommendation 6**: The GOSO expand and strengthen research-industry/university-industry co-operation programmes including business incubators.

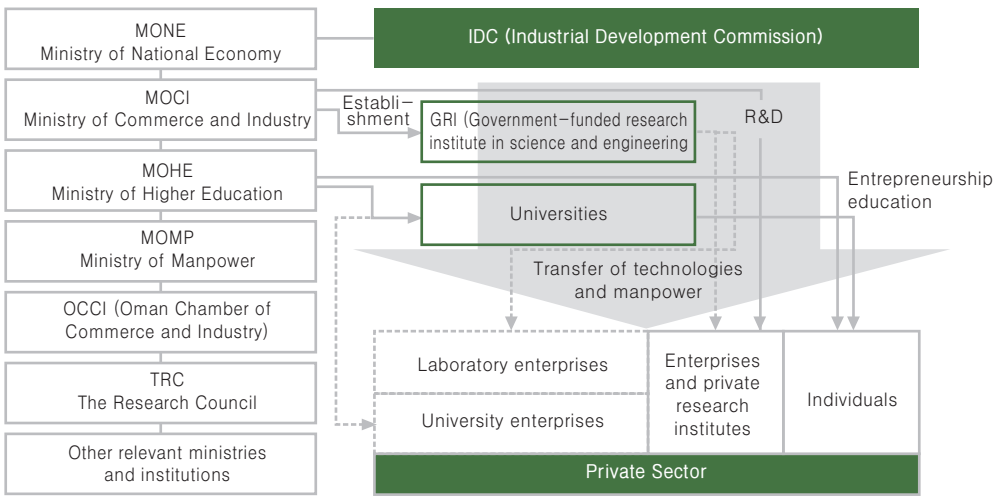
The focal point of the research-university-industry co-operation is to transfer knowledge produced in the academia to the industry so that the accumulated research outputs can be reproduced into some tangible yields in business - especially in the SME sector. The business, in turn, will provide feedback information for the academia enabling it to enrich future research. Hence, the co-operation creates a win-win structure for both the academia and the industry.

Human capital is the driving force of research, development, and innovation, which serve as the fundamental base for the growth of even the traditional manufacturing industry, let alone such high technology-laden industries as the ICT and bio-technology. Cultivating and nurturing research and innovation capacity, and linking them with entrepreneurship would be the most important industrial policy of the Sultanate.

In this regard, the role of the Research Council (TRC) becomes highly significant. TRC performs the role of a vanguard to promote research culture in Oman. It not only supports research projects but also promotes industry-university co-operation, and encourages the culture of research, development, and innovation among SMEs in Oman.

As TRC is a supervising body in the research area, the establishment of a government-funded research and training institute (GRI) in the science and engineering area is highly recommended (the role of the GRI will be elaborated in the following chapter). The GRI and universities act as the nuclei of innovation and entrepreneurial activities including entrepreneurial education and training, as shown in Figure 3-7. They could also serve as the core of the so-called "science parks" in the future, which create returns from "knowledge externalities," utilising the "economies of agglomeration."[38]

Figure 3-7 | Organisational Structure of the Industrial Development Commission in the Promotion of Innovation and Entrepreneurship



Box 3-6 Major Government Research Institutes in the Field of Science and Engineering in Korea

- Korea Atomic Energy Research Institute (1959)
- Korea Institute of Science and Technology (1966)
- Korea Research Institute of Standards and Science (1975)
- Korea Research Institute of chemical Technology (1976)
- Korea Institute of Machinery and Materials (1976)
- Korea Electro-Technology Research Institute (1976)
- Electronics and Telecommunications Research Institute (1976)
- Korea Institute of Energy Research (1977)
- Korea Research Institute of Bioscience and Biotechnology (1985)
- Korea Food Research Institute (1987)
- Korea Institute of Industrial Technology (1989)
- Korea Aerospace Research Institute (1989)
- Korea Institute of Ceramic Engineering and Technology (1991)

(The figure in the parentheses represent the year of establishment)

38. The Silicon Valley in the U.S. or Daeduk Techno-Valley in Daejeon City, Korea are examples of widely known science parks, or Eliasson (1998) calls the "competence blocs."

3.2.5 Entrepreneurial Education and Human Resource Development: Oman's Vision to Foster Entrepreneurship*

The GOSO as well as educational institutions are becoming increasingly involved in encouraging entrepreneurship in Oman. While the training and education provided by the colleges and universities still retains the required academic programmes, the initiative and efforts by Intilaaqah, Sanad and TKM provide the participants with encouragement and some experience on how to start and manage their own business.

Sanad programmes, initiated by the MOMP, are primarily aimed at supporting individuals to create self-employment so that they can own and run small shops, grocery stores, garages, and etc. However, Sanad caters to those who want to do business under its special programme and according to their own terms and conditions. A young Omani who wants to start a new business and run it independently is excluded.

Intilaaqah programmes target unemployed educated young Omanis from universities and colleges who are expected to come up with some new and innovative ideas for their own businesses. While the TKM at the KOM, initiated by the MOCI, attracts the budding information technology entrepreneurs, the graduates from SQU receive broad academic insights in business administration with some having the opportunity to take both the entrepreneurship and small business courses.

Although these organisations are trying to attract and train different groups of individuals, there seems to be no co-ordination at the national level. Given the importance of entrepreneurship in Oman, a national office could be set up at one ministry to co-ordinate and support the various services offered by the different organisations. It will be very insightful and essential to conduct a detailed review of the effectiveness of current programmes run by Sanad and KOM, as well as the corporate initiative of the Shell-funded programme, Intilaqaah.

In order to attract bright students to entrepreneurial careers, universities and colleges in the country could also design and offer courses/programmes like the New Enterprise Programme and Graduate Enterprise Programme launched in the UK or the Enterprise Development Programme launched in Ireland. In addition, both the undergraduate and graduate programmes

* This section is contributed by Darwish Almoharby of Sultan Qaboos University and is derived mainly from the following publications: Almoharby, Darwish (2008) Business Education: Addressing the 'What' Question (1)," *Industry and Higher Education*. v.22, n.6, pp.431-440; Almoharby, D. and G. Khan (2008) "Creating an Enabling Environment for Entrepreneurship in Oman: Some Policy Guidelines," 2008 *International Conference on Entrepreneurship and Family Business*, November 8-9, 2008 Hangzhou, China; and Almoharby, D. and G. Khan (2007) "Towards Setting up a Centre for Entrepreneurship and SMEs in Oman," *Entrepreneurship in Emerging Economies*, August 29-31, 2007 Mauritius.

in colleges and universities can include courses in entrepreneurship and small business management, a few even providing a major/concentration in the field.

Increasing social acceptability of taking the entrepreneurial path, what Porter calls "cultural barriers to entrepreneurship," needs to be taken seriously and addressed with care. One way to do this is to develop a few success stories of Omanis and other regional entrepreneurs, and include these in the middle and high school texts (e.g. in social studies). When students are exposed to the achievements of these local and regional successful entrepreneurs at a young age, some of them are likely to be encouraged to pursue an entrepreneurial career. The GOSO should present awards to excellent companies/organisations that need to be continued and extended to entrepreneurs, which will enhance the social acceptability of entrepreneurial career.

In order to effectively promote entrepreneurial education and training programmes, it is recommended that:

- **Recommendation 7**: The GOSO establish a national organisation entrusted with the responsibility of initiating and implementing a comprehensive entrepreneurship development programme in Oman.

This could be a Centre for Entrepreneurship and SMEs, which would co-ordinate all major entrepreneurship development programmes.[39]

This national organisation can work closely with SQU in the education and training of selected entrepreneurs. In addition to offering courses in entrepreneurship and small business in undergraduate and graduate programmes, short courses like the New Enterprise Programme and the Graduate Enterprise Programme should also be developed and offered. This will help create a new generation of educated and trained entrepreneurs who will create jobs not only themselves but for others also.

Any national entrepreneurship development programme could include a provision to provide support for start-up capital. Also, the government and private sector businesses should be encouraged to buy, where applicable, from new entrepreneurs in order to provide access to markets. Even after a successful start-up, in order to help new entrepreneurs continue to grow, support and extension services should be provided. These should include: access to cost effective business services and advisory services, access to labour and skills, access to information and technology, access to fund and managerial skills for entrepreneurial growth, and access to information on regional and international market opportunities.

39. Almoharby and Khan (2006)

In conclusion, the education and training for any successful entrepreneurship development programme should include the following three related phases:

(1) Training in the identification, selection and initial motivation of potential entrepreneurs;
(2) Training of potential and existing entrepreneurs by experienced and trained instructors, with specially developed and compiled training materials; and
(3) Training support and follow up services.

Some programmes have suffered due to the lack of integration of activities between these three stages.[40] Therefore, the government agencies, private sector enterprises, the Chamber of Commerce and Industries, and the educational institutions need to work together, in close co-operation and co-ordination, to provide strong stimulation to the young generation of Oman. As asserted by Michael Porter, Oman's competitive strategy should include a major priority emphasis on entrepreneurship development.[41]

3.2.5.1 Research and Innovation

Innovation whether technical, institutional or cultural depends on a spirit of inquiry and conceptual freedom, and is encouraged and made fruitful through research and development. Once innovation is made it can be commercialised. Aside from SQU, there is hardly any full-fledged research-based institution in the country. At SQU there exists various platforms for research funds both at the university and college levels, as well as the generous His Majesty's Fund (RO500,000 per year), while there are inadequate research facilities and support in other institutions. However, a recently formed organisation in Oman, the Strategic Research Council, is developing a strategic research plan for the country which is expected to address some of the shortcomings. There should be a generous research support available to the colleges of science, engineering, information technology and business and economics, so that innovation, processes and products can be made.[42]

3.2.5.2 Human Infrastructure

In order to stimulate entrepreneurship development, access to human infrastructure is as important as access to the physical infrastructure. Human infrastructure grew rapidly in the last twenty years or so and gaining access to it is becoming easier. A few decades ago, starting a new venture was a lonely pursuit; there were only a few experienced and trained people around

40. Patel (1986)
41. Porter (2004)
42. Almoharby and Khan (2008)

to provide assistance. Today, many entrepreneurship experts help people start or grow companies. There are support networks, both formal and informal, of professionals who know a lot about the entrepreneurial process.

Oman has a reasonably good physical infrastructure. It has an extensive road network, several ports, telecommunications services as well as water and electricity supplies. However, the cost of telecommunication and internet services are high compared to the neighbouring countries. There is also some room for improving the quality of financial services in the country. In contrast, there seems to be a lack of expertise and facilities for consulting, training, research experts and services for new start-ups and existing SMEs. For most new start-ups the entrepreneurs may need help in developing business plans, conducting feasibility and market research, incubator facilities, etc. However, there is hardly any such service available for new entrepreneurs in Oman. Government supports and incentives are needed in improving both the physical and human infrastructure of the country.

3.2.5.3 Education and Training

In a recent worldwide World Bank survey by Klapper et al., the findings suggest that a higher level of entrepreneurship significantly relates to greater economic development, formal sector participation, and better governance.[43] It also show that periods of economic expansion encourage optimism and entrepreneurship; for instance, individuals might be willing to leave their job security to start a business if they are more confident they can find another job should their business fail. In a recent report by the US National Centre on Education and The Economy, it was acknowledged that the core problem of the US education and training systems is their unsuitability for current period as these were "built for another era." [44] It suggests further that "rudimentary education" is no longer viable. Institutions of higher education, and in particular business schools, need to exert more effort in improving students' capabilities both at the analytical and synthetic level, establishing systems of creativity and innovation, and encouraging self-discipline and flexibility to adapt to an increasingly and frequently changing labour market.

There is a widespread call for more creativity and innovation, and more entrepreneurial educational programs. Ali and Camp argue that one problem that the educational system faces in the Arab World, for example, is the heavy reliance on foreign management theories and models, noting that solving societal problems effectively is critically linked to the educational system and that most programmes are inadequate to meet the demands of contemporary business practice and the needs of a new generation.[45] Similarly, Atiyyah maintains that there

43. Klapper et al. (2007)
44. NCEE (2007)

are evidences to indicate that the "effectiveness of these programmes is generally low due to inadequate needs analysis, irrelevant curricula, non-participative training techniques and lack of reinforcement."[46] More than a decade on, and in their article "American Hegemony and Business Education in the Arab World," Neal and Finlay believe that for Arab students to understand work and manage effectively they need to understand local realities, issues, problems, and strengths. These needs are not marginal but central to effective business education in the region.[47]

The UNDP observes similar deficiencies where the development of students' higher level skills, such as those involving evaluation and critical analysis are not encouraged by the predominantly used teaching methods and are not properly assessed.[48] Given the requirements of the modern international business, this weakness needs urgent consideration. For decades, Oman realised the importance of diversifying the economic base and sources of national income, enhancing international trade, and upgrading the skills of its workforce and developing human resources. Much has been achieved on this front, but in order to enhance this and sustain it for years to come, the mindset needs to change; these towering aims must be matched by appropriate tools in order to achieve them. One indispensable step is initiating an entrepreneurial educational system. Appropriate business education is one of the cornerstones to enhance and encourage more fruitful and sustainable entrepreneurial activities. Nevertheless, business education has come under continuous debate regarding its validity and viability in addressing current and future economic and social challenges.[49]

Robertson et al. call for a joint effort between government units and educational institutions in order to encourage an enterprise culture noting that, for example, the British government is currently providing funds and that universities are also playing an integral role in producing entrepreneurial students.[50] Their study, however, indicates that students are not motivated to consider self-employment and owning a business as a career, and call for universities to address such barriers through their innovative enterprise teaching. One suggestion they provide is to bring on board creativity, innovation, real-life cases, facts and figures, and real-life entrepreneurs. Robertson et al. stress the fact that the overwhelming majority of students are often subjected to educational systems that promote big firms with little nurturing of entrepreneurial activities.[51] This, according to Henderson and Robertson, creates a culture where students lack entrepreneurial aspiration and the skills to start their own businesses.[52]

45. Ali and Camp (1995)
46. Atiyya (1993). Quoted in Ali and Camp (1995)
47. Neal and Finlay (2008)
48. The United Nations (2005)
49. Almoharby (2008)
50. Robertson et al. (2003)
51. *Ibid*.

While this objective is laudable, the practical educational approach which would instill these qualities is not laid out.

Oman faces many challenges in providing job opportunities for its ever-increasing young citizens exiting the general education. To effectively address the challenges, visions, missions, and intended learning, outcomes need to be re-assessed. Job opportunities in the oversaturated government sector are no longer an option. This calls for an active engagement of individuals in both the private sector and in self-employment. The issue of entrepreneurship and SMEs education needs to be addressed seriously. To overcome such challenges, there is a pressing need for education and training systems that are responsive to the local needs and institutions, which are connected to the realities of current and future affairs in a constructive way. It is worth noting the strategic effort undertaken by the Ministry of Education in Oman to embed concepts of entrepreneurship into the curricula. Furthermore, the ministry has introduced a new subject called Life Skills, to be taught to students from grade 1 to 12. The subject addresses these concepts clearly through a series of relevant activities including themes on business, self-employment, job-seeking, and related personal and social skills. This is a gigantic and commendable step in the right direction which Oman envisages will help provide the labour market with much more educated and skilled persons.

3.3 Final Thoughts on the Strategic Industry, Institutions, and the National Development in Oman

The discussions in this chapter have thus far been mainly focused on the underlying structure of an institutional platform that holds two-fold objective with respect to national development. One is how to consolidate the private and public sector capacity, and the other is how to arrange it so that it becomes meaningful in the development of future strategic industries in Oman. Based on this, it proposes specific roles for the government agencies to be as pilot agencies and GRIs as policy intermediaries. An interesting question then is: "What is the pertinence of the policy intermediaries?" Through the discussions on the three pillars of industrial development - industry support institutions, financial institutions, and entrepreneurship and human resource development - this document concludes that it is the specialisation, thus efficiency.

It is also postulated that the most important step towards the industrial development is the establishment of a policy co-ordinating agency in the GOSO, namely the IDC (Industrial Development Commission). The creation of a government apparatus like the IDC is highly

52. Henderson and Robertson (1999)

important for the GOSO in its efforts to develop future strategic industries, as it removes redundancy and duplication by co-ordinating and consolidating various development efforts and subsequent support functions widely scattered across various government agencies. Aside from the co-ordinating function, the IDC will also carry out such important duties as monitoring and evaluating the progress of developmental policies/programmes, whereby those policies/programmes that are successful can be disseminated and replicated. The commission's *raison d'être* is with its organisational function of being an effective channel of communication with the private sector as well.

The mere installation of institutions should not be construed as a means with a high probability of success in achieving the goals of Vision 2020. However, its significance is profound to the extent that it synthesises institutional strengths that Oman's institutions have already developed. Hence, creating a platform which consolidates available institutional strengths in Oman becomes a task of the utmost exigency.

Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

Chapter 04

The Technology Transfer and Domestication

Chapter 04

The Technology Transfer and Domestication*

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As indicated earlier, some critical factors of industrialisation, thus national development - such as new technologies - are obviously exogenous to an economy. They may not be readily available merely by a reshuffling national resources or capacities. Because of this, technology transfer and successful internalisation has become a focal point of developmental studies today. This chapter will shed some light on this issue of technology transfer and domestication.

Specifically, it will explore the characteristics of respective technology transfer methods based on international norms or conventions, and will identify the respective roles of the government and private sector in the course of the transfer. Furthermore, using Korea's case studies and experiences, it will attempt to put forth a few specific policy recommendations, which the GOSO will be able to implement to stimulate technology transfer.

The most efficient and effective method to prop up the level of industrialisation for a country that lags behind in technology compared to other countries is to acquire the needed technologies through a transfer from technologically and industrially advanced nations. In other words, the country may directly import the needed technologies, like any other goods and services, from abroad. Korea may be a good example of a technology-lagging country that had imported the needed technologies from abroad and successfully internalised them. Indeed, many attribute Korea's rapid growth to the successful technology transfer and domestication.[53]

53. Koo, Bon-ho and Eun-mi Kim (2005) "The Role of Private Businesses in Economic Development," in Modernization of the Republic of Korea: A Miraculous Achievement, Yi-je Cho and Carter Eckert, eds., in Korean, Seoul, Korea: Chosun Daily Newspaper, Inc.

Box 4-1 Growth of the Manufacturing Sector in Korea through Technology Transfer

A large number of Korean firms in the manufacturing sector have grown by technologically associating closely with firms in Japan, Europe, and the United States. To promote technology transfer and to protect the interest of those firms that have localised foreign technologies, the Government of Korea has designed various support mechanisms including financial assistance programmes, the establishment of research funds for technology localisation and internalisation, and the like. The support measures were also extended to the enforcement of import restrictions on those products and services that had been localised. The government has also executed a number of active trade policy measures to diversify the sources of importation for particular products and services aimed at promoting the transfer of technologies and protecting local manufacturing firms that has successfully domesticated foreign technologies.

The technology-importing country expects to localise the given technologies as much as it can. However, for a provider of technologies, the expectation is the opposite; it seeks just as much benefit as the recipient expects from such a transfer. Therefore, it is important that the beneficiary furnishes a certain level of economic benefit that may satisfy the supplier. In general, the terms and conditions of such an exchange largely depends on the expected yields - the anticipated size and longevity of the market in the recipient country which the technologies subject to transfer will bring about. Therefore, there is a crucial difference between the transfer of technologies and the trading of common goods with respect to the terms and conditions attached to an exchange.

From an economic perspective, method of technology transfer can be broadly classified into sales, licensing, and M&A (merger and acquisition). In this study the terms “sale of technologies” and “technical licensing” are used interchangeably; the two have no distinctive conceptual difference, except perhaps a contractual condition that licensing involves such issues as copyright and patent as well as a prearranged span of time for the use of given technologies. M&A will not be dealt with in this study for it is normally adopted by an individual firm, or firms, rather than by the government or government policies, in a country in which the level of industrialisation has already deepened considerably.

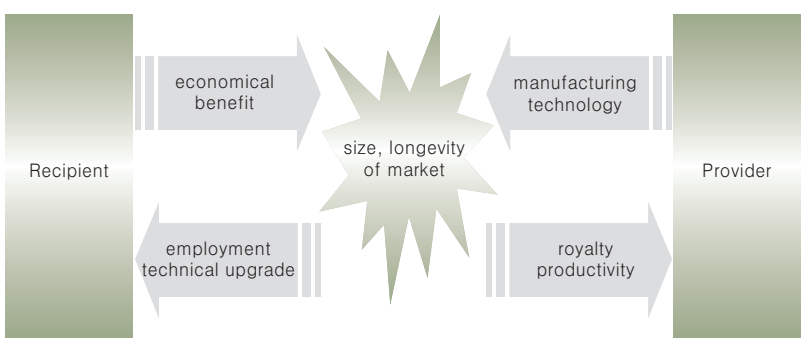
4.1 An Overview of the Technology Transfer Methods

The main concern for a supplier of technologies is the expected economic benefits. The benefits can be further classified as (1) direct economic benefits, i.e., "technical fees" or an increase in the productivity of its products, and (2) the continuity, or longevity, of the benefits. On the other hand, the recipient incurs costs from the transfer, as the recipient has to pay the supplier. Therefore, the recipient country usually takes into consideration such utilities as the employment effect, value added effect of products, and the technology internalisation effect, before deciding the transfer method.

Technology transfer only occurs at an optimal point at which the interests of both parties in the transfer are met. To this extent, the technology transfer exchange may be just the same as any other international transactions. This implies that there are no set rules or standardised methods of transfer that govern the exchange of technologies other than internationally agreed norms or conventions based on the price mechanism.

Figure 4-1 below summarises the factors that stimulate the rise of technology transfer between the technology provider and the recipient.

Figure 4-1 | Schematic Diagram of the Stimuli for Technology Transfer



Normally, the end-point of industrialisation is the manufacture of some tangible products. Therefore, the industrialisation process through technology transfer that occurs in developing countries tends to go through certain stages. From this point of view, the mode of technology transfer can be categorised as follows:

(1) outsourcing/subcontracting/OEM supply;
(2) purchase of mass-product line;
(3) purchase of unit process or equipment technology;
(4) employment of technical advisor.

The outsourcing, subcontracting, or OEM supply is an approach in which technology or capital investments are made by a client organisation (investor). The client enters into a contractual agreement with a subcontractor in order to enhance productivity normally by utilising low-waged labour or abundant natural resources in the host or recipient's country. This mode is often employed when the recipient country is in the early or intermediate stage of industrialisation.

The purchase of mass-production line is the approach in which a recipient purchases a product line/equipments and associated technologies in their entirety from the technology provider/supplier. This method is often employed when the recipient country's technological infrastructure is lacking.

The purchase of unit process or equipment technology refers to the transfer of unit process and/or the technological "know-how" associated with production equipments. This method is effective when the recipient country wants to upgrade its mass-production line from low or middle-end products to high-end ones.

The outcome of the employment of technical advisors is quite similar to what is expected from the purchase of unit process/equipment technology. However, the contract for advisory work is dealt at the company-to-individual level rather than the company-to-company level. The benefits of employing advisors are quite substantial. Depending upon the expectation of the recipient, the level of technologies that can be obtained through this channel ranges from mass-production line transfer to unit process/equipment technology.

Figure 4-2 depicts the relationships between the level of a country's industrial infrastructure and transferred skill level and domestication period. It is often the case where a provider invests the technology and capital while the recipient country adopts the role of an OEM supplier or a subcontractor, if the recipient country's industrial infrastructure is lacking. As the level of the infrastructure improves, technology transfer takes place, generally in the following order: the purchase of mass-production line, the unit process/equipment technology transfer, and the employment of advisors.

As for the control of technology development, the general observation is that the higher the stage of technology transfer, the stronger the control of technological development, and the shorter the time required for localisation (Figure 4-3).

Figure 4-3 illustrates the cost of knowledge transfer in relation to the stage of the transfer. In the OEM-type subcontract manufacturing stage, the transfer is mainly disposed according to the technology supplier's (investor's) interests, such as productivity enhancement or market expansion. Thus, in the early stage of the transfer, public sector investments are largely required in the arrangement of infrastructure.

Figure 4-2 | Relationships between the Level of the Country's Industrial Infrastructure and the Transferred Skill Level and Domestication Period

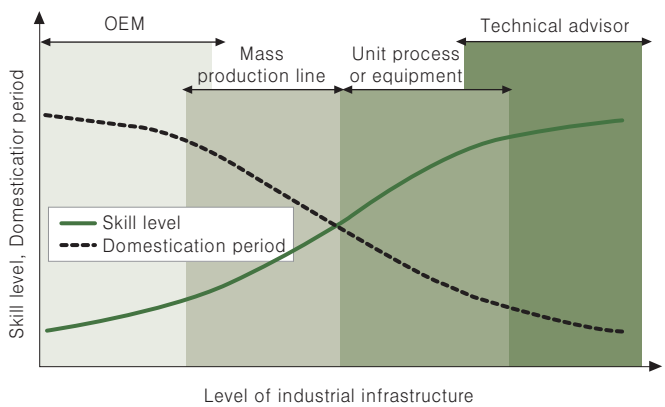
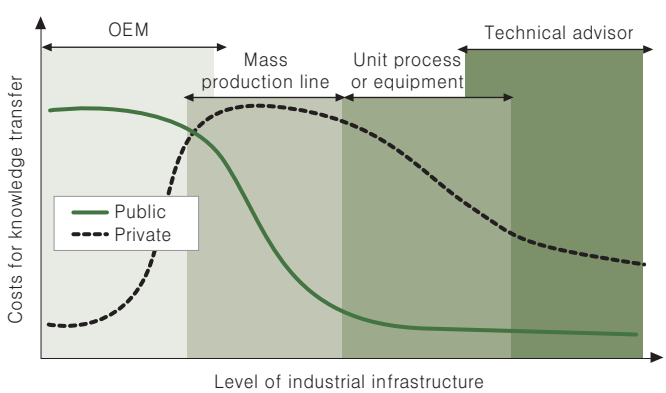


Figure 4-3 | Relationships between the Level of the Country's Industrial Infrastructure and the Costs for Knowledge Transfer



The costs incurred by the private sector are insignificant at this stage. As time passes and as the stage of technology transfer progresses further, a transition occurs. The control for and the locus of the technical aspects as well as economic aspects of the transfer, are shifted to the recipient country and as a result the costs to the private sector increase proportionally.

In the post-mass production line stage and onward, the recipient may become a potential competitor with the technology supplier competing for the same markets. Therefore, the supplier often demands the royalties corresponding to the expected market share of the recipient. The transfer contracts are largely entered by and between companies, or by and between companies and individuals. Hence, the private sector will ultimately be responsible for the costs.

Box 4-2 Hyundai Precision Incorporated - The Consequences of a Failure in Technology Domestication

In order to enter the huge equipment market, Hyundai Precision Incorporated, a subsidiary of the global conglomerate Hyundai Corporation, entered a 5-year term contract with Yamazaki Mazak Incorporated of Japan, an internationally renowned equipment manufacturer, in 1990 for the purchase of mass-production lines. Hyundai intended to produce the machining centers and milling machines that were mainly being employed by the automotive manufacturing industry.

Owing to its efforts to stabilise the imported mass-production lines - literally inputting a whole company-wide manpower - Hyundai Precision was able to successfully start its production lines in only five years from establishment. By mid-1990, it grew to be the second largest manufacturer in the equipment and machinery manufacturing industry in Korea, in terms of the size of sales. The rapid increase in sales was largely a benefit from the expansion of its major export market in the U.S.

However, its glory was short-lived. Hyundai Precision's profits exacerbated gradually inasmuch as its accountability to the changing automobile manufacturing process - especially in the area of the design and reconfiguration of mass-production lines - was lacking. Eventually, Hyundai Precision dropped out entirely from the machine and equipment business and its machinery and equipment division was acquired by the Hyundai Motor Company.

This case illustrates the consequence of a failure of the recipient to focus on medium- or long-term benefit - the domestication and internalisation of the technologies associated to the mass-production line - rather than the short-term interest and sales. Of course, a failure does not occur arbitrarily. At that time, Hyundai Precision was under serious financial pressure caused by the burdens from high technical fees incurred by the transfer. Consequently, Hyundai Precision had to quickly improve its financial position by focusing more on sales.

This illustration suggests that the domestication of technology should be placed at the top of the agenda in the process of the transfer. Indeed, it should be highlighted that the technologies attached to the mass-production lines - the software - are more important than the hardware itself.

4.2 Government Policies and Technology Transfer

While the private sector reaps the crops of industrialisation, the public sector sows the seeds, pulls the weeds, and looks after the growth of those trees named industrialisation. This statement briefly but succinctly illustrates the role of the government in the issue of industrialisation.

As was the case with the Government of Korea in the past, a country like Oman that is determined to deepen the level of industrialisation will have to excogitate deliberately which technological development path it should to take. It may be worthwhile to explore which paths others have taken in order to develop their technological levels. Table 4-1 epitomises various types of technological capacity development employed by a number of late starters in industrialisation.

4.2.1 Case Studies on the Type of Technological Development Path

In the 1960s, Korea, like Japan and Taiwan, went through a nascent stage of the industrialisation process in an effort to ameliorate unfavourable terms of trade resulted in part by the country's lack of natural resources. In this stage, the dominant method of technology transfer was the "learning by imitating" type, meaning, individual firms imitated those technologies possessed by firms in advanced economies. As a matter of course, the localizing process of the needed technologies was not as fast as desired due to the protective walls built by the advanced economies that were meant to prevent the outflow of their technologies. The advanced economies did not want to see other competitors bring products to the market manufactured by imitated technologies.

Nevertheless, in this stage, the local firms in Korea, by imitating advanced technologies, learned and eventually internalised the technologies, which served as the foundation to lay down a technological infrastructure.

In the stage that followed, Korea formally allowed FDIs, as it needed a larger scale of national-level investments. Korea also used a set of mixed policies in which it diversified its industries, promoted the localisation of technologies, and placed restrictions on imports in order to protect local firms. The focus of the government policies then were set on the enhancement of the competitiveness of local enterprises.

Some newly-industrialised countries (NICs), such as Hong-Kong and Singapore, on the other hand, followed the opposite direction - they instituted technology development policies that accommodated FDIs first and gradually increased the technological capacity and level of localisation.

Table 4-1 | Types of Technological Capacity Development of the Late Starters in the Industrialisation

Type of Technology Development	Learning-by-imitating type	Self-developing type	Technology-subservient type	*Laissez-faire* type
Country	Korea, Taiwan, Japan (in the 1960s)	China, India	Latin America, Hong Kong, Singapore	Developing countries with abundant natural resources, such as Thailand, Malaysia, and others
Method of acquisition	imitation, technology transfer, direct foreign investment	Self-development	FDI*	No specific methods
Policy on FDI	Developing technological capacities before expanding FDI	Recently commercialising technological capacities via expanding FDI	Placing efforts on fostering own technological capacities after inviting FDI	No specific policy
Focus on technology development	Active efforts placed on the internalising of acquired technologies	Accumulated own technological capacities	Gradually increasing technological capacities and the internalising level	No specific focus
Role of the Government	Import restrictions, active industrial/ technological policies	Promoting the fundamental/ applied research	Bureaucratic industrial regulations	*Laissez-faire*

Note: * FDI (foreign direct investment)

Source: Yoon, Jin-hyo (2006) *A Study on the Government Policy on Technology in Korea: The 40- Year Development History of Korea's Technological Capacity*, p.40.

China and India are yet another type of cases, where the involvement of the government was extensive with the focus limited on technology-development. They concentrated, for a long time, on the self-reliant technology development model in which the development of fundamental and applied technologies was underscored. However, these countries recently have placed economic development at the top of their national agenda and positive policies on FDIs and technology transfers were initiated. As a result, their economies are growing rapidly.

The preceding cases illustrate the effects of national policies on the development of technologies in a country. As a matter of course, the policies are affected by numerous factors ofa given country such as the culture, environment, the current level of technologies, and others. The government may need to take into consideration such factors as the level of industrial capacity, the likelihood of technology development promotion, the readiness of the infrastructure for technology development, the appropriate point in time for particular technologies and FDIs, and the like, when making decisions regarding which path to take for the development of national technologies. To this extent, the relationship between the stage of industrial capacity and the type of production, quality of labour, and economic characteristics is summarised and presented in Table 4-2.

Table 4-2 | Economic Characteristics of Product by Product Development Stage

	New Product	Product in maturity	Standardised product
Type of production	Technology intensive	Capital intensive	Labour intensive
Quality of labour	Highly specialised skill	Intermediate skill	Simple labour
Core competence	Differentiation	Differentiation and competitive price	Competitive price
Economies of scale	Low	High	High
Demand elasticity	Low	High	Very high
Income elasticity to demand	High	Low	Very low
The area of FDI (Production and the market demand)	Advanced country-centered	Intermediate developed country-centered	Developing country-centered

Source: Yoon (2006) p.40.

4.2.2 The Role of the Government in Technology Transfer: The Economic and Industrial Aspect

The most important role of the government in the technology transfer is the formulation of a national-level strategy. The provision of required manpower for the technology transfer is another important task of the government.

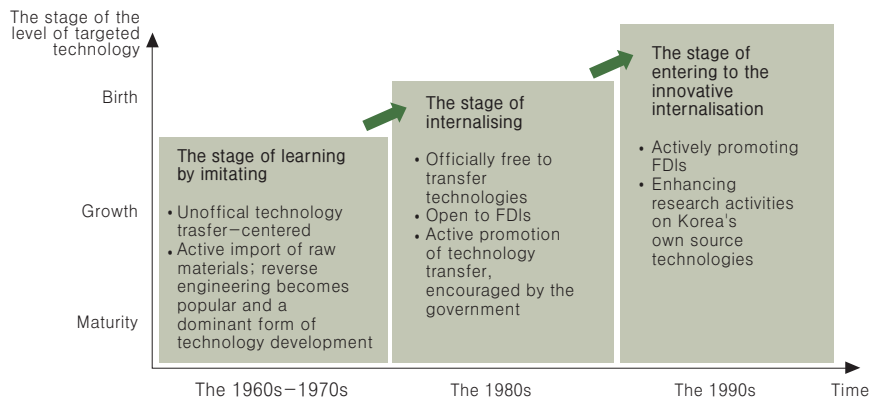
As far as the national strategy is concerned, the government may, in the near-term, focus on the following measures:

(1) setting-up of infrastructure
(2) probing on the industrial areas with a relatively low entry-barrier for post-transfer manufacturing, and
(3) creating financial and legal support system for start-ups and technology transfer.

Box 4-3 Stage of Technology Development in Korea

In terms of the technology development/acquisition type, Korea is an outright case of learning by imitation. Korean firms accumulated a certain degree of technologies by imitating matured technologies of the advanced countries through reverse engineering. After this stage, the firms enhanced the level of technologies by entering into strategic alliance relationships with foreign firms or inviting FDIs (refer also to the following Figure).

The Stage of Technology Development in Korea



Source: Excerpted from Yoon (2006) p.43.

Until about the end of the 1970s, Korea concentrated on enhancing its national technological capacity by imitating such technologies in the maturity stage as textiles, paper-milling, and etc. The transfer of those technologies in the maturity stage via an official or formal channel may be rather inefficient, as the technologies were relatively easily obtainable; thus, they were relatively affordable with respect to the "technical fees."

At this stage, Korea was in the nascent stage of industrialisation. Its import-substitution era was short after which there was a complete turn-around to the export-driven development paradigm. The government focused on export so that it reared and relied on a few number of large export enterprises. As a result, they absorbed technologies in the maturity stage in a relatively short period of time and thus contributed to the rapid development of the nation's technological capacity.

However, the picture changed completely after the 1970s, when the government aimed to turn the industrial structure into high value-added, focusing on such industries as the heavy chemical industry. This change made the learning-by-imitation model irrelevant and non-applicable because of the complexity of technologies and the size and volume of capital required by the industry. Hence, the government had to abandon restrictions on FDIs and actively promote the importation of

advanced technologies using the channels of technology transfer.

At this stage, the transfer of technology was concentrated on those technologies in the maturity stage. Korea's iron and steel industry is a prime example of the benefits of transfers in this period. Indeed, it was almost impossible to imitate mass-production lines in the industry because the level of technologies employed in the mass-production lines were high.

During the 1980s, Korea successfully internalised a large number of the technologies in the maturity stage, which became an impetus for the development in the 1990s of a few new technologies in the birth stage. As a matter of fact, Korea had to develop technologies on its own, for most advanced countries were avoiding the transfer of technologies at the birth stage (because they were the newest and the most advanced technologies). As a result, the government devised and implemented a series of policies to improve Korea's own innovative capacities. In doing so, the government encouraged the private sector participation by investing heavily on R&D activities, the fostering of human resources in the R&D area, and the reinvigoration of research institutions and their research activities.

In the medium- and long-term, the focus shifts to the following:

(1) setting-up of the strategic areas and strategic plans for FDIs and technology transfers within the framework of national development plans
(2) establishment of an R&D support system
(3) implementation of trade policies to foster the level of technologies and to protect domesticated technologies, and
(4) fostering of the fields of specialisation of local enterprises induced by the government's investment co-ordination and control.

Based on the technology transfer methodologies as well as the implications drawn from the illustrated case studies in the preceding sections, the role of the government can broadly be classified into three aspects - economic, industrial and legal.

In the economic aspect, the government needs, in order to encourage the private sector to participate in the industrialisation process as well as to set a ground to attract FDIs, to employ such supporting measures as creating industrial complexes furnished with power, water, a network of roads, highways, and communication. The government should also be committed to provide low-rents in such complexes.

In accordance, the GOSO may provide the impetus for the technology transfer by taking the actions in the following:

● **Recommendation 8**: The GOSO should enhance infrastructural capacities of the existing industrial complexes and expedite the creation of the planned complexes.

To fulfil this end, the GOSO may set its focus on the expansion phase of the Sohar Industrial Complex with respect to the infrastructure. By the same token, the establishment of the Dqum Industrial Complex also needs to be accelerated.

The government also needs to extend tax benefits such as exemption. For example, in corporate taxes, VAT (value-added taxes) and similar taxes can be exempted for companies that undertake technology transfer schemes. It is also recommended that a financial support system be created, i.e., support for technical fees or loans with a low-interest rate, to promote technology transfer. The financial support programmes that assist technology transfer should be implemented in addition to the financial support system discussed in the preceding chapter. In this vein, the following recommendation seems pertinent in helping to foster technology transfers in Oman:

Box 4-4 Masan International Export Complex (MIEC)

Masan International Export Complex (MEIC) was established in 1970 based on the Export Free Zone Act of 1970, in a plot of 830,000m^2 facing a sea in the southern part of Korea. The tenant firms in this complex were all manufacturers, processors, and assemblers for export in the electric and electronics, precision machinery and equipment, textile, garment, leather goods manufacturing industries. In the late 1990s, those firms employing less than 300 accounted for some 80% of the total number of firms in this complex.

The government set aside the estate for domestic and foreign labour-intensive manufacturing firms. In particular, the government selected tenants by concentrating on FDI firms and joint-ventures with high levels of technologies, firms that possessed high potential to contribute to export and foreign currency-earnings. The tenant firms were exempted from various types of government certifications and regulations that were normally applied to domestic firms. The FDI firms and joint-ventures were given a 5-year tax holiday including a total exemption in both the corporate and individual income taxes, property taxes, and acquisition taxes. In addition, tariffs and special consumption taxes were exempted for the importation of raw materials, parts, and half-processed goods brought in to the complex by the firms. The government also extended a tax benefit to the goods exported by the firms such as exempting them from value-added taxes (VATs).

The government leased the factory sites according to a principle of low-rent and standardised factory design plot, and provided the infrastructure including the industrial water supply system, electricity conversion system, communication system, and others.

In the 1970s, the MIEC recorded rapid growth, thanks to the export-driven policies of the

Government of Korea, whereby the number of the tenants increased to 75 in 1988 from 22 in 1977. The export amount accounted for by the tenants was augmented to US$1.77 billion in 1988 from US$850,000 in 1971. However, the growth of the MIEC was overshadowed by labour disputes after 1988, which eventually wrecked the MIEC's successful growth path. As a result, the number of tenants decreased to 71 in 1995 and their export also decreased to US$1.46 billion. The number of employees was reduced to 19,000 in 1991 from 36,000 in 1987.

In 1999, the MIEC's major tenants were investors from Japan, accounting for 69% or about US$171.8 million (wholly-owned investments in the amount of US$168.5 million and joint-ventures amounting to US$3.2 million). Korean investors were the second largest, 21.5% of the total investment in the MIEC, followed by the EU, the U.S. and so on. The Japanese firms invested in the MIEC in the early stage of the complex, while the Europeans began investing in late 1997.

Today, the MIEC's significance in the Korean economy is minimal, as the industrial structure in Korea has changed. The main attraction to the complex faded away as the average wage level in Korea rose. However, the MIEC is attempting to make a significant change to re-create itself as a high-tech industrial complex, primarily utilising the existing infrastructure.

- **Recommendation 9**: The GOSO establish a fund set aside for technology/knowledge transfer.

In practice, the technology transfer fund can be disbursed through the Oman Development Bank (ODB) upon the submission of adequate plans for technology transfer. The feasibility of the submitted plans may be evaluated by a committee comprised of the representatives of, for instance, MONE, MOCI, TRC (The Research Council), ODB and the OCCI (Oman Chamber of Commerce and Industry). The bank may also be mandated to monitor and supervise the entire transaction of the transfers.

In the case of Korea in the 1970s, the government selected some 100 export-oriented firms and provided differentiated financial support measures, i.e., loans with a substantially low rate of interest compared to the ongoing market rate at that time. The firms increased their export via the technologies transferred from advanced sources abroad. Korea in the 1970s saw a huge drive towards export along with the emergence of large exporting enterprises. During the period of 1971-1980, export grew on average at some 35% annually.

As for the industrial aspect, the first and the foremost step that the government needs to do is to create a supply-chain that enables local enterprises to gain a sustained market access. In other words, it is recommended for the government to aggressively forge a market structure in which linkages between LEs and small- and medium-sized enterprises (SMEs) are created, especially, to support the evolution of LEs in those industrial areas that are closely related to people's daily

lives, such as construction, textile, automotive, food-processing, and consumer electronics. Not only does it help to substitute imported goods and services, but it also promotes the development of local subcontractors that are in the downstream supply-chain. This, contributes to the expansion and enhancement of the national economy, productivity, and employment. The growth of LEs brings forth a thrust for positive downstream linkages for the local economy and the industry.

If there were an absence of sizable LEs in a country capable to form downstream linkages, the government would in the near- and medium-term to proactively support local firms to forge a supply-chain with those LEs located in the neighbouring countries. In the long-run, the government would need to initiate industrial policies to assist the local enterprises that possess market potential and competitiveness to grow into LEs.

The government also needs to attract FDIs and technology transfers to a number of strategic industrial clusters that have a high likelihood of domestication so that future synergy effects can be expected. An industrial cluster, such as the heavy industry/iron and steel industry, the large-sized equipment and facilities, and the shipbuilding industry, or the consumer electronics and the metallic moulding/injection moulding industry, are the case examples. In the clusters, synergy effects can be maximised as the respective industries mutually pull and push each other to further development. This, results in the development of a local industrial infrastructure. Therefore, the government needs to design technology transfer and domestication plans, and the industrial clusters, as shown in the preceding examples, based on the long-term, national-level strategic interest.

The discussions presented thus far add great emphases to reviewing and re-evaluating the roles of the existing public sector LEs/agencies in Oman, such as the Public Establishment for Industrial Estates (PEIE), Oman Polypropylene LLC, and Oman Dry-dock Corporation to determine whether they are strategically poised to support technology transfers and domestication. Hence, it is recommended that:

- **Recommendation 10**: The GOSO review and re-evaluate whether the public LEs and agencies are strategically poised to support technology transfers and domestication, and advise them to adjust their strategic objectives and action plans in order to make technology/knowledge transfer and domestication a priority.

A series of government policies to privatise national-level projects, such as building key industries and inducing the participation of the technology recipients, local firms, in those projects - so that the effects of the technology transfer are enhanced-are also a practical and applicable means of industrialisation. In particular, such schemes as the fostering of e-business through a project like the construction of a nation - wide computerised network or the

promotion of the automated equipment and facility industry through a public service facilities automation project are by themselves highly effectual means in building a network of key industries. These schemes are important in the medium- and long-term as they intend to accumulate a technologically soft infrastructure which will later serve as the foundation for the growth of the nation's technological capacity.

In this respect, the roles of such public sector institution like the Information and Technology Authority of the Sultanate (ITA), for example, become highly significant. While it is appropriate that the ITA assume the responsibility of conducting some flagship projects like the e-Government project of the Sultanate,[54] the ITA also needs to consider how to domesticate transferred technologies during the course of constructing a computerised network throughout the government facilities. The best way to achieve this objective is to allow local private enterprises to participate in the projects, offering them an opportunity to accumulate the needed technologies. They will be able to apply the localised technologies to similar settings in the future.

Consequently, it is recommended that:

- **Recommendation 11**: The GOSO expedite the implementation of the e-Government Project as soon as possible. In the course of constructing the government's computerised network, the participation of local business entities must be ensured.

The e-Government Project could certainly serve as a catalyst in the growth of the ICT industry. By doing so, the ITA could also support KOM by bringing in more business ventures.

4.2.3 The Role of the Government in Technology Transfer: The Need for Human Resource Development

Preparing qualified personnel is an absolute necessity for knowledge transfer. No matter what sort of technology/knowledge is transferred the most important aspect for its success is the people, as they will utilise the skills and further develop the knowledge. Therefore, the government needs to design national-level HRD programmes which will be responsible for the medium- and long-term manpower demands forecasted by the respective strategic industrial sectors that the government plans to develop.

In general, the needs for personnel in industrial development arise in four broad categories - the demand for managers, researchers, engineers, and technical engineers/technicians. The

54. See also the "Future Industrial Strategy of the Sultanate" in Appendix 2.

number of need for industrial workforces in the respective classifications depends on the kind of industry and its development stage. The ratio among the respective personnel - manager, researcher, engineer, technical engineer/technician - may be constituted as shown in Table 4-3. When the level of industrialisation reaches a highly value-added stage, the ratio may diminish.

Table 4-3 | Ideal Ratio for Industrial Workforce in the Technology Transfer Process

Manager	Researcher	Engineer	Technical engineer/ Technician
1	5-10	20-30	80-100

Qualified industrial work forces are the key to the success of technology/knowledge transfer. This suggests that the work forces must be readily available as the actual technology/knowledge transfers begin to take place. Hence, the role of the Ministry of Manpower (MOMP) in the technology transfer scheme becomes more important than ever. Specifically, the MOMP's vocational training programmes must accommodate and reflect the manpower needs incurred at the respective stages of technology development, as shown in Table 4-3.

In addition, all the public sector agencies concerned with the technology transfer, i.e., the MOCI, the MONE, the Ministry of Manpower (MOMP), the Ministry of Education, etc., have to co-ordinate closely to make an assessment and appraisal of the supply-demand of manpower as accurately as possible.

4.3 A Technology Think-Tank: A Stepping-Stone for Technology Development

As pointed out, the establishment of a national infrastructure in advance is necessary to solidify and to effectively implement the technology transfer/development policies of the government. In a country like Oman, where the private-sector capacity is lopsided vis-á-vis the public sector, a need for a policy intermediary is quite compelling to fine-tune the point of difference between the government and the private sector. The intermediary not only puts forth the views and needs of the private sector with regard to the technology transfer/development, but it also presents and interprets government policies for the private sector. In short, the policy intermediary speaks and acts for both.[55]

55. The role of a policy intermediary was fully discussed in the preceding chapter.

Imagine a case where the government devises a development plan of a certain industry, or industries, based on technology transfer. In this case, the preparation of a roadmap, which specifies "how to get there," may be preceded to any other tasks. The roadmap should include trend analyses on the target technologies and the potential markets for the products manufactured by the technologies. The analyses on the current level of domestic technologies as well as the domestic market trend should also be included. At this point, the government needs, a group of experts who are able to convert the roadmap into action. It is not only necessary for the government to bring together the experts and expertise, but it also requires the training and creation of highly educated manpower to prepare for the forthcoming stages of technology development.

Therefore, it is recommended that:

- **Recommendation 12**: The GOSO establish a government-funded science and technology institute, which acts as a policy intermediary as well as a think-tank that also trains and generates highly qualified manpower who will serve as a catalyst for the nation's technological development.

The proposed government-funded science and technology institute should position itself as a policy intermediary as well as a think-tank, and act as a government agency that promotes the national agenda with regard to technology transfer/development. The organisational objectives fundamentally lie within:

(1) identification of leading-edge technologies that the Sultanate needs in order to attain the objectives set forth in the industrial strategy by conducting analyses and studies on cutting-edge technologies of advanced economies,
(2) domestication and internalisation of the technologies that the government has selected to be transferred to the Sultanate, and
(3) conception of a long-term vision for industrial technology development and a subsequent roadmap (action plans).

In the short-run, the institute may set its focus on the following areas:

(1) to introduce, absorb, and domesticate overseas leading-edge technologies needed by the Sultanate
(2) to conduct analyses on overseas technological and industrial trends and progressions
(3) to act as an agency of the GOSO in technology certification programmes, and
(4) to attract foreign experts.

However, the medium-term goals of the proposed institute may be as follows:

(1) R&D
(2) to train professors and technical managers
(3) to act as an agency for the GOSO in the building of an industrial network, and
(4) to render technical support to SMEs.

The longer-term goals of the proposed institute may be:

(1) to prepare such longer term plans for the GOSO as the long-term technology development strategy, the industrial technology roadmap, etc.
(2) to identify and develop strategic technologies of the Sultanate
(3) to build the national infrastructure for further improvement of industrial technologies
(4) to extend technical support to SMEs, and
(5) to commercialise accumulated leading-edge technologies (i.e., establish, or support the establishment of, venture companies).

The size of the institute's work force may be flexible, depending on the phase, or the level, of industrialisation. The institute may start as a poly-technology research and training centre and develop to specialised areas such as machinery, electronics, chemistry, materials, and others. Accordingly, the number of researchers will gradually increase. Nonetheless, the science and technology institute, should be established with an initial focus on the applied science areas, i.e., electronics, machinery, and chemistry, consisting of some 50-100 science and technology researchers and specialists.

As the magnitude of industrialisation as well as the level of technologies deepens - as the technology development capacity of the private sector (private enterprises) rapidly advances - the role of the institute will be confined mainly to the study of national strategic technologies. The size of the institute will also diminish accordingly.

One may ask whether this institute may cause a conflict with respect to the organisational functions with existing organisations/institutions in the Sultanate. As inferred from the preceding elucidations, the institute will not present such conflicts, nor will it pose any functional overlaps, with existing institutions, such as the TRC or the ITA, whose main organisational mandates are focused more on the management of research activities. To this respect, the main mandate of the proposed institute is unique in the sense that it yearns to be a policy intermediary as well as a research arm for the government at the same time. The Sultan Qaboos University (SQU), primarily as an educational institute, has somewhat different and confined mandates, compared to those of the proposed institute, although the SQU is to carry out commissioned research works, as described in Future Industrial Strategy of the Sultanate.[56]

Box 4-5 Establishment and the Subsequent Performances of the Electronics and Telecommunications Research Institute of Korea (ETRI) in a Chronological Order

- 1976: Established as a government-funded research institute.
- 1976-1980: Brought in the time division exchange (TDX); Began to render the support in operation
- 1981-1985: Focused on the domestication and localisation of foreign electronic technologies; Rendered technical assistance to private firms; Localised the TDX; Localised semi-conductor (32K ROM); Developed 8-bit computers.
- 1985-1991: Devised a long-term development plan for the telecommunication sector; Commercialised digital TDX based on technology transfer (the 10th commercialisation achievement in the world); Developed a proto-type 16Mb DRAM; Installed a national key computerised system (by developing the mainframe, TiCOM)
- 1992-1996: Fully developed 64Mb DRAM (the first in the world); Developed and commercialised the digital mobile telecommunication system (Code Division Multiple Access, CDMA, the first in the world)
- 1997-2003: Enhanced the infrastructural capacity of the broadcast and telecommunication sector; Developed the satellite broadcasting system for high definition television (HDTV); Publicly demonstrated the digital multimedia broadcasting (DMB), the first time in the world; Selected the international standard for the 4-G mobile telecommunication; Started venture companies (some 72 firms in 2000); Established the Information and Communications University(ICU)
- 2004-2006: Developed and commercialised wireless broadband internet (WiBro); Set the European standard for DMB and commenced service.
- 2007-present: Focus on the development and improvement of technologies realted to post-generation mobile communication, digital broadcasting, digital contents (i.e., game, animation, UCC, etc.), ubiquitous system, telemetics, and the like.

- Number of personnel: 1,926 employees including 677 doctorate holders (2006)
- Number of patents filed: 1,018 (International); 11,336 (Domestic)
- Technology transferred to the private sector: total 1,910 projects (to 3,467 companies); total revenue from the technical fees received (some KRW46 billion, or USD460 million*)
- Number of venture firms established: 190 (as of 2008); Of the 193 firms, 13 were listed on the KOSDAQ market.
- (Exchange rate based on KRW1,000/USD1.00)

All in all, the proposed institute will complement the existing institutions in the functional aspect. There is also an important function of the institute that should not be overlooked. The

56. See Appendix 2.

institute will serve as the future source of supply for the high-quality manpower that the private sector will doubtlessly demand as the sector develops further.

The significance of the institute lies also within its organisational characteristics - it is the institution in which the developmental efforts of the private sector and the GOSO could be merged. It can be concluded that the institute will serve as a stepping-stone for the technology transfer/development envisaged by the GOSO.

4.4 Final Thoughts on Technology Transfer and Domestication for Oman

To reiterate, the focus of this chapter was on technology transfer and domestication. In short,

(1) Broadly there are four methods whereby technologies can be transferred from abroad and be internalised;
(2) Nonetheless, it should be noted that an infrastructure needs to be established to effectively consolidate the transferred technologies. The infrastructure encompasses:

- succinct and focused technology development governmental policies/strategies;
- manpower adequately skilled at respective level of technology development;
- an industrial base to create a supply chain;
- a specialised science and technology institute and the like.

(3) The co-ordinated technology development/transfer policies and strategies at the government level with respect to "what is needed" as well as "how to acquire it" must be designed, so that available national resources would be used efficiently to serve the policy objectives/strategic goals;
(4) The demand for the quality of manpower changes at each respective stage of technology development. Thus, the manpower supply schedule has to be designed to account for changing demands;
(5) An industrial base consisting preferably of LEs to create a supply chain that enables local SMEs to access to the market is necessary;
(6) To serve as a policy intermediary and a think-tank, the establishment of a science and technology research and training institute is recommended.

Table 4-4 summarises the costs and benefits for the parties directly involved in the technology transfer scheme, by respective levels of technology as well as transfer methods and expected products to be manufactured.

Table 4-4 | Summary of Costs and Benefits for the Parties Involved in Technology Transfer

Technology level		Standardised technology	Matured technology	Medium technology	High technology
Recipient	Provides:	- labour	- labour or royalty	- royalty	- royalty
	Receives:	- employment	- employment - manufacturing line and technology - market	- technical know-how	- leading-edge technology
	Needs to prepare:	- infrastructure (facilities)	- infrastructure (facilities) - capital - manpower (engineers, technicians)	- manpower (managers, researchers) - market	- infrastructure (technical level) - capital - manpower (managers, researchers) - market
Provider	Supplies:	- investment	- manufacturing line and technology	- technical know-how	- leading-edge technology
	Receives:	- productivity	- royalty	- royalty	- royalty
Technology transfer method:		- OEM	- OEM - mass production line	- unit process or equipment - technical advisor	- technical advisor
Potential products to be manufactured:		polluter products (dyeing, rubber), assembly of simple process products	textile, footwear, assembly of medium technology products	machine and machinery parts, parts for home-electronics and IT products	automobile, airplane LCD, memory IC, products of IT, BT, NT, ET, and the like

What do all these mean to Oman with respect to technology transfer and domestication? Given the present level of Oman's technology - seemingly on the borderline between a standardised and matured technological level - as well as the lack of an industrial base and the availability of manpower, OEM seems the most suitable method for Oman in adopting technology transfer. In particular, priority is recommended to be given to the areas of food-processing and consumer electronics among those industries that were identified in the Future Industrial Strategy of the Sultanate.

The field of consumer electronics manufacturing by OEM has merits for Oman, as it would

be quite effective in creating a supply chain. It establishes linkages that give rise to such industries that produce moulds and parts for machinery, which can generally be sustained by a low or medium level of technology. Thus the manufacturing of such IT technology-laden products on OEM basis, such as TV, DVD, DMB, and etc. is worth considering. This will serve as a starting point for building up the manufacturing industry in Oman.

In the short-run, the local market may serve to sustain the industry. However, in the medium-run, the GCC market, or other adjacent regional export markets, must be developed as the local market will not be sufficiently large enough to support further development of the industry. And in the long-run, developing markets in Africa and the Central Asia will be highly promising.

To this end, Oman's strategic position as a hub connecting the East and the West, as well as its accrued experiences as a re-exporter of finished goods would be an unsurpassed advantage. In fact, Oman in 2007 re-exported USD2.6 billion to the world, as shown in Table 4-5. Of the total, more than 60% was destined to the neighbouring countries such as Qatar, KSA, the UAE, and Yemen.

Table 4-5 | Oman's Re-Export Value by Target Nations

Target Nations	Value (US Dollars)
Qatar	26,321,293
KSA	97,869,492
UAE	1,452,251,575
Yemen	31,610,954
Iran	317,139,033
Egypt	23,980,906
Syria	20,046,802
Ukraine	47,867,460
Kazakhstan	34,348,746
Belgium	28,554,226
United Kingdom	43,808,376
Singapore	43,610,901
India	25,403,613
China	33,204,806
China, Hong Kong SAR	85,272,770
World	2,609,867,903

Source: Recomputed from the UN Comtrade database (2007)

Table 4-6 | Oman's Re-Export Value by UN-SITC Classification (2007)

Commodity Code	Commodity Description	Value (US Dollar)
00-09	Food and Live Animals	44,134,711
10-19	Beverages and Tobacco	31,545,438
20-29	Crude Materials, Inedible, except Fuels	16,674,727
30-39	Fuels, Lubricants, etc	4,531,773
40-49	Animal, Vegetable, Oils, Fats, Wax	2,889,035
50-59	Chemicals, Related Products, n.e.s	21,686,224
60-69	Manufactured Goods	53,074,341
70-79	Machines, Transport Equipments	330,096,673
80-80	Miscellaneous Manufactured Articles	118,341,859
90-99	Goods not Classified by Kind	1,986,893,122
	Total	**2,609,867,903**

Source: Recomputed from the UN Comtrade database (2007)

Aside from the goods belonging to the UN SITC 90-99 classification-special transactions, goods not classified by kind, and the like - machines, transportation equipments, parts, generators, and the like (SITC 70-79) were reported to be re-exported commodities of the highest value, followed by leather, leather goods, wood manufacture, and other goods (Table 4-6).[57] These data suggest that setting up a manufacturing industry in Oman is not an implausible proposition. Co-operating with an export promotion agency, OCIPED for instance, Oman's manufacturing industry will certainly be able to find its own competitive niche in exporting activities of the region.

Based on the preceding logic, it is recommended that:

- **Recommendation 13**: The GOSO designate a manufacturing complex and attract FDI in the area of OEM manufacturing.

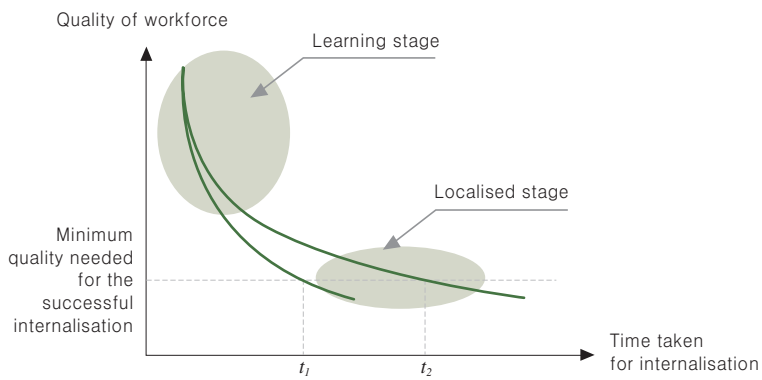
As proposed earlier, the complex should be set up mainly for OEM manufacturing in the area of household electronic appliances as well as those IT-laden products. Since the products are intended for export, the complex has to be located near the port. However, the provision of manpower needs to be considered as the foremost priority on the agenda for the promotion of manufacturing technology.

57. SITC, Standard International Trade Classification, is issued by the United Nations. See Appendix 4 for a detailed description of goods in respective classifications.

It should also be noted that the "cultivation" of manpower is the point of departure for the development of nation's technology. The development and further growth of a nation's stock of technology depends largely on the availability of qualified manpower.

This postulate is simplified in Figure 4-4. What this simplified diagram implies is that the domestication/localisation of transferred technology would take less time (t_1 rather than t_2 in Figure 4-4) if the learning curve is stiffer (meaning the learning effect is positive).[58]

Figure 4-4 | Schematic Diagram of Learning Curve Effect



It can be concluded that the success, or failure, of the national vision for technology transfer and domestication greatly hinges on the quality of available manpower. It can also be said that the provision of highly skilled manpower is the very first step for technology internalisation. This implies that the manpower development programmes instituted by the MOMP as well as future contributions of the Science and Technology Research Institute carry the utmost importance in the national agenda for technology transfer and localisation.

58. It assumes that the quality of labour is measured by a variable such as the number of errors a worker makes to complete a job-task.

Institutions, Public and Private Sector Partnership, and the Development of Strategic Industry in Oman

Chapter 05

Summaries and Conclusion

Postscripts

Appendices

Chapter 05

Summaries and Conclusion

Jaehoon Lee, Market Economy Research Institute

This study is based on a fundamental premise that Vision 2020 is Oman's overall strategy for national development, which dictates a dynamic private sector as a *sine qua non* of sustainable growth. Vision 2020 expects Oman's private sector to undertake the leading role in the nation's economic development, while the public sector, as a provider of strategic guidance, focuses more on the strategic planning and vision setting.

Thus, this study begins by asking the question, among others, "How can the Sultanate government consolidate its public and private sector capacities through which the impetus for sustained growth can be established?" The answer to this question is sought within the framework of the public and private sector partnership, which, according to the new development paradigm, is tantamount to a web of institutions or a soft infrastructure.

Taking into consideration the goals set forth by Vision 2020, which call for the development of the strategic industries identified by the Ministry of Commerce and Industry, this study proposes that the Sultanate Government set its focus on the establishment of (1) a pilot governmental agency and (2) policy intermediaries.

Based on the postulates, the GOSO is urged to establish a few policy intermediaries - business associations, financial policy co-ordinator, and the Small and Medium Enterprise Promotion Corporation - which will serve as a conduit between the public and private sector. And, these institutions are meant to synthesise the public and private sector participation particularly in the three areas of:

(1) industrial support institutional structure;

(2) financial support institutional structure; and
(3) institutional support structure for the promotion of human resource development and entrepreneurship.

By doing so, government agencies can focus more on the strategic planning and vision setting. A new institutional structure would enhance institutional capacities, both in the public and private sector, for it would enable them to achieve specialisations, and thus efficiency.

It must be underscored that the institutional base in Oman is in fact generally quite well developed. However, a co-ordination problem plagues organisational/institutional efficiency and effectiveness. The horizontal communication mechanism in both the public and private sector's institutional/organisational structure is rather weak in Oman compared to its institutional strengths as a whole. To address such predicament, this study recommends that the GOSO establish, a policy/strategy co-ordinating agency named the Industrial Development Commission (IDC). It will spearhead the synthesis of the public and private sector capacities by accommodating private sector participation and initiative from the planning stages, among other tasks.

The main organisational tasks of the IDC as a policy/strategy co-ordinating agency will include not only preventing/removing any redundancies and functional duplication in government policy support functions, but also being an effective channel of communication with the private sector. The commission's more important *raison d'être* is its mandate of monitoring and assessing the progress of the government's development policies and programmes. Through these functions, it can disseminate the development programmes that it deems successful and allow other agencies to replicate them. In this way, some developmental models idiosyncratic to Oman may be collected and documented, and thus, replicated.

A critical issue relating to an exogenous growth factor - new technology - is treated in a separate chapter. Recently, technology transfer and successful internalisation has become a focal point of developmental studies for technologies are not readily available factors of growth that yields by reshuffling national capacities.

This study finds that the success of the national vision for technology transfer and domestication hinges largely on the quality of available manpower. Therefore, the provision of highly skilled manpower is the very first step for technology internalisation. Given that the quality of manpower is driven mainly by the quality of education, training and education becomes the tasks of utmost importance. The probe of this study reveals that the creation of an institution mandated with a programme co-ordinating function, in entrepreneurial education for instance, is deemed necessary.

As a matter of course, merely installing institutions should not be construed as a means with a high probability of success in achieving the goals set forth in the national development strategy. Its significance is profound to the extent that it synthesises the strengths that Oman's institutions have developed. Hence, creating a platform which consolidates the available institutional strengths in Oman becomes a task of the utmost exigency.

Accordingly, this study puts forth some thirteen recommendations to the GOSO, which is the strategy planner concerning the national development. For the three-pillar support institutions that are necessary for industrial development, the following recommendations are proposed:

(1) To create an inter-ministerial co-ordinating governmental body such as the Industrial Development Commission;
(2) To establish a policy intermediary to execute the industry support policies/programmes designed by the government especially for the SME sector;
(3) To encourage the establishment of business associations in respective industries;
(4) To appoint the ODC as the co-ordinating body for existing financial support programmes for SMEs established both in the public and private sectors, and allow the ODC to re-orient the programmes to support the objectives of Vision 2020;
(5) To introduce a credit guarantee system that meets the needs of new frontier start-up and venture SMEs in strategic industries, while sharing the risks with the private sector;
(6) To refine and strengthen research-industry/university-industry co-operation programmes including business incubators; and
(7) To establish a national organisation entrusted with the responsibility for initiating and implementing comprehensive entrepreneurship development programmes in Oman;

And for the critical issue of technology transfer and internalisation, this study proposes the following:

(8) To enhance infrastructural capacities of the existing industrial complexes and expedite the creation of planned complexes;
(9) To establish a fund set aside for technology/knowledge transfers;
(10) To review and to re-evaluate whether the public LEs and agencies are strategically positioned to support technology transfers and domestication, and advise them to adjust their strategic objectives and action plans to place the technology/knowledge transfer and domestication as a priority;
(11) To expedite the implementation of the e-Government Project as soon as possible. In the course of constructing the government's computerised network, the participation of local business entities must be ensured;
(12) To establish a government-funded science and technology institute to act as a policy

intermediary as well as a think-tank that trains and creates highly qualified manpower who will serve as a catalyst for the nation's technological development; and

(13) To designate a manufacturing complex and to attract FDI in the area of OEM manufacturing.

Most of the recommended institutions/programmes above can become functional in a relatively short time by re-directing resources and re-arranging the structure of existing organisations/institutions.

This study does not claim that policy-mediating institutions are the most effective means in promoting industrialisation and subsequent national development. However, the *raison d'être* of the institutions is clear. They contribute to national development by serving as the platform on which the public-private sector co-operation can be anchored. It signifies that they are an effective means in enhancing the cohesiveness of the public and private sector in Oman. This is the most invaluable organisational value that the institutions may bring forth in the context of Oman's national development.

POSTCRIPTS*

This study started in June 2008 - a few months before the so-called the "Global Financial Crisis of 2008," widely known as the "subprime mortgage crisis," began to sweep the globe like a tidal wave.

The ongoing crisis has triggered a series of questions pertaining to the issues of government policies, regulation/deregulation, moral hazard, and other relative matters. The current crisis is quite different from the financial crisis of 1998 in several aspects. Among those differences, the scale of the crisis stands out most conspicuously. The current crisis has affected all the countries on the globe, whereas the financial crisis of 1998 was limited to a few. Hence, many questioned the viability of the current international economic system that has been led by the United States for decades since the Bretton Woods. Their questions were fundamentally about the systemic stability of the structure of the liberal economy represented by free market. A decade-old question of the market versus the state has re-emerged.

A few in Oman's academia were also concerned about the fundamental tenets of the liberal

* This postscript is written by Jaehoon Lee of MERI.

economy-especially about the idea of free market and free competition-primarily because the Sultanate developmental policy has been built upon them. The concerns are very much legitimate and timely in light of the ongoing crisis. The Sultanate government's drive for privatisation is a good case in point. Thus such questions as "Is it quite justifiable to continue privatising public corporations amid the crisis caused by market failures?", "Do we not need to revisit the national development strategy and re-evaluate the strategic goals for the development?" and the like were raised.

This study does not intend to elaborate on the issues relating to the current crisis, as they are outside the purview of this study. Nevertheless, it is worthwhile to ask, at least once, whether the strategic goals of Vision 2020 might need to be adjusted or altered to reflect the recent development in the international economic system.

There are numerous views that portray and analyse the recent development in the system. For example, the crisis may be looked at from a viewpoint that the market is inherently prone to fail as it does not have a fail-correction mechanism. Other views may include the view that the state has failed to regulate a market that needed to be regulated, i.e. the derivatives-laden financial market.

Whatever the cause, or causes, for the interferences in the international economic system may have been, it is clear that it affects Oman's long-term vision for the development of its economy at least a little, if at all. For one: the privatisation efforts whereby the GOSO intended to change a fundamental attribute of its developmental patterns-from the public sector-driven to the private sector-driven-do not mean that the GOSO should abandon what it would, or should, do. Rather, it is clear that the GOSO would remain, as clarified in Vision 2020, the provider of strategic guidance while shaking off rentier tendency and dependency prevalent in the private sector. This means that the GOSO may want to focus more on strategic planning and vision-setting, while the private sector does more implementation. By doing so, the GOSO also expects that the private sector capacity building will be attained concomitantly.

And two: it is a matter of principle that a long-term vision/strategy should not easily change because of the changes occurring in the environmental factors. Maybe sub-level strategies or action plans should. (However, it must be noted that this postulate can only stand on the premise that the current interferences are only an ad interim phenomenon, not a signal of a permanent change in the international economic system. In fact, there is another stream of interpretation on the current crisis, á la Klaus Schwab, which has begun to garner a wide range of consents and agreements.[59] The world will soon witness whether a fundamental change will take place in the international economic system or not, as the jury is still out.)

Lastly, what Vision 2020 envisages by principle would not be affected by the current crisis.

The major tenets of Vision 2020, i.e., human resource development, technology transfer and domestication, and the fostering of the manufacturing industry, may have little association, if at all, with the basic problem of the current crisis - the liquidity problem. What Vision 2020 envisions is to lay down the stepping stones whereby the Sultanate can foster its economy and enhance its national competitiveness in the international arena.

For these reasons, it can be said that Vision 2020 - the overarching strategy for the national development of the Sultanate - is still valid and quite consistent with the developing realities in the international economic environment.

Nonetheless, it is obvious that the current crisis rendered the academia and policymakers in Oman an opportunity to review and re-visit the backdrop and goals of Vision 2020. For instance, an important issue that may have been overshadowed by the financial crisis was the drastic rise in international commodity prices. The change, in fact, overlapped timeframe-wise with the financial crisis. Apparently, it has taught the academia and policymakers in Oman more than a few lessons. The national development strategy has to focus more on agriculture and fisheries industries, as the industries deserve more attention than they do now. Food sufficiency, or food security, has truly become a strategic issue at the national level, as reflected by the drastic increase in food prices that has affected domestic prices tremendously.

However, this study, as stated earlier, will not deal with these issues further as they do not fall within its purview. Perhaps, they can be dealt by other studies in the future.

59. At the World Economic Forum 2009, Klaus Schwab reminded participants, "what we are experiencing is the birth of a new era, a wake-up call to overhaul our institutions, our systems and, above all, our way of thinking." World Economic Forum Annual Meeting 2009 (January 28- February 1 2009) "What Must the G20 Do to Get the World Economy Back on Track?" http://www.weforum.org/pdf/AnnualReport/2009/back_on_track.htm (Access date: April 13, 2009)

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Appendix 1 The Hierarchy of Oman's National Development Strategies

As depicted in the schematised diagram below, Vision 2020 is the overarching development strategy of the Sultanate, which sets out the long-term socioeconomic visions. Hence, the goals of such sub-level strategies as the 5-Year Economic Development Plan, the Industrial Strategy, and the like, ultimately prop up the strategic goals set forth by Vision 2020.

Likewise, the strategic industries identified in the Industrial Strategy are an important instrumental means to attain those strategic goals designated by Vision 2020.

THE FUTURE INDUSTRIAL STRATEGYOF THE SULTANATE

Introduction:

The future Industrial Strategy represents the Sultanate aptitude for activating the role of manufacturing industry and enhancing it in the following decades so that it may become a real economic substitute in case the country's oil and gas income decreases. The strategy, also, depends on the basic concepts of the contemporary free economy, most important of which are globalisation, economic liberalism and privatisation.

The Sultanate is well aware that its oil and gas resources are exhaustible. Consequently, instead of relying on such unsustainable natural resources, it currently concentrates on developing human resources and knowledge. This, in itself, is a big challenge which the Sultanate has to face successfully so as to establish a solid foundation of global interaction and sustainable economic development.

To achieve such strategy, the Sultanate should be capable of creating and activating a strong economy based on diverse products and services, advanced telecommunications infrastructure and an educated labour force, skilled in different practices.

The industrial strategy is based on eleven policies each of which requires certain implementation mechanisms that should be adopted by the different executive authorities so as to achieve the contemplated objectives of the strategy.

There are other policies which help to achieve, indirectly, the industrial strategy in economic and educational areas conducive to the targeted industrial development. Such policies have been referred to the concerned Ministries and authorities to implement them in the framework of the seventh five year plan and the following plans.

The future industrial strategy of the Sultanate was adopted by the Council of Ministers in its session No. 22/2007, held on 2 Dul Qaida 1428H - 13 November 2007.

* Devised by the Ministry of Commerce and Trade, the Government of the Sultanate of Oman (2007).

Future Strategic Policies

1. Adoption of a comprehensive and effective policy on information and communication technology (ICT) for the development of science and knowledge based industry taking into account the national strategy of digital Oman prepared by the National Committee for Information Technology (IT) at the Ministry of National Economy, (currently, the Public Authority for Information Technology)

Implementation Mechanisms:

1) Minimizing regulations and restrictions on setting up ICT projects.

2) Applying all available incentives to attract foreign and local investments in ICT sector.

3) Classifying the software and service products related to ICT as an industrial activity qualified for government support and loans subject to the adopted policies in this concern, besides other industrial incentives such as exemption from taxes and customs duties according to the applicable exemption rules.

4) Promoting competition environment in ICT industry by increasing competition in order to reduce the cost of services.

5) Developing Knowledge Oasis of the Public Establishment for Industrial Estates(PEIE) by:

- Intensifying co-ordination and co-operation between the Public Authority for IT, the Scientific Research Council and the Knowledge Oasis synchronize the Oasis initiatives to the mechanisms of the national strategy of Digital Oman, as well as benefiting the Knowledge Oasis from the science, innovation and research policy related to ICT.

- Opening communication channels and promoting close co-operation with the private colleges, pioneer in ICT and the private sector concerned with the development of this sector.

- Linking Knowledge Oasis with the industrial and research infrastructure in the Industrial Estates and free trade areas and other institutions.

- Developing business incubators in the area of knowledge based industry and providing necessary incentives and care.

- Establishing local and international research centers engaged in knowledge based industry

and providing necessary incentives.

- Benefiting from the experience of other countries in the field of technology parks.
- Establishing bilateral relations with technology institutions in other countries to benefit from their experience, exchange such experience and encourage joint venture between the two sides.
- Developing the Knowledge Oasis by adopting a phased implementation strategy and proper finance methods based on international experience in this regard.

6) Teaching computer applications in the first school year, caring for innovation in the teaching of this subject and giving each child the chance to be familiar with using the personnel computer (PC) during the lessons and leisure time so as to create a generation capable of dealing with IT.

7) Providing each educational institution with a local area network (LAN) to be used by the students, teachers and administration, and facilitating connection with other networks over the internet.

8) Pursuing the application of the E Government initiatives effectively.

9) Providing DCL service all over the Sultanate so that the citizen be able to access the internet and information centers with high speed and maximum benefits.

10) Reducing the internet costs to increase number users.

11) Co-ordinating the strategies and policies of different authorities on implementing ICT projects and harmonizing them with digital Oman strategy.

2. Defining the strategic industrial sectors:

Implementation Mechanisms:

Adopting the following strategic sectors in the Seventh Five Year Development Plan as sectors having priority in the industrial incentives, and urging private sector investors to channel their investments to such sectors:

1) New Industrial Sectors:

a) IT, software, e-business and knowledge intensive activities.
b) Biotechnology based modern industries.
c) Petrochemical industries (especially those based on crude oil and its by-products).
d) Low energy consuming industries (e. g. assembly and knowledge based industries).
e) Free Zones trade and assembly & re-export industries.
f) Tourist related industries.

2) Existing industries requiring re-structure:

a) Small and medium industries associated with international companies to achieve economies of scale and transfer of technology.
b) High value added Industries, including:
- Food industries related to fisheries and agricultural industries with proven feasibility.
- Engineering industries related to oil, gas, mining, building materials and construction sectors.

3. Amending the mechanisms for granting Government Soft Loans so as to enhance efficiency, improve their return and ascertain the achievement of the required effect on the economic development.

Implementation mechanisms:

1) Enhancing the Oman Development Bank abilities to carry out techno-economic studies and analysis (establishment of studies and analysis centre).

2) Focusing the efforts of the Ministry of Commerce & Industry on developing strategies and policies on Government Soft Loans in co-ordination with the Ministry of Finance, and entrust Oman Development Bank with implementing and following up Government loans according to the industrial strategy.

3) Reducing reliance of development projects on Government soft loans by providing additional appropriations in the Plan to contribute to the capital of the projects, especially for small and medium industries (equity/venture fund) as they suffer shortage of finance, e.g. Youth Projects Development Fund, as a substitute for Government soft loans, for small and medium industries. This is in line with the recommendations of the economic diversification strategy within Oman Economic Vision 2020 (the third axis of small and medium industries development).

4) There is an urgent need of experts in the field of project's evaluation, management and follow-up in the institutions responsible for granting loans. This can be achieved by employing consultants in development banking, improving companies conditions and re-structuring for limited periods to work with Omani experts so as to give them specialised expertise that suits their work.

4. Providing assistance for restructuring companies facing difficulties:

Implementation Mechanisms:

1) Establishing a specialised unit to restructure companies facing difficulties which have obtained Government soft loans, as well as other industrial companies which have not obtained any loans, and restructuring the industrial base to create a solid industrial base capable of competing in the Gulf and international markets, provided that the sickness is attributable to circumstances beyond companies' control, reconcile their positions according to the conditions set by the Government and increase their financial contribution in these projects before applying for any further support.

Implementation if this recommendation has already started. The foundation of this unit has been laid down at the Directorate General of Industry at the Ministry of Commerce & Industry.

2) Encouraging companies facing difficulties to merge with each other, if this can reactivate them and make them more profitable, and providing a package of incentives to motivate such companies in this course of action.

5. Improving the level of services and industrial incentives to keep abreast with what is provided in competitive neighbouring countries:

Implementation Mechanisms:

1) Simplifying the procedures for granting exemption from custom duties on industry inputs to the level of exemption in the neighbouring GCC States (a part of this recommendation has already been applied based on unification of the rules and procedures for customs exemptions in the GCC States)

2) Revising Government incentives to encourage the private sector to train national labour, develop technology and increase exports. Though time, such direct Government incentives may be gradually reduced.

3) Expanding the concept of the industrial incubators in Knowledge Oasis Muscat, which focuses on IT projects, so as to include technical services and minor work in other areas such as commerce, fabrication workshops, electricity and maintenance. This is anticipated to give chance to the initiatives of Omani pioneers and youths in such fields, and help them to find independent and self employed job opportunities and help the Government in its fight against disguised trade.

4) Replacing the projects licenses and approvals system by simple procedure for registration only.

5) Concentrating on improving infrastructure services, especially ports services so as to provide their services at competitive rates in line with the prevailing levels in the GCC States, which will effectively assist commerce and industry.

6) Increasing the area of the lands earmarked for factories in the Sultanate Industrial Estates, and completing provision of basic services (including natural gas) to the existing and future industrial estates.

7) Revising service tariff rates, particularly the gas and electricity tariff for energy intensive industries.

(At the beginning this could be done through revaluation of the current tariffs by the Ministry of Finance and other concerned authorities in comparison with the neighbouring countries, bearing in mind financial commitments of government spending and to avoid budget deficit. It is also possible to study the different methods of pricing services, in a way that takes into considerations the consumer companies consuming such services and the intensity of their energy consumption without burdening the Government with extra obligations.

8) Continuing the efforts of the Ministry of Commerce & Industry in studying ways of rationalizing energy consumption in industry, conducting energy audit for industries and including company's efforts in this area as one of the criteria for H.M. Cup Competition for the best five factories.

6. Activating Research and Development (R & D) to solve the Problems of the Industrial Sector and Develop it:

Implementation Mechanisms:

1) Development of technical co-operation between the Ministry of Commerce & Industry, Sultan Qaboos University and the Scientific Research Council with the aim of giving

impetus to R&D to solve the problems facing the industrial sector, raise the level of productivity in its integrated implication which includes productivity of labour force, capital and other production elements. This includes the following services:

a) Industrial applied researches.
b) Productivity development services.
c) Innovation and development in the field of industrial technology
d) Small and medium industries development services.
e) Scope of using other sources of energy alternative to oil and gas in industry (such as coal and nuclear energy).

7. Implementing the Strategy of Exporting Non-oil Products of Omani Origin:

1) Continue updating the export strategy of the non-oil products of Omani Origin prepared by the Omani Centre for Investment Promotion and Export Development to accommodate new developments in regional and international markets, and in order to improve the chances of exports of Omani Origin, as well as drafting specific policies and objectives on which the extent of the targeted progress in developing Omani exports can be measured.

8. Developing and applying the Legal and Legislative Framework for Creating the Appropriate environment for Implementing the Industrial Strategy:

1) Promulgating electronic transactions Law to facilitate and develop sales and industrial exports.

2) Co-ordinating and harmonizing the Sultanate efforts reflected in the issue by the Ministry of National economy of electronic transactions Law and the issue of the Unified Gulf Law on electronic transactions by the GCC States.

3) Promulgating the Law on the Protection of Competition, Prevention of Monopoly and Protection of Trade Secrets to help creating a fair, free competitive market, and support the economy and enhance commercial and industrial business.

4) Co-ordinating and harmonizing the efforts of the Sultanate represented by the Ministry of Commerce & Industry and the GCC States to issue the Law on protection if competition and prevention of monopoly, and the Unified Gulf Law on prevention of unfair competition and protection of trade secrets.

5) Completing the structural and administrative requirements for the application of the

Unified Law on Anti-dumping, Countervailing and Safeguard Measures of the GCC.

9. Balancing between the economic development objectives and the environmental stipulations to achieve a sustainable industrial development that does not adversely affect the Omani natural environment:

1) Adopting the national strategy of protecting the Omani environment and including the environmental considerations in all the stages of preparation and implementation of industrial projects, and choosing their locations.

2) Solving any problems that may arise in the industries established before the setting up the Ministry responsible for the environment in co-ordination between the Ministry of Commerce & Industry and the Ministry of Environment and Climatic Affairs.

10. Government to take the lead in Training Omani businessmen

Implementation Mechanisms:

1) Providing additional appropriations to finance a permanent service of providing training and education for new businessmen, and helping educational institutions to design and organise training courses in the field of business (e.g. how to begin your business - development of business plans - conducting feasibility studies - project management - finance, marketing and scientific management).

2) Concentrating on providing education and training for new businessmen as a pre-condition before commencing business in case of government soft loans.

3) Introducing the principle and concept of practicing business in all educational levels and kinds (general, higher and vocational, technical and academic).

4) Equipping the youths with administrative, social and personal competences, as well as the competence related to initiatives.

5) Guaranteeing the commitment of all educational institutions to adopt the concept of practicing business and incorporating it in their curricula and programme.

6) Developing indicators for measuring the extent of implanting the business pioneering principles and values in the youths and educational institutions.

7) Developing a mechanism for assessing the effectiveness of incorporating the concept of business pioneering in the teaching programmes of educational and training institutions.

8) Providing necessary training for teaching staff to assist them in implementing the initiative and assessing the efficiency of the learners in business pioneering.

9) Creating means to connect educational institutions with industrial private sector.

10) Supporting youth initiatives and encouraging them to start their private business.

11) Adopting self-employment principle to increase job opportunities and encourage small and medium industries, handicrafts and business.

12) Allocating a certain fund, annually, in the government loans budgets for training government employees as well as those working in the government loan granting agencies the enhance their efficiency in evaluating and analyzing development projects.

11. Developing abilities of national manpower to raise Omanization ratio:

Implementation Mechanisms:

1) Increasing the productivity of national labour to match wages and salaries.

2) Adopting more effective means to follow up Omanization percent specified in each sector, and to adopt effective policies to increase percentage of Omanis in private sector.

3) Conducting regular surveys of the manpower and keeping updated labour statistics.

4) Intensive investment in education and training to enhance national labour skills, and benefiting from the relative advantage, available in the Sultanate, of greater workforce of Omani nationals compared with the neighbouring Gulf State, national manpower should be encouraged, in co-operation with these States, to seek jobs abroad.

5) Considering the participation of the private sector in the training efforts carried out by the Government.

6) Developing new Omanization policies aimed at providing Omani cadre with high scientific qualifications suitable for top management and leadership positions.

Appendix 3 The Developing Country Group for the UNIDO Data

- Algeria
- Anguilla
- Antigua and Barbuda
- Aruba
- Bahamas
- Bahrain
- Barbados
- Belize
- Bermuda
- Bolivia
- Bosnia and Herzegovina
- Botswana
- British Virgin Islands
- Brunei Darussalam
- Cameroon
- Chile
- China (Macao SAR)
- Congo
- Cook Islands
- Costa Rica
- Côte d'Ivoire
- Croatia
- Cuba
- Democratic People's Republic of Korea
- Dominica
- Dominican Republic
- Ecuador
- Egypt
- El Salvador
- Fiji
- French Guiana
- French Polynesia
- Gabon
- Ghana
- Grenada
- Guadeloupe

- Guam
- Guatemala
- Guyana
- Honduras
- Iran (Islamic Republic of)
- Iraq
- Jamaica
- Jordan
- Kenya
- Kuwait
- Lebanon
- Libyan Arab Jamahiriya
- Marshall Islands
- Martinique
- Mauritius
- Micronesia, Federated States of
- Mongolia
- Montserrat
- Namibia
- Netherlands Antilles
- New Caledonia
- Nicaragua
- Nigeria
- Oman
- Pakistan
- Palau
- Panama
- Papua New Guinea
- Paraguay
- Peru
- Puerto Rico
- Qatar
- Réunion
- Saint Lucia
- Saudi Arabia
- Serbia and Montenegro
- Seychelles
- Sri Lanka
- St. Vincent and the Grenadines
- St.Kitts and Nevis

- Suriname
- Swaziland
- Syrian Arab Republic
- The former Yugoslavia, Republic of Macedonia
- Tonga
- Trinidad and Tobago
- United Arab Emirates
- United States Virgin Islands
- Uruguay
- Venezuela (Bolivarian Republic of)
- Viet Nam
- Zimbabwe

Appendix 4 UN SITC Version 3

Commodity Code	Description of Exporting Commodity
00-09	FOOD AND LIVE ANIMALS, MEAT, MEAT PREPARATIONS, DAIRY PRODUCTS, BIRD EGGS, FISH,CRUSTACEANS,MOLLUSC, CEREALS,CEREAL PREPRTNS, VEGETABLES AND FRUIT, SUGARS,MOLASSES,HONEY, COFFEE,TEA,COCOA,SPICES, ANIMAL FEED STUFF, MISC.EDIBLE PRODUCTS ETC
10-19	BEVERAGES AND TOBACCO,
20-29	Crude Materials, inedible, except fuels, HIDES,SKINS,FURSKINS,RAW, CORK AND WOOD, PULP AND WASTE PAPER, TEXTILE FIBRES, CRUDE FERTILIZER,MINERAL, METALLIFEROUS ORE,SCRAP, CRUDE ANIMAL,VEG.MATERL.
30-39	FUELS, LUBRICANTS, ETC., PETROLEUM,PETROL.PRODUCT, GAS,NATURAL, MANUFACTURED
40-49	ANIMAL,VEG.OILS,FATS,WAX, FIXED VEG. FATS AND OILS
50-59	CHEMICALS,RELTD.PROD.NES, ORGANIC CHEMICALS, INORGANIC CHEMICALS, DYES,COLOURING MATERIALS, MEDICINAL,PHARM.PRODUCTS, ESSNTL.OIL, PERFUME,FLAVR, FERTILIZER,EXCEPT GRP272, PLASTICS IN PRIMARY FORM, PLASTIC,NON-PRIMARY FORM, CHEMICAL MATERIALS NES
60-69	MANUFACTURED GOODS, LEATHER, LEATHER GOODS, RUBBER MANUFACTURES, NES, CORK, WOOD MANUFACTURES, PAPER,PAPERBOARD,ETC., TEXTILE YARN,FABRIC,ETC., NON-METAL.MINERAL MANFCT, IRON AND STEEL, NON-FERROUS METALS, METALS MANUFACTURES,NES
70-79	MACHINES,TRANSPORT EQUIP, POWER GENERATNG.MACHINES, SPECIAL. INDUST.MACHINERY, METALWORKING MACHINERY, GENERAL INDUSTL.MACH.NES, OFFICE MACHINES,ADP MACH, TELECOMM.SOUND EQUIP ETC, ELEC MCH APPAR,PARTS,NES, ROAD VEHICLES, OTHR.TRANSPORT EQUIPMENT
80-89	MISC MANUFACTURED ARTCLS, PREFAB BUILDGS,FTTNG ETC, FURNITURE, BEDDING,ETC., TRAVEL GOODS,HANDBGS ETC, CLOTHING AND ACCESSORIES, FOOTWEAR, SCIENTIFIC EQUIPMENT NES, PHOTO.APPARAT.NES; CLOCKS, MISC MANUFCTRD GOODS NES
90-99	GOODS NOT CLASSD BY KIND, SPEC.TRANSACT.NOT CLASSD, GOLD,NONMONTRY EXCL ORES