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Technology Transfer and Foreign Market Entry: Case of Egypt

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Declaration of Author's rights

Dedication

Having completed my PhD, I struggle to find words to describe my feelings.

So simply, yet deeply, my heartfelt thanks and eternal gratitude go to God,

and to my family for always being there.

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This thesis could not have been completed in its present form without much appreciated support from academic colleagues, friends and family. I consider myself fortunate to be associated to these people. First and foremost, I would like to express my sincere gratitude to my research supervisor, Prof. Dr. Stephen Young, for without his support, guidance and sometimes tolerance, this thesis could never had been completed. It is an honour to have his name on this thesis. I respectfully say that I have learnt a lot from him. *'Thank you Stephen, for everything'.*

Then, My Family. First my Father Prof. Dr. Eng. Samir Elsayad who has technologically transferred to me throughout my life, his high values, insights, way of thinking, ambition, and ...baldness. Without him I would have never reached to where I stand today. *'To you whom I consider my backbone in this life, and the rock I can always lean upon'.* Then, my Mother, Prof. Dr. Eng. Madiha Elkashouti, who has always given me her prayers, love and support. Her confidence in me has and will always drive me forward. *'To you whom I consider the queen of my heart, and the warmth in my life'.* Then, my sister, Assistant Prof. Dr. Eng. Hanan Elsayad, for the listening ear, the jewels of thought and the talks throughout the hard years. Knowing that my sister loves me, as much as I love her, always gives me a safety net. *'To you whom I will always protect and confide'.* And my 'flying' Solly who brightens my gloomy days with her smile. *'To you, Solly. You are my truly beloved first daughter'.* And of course, my beautiful wife Eman, who has given me purpose, happiness, peace, hope and much needed support. *'Beba, I will always be thankful and content for having you in my life'.* And young Zeina *'I only hope that one day you'd be as proud of me as much as I am of you'.* And finally, baby Lana *'your birth marks hopes in better days'.*

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Abstract

The topic of technology transfer has been studied from several perspectives; however, very few of these addressed the association between technology transfer and various foreign market modes of entry in developing countries, and especially in Egypt. Moreover, a coherent and systematic framework for understanding the dynamics of the process of technology transfer does not clearly emerge from the literature; neither does the assessment of the implications of national policy and interlinked issues on the content of technology transferred from foreign market modes of entry.

Hence, the key objectives of the current thesis are "To develop a dynamic conceptual framework that allows for systematic representation and exploration of the process of technology transfer associated with different modes of foreign entry into a host developing country (Egypt); To empirically explore the dynamic process of technology transfer associated with foreign market modes of entry into Egypt; and To assess and critique Egypt's current policy environment impacting on modes of foreign entry into Egypt and their associated technology transfer".

This thesis qualitatively explores the technology transfer process occurring in foreign companies operating in Egypt, under various contractual and investment modes of entry. The empirical findings of the multiple case analyses (conducted using in-depth interviews) and the subsequent cross-case synthesis showed that the framework developed in this thesis is valid and applies well to all explored cases. Findings also revealed that the highest level of technology transfer occurred at start-up phases of all modes. This transfer involved all components of technology. In cases of FDI and JVs, technology transfer is sustained through continuous and regular foreign interactions, and increases with the introduction of new 'events' such as new product lines being added. In the licensing modes, a slow down of technology transfer is found after start-up phases. In regards to linkage issues impacting on both foreign entry and technology transfer, the findings confirmed many expectations outlined from the literature, such as the importance of learning, compatibility of partners, contractual perspectives (and others). Some issues emerging from literature were not substantiated by findings of this thesis such as the importance of technological gaps in entry mode decisions. In addition, new issues were identified, such as the overwhelming impacts of Egyptian government measures that hamper many aspects of technology transfer. Such policy measures include exchange rate policy, as well as inconsistencies and inflexibility of policy implementation.

This thesis concludes that modes of foreign entry into Egypt and technology transfer are tightly coupled, but are subject to the effects of many issues. A better understanding of the dynamics of the technology transfer process associated with foreign entries, along with an integrated and more flexible policy framework are essential requirements for attracting quality foreign investments, and catalysing associated transfer of technology.

Finally, conducting research on a highly contextual topic such as technology transfer associated with modes of foreign entry, in the very challenging research environment of Egypt (due to many factors such as culture, absence of previous empirical efforts and the current turmoil in the economy) has resulted in several methodological and theoretical contributions. These contributions, along with the limitations of the research and directions for future efforts are discussed.

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List of Abbreviations

AA	Association Agreement
AFTA	Arab Free Trade Area
BIT	Bilateral Investment Treaty
BOT	Build Operate and Transfer
CAPMAS	Central Agency for Public Mobilization and Statistics (Egypt)
CBE	Central Bank of Egypt
COMESA	Common Market for Eastern and Southern Africa
e.g.	exempli gratia (for example)
EEAA	Egyptian Environmental Affairs Agency
etc.	et cetera (and so on)
EU	European Union
FDI	Foreign Direct Investment
FEI	Federation of Egyptian industries (Egypt)
FOS	Fully Owned Subsidiary
GAFI	General Authority for Investment and Free Zones (Egypt)
GDP	Gross Domestic Product
GNP	Gross National Product
GOFI	General Organization For Industrialisation (Egypt)
HQ	Head Quarters (MNC)
HRD	Human Resource Development
i.e.	id est (that is to say)
IDSC	Information and Decision Support Centre (Egypt)
IMC	Industrial Modernisation Centre (Egypt)
IPR	Intellectual Property Rights
IPR	Investment Policy Review
ISO	International Standards Organisation
IT	Information Technology
ITC	International Trade Centre (UNCTAD/WTO)
JV	Joint Venture
L.E.	Livre Egyptien (Egyptian Pound)
Lic.	Licence/licensing agreement
M&As	Mergers and acquisitions
MEA	Middle East and Africa (region)
MENA	Middle East and North Africa region
MITD	Ministry of Industry and Technological Development (Egypt)
MNC	Multinational Company
MOF	Ministry of Finance (Egypt)
MOFT	Ministry of foreign Trade (Egypt)
NGO	Non-Governmental Organization
OECD	Organisation for Economic Cooperation and Development
PLC	Product Life Cycle
R&D	Research and Development
RIF	Regional Integration Framework
S&T	Science and Technology
S/W	Software
SFD	Social Fund for Development (Egypt)
SME	Small and Medium-sized Enterprise
TBP	Technological Balance of Payments

TNC	Transnational Corporation
TRIMs	Trade-Related Investment Measures
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TT	Technology Transfer
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIDO	United Nation Industrial Development Organization
vs	versus
WIR	World Investment Report
WTO	World Trade Organisation

Chapter 1: Introduction

1.1. Background of the Research

Developing countries share a number of common goals, such as achievement of sustainable economic growth, improvement of currently low living standards, reduction in unemployment and improvement in provision of social services. Developing countries' governments formulate policy packages to meet such goals. Meanwhile, unprecedented opportunities are presented, such as prospects for expansion of trade, increasing globalisation of world financial markets, closer economic links with the European Union and possibilities for greater regional stability and closer integration. All these prospects are not automatic, and developing countries such as Egypt recognize that they must establish for themselves conditions that will enable them to reap benefits.

Domestic policies will have to take the lead through consolidating stabilization and deepening and widening structural reforms on a broad front. Such structural reforms include, among others, technological reform for capacity building. It is in agreement with most internationally appreciated principles that technology has a positively correlated role in national growth and development.

On this front, observation of the international technological market place demonstrates a complex situation of its own. There certainly exists a technological gap between developed and developing nations and the outcome arrangements of recent WTO meetings and agreements (e.g. DOHA 2002/2003) imply that this existing gap will remain, if not widen.

It is hence contended that a national plan involving policies addressing the technological issues of Egypt (as focus of this thesis) and narrowing the gap between it and more technologically advanced nations is much needed. This plan should depend on both the government and the private sector to drive a national technological build-up that enables Egypt to achieve desired international competitiveness, growth and development.

From a more particular Egyptian perspective, the consecutive regional wars have lowered the comparative advantages of Egypt and its competitiveness at the micro level and have delayed its overall economic development.

This delay has in itself stimulated other unfavourable circumstances for Egypt such as accumulation of foreign debt and inferior technological capacity.

In recent years, the situation has started to change and the Egyptian government has set objectives to achieve substantial development in areas such as industrial modernisation and economic reform. The Egyptian government is assessing many measures and policies to meet its objectives, including possibility of promotion of technology transfer from existing/new foreign investments, privatisation policies, and monetary policies such as flotation of local currency.

This thesis focuses on technology transfer, which has gained a large share of support both in literature and in practice, as a vehicle for technological capacity build-up.

1.2. The Research Context

The well-documented literature on internationalisation of the firm contends that firms consider many issues and factors (separate and/or combined) upon making their internationalising decision and host choice, especially when that host is a developing country (such as Egypt). The firm's choice of a particular mode of entry is based on its own assessment of its capabilities and objectives, the surrounding environment, host policies, technology involved, micro characteristics, and many others. After actual entry, and forward in the life span of the mode's operation, the original mode of entry may be retained, developed or changed by the foreign company (based on their experience-based perspective of the host market).

The general contention of this thesis is that technology is transferred to the host country via modes of foreign entry throughout the various stages of mode development. The content and nature of such transfer process is obviously dependent on many surrounding issues, such as the actual mode choice, the technology and players involved and the exact context at the selected host nation on both the micro and macro levels.

The analyses of technology transfer literature will reveal that due to the very nature of the process, complex issues and linkages may arise, contributing to increased or decreased technology transfer content associated with a foreign market entries. Examples of such issues include motivation of parties' involved, technological gaps, and host frameworks.

Therefore, to address a phenomenon such as technology transfer with its wide array of overlapping issues, a holistic approach is needed. Such holistic assessment of the content of technology transfer associated with modes of foreign entry to Egypt is believed to assist policy makers in pursuance of highly sought technological capacity build-up.

Interestingly, and on the other hand, in order to accurately assess such technology transfer content, practical technology aspects could not be treated as a whole. Rather, they need to be decomposed into their smaller components (process, management and product component levels) in order to usefully account for all contributions to the technology transfer content.

On the policy front, policy intervention mechanisms (especially in areas of mode choice and technology transfer) are subject to mixed, far from unanimous, views. Targeted policies, incentives and performance requirements are no exceptions, and are still debated in literature to date.

An assessment of the effects of Egypt's current policies on foreign operations and any associated technology transfer is almost non-existent. This limits any truthful assessment of the effectiveness of alternative Egyptian policies.

To address all the above, this thesis needed a reliable, expandable, conceptual model that provides a context for understanding of the process dynamics and complex relationships surrounding technology transfer from modes of foreign entry. This model should incorporate the array of issues that may affect the technology transfer content in Egypt, the issues considered by various parties, the mode of entry development and the many policy perspectives.

Guided by the conceptual model, this thesis would be a pioneering contribution towards realizing Egypt's national goals, through providing an integrated policy critique (covering modes of entry, technology and national frameworks) that is for first time, conducted within a technology transfer context.

The following sections describe the aims, expected value and structure of the thesis.

1.3. Aims of the Research

Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- The aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.

In addressing this, answers to three groups of research questions are investigated. The first group focus on the characteristics of the transfer process, namely: What are the main technology components being transferred, and what are the means and purposes of that transfer (content) from various modes of foreign entry into Egypt? What are the main categories of issues that affect technology transfer associated with foreign entry?.

The second group focus on the dynamics of the process of technology transfer at various stages of modes of entry, namely: What are the main pre-entry motives behind foreign entry decisions into Egypt, and did government policy have an influence? What are the perceived technological contributions of foreign modes' operations in Egypt? What are the dynamics of the technology transfer process associated with the post-entry operations of these modes?

Finally, the third group of research questions focus on Egyptian policy perspectives, namely: What is the perception of effectiveness of existing national policies and frameworks on mode choice, subsequent mode operations, and technology transfer? What are the impacts of Egypt's international policy (bilateral and multilateral cooperation) on technology, its transfer and mode of foreign entry into Egypt? What are the targeted policies that can improve technology transfer from modes of foreign entry?

The previous research aims and questions are further developed into specific research objectives in section 6.2.

1.4. Value of the Research

The findings of this research will be of value to the following audiences:

1. The value to the academic community lies mainly in an increased understanding of the, currently limited, knowledge about the technology transfer content, process and impacting issues associated with the various modes of foreign entry to a developing country host. Such understanding should contribute to new research topics on areas of internationalisation of the firm, technology and technology transfer and to a better understanding to the ties and knots between the above areas within a developing country context. The academic community in Egypt will gain a better understanding of the entire process of technology transfer associated with foreign entry in Egypt through the ability to dynamically trace the impacts of introducing different variables to the process, in addition to a substantial increase in empirical data on sectoral levels.

2. The value to management on the micro level lies in better understanding of the issues and actual dynamics of technology transfer that they experience/target in association with their foreign partners, especially if technology transfer was not a predetermined concern (contractually) upon making the entry and mode choice. With a better understanding of such dynamics, of the prerequisites of successful partnerships, and the characteristics of the current global environment; competitiveness of Egyptian companies may be improved.

3. A crucial value of this research relates to the policy makers on the macro level. This lies mainly in better understanding of the factors that are considered most important by the foreign suppliers throughout their various phases of internationalisation and of the positioning of technological issues within these factors. This thesis provides a better understanding of the effectiveness of current incentives, performance requirements, policies and overall frameworks on foreign entry and associated transfer of technology. Therefore, this research helps in formulating and assessing implications of host policies aiming at optimising transfer of technology either through targeting the issues that affect the process, the parties involved or the actual entry mode selected.

1.5. Structure of the Thesis

Chapter 1 of the thesis provided the background to this research, its context, aims, and expected value. This section of Chapter 1 reviews the overall structure of the thesis, also represented in figure 1/1.

Chapter 2 provides a literature review on technology, its definitions, characteristics, components, and development within the current global setting. Conceptualisation of technology transfer is addressed through assessment of technological issues related to parties involved (foreign MNCs/host) and the international technology market place. Technology-related issues such as appropriateness, management perceptions and cost are discussed. In addition, technological capacity building in developing countries is assessed, along with a technology policy rationale. The conclusion of this chapter summarizes the main identified gaps in the literature on technology and its transfer.

Chapter 3 provides a literature review on foreign markets modes of entry covering internationalisation of the firm, the associated theories and a critique on them from a technological perspective. The types of foreign market entry modes, their contractual assessment and governing determinants are discussed. Expanding upon roles of MNCs in development, this chapter also critically reviews practical frameworks of foreign market entry and the policy rationale in relation to their foreign market entry. The conclusion of this chapter summarizes the main identified gaps in the literature on foreign market modes of entry.

Further closing up on the core of research, Chapter 4 provides the literature evidence and synthesized linkages between technology transfer and modes of foreign entry. The chapter reviews empirical research on the effects of global business strategies on developing countries, from the technology perspective. The multi-dimensional aspects of technological gaps, post-entry mode development, R&D linkages and mode-contractual implications will also be discussed. Finally, an assessment of the effectiveness of an integrated technology transfer policy will be conducted, with emphasis on incentives and policy rationale highlighted in the previous chapters.

Having discussed the policy assessments in the previous three chapters, Chapter 5 provides the overall macro assessment of Egypt, with emphasis on the current government policies,

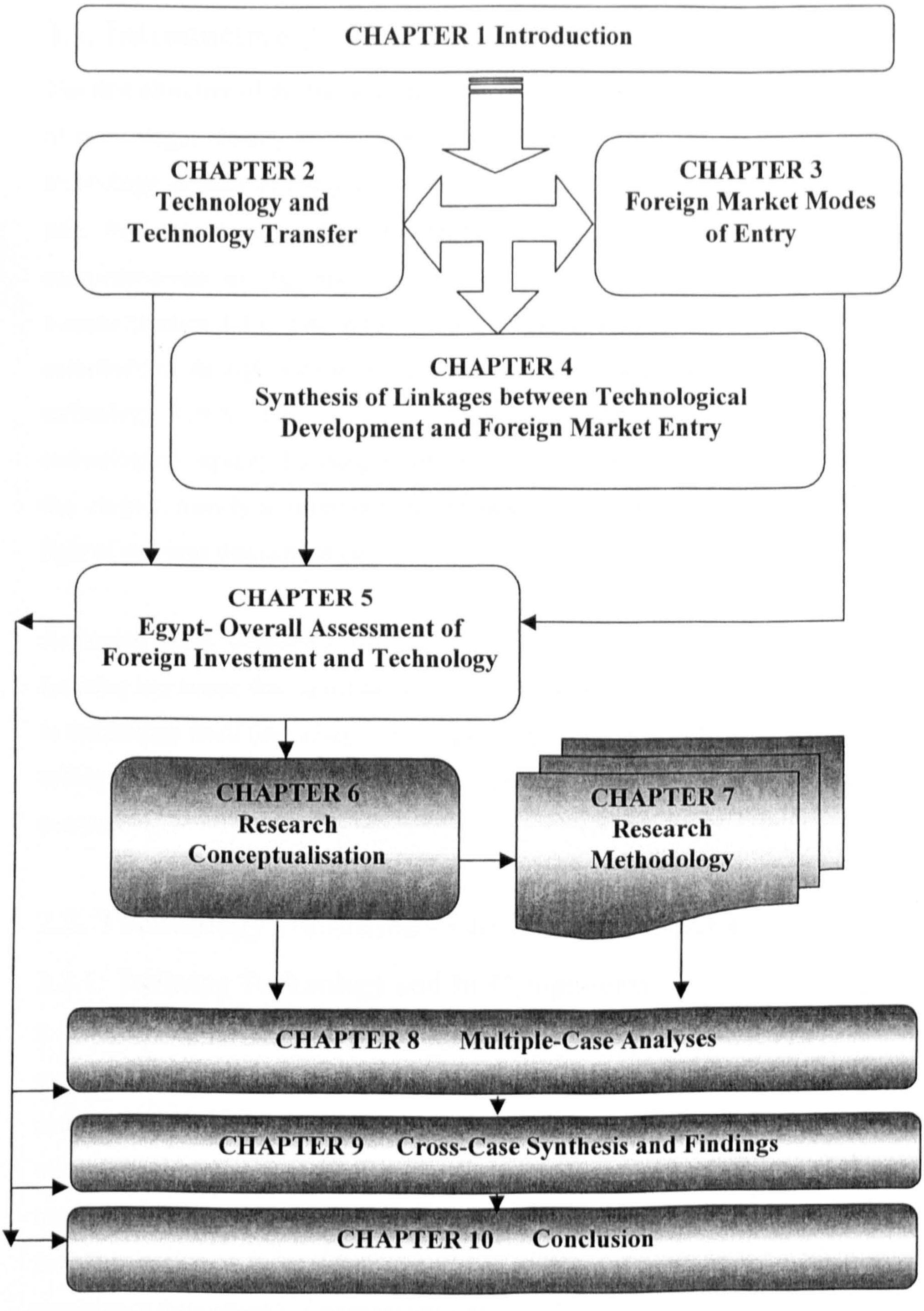
frameworks and activities affecting overall attractiveness of Egypt to FDI entry and subsequent operations. The privatisation process in Egypt and its impacts on investment and technology transfer and appeal to foreign investors are assessed. The effectiveness of government policy regarding operations of foreign companies and technology transfer is criticized. Finally, a sectoral review will be conducted to set the foundation for the fieldwork of this thesis.

Chapter 6 provides a literature synthesis leading to and followed by the carefully drawn objectives of this research. The conceptual model that links the different issues emanating from the literature review is developed here, providing a precise representation of various perspectives, such as the dynamics of technology transfer process, the routes that this process leads (filling a critical gap in literature), and the players involved. This chapter will identify and categorize the outstanding issues emanating from previous chapters to have an impact on technology transfer. These categorizations include technological, mode of foreign entry, unique Egyptian setting and finally common linkages issues. The developed model is considered a base for empirically assessing the topic in the following chapters.

Having set the theoretical and conceptual foundation in the previous chapters, Chapter 7 reviews alternative research methodologies and designs, and assesses the selection of the current research design, methodology, justification, decided instrument (interview guide), sample and subsequent phases, setting the basis for operationalisation of empirical efforts. Briefly, this research will qualitatively explore technology transfer associated with modes of foreign entry into Egypt through in-depth case study analysis, at seven different companies in Egypt, operating with various modes of entry. Chapter 8 presents the individual empirical case analyses reports for these companies.

In Chapter 9, a cross case synthesis will be conducted, and the overall findings of the empirical research are presented. This chapter also includes validations and opinions on the findings, by an expert interviewee who is well qualified for the task. Finally, Chapter 10 consolidates the findings of this thesis into broader conclusions and recommendations in various perspectives. The chapter then presents the limitations of the current research and ends with suggestions for future research efforts.

Figure 1/1: Structure of the thesis



Source: The author.

Chapter 2: Technology and Technology Transfer

2.1. Introduction

The first objective of the literature review in this chapter is to reach to a working definition of technology, identify its components and characteristics and assess the importance of technology as such in today's business environment (section 2.2.) The second objective takes from there to assess the role of technology in economic growth and its significance to competitiveness and national development and hence furnish for the importance of its transfer (section 2.3.). The third objective of this chapter assesses the technology transfer contributions through review of the conceptualisation issues, frameworks and channels of technology transfer (section 2.4.). A review of developing countries' strategies for technological capacity building is conducted in section 2.5. to fulfil the final objective of this chapter, namely to investigate the rationale behind governmental technology policy in light of previous discussions (section 2.6.).

Achieving these objectives will facilitate the forthcoming empirical investigation by isolating key issues that significantly impact on technology transfer content and are related to technology itself (including technological gaps), technology transfer and/or the existing setting at time of transfer. Arguments in this chapter are from a developing country, host perspective.

2.2. Technology Definitions and Building Blocks

2.2.1. Defining Technology and its Components

It is noteworthy that there is neither an exact nor a unanimously agreed-upon definition of technology. The definition of technology has tended to depend largely on the perspective and aims of the person or group investigating it. Likewise, the research and literature on technology sometimes suffer from variations and interchangeable use of terminology; based on the perspective of study, interest area or timing of the research itself. It is therefore important to be sensitive to these nuances of meaning, in order to guarantee consistency throughout the research process.

Zander (1991) observed that many of the definitions in the literature on "technology" are broad and sometimes all encompassing. For instance, technology is viewed as a composite phenomenon consisting of techniques and know-how and is understood to mean a whole system of applied knowledge embodied or manifested in physical objects and human beings. The physical objects embody techniques such as in the case of products (i.e. product technology) or in the case of production processes (i.e. process technology). On the other hand, know-how is contended to mean the skills and intellectual processes embodied in human beings and manifested in such activities as installation and operation of machines (i.e. technical know-how), problem solving and managing an enterprise (i.e. managerial/marketing know-how) (Obaidi, 1993).

Technology was historically viewed as that part of firm's resources which changes the firm's production function (Mansfield, 1968), or the firmware combination of applied knowledge or technical information (software) and their application to physical products (hardware) or to organizational mechanisms (such as manufacturing processes, organizing the provision of a service and the performance of human functions).

Meissner (1988; see also Feibleman, 1980) defined technology to be the configuration of processes, plans, techniques, knowledge and skills. The function of this configuration according to his idea is to effectively produce, process and market a product or service.

Emmanuel (1982) argued that technology is the capacity to create, install and use a combination of actual operations really usable in the production of a commodity.

Dahlman and Westphal (1982) follow the view defining technology as a collection of physical processes, which transforms inputs into outputs, together with social arrangements, which structure activities involved in carrying out such transformations.

As noted, the configuration of any of the previous definitions depends largely on the context within which the technology is being used. Moreover, many of these traditional definitions are too narrow to catch the realm of currently important components of technology, such as know-how. This hinders the realistic measurement of actual technology flow and transfer process. Therefore, a careful review of definitions of technology that explicitly emphasize the know-how component is needed.

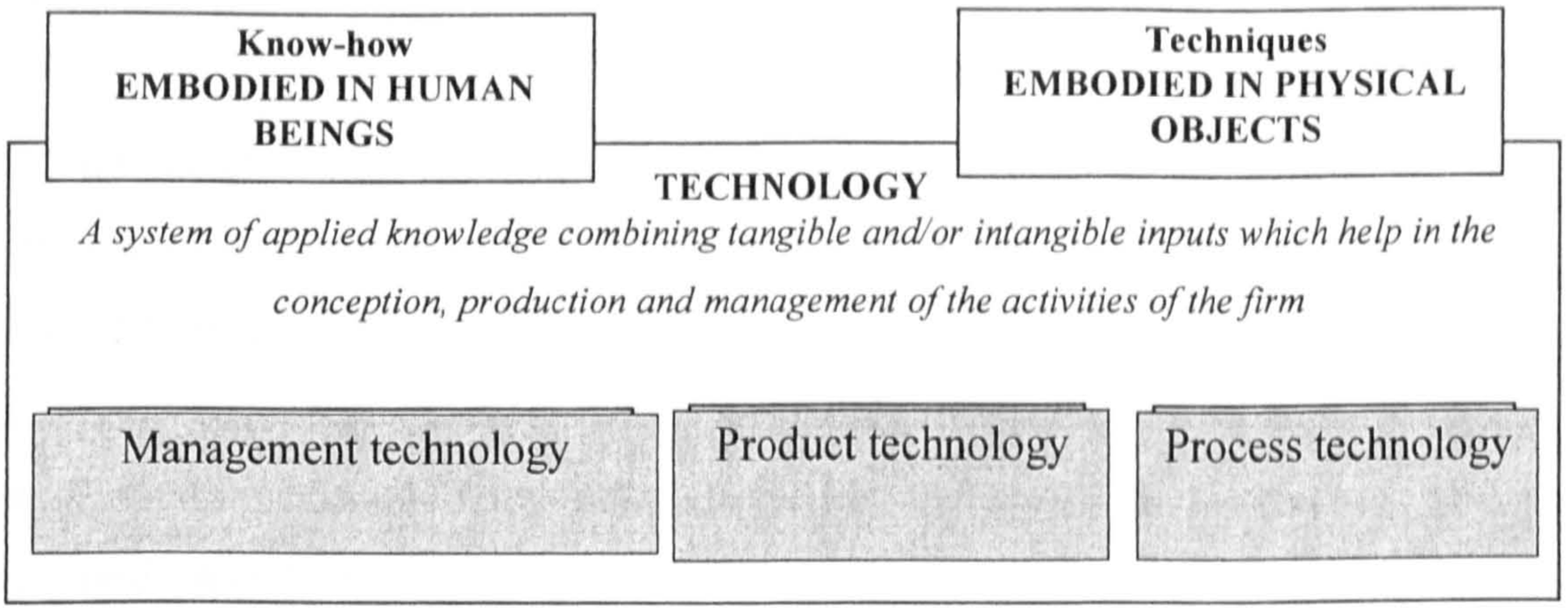
In his work on the sources of innovations, Hippel (1988) separately defines know-how as the accumulated practical skill or expertise that allows one to do something smoothly and efficiently, for example the know-how of engineers who develop a firm's products and develop and operate its processes. Firms often consider a significant portion of such know-how proprietary and protect it as a trade secret. Mostly, know-how remains tacit in human skills, and is not made totally explicit in blueprints, manuals and documents, because either the supplier does not wish to do so, or because the relevant knowledge is impossible, difficult and/or lengthy to be set out in documents. The contents of know-how are not codified or registered in contrast with the content of techniques, which are often codified, legally registered and protected.

Stewart (1981) in a more concise definition of technology classifies technology into three distinct components, namely products, processes and services. He refers to techniques, which are related to the conception, planning and creation of a product as "product technology" and techniques related to manufacturing the product as "process technology". The know-how related to the utilization and problem solving of product and process techniques are referred to as "technical know-how", while know-how related to running and organizing a firm in order to achieve its objectives are referred to as "managerial and marketing know-how".

More recent, article 5 (8) of the Law of the Sea defined technology as the specialized equipment and technical know-how, including manuals, designs, operating instructions, training and technical advice and assistance, necessary to assemble, maintain and operate a viable system and the legal right to use these items for that purpose on a non-exclusive basis (UN, 1994; UNCTAD, 2001).

Based on the previous discussion, figure 2/1 illustrates the definition of technology adopted by this thesis.

Figure 2/1: Overview of adopted technology components



Source: The author, derived from Stewart, 1981; Obaidi, 1993.

2.2.2. Characteristics of Technology

2.2.2.1. Macro-level Characteristics of Technology

It started during the 1970's that host country governments devoted a great deal of attention to issues of technology transfer, especially from foreign investments, and interest in quantifying this transfer increased. However, local firms at host countries were often tied to multinational companies (MNCs) in manners allowing only minimal access to data. Consequently, hosts gained at best only operating knowledge of technology used.

On the national level, no single indicator can give the exact picture of the technological knowledge base. Nevertheless, three types of indicators are often used to quantify technological flows, and assess an international standing from the technology perspective (excluding non-commercial transactions). These are classified in table 2/1:

Table 2/1: Indicators of technological flows

"Input" indicators (R&D expenditure)	**"Output" indicators (Patents)**	**"Impact" indicators (Productivity indices)**
Employment of scientists & engineers	Technological balance of payments (TBP) Scientific publications	Trade in technology-intensive products Patterns of competitive advantage

Source: UNIDO, 1987.

In this respect, efforts were made to generate internationally comparable technological balance of payment (TBP) data. This includes mainly payments arising from licences, patents, trademarks, design, copyrights, use of technical know-how and technical

assistance. Not reflected, however, is technological knowledge embodied in products and technology provided to affiliates or subsidiaries (unless royalties are being paid).

On the other hand, data on both trade and investment flows reflect far more than information on technology flows alone. Therefore, the technology-related data collected from different countries are not always comparable. For example, sometimes these are compared using R&D surveys, which are highly misleading. Exchange rate fluctuations and overall economic frameworks also affect the data. In conclusion, TBP reflects economic and financial, rather than technological, relations between countries, further missing the existence of agreements to supply or to trade technology in which no financial exchanges are involved (UNIDO, 1987).

The previous discussion predicts difficulty in researching technology and its transfer, through statistical and quantified means.

On another macro front, various issues affect the capacity of developing countries to improve participation in the international economy, improve their own technological base, or even import technological inputs.

Developing countries strive to achieve suitable socio-economic performance levels, but are continuously faced by challenges, including technological ones, posed by development and trade. This clearly requires that internal and external resources on both macro and micro levels be mobilized towards activating technology flows through all possible channels, mechanisms or vehicles of transfer. It also requires the tapping of all possible sources, evolving new avenues, securing external and additional internal financing for technology transactions and development of strategies to encourage the countries' science and technology (S&T) resources.

The work on national systems of innovation (Endquist, 2001) and clusters or industrial districts (Porter, 1998) seek to identify factors, interactions and relationships that are crucial in creating a conducive environment that promotes innovation and commercialisation of technologies. Among these, governmental policy and incentives are contended instruments for the creation of a conducive infra structure environment to

Science and Technology (S&T) and hence the development of local technological capability (see table 2/2).

In fact, S&T policy in many countries has become an integral part of overall development policy as technology is increasingly recognized as the key to building competitiveness of industries as well as enhancing social welfare (Da Silveira, 2001).

Table 2/2: Categories of governmental policy and incentives

Category	Policy and incentives
Promotion of demand for local technology	Government purchasing; Fiscal measures (taxation, price controls, export promotion, special credit, other financial incentives)
Development of local scientific technological infrastructure	Establishing institutions, R&D agencies and information centres Planning / financing S&T activities & programmes; Awards for innovators; Establishing credit lines
Promotion of absorption of technology by local firms	Fiscal measures; R&D department formation; Encouraging mergers and joint ventures; Offering Foreign direct investment incentives
Regulation of technology imports	Controls on imports; Patent system; Protectionism; Standardization and environmental regulation
Promotion of Science and Technology intensive enterprises	Establishing technological standards; Providing Science and technology assistance; Training awards; Providing training and access to consultants; Co-financing of R&D; Increase public awareness; Loans, subsidies, export credit

Source: The author, adapted from UNIDO, 1987; UNCTAD, 2003.

Creating a science and technology capacity that allows a country to meet its social and economic challenges requires the participation of a range of players, including academic institutions, research and development (R&D) centres (government and private), manufacturing enterprises, financial institutions and government advisory bodies. As will be elaborated later, regulatory, legal and administrative policies have a large influence on those players and their interactions, which in turn determines how knowledge and resources flow among those players. The challenge for governments is to create a policy environment and institutions that are supportive of technology development and diffusion as well. The rationale behind technology policy is extended and further elaborated in section 2.6.

Nevertheless, it is not a simple task to translate national development objectives, within its rights to regulate, into specific policies especially in light of socio-economic challenges faced by developing countries. A sound policy environment should stimulate investment, provide incentives to entrepreneurs and researchers, promote investment in human resource training, improve protection of intellectual property rights and provide financial support for research and development activities (UNCTAD, 2003j).

2.2.2.2. Micro-level Characteristics of Technology

The rapid pace of innovation is resulting in a continuing surge of activities of multinational corporations seeking efficiency across the globe (Dicken, 1998). While satisfactory macro economic conditions and appropriate national policies are a prerequisite for development, micro level factors and the capacity of firms to organize and compete for technological change are gaining substantial importance in literature.

Dynamic, interactive and cumulative processes take place between the firm and its environment. Numerous studies have shown that the performance of the firms depends on their own qualities, as well as on the structural characteristics of the sectors and the countries in which they operate. The concepts of structural competitiveness and the diamond of the national competitive advantage now offer two ways of bridging the gaps between macro-economic policies, micro level corporate performance, the systematic features of technology and the processes of innovation and R&D (OECD, 1992).

But competitive success in an innovation-driven global economy needs strong local capabilities, and the development of such capabilities faces numerous market and institutional failures (Stiglitz, 1996, 2002; Lall, 2001).

For instance, in fastest-growing segments of trade, such as technologically sophisticated activities, global value chains are now very tightly knit and coordinated. Therefore, entry into dynamic technology-based activities entails that interested firms "plug into" these MNC-dominated chains (UNCTAD, 2003a).

The problems faced at the micro level on route to competitiveness, are not only economic, but technological as well. The choice between developing new technologies or improving existing ones, and the selection of the strategies to be adopted in face of uncertainties of the global business environment and the continuous need for access to new technologies is essential to sustain competitiveness (Radosevic, 1999).

Access to new technologies can take two broad forms: internalised (from a multinational company to affiliates under its control) and externalised (between independent firms). While internalised modes necessarily involve MNCs, externalised ones may also involve MNCs selling technologies on contract (UNCTAD, 2003a).

One advantage of internalised forms lies in the long-term commitment of the foreign partner and his ability to provide the elements needed to operationalise new technologies.

Nevertheless, there is an increased tendency among firms in developing countries towards external technology acquisition, as opposed to their own internal R&D, benefiting from the growing trends in the internationalisation of foreign companies (see chapter 3). The emergence of quasi-integrated or immediate organizational forms for technology acquisition and exploitation is noted in literature. Technology acquisition strategies at micro level include: internal R&D, acquisition of technology based firms, cooperative R&D, technology purchasing and technology scanning (Granstrand et al, 1990, 1992; Lindholm, 1990).

Considering the counter perspective of larger technology-based firms, quasi integrated internationalised system for innovation would emerge as most conductive to their innovation and technology-based growth, involving mixtures of internal R&D, and internationalisation of R&D. However, the optimal degree of quasi-integration would in general be dynamically changing due to managerial learning and innovations (e.g. new contractual or organizational forms) and technological innovations. Consequently, the patterns of corporate development strategies had also become more varied and technology-related, with emphasis being on costs, profitability and growth, product diversification, internationalisation of sales, internationalisation of production, internationalisation of R&D and investments in R&D (Granstrand, Hakanson and Sjolander, 1992; see Zander, 1991).

The proposition that investment in R&D and technological progress are essential for future growth has not yet been conclusively empirically demonstrated. However it is widely agreed that R&D and technological progress do indeed play a crucial role in the economic growth of nations (OECD, 1992), and hence these issues must be carefully considered in any research context dealing with capacity building, especially if through technology transfer.

2.3. The Role of Technology in Economic Development

2.3.1. Technology and the International Business Environment

On one side, globalisation with its associated production and distribution within worldwide networks tends to reinforce the cumulative character of the innovation-based advantages of larger firms, but may weaken the resource base and organizational cohesion of domestic systems of innovation. The importance of the systematic aspects of the relationships of technology, growth and competitiveness together with social, cultural and institutional factors in a country gives rise to novel issues (OECD, 1992).

Retrospectively, technological developments have profoundly affected the rules of the game in the international market place through creation of new modes of organization and competition (Granstrand, Hakanson & Sjolander, 1992). Technology is the chief driving force of social, economic and cultural change (Freeman, 1982, 1988, 1990; Nelson & Winter, 1982; Dosi, 1988).

Therefore, complex interplay and parallel developments in the areas of organization structure, internationalisation of the firm, global/national trade policy, environmental legislation, infra-structural investments sometimes facilitate and in other times discourage exploitation of technological possibilities (see Ergas, 1987). Current with these tendencies, developments in macro-economic theories involving technological change have laid foundation for improved empirical and theoretical understanding of the nature of technological change and its overall impact on society (also see section 3.2.3.1.).

Examples of technological issues of ascending significance to international business executives are keeping pace with technological progress, shorter allowable lead times, shorter market lifetimes, increased external acquisition (sourcing) of technology, technological protectionism, increased fusion of technologies, and increased demand for higher quality. Studies indicate that to USA technology executives, shorter innovation lead times, and external and international acquisition of technology are considered the most important. Among Swedish technology executives the availability of labour and managerial talent is perceived to be increasingly important. Japanese executives express increased importance of competitive issues such as shorter innovation lead times and market lifetimes, along with technology-related issues, such as external sourcing and

technology fusion. Other issues of significance, especially to developing countries include demand for standardization, environmental protection, and quality considerations, along with advanced supplier relations and an adequate economic environment with the associated issues of exchange rates, protectionism, low economic growth and government policy intervention (Granstrand et al, 1992).

2.3.2. Contribution of Technology to the Economy

Freeman (1982) considers that the role of technology in economic development can be traced back to the discussion of Adam Smith on improvements of machinery and the wealth creation more than 200 years ago. Technology development as a wellspring of economic growth has been well documented by scholars (Rosenburg, 1976; Freeman, 1982; McIntyre, 1986; Methe, 1991).

Discussions on the role of technology in the economy tackle the issue from different angles that primarily fall under the following aspects: First, technology provides resources for creating new wealth and increasing efficiency, whereas on macro level, modern technology has emerged as one of the primary sources of national power, prosperity and strategy (McIntyre, 1986). Second, technology shapes the economy, whereas international management change their organizational modes of operation in their quest for acquiring new productive forces (see Rosenburg, 1982). Third, technology forges economic fluctuation. For instance, Methe (1991) relates technology change with innovations and associated economic impacts. Also, qualitative and quantitative efforts have revealed the role of technology to create economic growth (Solow, 1957; Dension, 1962; Press, 1987; Abramovitz, 1993).

Therefore, as indicated earlier, indicators concerning the impact of technological change on growth or productivity are difficult to establish for a variety of reasons. These include: numerous definitions used for the term "technology" itself and the lack of a consistent interpretation of concepts such as technological change, technological advancement, technological progress, technology flows, technology trade, etc. (also see section 2.2.2.1).

Moreover, while technological advancement is a precondition for growth, there are numerous institutional, structural, attitudinal and social factors which crucially affect the capacity to introduce or maintain the momentum of technological change required by short

and longer-term adjustment or structural transformation of an economy. These non-economic factors strongly influence purely economic analyses of the role of technology in raising the overall output, productivity or competitiveness of any economy (see section 2.3.3). Retrospectively, technology development itself is counter shaped by economic and social issues such as those related to financing technology flows and technological investments in any form (absorption, adaptation and generation). The two-way relation between technology and economy sets an important context to address issues of appropriateness of technology as well (section 2.4.2).

It may be concluded from the previous discussion that it is crucial for developing nations such as Egypt to create the attractive host environment that is conducive to technology, allows for externalities and optimises the use of international instruments, in order to reach to a desired level of competitiveness. The importance of competitiveness is elaborated in the next section.

2.3.3. The Significance of Technology to Competitiveness

International competitiveness has long been considered vital to growth in industrial economies. With globalisation, it is also becoming crucial for the developing countries that have long insulated themselves from world markets (Lall, 2001).

The real value of the product has become in its scientific and technological content, which is in fact the amount of research, development and innovation dedicated to this specific product. This fact implies that the current technological gap (difference in technological standing) will remain, if not widen, especially that most developing nations do not have the prerequisites necessary for local innovation (see also section 2.4.2 and 2.4.4.1). Therefore, efforts made by many developing countries to incorporate the technological dimension into the mainstream of economic management and policy-making should optimally strike the balance between short-term stabilization and longer-term trade development objectives on the other (UNCTAD, 1995).

2.4. The Transfer of Technology

Technology accumulation in general is realized by a wide learning spectrum. On one end is the creation of knowledge (learning by researching) and explicit diffusion of knowledge on the other end (learning through training). Between them there is learning by sharing, learning by hiring and learning by leaking (Arrow, 1962; Rosenburg, 1982; Bell, 1984; Enos and Park, 1988; Cohen and Levinythal, 1989).

Such learning process may be differentiated by technology itself, whereas some technologies are more difficult to master than others because the learning process is longer and more uncertain, involving greater effort and more externalities and coordination problems. At the same time, more difficult technologies also tend to offer greater potential for further learning and have greater scope for the application of new knowledge. Some complex technologies, have stronger leakage and spillover effects, acting as "hubs" for technical progress and diffusion.

The main reasons for the growing importance of international competitiveness are technological (UNCTAD, 2003). Therefore, for improved learning on the national scale, developing countries need to introduce more complex technologies and more difficult functions within given technologies; otherwise, competitiveness will erode with rising wages and exports will stagnate.

Policies today have to specifically address failures in achieving international competitiveness. The need for strategy remains, but the kind of strategy that will maximize technology development is new. Technological effort is vital to developing countries, even though it is clear that they are not "innovating" at the frontier. They import new technology, equipment, patents and so on from more advanced countries, but they have to learn to use these inputs effectively. Using new technologies is not an automatic or simple process. It entails conscious building of technological capabilities, a mixture of information, skills, interactions and routines that firms need to handle tacit elements of technology and plug into global supply networks (UNCTAD, 2003), and very importantly the creation of mechanisms for effectively deploying these technologies afterwards within the economy.

Nevertheless, the recent experience of the impact of rapid liberalisation on technology development has not been very encouraging in many parts of the developing world. In

other words, technological lags between the leaders and laggards are growing apace. How enterprises access, master and improve upon new (and increasingly difficult) technologies is critical. There are two broad approaches to narrow the technological gap, namely: fostering learning by domestic firms (autonomous), and depending on FDI (as a potent source of technology) to drive technological upgrading (UNIDO, 2001), both directly and through learning and transfer of technology. The abilities to internally develop technology through R&D, acquire and adapt technology successfully from both external and internal sources are critical determinants of ability to compete successfully in today's knowledge-based global economy.

It is necessary to emphasize that many of the existing international instruments and numerous regional and bilateral agreements contain themselves measures related to transfer of technology and technological capacity building, but the technology-related provisions contained in these instruments follow different approaches, depending on the object and purpose of the respective instruments (see also section 2.5.2.1.). For instance, under WTO, the General Agreement on Trade in Services (GATS) and the TRIPS Agreements both refer to technology in a broad sense, whereas the Law of the Sea Convention deals specifically with marine technology and capacity building in the management, exploration and exploitation of marine resources; and provisions of the Vienna Convention and the Montreal Protocol are related to technologies for environmental protection. As seen, some of these instruments provide their specific definition of technology. In the absence of a generally accepted definition of technology, the terms of a Convention itself should be interpreted in accordance with its ordinary meaning, in its context, and in the light of a treaty's object and purpose (UN, 1980; see also Aust, 2000).

It is noteworthy that most instruments that deal with the promotion of, and cooperation in, transfer of technology do not refer to any actual mechanisms, terms or conditions of transfer of technology. Furthermore, these instruments refer to transfer of technology in such a way that does not facilitate its use as a performance requirement (see section 2.6). On the other hand, protection of intellectual property rights is included within the broader objective of trade and investment cooperation (UNCTAD, 2001h).

From the perspective of the foreign firms (owner to the technology), while technology offers unique competitive advantages, its transfer, however, may create competitors, take

time, require effort and need resources. Firms have often tended to exploit their technologies within the boundary of the corporation and internalise their use rather than allow external and independent competitors' or even would-be competitors, benefit from them (Buckley & Casson, 1976; Dunning, 1982).

Therefore, from a host point of view, technology transfer and indeed the acts of technology creation or learning as well, are not one-shot acts. Technology transfer is a process characterized by many stages or phases, each having its own time, human and material dimensions all systematically coordinated. Therefore, technology transfer may no longer regarded as the black box that can be purchased to solve competitive and technological problems of the firm, nor is it a one-time act of conveying information, formulae and patent rights to other firms capable of assimilating them (Contractor, 1980; Porter, 1983).

2.4.1. Conceptualisation Issues of Technology Transfer

There is an abundance of, often semantic, definitions of technology transfer and these do little to increase our understanding of the phenomena. The term technology transfer encompasses a broad range of activities that a definition general enough to be useful is hard to develop. However, operational definitions of technology transfer are easier to devise within their specific contexts, and are best constructed in terms of their specific mechanisms of transfer (Carr, 2001).

Since 1970's, the term "technology transfer" usually means the horizontal transfer which is the knowledge flow between different places and parties, while vertical transfer refers to the knowledge flow between pure and applied research and product development, as in the stages of a production cycle.

Transfer of technology means, the transmission of technology produced and/or used in one place for a given purpose and its application in another place and/or purpose as technological innovation. Hence, international technology transfer consists in the transmission of technology form one country (technology supplier) to another (technology recipient) (UNIDO, 1990).

Technology transfer is also defined as a process of acquiring technological capabilities from abroad. The methods used to acquire this capability are various. It can be: buy, borrow, imitate, copy, or adapt (Meissner, 1988).

The United Nations Conference on International Code of Conduct on the Transfer Of Technology (UNCTAD, 2001h) has defined transfer of technology as the transfer of systematic knowledge for the manufacture of product, for the application of a process or for the rendering of a service and does not extend to the transactions involving the mere sale or mere lease of goods. The expected outcome is transferring the capability, to the recipient firm, of adapting, integrating, utilizing and commercially exploiting what is being transferred.

Nahar, Al-Obaidi and Huda (2001) conceptualise the technology transfer process as the integrated and organized set of decisions, arrangements and activities that build on each other, and where each of these sets takes one or more input to create the desired transformation in capabilities to bridge the technological gap between a technology supplier and recipient (see also Obaidi, 1999).

Based on the previous literature on technology transfer, and with the definition adopted by this thesis for technology itself in mind (section 2.2.1.), the definition that is synthesized in this thesis for technology transfer (from the host perspective) is that technology transfer is the dynamic process that should be understood to mean both the transfer (conveying) of information (product, process and managerial technologies) by one party to another, along with effective development of the ability of the recipient to take measures necessary to apply and sustain that information to generating competitive products and services within the host environment and surrounding international settings.

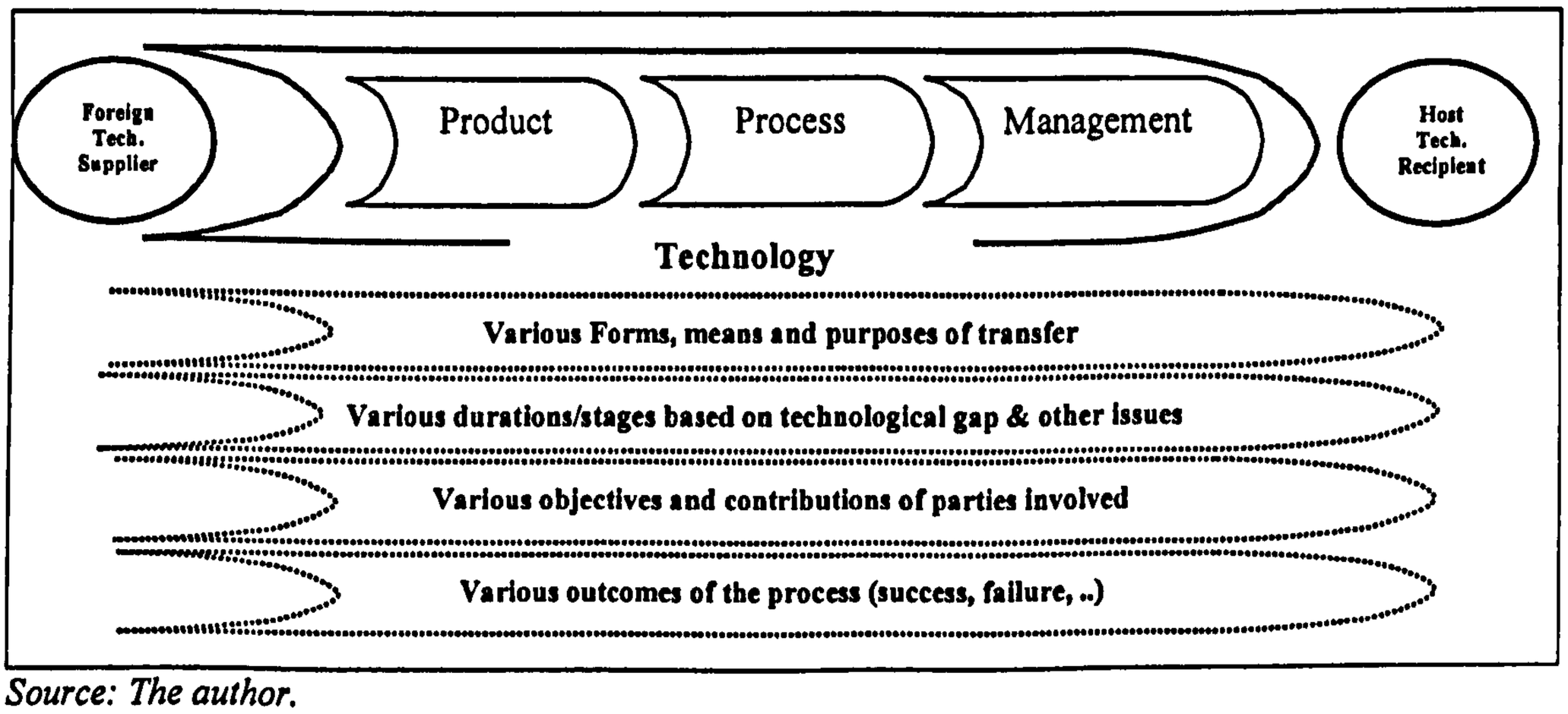
Technology transfer is costly and requires investment by all involved parties (UNCTAD, 2001). It could therefore be further viewed as an evolving process that requires constant adaptation by all involved including the recipient, the supplier and the setting (the specific mode of entry selected by supplier). These players are engaged within an environment involving the home country of the supplier; the host country of the recipient; complex relationships between the two and the international market itself, all acting as sources of issues influencing the process of technology transfer. There is a multiplicity of potentially important issues on the process of technology transfer. Moreover, the interrelationship of

issues to each other, and their varying importance level in different situations, has made it difficult to develop a general, universal model of technology transfer.

Furthermore, it is important to make a distinction between the impact exerted by technology itself and the influence of different channels and mechanisms of its transmission. This distinction is very important, from the point of view of tailoring the policy measures aimed at regulating and controlling any inflow of foreign technology and making it compatible with the host country's development priorities and interests (for instance, some hosts might favour short-term investments over long-term investments, even if they include technology content).

The process of technology transfer from one country to another and from one firm to another may be in the form of movement of hard printed documents (books, journals, manuals, checklists, specifications, and other published materials), people (formal training, informal interactions, etc.), equipment, and even final products. Synthesized building blocks for a technology transfer process are indicated in table 2/3.

Table 2/3: The technology transfer process from a host perspective



Source: The author.

An important way to understand technology transfer is to examine the channels, routes and mechanisms by which it takes place, without missing the important challenges previously discussed. Technology transfer is a highly human-oriented phenomenon that is fundamentally concerned with the capabilities of parties involved, therefore the conceptual and analytical instruments need rethinking in order to integrate the various issues of technology transfer onto formulation of new policies for capacity building.

2.4.2. An Analytical Framework of Technology Transfer

Two outstanding broad sets of issues must be considered in the context of technology transfer. Firstly, issues and motivations of involved parties (firms, home countries and host countries) choosing certain technologies and technology transfer arrangements over others. These will be discussed in chapter 3 from the mode of entry context. Secondly, issues of appropriateness of the technology (and the technology transfer arrangement) to the various circumstances related to firms and host country involved (developing host country for the purpose of this research).

Appropriate technology was historically conceived to consist of those technologies using local resources to meet local needs (Honour, 2002). Ahmad (1996) notes in earlier writings that appropriateness depends on the goal of society rather than on the functions of technologies.

For the purposes of this thesis, and based on earlier definitions of technology and technology transfer, the appropriate technology is synthesized to be: the local and/or foreign technology (including all its components) that fills the current needs of the company/society (including current desires to export and promote indigenous technology through transfer) and is still future ready. Based on such synthesized definition, there are several factors to be considered during evaluation of appropriateness of a technology to be transferred, such as:

- Size of the market
- Natural resources endowment; whereas certain transferred technologies may entail sub-optimal use of local natural resources in the recipient countries. The main reasons for this lie in the technological characteristics of imported innovations requiring strictly defined raw materials which are not readily available at host country, exists but with inferior quality, or exists at desired quality but contract provisions oblige the host to purchase from specified foreign sources. In all cases, non-technology issues offset part of benefits of the transferred technology (see also section 2.5.1.).
- Obsolescence over time; a clear concern related to intangible technological assets, such as patents, models, plans, blueprints, software, etc., is their obsolescence with time. In some instances, the rate of depreciation may be very fast, as is the case of technologies that fall into the public domain by means of immediate disclosure (packaging designs

and some IT sectors for example). Technology embodied in human resources may also become outdated unless these resources are retrained. Upon considering the period between technological investments and outputs in terms of technological asset development, a number of factors must be considered, such as: the type of technological innovations or assets that are envisaged, the technological capacity and capabilities already established or establishing periods (for new capacities, current structures, linkages and technologies available or readily accessible), the financial and non-financial resources (vehicles and institutional agents) and the nature of perceived risks and uncertainties, as well as the capacity to use technology policy to protect desirable developmental and structural changes.

- Technological gap; whereas the extent of the gap relates to the ease of understanding, learning and transferring the involved technology, which in turn relates to the overall transfer performance. As discussed earlier, the performance of the technology transfer process is also influenced by such factors as the nature of the technology itself, pace of technology change, technology management and the international technology scene. These factors also affect the characteristics of the outputs (such as quality, variety and marketability).
- Costs of technology transfer process; whereas any forthcoming assessment of the role of transfer of technology in economic development of developing countries would be incomplete without taking proper account of the total (including hidden and indirect) costs and contractual terms and conditions of technology transfer. Cost issues resulting from inappropriateness of technology may have unfavourable impacts. This aspect may sometimes be decisive for the final balance of appropriateness (benefits and losses) of the technology transferred (Sarfaraz and Emamizadeh, 1993).

Obviously, the direct costs of technology cover the price for the elements of technological knowledge charged explicitly by the supplier. The indirect (also called hidden) costs of technology transfer are often correlated with contract clauses of the entity and position of technology supplier who may create multiple additional channels for extracting extra rents from technology sales and maximize his actual (as opposed to officially declared) revenue. It is a widespread conviction that the much heavier burden for the recipient countries lies in indirect costs such as overpricing (price mark-ups) of raw materials, installation, training, intermediate products and machinery accompanying the inflow of technology.

Such concerns are often governed by contracts or technology transfer agreements (see section 2.4.3.). It may then be expected that well formalizing the process of technology transfer may have a significant effect on lessening negative impacts.

Other hidden costs of technology transferred to developing countries may also be ascribed to the different forms under which foreign company enters the host and the mechanisms of the transfer. For instance, in financial terms, the capitalization of know-how, i.e. conversion of part of payments (due for technology acquisition) into equity shares in the recipient's company. In addition to direct payments for technology (e.g., royalties), the seller gains dividends on his shares in the equity capital. The foreign exchange premiums needed to acquire foreign technology also comprises a substantial cost (inefficiency rent). In conclusion, cost of technology is key to determining the appropriateness of technology on both micro & macro levels of host country.

Therefore, transfer of inappropriate technology may have negative impacts on host and turn itself into a barrier to growth through:

1. Diminishing the stock of resources available, e.g., brain drain
2. Loss of control over certain national assets exploited by foreign capital
3. Inefficient utilization of existing factors.
4. Increase of imports.
5. Dilution of focus from typical strength areas to less important ones (Dunning, 1981, 1988; Rosenburg, 1982).
6. Change sectorial and regional distribution of incomes in favour of modern sectors.
7. Burdening demand for foreign exchange for transfer of dividends for foreign partners, royalty payments, expatriate salaries, etc. (see also chapter 5 for Egypt)
8. Cultural frictions or disputes

It is important to highlight the fact that many of the issues related to appropriateness of technology are multi-dimensional and may have several commonalities, which will need to be broken down into separate issues upon assessing them empirically.

2.4.3. The Aspects of Contractual Technology Transfer

It is important to highlight that this thesis differentiates between the impacts exerted by technology itself, and those resulting from the selection of channels of its transfer. The contractual issues should hence be differentiated to include issues relating to the mode of operation that may affect the process (see also section 4.2.3.) and issues of technology and its transfer. Noting such differences is very important, especially from the view point of tailoring a policy measure for governing the inflow of foreign technology and making it compatible with the host country's development priorities and interests.

Recent empirical findings of Roxenhall and Ghauri (2004) indicate that the contract itself, rather than the negotiation phase, has the greatest influence on how the contract is used. From this context, the importance of drafting contract provisions focussing on technology and its transfer process arises. These may protect the technological interests of involved parties, regularly gauge the transfer performance, and assist in meeting the technological objectives and counter negative impacts of this transfer. Nevertheless, contract provisions are often referred to as restrictive business practices (table 2/4) and have frequently had negative implications as well (see also section 4.2.3.).

Table 2/4: Restrictions in technology transfer contracts

- Export restrictions (total or selective ban on exports, both in terms of commodities and markets, export quotas, the demand of prior supplier's consent for exports, export pricing controls, ban on exports of substitutes, etc.);
- Ban or restriction on the use of the supplier's trade mark, in particular when undertaking exports;
- Restrictions on the volume of output or sales;
- The possibility of supplier's interference in production structure, types of goods manufactured, etc.
- Provisions allowing the supplier to fix prices for the domestic market;
- Obligatory employment of foreign personnel;
- The supplier's intervention/participation in the recipient company's management;
- Tie-out provisions and clauses (obligation to sell goods produced on the basis of imported technology to its supplier or to firms indicated by him);
- Grant back provisions (obligation to provide the technology supplier free of charge with all improvements, patents, trade marks, etc., Introduced by the recipient);
- Restrictions on recipient's R&D activities;
- Ban to sub-licence and/or disseminate technology to other local companies;
- Post-expiry commitments;
- Tie-in clauses (obligation to source from particular suppliers).

Source: Adapted from UNIDO, 1990.

Interestingly, an option of acquiring individual elements of the technology component exists, but often needs as much negotiation itself, whereas "unpackaging" refers to the disaggregating of various types of technological assets and elements and the negotiation of

the acquisition piece by piece. Nevertheless, the buyer in the receiving country must be able to combine the disegregated elements so as to utilize the technology. The advantage of the unpackaging process lies in the fact that the buyer can seek alternative sources for various technology elements, including domestic sources, and try to acquire each element at a competitive price, thus probably reducing the cost of the technology.

The ensuing adaptation and assimilation may in itself lay the foundation for an innovative process from within, rather than continued transplantation from the outside (UNCTAD, 1988). The consent of the seller of technology is mandatory to guarantee continuity, and often is acquired after negotiations based on many conditions.

In conclusion, the impact of technology transfer on the economic development of developing countries may be both positive and negative, because the nature of the transfer process is very heterogeneous, and dependant on many issues, related to many channels. These contribution channels are discussed in the following section.

2.4.4. The contributions of Technology to Growth and Development

The actual channel through which technology interfaces with the economy has significant impact on the outcome effect of technology transfer on national growth and development. One channel is the 'trigger' or 'Snowball' effect, the other is 'Spill over' or 'Externalities' or 'Social returns' effect. The former is usually shown in market transaction and is more obvious. The latter is usually shown outside the market transaction and is difficult to measure.

"Trigger" or "snowball" effect means that a new product or process innovation in a firm will increase the purchasing power of the innovator. Therefore, this initial innovation will be amplified to a very substantial increase over the business phase; on the other hand, the new function, new standard and new demand initiated or adopted by innovators will form uneven development among different firms and industries. Clark (1987) sets a market and production matrix to assess the impact of such innovation at the firm level. "Spill over" or "Externalities" or "Social return" effect means that firms can acquire information created by others without paying for that information in a market transaction (Grossman and Heilpman, 1991). This effect allows successive generations of researchers to achieve technological breakthroughs using fewer resources than their predecessors.

In all cases, the ultimate contribution of labour, capital and natural resources to economic development of a nation is the derivative of many factors among which technology plays a prominent role. The transfer of technology, under any category, may impact on the growth and development of the recipient country through impacts on domestic technological progress and national technological build up.

2.4.4.1. Impacts of Technology Transfer on Technological Capacity and Progress

Transfer of technology to developing countries assists in technological progress in economies suffering from a general lack of research and development infrastructure, as well as capabilities to generate science and technology locally. The impact of transferred technology on the domestic technological progress in the host country can take various forms of effects:

1) Direct effects

Technology transfer fills a certain part of the technological gap between recipient and supplier by directly enhancing the technological capability of the importing company and hence country. The recipient may be provided with product innovation, process innovation, management innovation, or all.

2) Indirect effects to supply linkages and networks (diffusion)

These effects are often referred to as technological multiplier. These are technological improvements induced by a given project (with a foreign technology component) to other segments of the national economy such as supply linkages and supplier networks. That is a process of diffusion of overall technology and skills. Basically, such diffusion can take two, partly overlapping forms. First, as a consequence of the technology importer's decision to transfer the innovation to other local companies (e.g. sub-licensing, feeding industries,..). Secondly, it may result from a demonstration effect and/or imitation efforts of the recipient firm.

The assessment of success of this process depends to a large degree, as in the case of technological progress itself, on the extent of diffusion of these skills in form of added skills (especially at the project level). Moreover, mobility of labour/staff between firms may result in extra benefit (externalities) for other firms and the host nation.

3) Skills-creation effect

As opposed to diffused skills, new or higher skills may be created/acquired via different channels of technology transfer, such as the training (local or abroad) of the recipient's personnel; employment of expatriate personnel during the implementation phase; contractual technological assistance to the supplier, etc.. On the job training provides for a learning-by-doing effect on the local and managerial staff, resulting in possible assimilation of foreign technology in the future, and in a job creation effect.

It is noted that the more capital-intensive the technology is, the smaller is the contribution of technology transfer to solving (through skill creation) the problem of unemployment, which happens to be one of Egypt's most acute challenges.

Hence, in line with previous argumentation, transfer of capital-intensive foreign technology has frequently proved competitive and not complementary to the domestic technological progress in developing countries. New investment projects of higher technological standards undermine local small-scale companies that could not effectively catch up with competition, hence they are driven out of business and the unemployment situation complicates.

It is important to highlight in this respect that many of the successful Asian countries started out through imports of capital goods, reverse engineering and massive investments in skills creation (Kim, 1997; 2002). This points towards the importance of an integrated governmental approach towards regulating the selection process for prospect industries and defined technology types.

4) Effects on domestic R&D

Transfer of foreign technological knowledge may generate positive effects on the R&D sphere of the recipient country. It provides new information input and presents challenges and opportunities that, quantitatively and qualitatively; enrich the scientific and technological potential. This encourages adaptation of foreign technology to local conditions, particularly in the developing countries (e.g. Arabisation of IT software applications, localization for climate of pharmaceuticals or advertising adaptations for culture particularities). Moreover, transfer of technology may induce further positive changes in the recipient country's R&D activity via channels such as increase of local

inventiveness and creativity, inflow of new research ideas, on the job training by R&D personnel during project implementation, training abroad at corporate centralized R&D locations, personal contacts with foreign experts and advisers, etc.) (UNIDO, 1990).

Nevertheless, it has been the case in several developing countries that due to the weakness of local R&D infrastructure and to weak links between local R&D, S&T institutes and production, foreign technology had proved to be a deterrent to the domestic innovative activity. It replaces indigenous research efforts, diverting the attention of local R&D staff and scientific institutions towards current production issues (such as the adaptation of imported technology instead of following it up with local modifications and improvements).

The conventional isolation of R&D from production causes an information gap, typical in developing countries and occurs as a result of lack of coordination and transparent governmental information on existing possibilities. Nevertheless, formal R&D assumes increasing significance with industrial maturity, even in developing countries that have not reached the "frontiers" of innovation. As more complex technologies are imported and deployed, R&D is vital in order to absorb their underlying principles. It is also vital as a means of keeping track of new technologies as they emerge. A growing base of R&D capabilities also permits better and faster diffusion within the economy of new technologies, lowers the cost of technology transfer, and captures more of the spill over benefits created by the operation of foreign firms. Most importantly, it permits the industrial sector as a whole greater flexibility and diversification of industrial activity, and allows it greater autonomy by creating a "technology culture". Policies to stimulate local R&D (see also section 4.2.4.) clearly fall into the category of strategic choices that are quite relevant to technology transfer, but there is no clear market failure involved in remaining highly dependent on foreign technology (UNCTAD, 2003).

2.4.4.2. Structural Changes Induced by Technology Transfer

Technology transfer to developing countries not only influences the economy of the recipient country in the physical sense, but simultaneously influences its institutional environment in the broad sense, i.e., organizational set-up, social habits and attitudes, values and behaviour, economic system, etc.

Seen from the macro-economic angle, transfer of technology, in particular if the diffusion (spill over) effect takes place on a large scale, may accelerate growth and economic development in the whole economic structure of the recipient country through catalysing subsequent adjustments such as the establishment of new government agencies, restructuring of the existing institutional set-up, reshaping of the economic policy and development strategy, better selection of personnel for government and other positions, changes in legislation, arbitration and contract issues, quality, environment and standardization concerns.

2.5. Developing Countries: A Technological Capacity Building Overview

2.5.1. Introduction

Focusing, motivating and promoting certain activities, guiding and monitoring others, and providing supportive facilities or services and resources are some of the key functions of national governments. Technologically, a developing country's objective will be to attain and ensure an optimal mix, both in terms of stocks and flows, between domestic sources and foreign sources. The relative pace at which these two elements grow over time, has various effects on technology as has been seen earlier. One of the most important and difficult tasks in a strategic approach to technology is to coordinate and synchronize the efforts of individuals, enterprises and institutions so that they act in a mutually supportive way towards a country's unified strategic objective. Such co-ordination is required to overcome the fragmentation in decision-making and to ensure the harmonization of actions over a wide variety of sectoral specializations, technological institutions and government ministries involved in setting policy towards technology and foreign investment as a whole (UNCTAD, 1988; 1995).

The country's strategic objectives and interests may evolve over time, stressing the need for a flexible and consistent approach to technology through replenishing the existing stock of "obsolete" technological assets, taking into account new technologies, improving the efficiency of the existing technologies, taking into account new organizational modalities, enhancing the capacity to absorb, upgrade, adapt, modernize, innovate or develop new technologies, and increasing size and improving composition of the technological stock and streamlining it in accordance with strategic objectives.

2.5.2. Technology Capacity Building in Developing Countries

Understanding of the current and future host-specific needs should be the bedrock for policies, action plans and initiatives. Furthermore, the setting up of a dense network of cooperation requires the development of an overall favourable economic, institutional and legal environment, and setting mechanisms for international economic and technological cooperation. Developing country governments need to encourage foreign investment (especially through MNCs and SMEs) to engage in partnerships with host enterprises for increased scientific and technological capacity; and to create institutions to provide technological and information services; as well as sponsor programmes in cooperation with the international community to strengthen entrepreneurship (UNCTAD, 1995). For the purposes of this thesis, the focus is on the roles of MNCs and international cooperation in capacity building as these are the most significant in Egypt, however, it must be highlighted that capacity building through SMEs is well established and documented in literature (White and Campos, 1996).

2.5.2.1. Capacity Building through International Cooperation

Many international agreements and instruments include technology-related provisions aiming at supporting capacity building, access to technologies and, in some cases, the development of local capabilities in developing countries. However, the effectiveness of such international arrangements for transfer of technology, capacity building and successful implementation of best transfer mechanisms is not clearly established. For instance, the dynamic process of technology transfer may respond positively to investment protection through intellectual property rights (IPRs), but strengthening IPRs could increase the costs of acquiring and diffusing modern technologies.

The global regime for protecting technology development and technology acquisition has changed considerably since the TRIPS Agreement entered into force within the larger framework of the World Trade Organization (WTO). However, the developing countries expressed concerns that TRIPS and other WTO Agreements contain few measures to facilitate and promote access to technology in the short and medium terms. The technological gap between developed and most developing countries is wide. In principle, this technological gap may be bridged through the transfer of technology from producers to users by market means (UNCTAD, 2001).

Donor governments have programmes for subsidizing partnerships between their firms and developing country firms. Experience gained in such programmes should be deployed to design new programmes targeting to enhance the technological capacity-building components of these partnerships. A number of donors developed technical and financial aid programmes in the area of technological capacity building under bilateral (BITs) and regional agreements (RIFs). Examples of such programmes in Egypt include USA's USAID, Denmark's DANIDA, Canada's CIDA and Japan's JAICA. These donors offer financing and training, but their procedures in Egypt are subject to criticism (Potter, 2003).

2.5.2.2. Capacity Building through MNCs

The literature is replete with examples of impacts of linkages to multinational companies and their affiliates, including access to new and updated information, designs, processes and products, access to a wider range of financial assistance possibilities, access to quality control techniques and standardization and inspection methods and also development of local supplier linkages. MNC affiliates often provide technological support for their suppliers. On the other hand, foreign affiliates of MNCs may reduce indigenous technological capacity at hosts if they import a higher proportion of intermediate products.

Polanyi (1997), Saxenian (2000), Rasiah (2001) and Best (2001) argue that MNCs act as "invisible colleges" to stimulate human capital synergies, and that they are important training grounds for the development of tacit and experiential knowledge embodied in entrepreneurs, professionals, technicians and skilled human capital.

Recent research into international business activities of East Asian companies has generated a number of key conclusions, among which are widely acknowledged conclusions on the importance of active role of State; the importance of inter firm linkages; and personal, ethnic and network relationships (Ibeh, Young and Lin, 2003).

The lessons from international experience suggest that capacity building from MNCs must be seen in a systemic context, involving process, product, functional and chain upgrading. The ability to meet changing process and product standards is an increasingly important requirement for upgrading. MNCs do often take active steps to upgrade the capabilities of their suppliers, but pressure is however on them to reduce their number of suppliers for economic, technological and other purposes.

2.6. Rationale for Technology Policy

The technology literature has long accepted the need for intervention to raise private innovative effort to socially optimal levels (Arrow, 1962).

Technology policy in developing countries may be seen as an inherent part of an overall industrial development policy, stimulating R&D, building technology support institutions, and providing the setting in which industrial firms may operate, seek technology, learn how to use and improve it to become more industrially competitive. Broadly defined industrialization policies have in the past led to technology acquisition related only to the final product, depending significantly on pre-processed imported inputs.

Technology-related policy measures implemented by national governments to furnish favourable conditions include a variety of means such as establishing industrial estates (creating physical externalities for the investors), improving infrastructure and technological support services (ranging from access roads to standardization, quality control and testing), and in some instances, establishing important R&D institutions and facilitating the creation of domestic design, engineering and consultancy organizations.

The elaboration on and implementation of a well-tailored technology transfer and science and technology policy in developing countries is of key importance, in order to avoid many shortcomings. Technology transfer policy in developing countries aims at optimising the inflow of foreign technology, assisting in stipulation of technological contracts and channelling imported innovations to the priority sectors of the economy, and effectively providing up-to-date information on available resources and supply clusters. The issues relating to supplying cluster network externalities are key to policies related to development of technological absorptive capacity (as one form of transfer). Such policies may include government assistance with research, sharing costs, encouragement to adopt specific technologies and formation of a systematic industrial and information structures, implement collaborative international agreements, and standard setting as standards have a clear bearing on diffusion of technology (UNCTAD, 2003b).

That Governments can mount such interventions effectively is amply borne out not just by the experience of East Asian Tigers but also by that of the major industrialized countries in their early days of industrial growth (Chang, 2002).

Finally, the previous discussions indicate that a re-examination of technology policy must go hand in hand with a new look at regional, economic and investment policies. In combination, these policies preserve structural cohesion for the host environment.

2.7. Conclusion

The working definition of technology that has been adopted for this thesis is that technology is a system of applied knowledge combining tangible and/or intangible inputs, which help in the conception and management of the activities of the firm. This definition allows the accommodation of the forthcoming research on technology transfer.

In this chapter, it was found necessary to unbundle the technology system in order to facilitate the understanding of how in practice technology will be transferred to a developing country such as Egypt. Accordingly, conceptualising technology spectrum as a set of components (process, product and management technologies) that are linked together, it becomes possible to discuss technology transfer in a meaningful way.

The second objective line of this chapter was to assess the role of technology in economic growth and its significance to competitiveness and national development. The overall importance of technology to competitiveness and economic growth was clearly established in literature, furnishing for the following discussions in this chapter on technology transfer. A definition was carefully developed for technology transfer, in accordance with the definition adopted for technology (sections 2.2.1. and 2.4.1.).

In regards to the players involved in the transfer process, the importance of issues such as the existing abilities and potential capabilities of the recipient firm, its learning patterns and the compatibility and complementarities with the foreign partner has been established. It is crucial to create and maintain a critical mass of human resources devoted to such technological activity.

Notably important contributions and means of technology transfer frameworks from MNCs and through international cooperation to the host economy were assessed, especially through aspects such as job creation, skills creation, domestic R&D, etc. This gave rise to the importance of issues such as appropriateness of technology and technological gap

considerations, which impact on the evolution of technology and interlocking absorption, generation and dissemination elements within host's systems.

The review of developing countries' strategies for technological capacity building revealed that on the national level, host governments are clearly looking carefully at foreign investments, to ensure that they include a range of key intangibles (R&D, training, management assets, etc..) or in other words, the quality, not quantity, of foreign investment.

Technology and foreign investments are interlocked in a continuous circular flow system having proven impact on growth and development, where any weak link (such as technology) could be disruptive to the entire system. The pace and efficiency of any transfer process, is critically influenced by host macro economic conditions, and hence policies to improve the macroeconomic environment (such as industrial and investment policies influencing modes of foreign entry) will expectedly be associated with any technology related policy.

Governments have at their disposal a battery of policy instruments that could be used to encourage strategic perspectives on the national level. Such instruments are obviously related to the level of importance that each perspective presents from the viewpoint of each nation and cannot be isolated from the consideration of the nature of the asset they are supposed to transfer.

It is a final conclusion of this chapter that several key issues emerge to have significant impact on technology transfer. These issues are diverse and need special attention upon implementing any national policy aiming at achieving a coordinated approach to technology. Understanding the process of technology transfer from a host perspective, as well as the relationship between technological and public policy' issues still needs much more national-level empirical research of a holistic nature. Such research will complement the more international-level literature and efforts in this area, and provide a better understanding to the process of technology transfer, its basic determinants and issues involved and the ways policy can affect them.

It is important to indicate that policy conclusions of this chapter should be read in conjunction with those of the following two chapters as well.

Chapter 3: Foreign Market Modes of Entry

3.1. Introduction and Background

Having separately reviewed literature on technology and its transfer in the previous chapter, this chapter will assess the main issues underlying foreign market entry.

Therefore, the objectives of this chapter will be three fold. The first objective is to gain an understanding of the foreign market entry mode perspectives within the current international business setting. These include the various classifications of modes of entry and the underlying internationalisation theories (section 3.2.). The second objective is to assess the micro and macro determinants and frameworks of foreign market entry strategies (section 3.3.). Finally, it is obvious that the effectiveness of any host government policy aiming at modes of foreign entry is highly dependant on clearly understanding the underlying practical issues. This understanding was established by the first two objectives; hence the third objective of this chapter is to conduct a clear rationale regarding policies aiming at modes of foreign entry (section 3.4.).

For the purposes of this thesis, foreign direct investment (FDI) shall mean the wide scope of investments made by a foreign company at the host country. References to FDI in the sense of full foreign equity situations (such as fully owned subsidiaries) shall be separately identified.

Recent years have seen a more welcoming stance to inward foreign investment from both developing and developed countries. Indeed, governments are increasingly competing for these investments. Many elements have contributed to this such as the deregulation of financial markets and privatisation programmes that most countries adopted; standardization issues, regional treaties, global strategies and unified currencies. Developed countries and their multinationals are responsible for most of the outward foreign investment, and are also the main receivers of foreign direct investment, hence experiencing a cross-flow of investment (Dunning, 1982). Erdilek (1985) provides a comprehensive review of evidence and motivations in FDI.

Associating inflows of foreign investment with a variety of benefits, including technology transfer, developing countries must give special importance to the methodological issues involved in assessing the extent to which foreign investment replaces domestic investment or unleashes forces that have positive or negative effects on further investment (Ietto-Gillies, 1992). However, the extent to which a host country can secure benefits of foreign investment highly depends on the mode of foreign entry.

Therefore, as indicated, in order to understand the expected outcomes from any mode of internationalisation, and in fact the capabilities and limitations of such mode (especially from a technology transfer perspective), a review of foreign market entry aspects is necessary. This is conducted in the following section.

3.2. Foreign Market Entry and International Business Imperative

In this thesis, evaluating market selection and mode of entry choice is considered as an inter-dependant decision. Therefore, this section will discuss the classifications of entry modes, generally and technologically, followed by a review and critique of the conceptual theories and frameworks underlying internationalisation of the firm.

3.2.1. Entry Mode Classifications

The choice of foreign market entry and development strategy is a frontier issue; especially because complex decisions on the foreign market supply strategy face the internationalising firm (Young et al, 1989). A comparative assessment of the different types of entry modes is important to distinguish the different characteristics and commonalities. Root's classification of the three broad entry mode types is indicated in table 3/1.

Table 3/1: Foreign market entry mode types

I. Export entry modes:	**II. Contractual entry modes:**	**III. Investment entry modes:**
Indirect	Licensing	Sole venture: new establishment- Greenfield
Direct agent/distributor	Franchising	Sole venture: acquisition
Other	Technological agreements	Joint venture: new establishment
	Service contracts	Merger and Acquisition
	Management contracts	Other
	Construction/turnkey contracts	
	Contract manufacture	
	Counter-trade arrangements	
	Other	

Source: Based on Root, 1994; 1998.

I. Export Entry Modes

Many Multinational enterprises commenced their foreign market entry through the use of export strategy. Advantages of export activities include high levels of control, low levels of risk and co-ordination effort. Disadvantages of the export entry mode include the possibility of tariff barriers, high transport costs (especially for products with a high weight/value ratio like cement or beverages), and a lack of adaptation and responsiveness to local consumer needs.

The following represent a range of different methods of exporting, whereas a clear export strategy must be formulated for a successful process to occur:

Indirect export: The firm itself does not engage in international trade but uses export houses, trading companies or other types of intermediaries to serve foreign markets.
Direct export: This is where the firm itself undertakes the work of exporting. A number of organizational tasks are involved including market research and taking decisions regarding the marketing mix; foreign market pricing, product policy, promotional strategy and distribution channels in the foreign markets, export documentation and the logistics of the movement of goods to target consumers.
Use of agents and distributors: In the foreign market itself, supply frequently takes place through a foreign agent or distributor (Brooke, 1986).

The profiles for success in export and in fact many other modes of entry as well include seeking, negotiating and developing a long term relationship with a local partner (e.g. distributor, joint venture), learning by doing, selectivity in markets, financial investment, addressing cultural issues, studying host well, sensitivity of pricing and staff recruitment issues and achievement of appropriate technological and organization standards.

II. Contractual Entry Modes

These are long-term, non-equity associations between a foreign company and a host entity involving transfer of technology or human skills from the former to the latter (Root, 1994). Contractual entry modes take a number of forms: licensing, franchising, technological agreements, management/service agreements, construction and turnkey contracts. For the purposes of this thesis, and based on preliminary review of modes of entry in Egypt, licensing is the most relevant form of investment entry modes.

International licensing: Under a licence agreement, the foreign firm grants rights to a foreign company to manufacture the company's products or to use some other type of proprietary knowledge gained from the firm such as patents, copyright, brands and trademarks. In return, the foreign firm makes royalties payments to the parent company. The licence holder bears the costs of setting up the manufacturing process and distributing the product in the foreign market. International licensing may therefore permit the parent firm to expand very fast in international markets without having to finance this growth itself. Licensing may be practically appropriate where the goods involved are bulky or costly to transport, or involve brand name manufacturing, and may be often merged with other modes such as joint ventures.

Long-term licences are usually taken by well-established businesses, particularly where they are related to technological know-how, copyright and trade marks. Disadvantages of international licensing include the loss of direct control over the industrial property, its manufacture and quality. Its worldwide reputation could suffer from poorly manufactured products licensed in one or two countries. The loss of profits to the licence holder needs to be set against financial benefits of international expansion through licensing. Finally, firms risk the surrender of competitive advantage through loss of proprietary technology to foreign competitors "dissemination risk" (Hill, Hwang and Kim, 1990).

There are several conditions under which licensing may be a preferred strategy. On the firm level, the conditions include licensor firm size, research intensity, and choosing competition, creation of auxiliary business, licensor diversification and organization. On the industry/product level the conditions include product cycle and technological turnover. On the country level, the conditions include constraints on FDI, or foreign-Investment income and constraints on imports into host nation (Contractor, 1985).

III. Investment Entry Mode

Investment entry mode involves the control of manufacturing plants or other productive assets in the foreign market itself through whole or part ownership. Foreign market entry through direct investment maximizes control and protects the firm's proprietary technology and knowledge. It internalises the stream of profits, but in the same time, it involves maximum commitment, financial investment and risk compared to the other modes. For the purposes of this thesis, joint ventures, and fully owned subsidiaries are the most

relevant form of investment entry modes. Interestingly, in Egypt, there existed a legal prerequisite that a local partner must be involved even with a minority holding in the venture. As such, what were considered a wholly owned subsidiary were in fact majority holdings in joint ventures. FDI (foreign direct investment), for the purposes of this thesis includes Greenfield development, the acquisition of an existing company, wholly owned subsidiary and joint ventures.

It is noteworthy that upon making the decision of an investment entry mode, several factors are considered. For instance, a study by Mattoo, Olarreaga and Saggi (2002) relates FDI policy, technology transfer and mode of foreign entry, and concludes that host government and foreign firm's choices diverge in mode preference based on the cost of transfer. When the cost of technology transfer is high, the foreign company will prefer direct entry over other alternatives (especially acquisition), while the government will prefer acquisition because it leads to more transfer content and a premium acquisition price. Such overlap of issues will be addressed in chapter 4.

Wholly/Majority owned Subsidiary

Subsidiary roles are of significance because of the presumed economic benefits associated with them (Young and Hood, 1994). Numerous typologies of MNC subsidiaries have been developed and emerge in the literature in response to the global environment imperatives. The White and Poynter (1984) categorisations for types of subsidiaries are relatively all encompassing. The categories are: Miniature replica (whereas a subsidiary produces and markets some of the parent's product-lines, in the host country); Marketing satellite (whereas a subsidiary sells into the local trading area products, which are manufactured centrally); Rationalized manufacturer (whereas, a subsidiary produces a particular set of component parts or products for a multi-country or global market- Regional mandate); Product specialist (whereas a subsidiary develops, produces and markets a limited product line for global markets, and internal MNC transfer use); Strategic independence (whereas a subsidiary is permitted independence to develop lines of business for either a local, multi-country or global market).

Three-way typologies have been applied in empirical studies, distinguishing between Miniature Replica, Rationalized Manufacturer and Product Mandate subsidiaries (Young et al., 1988; Crone and Roper, 2001; Pearce, 2001).

Extending on Dunning's OLI (eclectic) paradigm (see section 3.2.3.1) emphasizing the ownership advantages accruing in the home country of the MNC, it is now well recognised that ownership advantages may arise anywhere in the group (Hedlund, 1984; Rugman and Verbeke, 1992). In a similar manner, locational factors may generate ownership advantages for the subsidiary (that can be internalised by the group). The OLI paradigm is thus useful in understanding knowledge acquisition within the subsidiary (Tavares and Young, 2002).

Much subsidiary level research has, however, inclined towards a network perspective (see section 3.2.3.1.) of the MNC (Andersson, 1997; Birkinshaw and Hood, 1998; Gupta and Govindarajan, 2000). By this view the subsidiary moves from being highly dependent on headquarters decisions and corporate resources to becoming a node in a network, with links to internal and external actors and greater degrees of freedom. These network partners might include suppliers, customers and sister units within the MNC (Tavares and Young, 2002). Related work has been incorporated into the MNC literature through studies of inter-firm linkages between multinationals and host country suppliers (Crone, 2000; Görg and Ruane, 2001).

Joint Ventures:

International Joint Ventures (IJVs) have become a very common form of international business cooperation. But, despite the fact that they have a very good record of success and achievement, in many cases they are increasingly subject to a variety of problems and obstacles that impede and preclude their success and increase their rate of failure. Joint ventures involving equity participation will broadly follow the following types (WINVEST, 1986):

The industrial joint venture

In this venture, the overseas partner puts equity and technical expertise into an existing business. As such, the foreign partner is participating in the existing activities as well as the new venture.

The joint subsidiary

In this option, the local and overseas partners form a new joint operation to make a new product. This is the 'conventional' form of a joint venture, which is a legally and economically separate entity from parent organizations (two or more).

One of the parents may dominate, parents may share control, or the new venture may be given full autonomy, subject to regular parent audits.

The institutional joint venture

The overseas partner forms a subsidiary with funding and other forms of support provided by one or more local financial institutions. The financial institution will, if required provide assistance with recruiting management, recommending professional advisers, obtaining government grants and other operational matters.

Considering its importance within the current context of Egypt, it is important, to consider carefully all the details, motivations, risks and wealth of stages associated with the joint venture route. These are synthesized in table 3/2.

Table 3/2: The joint venture motivations, stages of development and risks

JV Motivations	JV Stages
Internal Uses ▪ Cost and risk sharing (uncertainly reduction) ▪ Obtaining resources (where there is no market) ▪ Obtaining financing to supplement firm's debt capacity ▪ Sharing outputs of large (minimum efficient) scale plants ▪ Avoiding wasteful duplication of facilities ▪ Utilizing by-products, processes ▪ Shared brands, distribution channels, wide product lines, etc. ▪ Intelligence: obtain window on new technologies and customers ▪ Superior information exchange ▪ Technological personnel interactions ▪ Innovative managerial practices ▪ Superior management systems ▪ Improved communications among strategic business units ▪ Retaining entrepreneurial employees **Competitive uses (strengthen current strategic positions)** Influence industry structure's evolution; Pre-empt competitors (first- mover advantages); Gain rapid access to better customers; Capacity expansion or vertical integration; Acquisition of advantageous terms, resources; Coalition with best partners; Defensive response to blurring industry boundaries/globalisation; Ease political tensions (overcome trade barriers); Gain access to global networks; Creation of more effective competitors; Hybrids possessing parents strength; Fewer, more efficient firms; Buffer dissimilar partners **Strategic uses (augment strategic position)** ▪ Creation and exploitation of synergies ▪ Technology (or other skills) transfer ▪ Diversification ▪ Toehold entry into new markets, products, or skills ▪ Rationalization (or divestiture) of investment ▪ Leverage-related parents skills for new uses	**Joint venture objectives** Establish strategic objectives of the JV and specify time period for achieving objectives. **Cost / benefit analyses** Evaluate advantages and disadvantages of joint venture compared with alternative strategies for achieving objectives, in term of: Financial commitment; Synergy; Management commitment ; Risk reduction; Control; Long-run market penetration; Other advantages/disadvantages **Selecting partner(s)** - Profile of desired features of candidates (resources, personnel, characteristics) - Identify/screening of candidates and draw up shortlist - Initial contact/discussions - Choice of partner **Develop business plan** Achieve broad agreement on: - Partners' inputs (finance; technology; management) - Venture outputs (products and markets supplied; dividend and payout policy) - Management style and decision making processes (reporting relationships) - Performance evaluation system (accounting and financial controls) - Marketing policies and practices (marketing mix) - Production and procurement policies - Personal policies - R&D policy **Negotiation of joint venture agreement and business plan** **Contract writing** Incorporation of agreement in legally binding contract allowing for subsequent modification to the agreement, with careful consideration of host law, dispute issues, technology transfer, share transfers, control methods, taxation, trademarks, ... **Performance evaluation**
JV Risks	
- Conflicting objectives of the joint venture partners unless the business is fully thought out in advance. - Even if objectives are clearly defined, the partnership may not work smoothly or amicably. - Lack of control compared with a wholly owned subsidiary. - The risk of establishing a competitor in the long run. - The local partner may not assign its best people to the venture. - The possibilities of inheriting work practices that are undesirable or alien to the overseas partner.	

Source: The author, synthesized from Harrigan, 1985.

3.2.2. Classification of Modes of Entry from a Technology Perspective

Luostarinen and Welch (1990) classified foreign operation modes according to their capability to transfer technology across national boundaries. Although they admit the lack of a unanimously accepted definition of technology transfer, they provide the following classification:

I. Non-technology transfer operations

1. Export of consumer durables and non-durables
2. Export of industrial goods
3. Export of services

II. Technology transfer operations

1. Licensing
2. Franchising
3. Management contracts and subcontracting
4. Co-production
5. Project operations
   - Partial projects
   - Turnkey projects
6. Research and development subsidiary
7. Joint/collaborative ventures
8. Assembly subsidiary (a fully owned subsidiary)
9. Fully owned subsidiary
10. Research and development cooperation agreements
11. Industrial cooperation agreements
12. Managerial cooperation agreements

The previous classification is made on the basis that in order to be classified as a technology transfer operation, the mode must, at least, contain a software component of technology.

For the context of this research the following broader classification of modes of foreign entry (from host perspective) is introduced in table 3/3.

Table 3/3: Technology transfer classifications of modes of entry

I. Modes involving non-purposeful Technology transfer:	II. Modes involving purposeful Technology transfer:
▪ Export of goods and services	▪ Licensing and Franchising ▪ Joint ventures (from minority to majority foreign equity) ▪ Fully owned subsidiary ▪ Specifically contracted operations: management contracts, subcontracting, turnkey projects, cooperation agreements and technical assistance.

Source: The author.

Upon analysing foreign market entry strategies and modes, a variety of approaches (frameworks) emerge. When these various approaches are brought together, a balance between risk, control and motivation emerges (Young et al, 1989). Literature review on internationalisation may be summarized into contributions from economics stressing the interrelationships between ownership, location and internalisation variables; the stages of development approach (which is related to market-seeking internationalisation and suggests an incremental evolutionary approach to foreign markets); and the business strategy approaches (which focus on the nature of the decision making within the organisation such as organizational networks and resources). For instance, the network approach emphasizes the importance of contacts and connections in all aspects; the resource-based approach emphasizes the impact of the firm's specific resources available for the process. Historically, many other approaches have preceded these. The following section provides a review of relevant approaches.

3.2.3. Internationalisation and Associated Foreign Investment

3.2.3.1. Internationalisation Theories from a Technology Perspective

This section provides a backward-conceptualisation of modes of entry choice theories from the technology perspective (see Ietto-Gillies et al, 1997). Only theories with more relevance to technology transfer are emphasized.

- ***The product life cycle theory***

The 'product life cycle' (PLC) theory of international production, investment and trade is one of the macroeconomic approaches and goes back to existing approaches to the life of the product (at the micro level) and to the technological gap theories of trade (at the macro level) (Posner, 1961; Vernon, 1966). The theory assesses the various phases of the

product's life at the micro level, and concludes that transfer of outdated technology between developed and developing countries may lengthen the life of some products, which might otherwise have been abandoned (Kuznets, 1953; Hirsch, 1965).

The theory has a strong macroeconomic emphasis in that it is linked to the gap in technology and per capita income between countries as well as to the relative scarcity of factors of production and labour skills. The theory also manages to deal with both FDI and trade flows within developed countries as well as between developed and developing ones, while assuming an imperfect market structure.

- ***Stage theories (the stages of development approach)***

This Scandinavian-origin approach suggests an incremental, evolutionary internationalisation into foreign markets, with involvement deepening by increased experience and sustained interest. The Uppsala internationalisation model is one of the best known (Johanson and Wiedersmith-Paul, 1975).

- ***Stagnationist views***

The lack of effective demand coupled with the connected increase in the liquidity of companies is likely to lead to foreign investment, particularly through mergers and acquisitions often across borders (Pitelis, 1991). Investment through mergers and acquisitions (M&A) increases capacity for the acquiring firm though not for the stock at the host economy as a whole. The consequence of this strategy is longer-term stagnation problems. This is the situation that privatisation programmes (as form of M&A) should carefully consider. In the case of the more recent stagnationist writers such as Kalecki, Baran, Sweezy, Cowling and Sugden- growth is linked to the monopolistic structure of the economy (Ietto-Gillies et al, 1997).

- ***Porter's Views***

Porter's approach to understanding the nature of global competition is based on structural analyses of the competitive, including technological, forces that operate across the industry in question. Globalisation will be of significance in an industry whenever competitive conditions dictate that there is an advantage to be gained by the firm from engaging in global configuration, global co-ordination, or both (Michael Porter, 1980; 1985; 1986; 1990). Global coordination is an essential feature of industries that have come to be

dominated by multinational corporations. This feature represents an important distinction between Porter's work and that of economists whose traditional focus for an analyses of internationalisation has been the firm. For Porter, it is the nature of the industry, rather than the shape of the firms within it, which is the crucial determinant of internationalisation in his model. The advantage of such approach is that it allows for international trade and foreign direct investment to be treated as aspects of competition in global industries rather than as mutually exclusive alternatives available to the firm.

- ***Cantwell's Views***

From another perspective, for Cantwell (1989; 1993) technology is the key to internalisation within firms, to the location of foreign investments and the behaviour of companies towards rivals and to the development and growth of countries. Companies internalise in order to retain their proprietary knowledge but technology and technological competence have considerable spill over effects. This means that companies can benefit from each other's technological advances and from a macro environment that is favourable to specific technologies. This leads companies to locate production where the macro environment gives them advantages of the spill over effects. In the long run this creates technological poles and clusters of foreign investments location. This approach (often called technology accumulation approach) leads to some decentralization of technology-based investments in foreign countries.

There are analogies between Cantwell's views and Vernon's (1966) theory in that both stress the role of technology in foreign investments. However, Vernon's theory is based on the technological superiority of one country over others while in Cantwell's (1989; 1993) work it is poles of technological development that attract production from companies based in many countries and in the same technological league.

- ***Networks and the internationalisation processes:***

Another major stream of work on the subject of internationalisation has developed from international industrial marketing, focusing upon interactions, relationships and networks.

These approaches postulate that interconnected exchange relationships evolve in a dynamic, less structured manner and that increased mutual knowledge and trust lead to greater commitment between international market partners (Turnbull and Valla, 1986;

Johanson and Mattson, 1988; Nordstrom, 1990; Axelsson and Easton, 1992; Blankenberg and Johanson, 1993). Interestingly, Johanson and Vahlne (1992) regard the network approach as presenting a more holistic approach to international corporate development, whereas the foreign market entry process is regarded as an integral part of a more extensive internationalisation process. Johanson and Mattson (1988) suggested that a firm's success in entering new international markets is more dependent on its position in a network and relationships within current markets, than on market and cultural characteristics. This applies to developing country firms who wish to integrate within global supply networks.

Much of the network research focuses on general network influences on firm behaviour (Lorenzoni and Ornati, 1988; Larson, 1991; Tjosvold and Weicker, 1993). Several studies highlight the potential role of networks in internationalisation (Lindquist, 1988; McDougall, 1994; Bell, 1995). Other findings also recognize the importance of networks to a small firm (Hansen, 1994; Hara and Kanai, 1994; Coviello and Munro, 1995; Kaufman, 1995). Korhonen (1995) found that over half of Finish SMEs started their internationalisation process with "inward" foreign operations, largely through the import of physical goods or services. From this, it was concluded that such inward operations allow for international network connections to be established (see also Bonsccorsi, 1992; Luostarinen and Welch, 1993; Coviello and Munro, 1995).

Network development is one of a number of explanatory factors in the "ability and preparedness of a company to expand its foreign market servicing commitments (Johanson and Mattson, 1988; Lindquist, 1988; Johanson and Vahlne, 1992; Bonaccorsi, 1992; Benito and Welch, 1994; Hansen, 1994; Bell, 1995; Kaufman, 1995). There are also growing links between network perspectives and resource-based views that suggest that a firm's unique resources and capabilities can generate competitive advantage (Barney, 1991; Tavares and Young, 2002). This is analogous to the eclectic paradigm reviewed later.

Competence development may accrue from interaction with other parties and relationship building (Grant, 1996). Andersson et al. (2001) have proposed that subsidiaries with critical corporate and market relationships in a network will have higher levels of competence. Relevant competence-based approaches include the dynamic capabilities view (Teece et al., 1997) and Cantwell's (1989; 2001) work on technological development.

Nevertheless, network perspectives fail to explain how certain firms begin to internationalise in the absence of any network connections. According to Cavusgil and Nevin (1981) "a tradition of building upon previous research is not well established in international marketing".

To deepen and enrich above views, pioneering research by Dunning resulting in an eclectic approach, is separately addressed.

- ***Dunning's Views: The eclectic approach***

As noted, explaining the many changes in the internationalisation of economic activities are far from an easy task. This is partly due to the complexity of the issues to be explained. Internationalisation can take the form of trade, which implies home production, which can either be direct, through internalisation across countries, or can be implemented through external arrangements such as licensing, franchising, sub contracting. Mixed arrangements such as joint ventures are also possible and are becoming increasingly common (Ietto-Gillies, 1997) especially for a developing country.

Dunning (1977) tried to explain the 'why', 'where' and 'when' of international production and trade by developing a system for classifying and analysing various advantages likely to influence decisions regarding the type of international activities undertaken as well as their country and industry pattern. The advantages are grouped into 'ownership', 'locational' and 'internalisation' (OLI) advantages.

Dunning (1980) considers the advantages of internal versus external production. His eclectic approach has a principal hypothesis stating that a firm will engage in foreign direct investment if three conditions are satisfied: (1) it possesses net ownership advantages vis-à-vis firms of other nationalities in serving particular markets. These ownership advantages largely take the form of the possession of intangible technological assets, which are, at least for a period of time, exclusive or specific to the firm possessing them (2) Assuming condition one is satisfied, it must be more beneficial to the enterprise possessing these advantages to use them internally rather than to sell them or lease them to foreign firms. That is, for the enterprise to internalise its advantages through an extension of its own activities rather than externalise them through licensing and similar contracts with independent firms (3) Assuming conditions one and two are satisfied, it must be profitable

for the enterprise to utilize these advantages in conjunction with at least some factor inputs (including natural resources) outside its home country; otherwise foreign markets would be served entirely by exports.

This approach is 'eclectic' in that it combines elements of various theories in a broad classificatory framework. It allows the analyst to consider all the possible influences on the determinants of the extent and patterns of various international activities. The advantages in each category can be many. There are also interrelationships between the various categories. Ownership advantages can be enhanced by locational specific elements. The distinction between ownership and internalisation advantages is not always clear. The generality of the theoretical framework can thus become both an asset and liability for Dunning's approach. The eclectic paradigm is to be regarded more as a framework for analysing the determinants of international production than a predictive theory of the multinational firm (Dunning, 1991). The eclectic paradigm has been widely accepted in the international business academic community as a practical framework for researchers.

- ***The transaction-cost theory***

Developed by Williamson (1975), this theory is an economic perspective explaining firm's activities in joint venturing and technological outsourcing, whereas firm's ownership and choice among entry modes is based on lowest sum of transaction costs and production costs (Yasuda, 2004). This theory primarily assumes that, for example, the firm's selection of a joint venture as a mode of entry over a fully owned subsidiary is based on its lower cost (including direct, indirect and opportunity costs), but this misses many other technological value-related and learning attributes of technology-specific alliances. Theoretical contributions towards the development of a transaction cost rationale for equity joint ventures (Hennart, 1991) and other choices of foreign market entry (Anderson and Gatignon, 1986) offer support to joint ventures being more efficient modes when dealing with environments with uncertainty.

- ***The resource-based theory***

This theory views the firm's own resources as the source of the competitive advantage, not the industry. This is useful in explaining the differences in entry mode decisions among internationalising companies. Resource alignments between partners may be supplementary, complementary or otherwise (Yasuda, 2004).

The greater the fit between the firms' own resources and the opportunities and threats presented by the host, the more successful the mode choice is. Empirical findings of US firms indicate that sole ownership is the preferred mode (Anderson and Gatignon, 1986; Erramilli and Rao, 1993). This falls in line with the resource-based approach, where technological resources are exchanged between firms. Yasuda (2004) contends that the resource-based theory prevails over the transaction cost theory to explain alliances, such as technology licensing and joint ventures, especially in hi-tech industries.

3.2.3.2. Critique on Internationalisation Theories from a Technology Perspective

First, from a technological perspective, the form in which technology is perceived by the foreign firm, determines, among other factors, its approach towards internationalisation. High research and development costs and shorter product-life cycles may accelerate the pace of internationalisation itself (Young, 1987). Internationalisation is a holistic process, with decisions concerning international host market selection being interrelated with products and market servicing methods (Andersen and Strandsov, 1996).

Firms do not necessarily adopt consistent organizational approaches to internationalisation (Buckley, 1979). In fact, previously discussed internationalisation concepts have less overall relevance to established multinationals, as opposed to new and developing international firms (commonly a smaller or medium-sized enterprise- SME). On the other hand, the link between initial internationalisation and future globalisation is specifically relevant to MNCs, who need to coordinate or integrate its activities on a worldwide basis. Having initiated its internationalisation, the firm will eventually seek to achieve competitive advantage through integrated international operations (globalisation) whether based on costs as a result of international economies of scale, or based on differentiation, for example by creating a global brand, or through other means.

As noted, the economic approaches emphasize rational behaviour, with cost/benefits being assessed. For instance, a higher control entry mode will increase return and risk simultaneously (Zafar et al, 2002). The stages of development category relate entry modes to the internationalisation process and status. The business strategy categories emphasize the pragmatic nature of the decision making process.

The competing theories of internationalisation are not mutually exclusive, but their explanatory power is more pertinent in certain situations than others. Moreover, substantial research criticizes the real-life applicability of the internationalisation theories, contending that they attempt to simplify several complexities (Vernon, 1966; Johansson and Wiedersheim-Paul, 1975; Pavord and Bogart, 1975; Bilkey and Tesar, 1977; Khan, 1978; Cavusgil, 1980; Czinkota, 1982).

For instance, many agree that internationalisation is a dynamic concept (Johansson and Vahlne, 1992; Melin, 1992), yet mainstream internationalisation contributions are criticized for their static nature (Hedlund and Kvernland, 1985; Young, 1989). Stage theories in particular have attracted significant criticism and empirical studies challenge their basic proportion (Cannon and Williams, 1981; Turnbull, 1987).

Internationalisation models – notably, those involving life-cycle theories – suffer from limitations concerning time-scales (Giddy, 1978). Moreover, their ability to delineate boundaries between stages or adequately explain the processes, which lead to movement between stages, is rather limited (Anderson, 1993). This is of particular importance from the technological perspective, as it does not provide basis for linking of technological events with such stages.

The eclectic framework has been criticized because it does not provide a unified perspective in explanation and prediction of entry mode decision. The model does not differentiate between firms having same characteristics but different choices of modes. In addition, it tends to overlook the overlap of various issues related to home country, product and host factors.

A number of useful reviews have assessed and synthesized the general internationalisation process literature (Luostarinen and Welch, 1988; Johanson and Vahlne, 1990, 1992; Anderson, 1993). Many of these agree that efforts to encapsulate the internationalisation concept in a definitive manner are inappropriate.

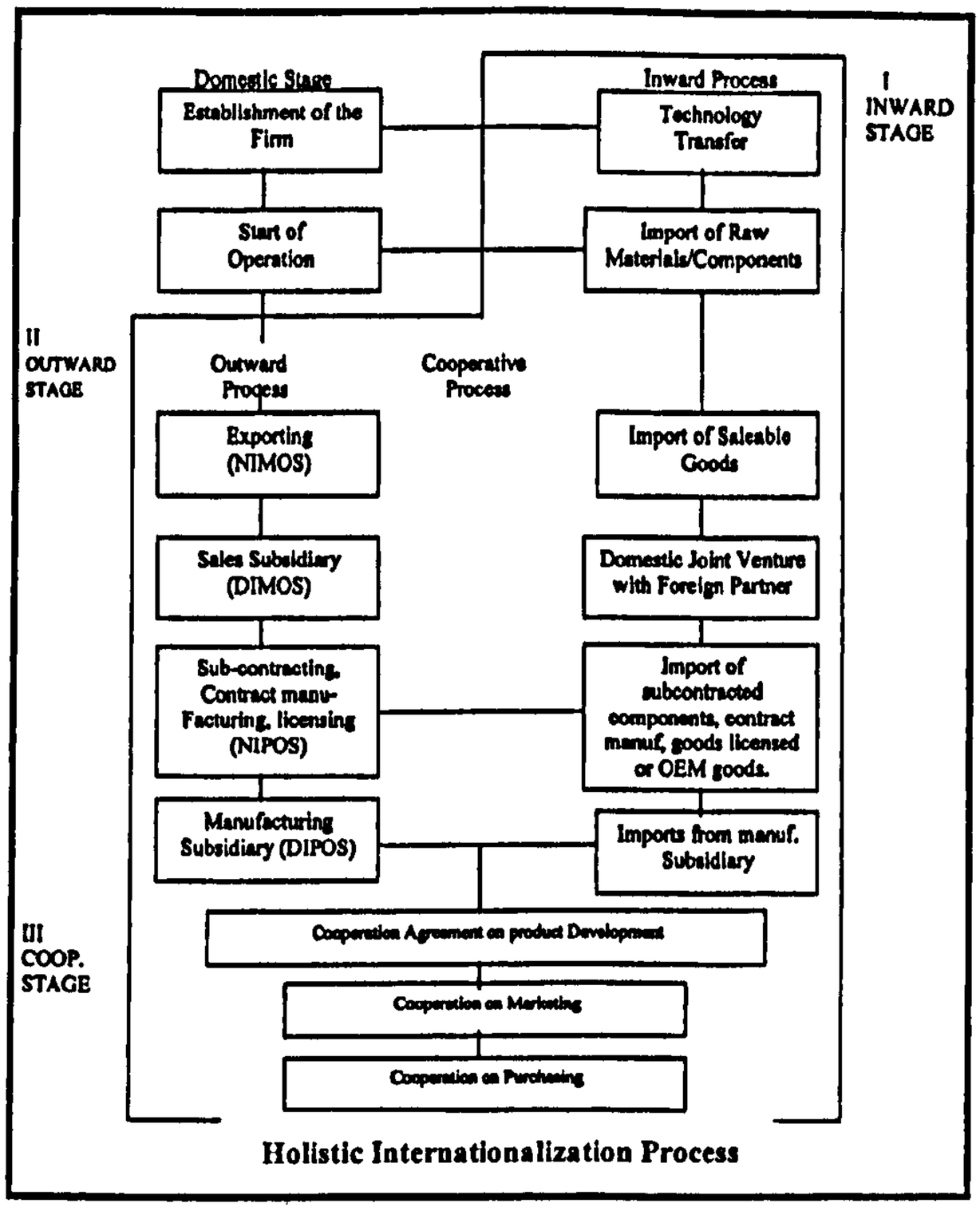
Beamish (1990) offers a more dynamic process-based definition of the internationalisation process, incorporating the internal dynamics and earning of the firm as it expands internationally, and the outward patterns of international investment exemplified by market

selection and mode of entry. This allows for recognition of the fact that firms may begin the internationalisation process through involvement in activities such as foreign sourcing or counter-trade (i.e. reflecting an "inward" pattern) (Luostarinen and Welch, 1988, 1993; Korhonen et al, 1995).

Luostarinen and Hellman (1994) proposed a holistic model of the internationalization process based on a study of small family firms in Finland (figure 3/1). This model includes an important notion of inward internationalization along with the traditional outward internationalization. Traditional approaches have tended to neglect the importance of the inward processes for the firm's internationalization and regard inward-outward activities as separate flows that are not related, although at the strategic level, inward-outward processes are closely linked. This traditional view implies that outward activities would not be connected to or dependent on the firm's previous inward activities.

The proposed model includes different stages and paths of internationalization, namely: a domestic stage (no international operations), then an inward stage (where technology transfer occurs through imports of equipment, etc), then the outward stage (involving cooperation processes, such as licensing and joint venturing or establishing fully owned subsidiaries), and finally the cooperation stage (extending cooperation to the length of R&D joint research).

Figure 3/1: The holistic perspective of the internationalisation process



Source: Luostarinen and Hellman, 1994.

According to Welch and Luostarinen (1993), inward-outward connections do practically develop in different ways. These connections can be found in the complex webs of relationships between sub-units within MNCs (networks) and in strategic alliances. Visits to foreign markets, investigation of potential suppliers, negotiations, learning about foreign cultures and deciding on what operational mode to use upon importing may give management the experience and courage to later initiate outward activities. Relationships and technology achieved from import activities could be useful when the firm engages in export activities (Luostarinen and Welch, 1990; Korhonen, Luostarinen and Welch, 1995).

Knowledge about foreign markets and networks gained as a by-product of importing can result in an outward flow, or in creation of a relationship (Rosson and Reid, 1987). As such, the theoretical frame for assessment of inward-outward relations clearly derives upon the network approach. The pervasive role of network effects on internationalization is illustrated on the way in which inward international activities (e.g. importing) act as catalyst to outward international operations, and influence the timing and character of these operations (Korhonen, Luostarinen and Welch, 1995; Korhonen, 1999; Liesch et al, 2002).

Taking the other perspective, a recent empirical research conducted among 3000 Finnish SMEs (mostly within the manufacturing industry and services areas) investigating the influence of the firm's earlier international activities (such as importing/transferring foreign technology) on following internationalisation activities has showed that there is no clear evidence of connections between inward and outward flows (Forsman, Hinttu and Kock, 2002). They conclude that there is also no obvious relationship between country from where the company imports and the country to where the company starts exporting.

On the micro level, the linkages between the particular stage of mode development and decision processes within the enterprise regarding international markets should be carefully noted because of the strong and unique influences of industry on internationalisation. Careful sectoral assessment is of particular importance. In their process of internationalising, firms seek empirical knowledge on individual clients and market sectors, as well as on institutional factors such as local laws, local governments and local cultures, and there are associated costs to this knowledge. Research using the specific concept of experimental knowledge on the internationalisation process and mode choice for foreign market entry has been accumulated (Wiedersheim-Paul, Olson and Welch, 1978; Reid, 1983, 1984; Root, 1987; Sharma and Johanson, 1987; Kogut and Singh, 1988; Lindquist, 1988; Beamish, 1990; Erramilli and Rao, 1990, 1993; Calof and Beamish, 1995; O'Grady and Lane, 1996).

In summary, the internationalisation process entails risk and investment of resources, and various cost aspects, which have a bearing on the profit generated by firms (Bilkey, 1982), on a firm's inclination to enter foreign markets (Dichtl, Koeglmayr and Mueller, 1990), and on selection or changing of foreign market entry mode (Calof and Beamish, 1995). These include costs of starting up business abroad (travelling costs, salaries, collecting foreign market information, office space, etc.) and costs due to changes required in the organizational set-up of the firm, such as training, reporting systems, technology transfer procedures, costs for evaluating local partners and securing R&D. Understanding the perceived cost of internationalisation is essential for developing countries, in order to implement policies and incentives that target cost concerns of internationalising companies, with focus on areas of national interest, such as technology and R&D.

3.3. Determinants of Foreign Market Entry Strategy

The previous discussions show that the conceptualisation of the internationalisation process is highly dependant upon building on previous research, acceptance and use of mixed methodologies to explore what is a complex issue. The following sections will assess the practical frameworks governing decisions of foreign market entry strategy. First the issues governing the selection and screening of prospect foreign markets, and second the issues governing the mode of entry choice.

3.3.1. Frameworks for Assessing Foreign Markets

It is widely agreed that foreign investment (as opposed to arm's-length relationship between investor and recipient) takes place when three sets of determining factors exist, namely the presence of ownership-specific competitive advantages in a multinational corporation (MNC), the presence of location advantages of a host country and the presence of superior commercial benefits in an intra-firm relationship. The ownership-specific advantages (e.g. proprietary technology) of a firm can compensate for the additional costs of establishing production facilities in a foreign environment and can overcome the firm's disadvantages vis-à-vis local firms. These advantages should be combined with the locational advantages of host countries (e.g. large markets, lower costs of resources, superior infrastructure,..).

The firm may find greater benefits in exploiting both ownership-specific and locational advantages, i.e. through a foreign investment rather than arm's-length transactions. Furthermore, it may be in a firm's interest to keep the exclusive rights to assets (e.g. knowledge), which confer upon it a significant competitive advantage (Dunning, 1993).

If only the ownership-specific advantages were met, firms will probably rely on exports to service a foreign market. If the ownership and intra-firm benefits are combined, direct investment becomes the preferred mode of servicing foreign markets, provided the presence of location-specific advantages as well. Otherwise, alternative modes of entry are weighed against each other.

Within the trinity of conditions for foreign investment to occur, locational determinants are the ones that host governments can influence most directly by existing suitable frameworks or through directed policies. It is imperative to understand the information that MNC seek

to analyse and determine a preliminary favourable locational advantage at a prospect host. This is the data that host nations make readily available (appendix 1).

The relative importance of different location-specific determinants depends in itself on at least four aspects of investment, namely: the motive for investment (e.g. resource-seeking or market-seeking foreign investment), the type of investment (e.g. new or sequential foreign investment), the sector of investment (e.g. manufacturing) and the size of investors (SME/ MNC). That importance also changes as the economic environment at the host evolves over time. It is therefore possible that a set of host country determinants that explains foreign investment at a given time, changes as the structures of its domestic economy and of the international economy evolve. At the same time, there are location-specific determinants that remain constant.

In short, host countries and companies need to study, from their respective perspectives, the various determinants of foreign market entry strategies as perceived by MNCs (the contended sources of foreign investment). These are addressed in the following sections.

3.3.1.1. Macro Level Perspectives

Indeed, it was the liberalisation of trade and national policy frameworks that helped unleash the key driving force of internationalisation and globalisation by MNCs pursuing increasingly regional and global strategies, and integrating their production structures on a regional or global basis. This in turn creates incentives to liberalize foreign investment policies aiming at achieving locational advantages and reflecting positively on technological capacity building and national development.

On the policy front, core foreign-investment policies consist of rules and regulations governing the entry and operations of foreign investors, the standards of treatment accorded to them, and the functioning of the markets within which they operate. Such policies satisfy specific objectives such as reducing or increasing foreign investment, influencing its sectoral composition or geographical origin, encouraging specific contributions to the economy and affecting ways in which these contributions are made. To achieve these objectives, foreign investment policies are usually accompanied by trade policy implementation (UNCTAD, 1996b; 1997).

Macro-economic policies are mainly monetary and fiscal policies, including among others those affecting taxes and exchange rates. These policies determine the parameters of economic stability such as rate of inflation and the state of external and budgetary balances hence influencing all types of investment. Interest rates and taxation (the cost of capital in a host country) are also determined by these policies, and they directly affect the investment decision. Fiscal policies determine general tax levels, including corporate and personal tax rates and thereby influence inward foreign investment. A country with lower corporate tax rates should stand a greater chance of attracting a foreign investment project than a country with higher rates. Egypt, as an example, has a high corporate tax rate of 32-42 percent.

Exchange rate policy is mostly related to stability, and influences foreign investment decisions mainly by affecting the prices of host country assets, the value of transferred profits, and the competitiveness of foreign affiliate exports (see sections 5.3.3 and 5.7. for an extended argumentation on exchange rates from an Egyptian perspective).

Example macro policies that may emphasize a country-specific location advantages, and hence have an impact on foreign market entry may include international cooperation commitments that a country may have as a result of being signatory to international organizations or agreements on multilateral and bilateral basis such as WTO and BITs (see section 2.5.2.1.).

Privatisation policies may also increase locational attractiveness of the host. Critical for Egypt, privatisation of national firms has two dimensions: a foreign investment policy dimension and a competitive policy dimension. Privatisation policy may hence broaden the scope of foreign investment and shorten the time-to-market. Among acknowledged goals of privatisation programmes are to: Reduce government expenditures; Improve efficiency; De-politicise decision making; Cut taxes; Reduce budget deficits; Shrink public borrowing; Reduce inflation through reduced public spending; Reduce inflation through better-cost containment; Increase government receipts through sale of assets; Enable the continuation of deficit spending; Reduce the power of labour unions; Safeguard employment; Encourage employees to own shares in the companies where they work; Raise worker and management production incentives; Strengthen the capital markets; Balance or strengthen weak private sectors; Transfer technology to strategic sectors; Make goods available at

lower cost; Accelerate economic growth; Raise consumer welfare; Bring about a permanent increase in GDP; Improve competitiveness; Lessen the state's administrative burden; Ease the transition from a centrally controlled to a market economy; Attract foreign capital; and/or Seek a wider distribution of enterprise ownership (UNIDO, 1996).

The above goals illustrate the wide range of objectives that governments seek to attain through their privatisation programmes, but increasing government revenues through the sale of assets, may well entail the lay-off of redundant workers. Furthermore, encouraging widespread ownership may require the selling of shares at a discount that would have a dampening effect on a revenue objective. Selling off a public monopoly without endangering its monopoly position will maximize proceeds from the sale but will have no positive impact on sustained performance through competition.

On the other front of macro level determinants of foreign market entry are the existing or potential agreements and integration among nations (multilateral-international, bilateral, regional,...). Integration among nations may be simple (shallow) and hence entails no more than tariff reduction among members and increase of external tariffs on non-members, which can have an impact on foreign investment determinants through trade or strategic responses to competitors (static effects) and growth (dynamic effects). A deeper integration allows for the movement of capital (including foreign investment) and would be expected to have more effects on the investment determinants.

In the case of free trade areas, movement of factors of production, particularly foreign investment capital, is often not addressed explicitly. In the case of customs unions, a common external tariff vis-à-vis the rest of the world is also adopted, and policies including those affecting foreign investment, are harmonized.

Therefore, proceedings of multilateral-international (WTO), regional (RIFs) and bilateral (BITs) treaties may substantially affect foreign investment determinants and are of considerable relevance to this thesis.

The impacts of multilateral agreements is very much dependant on the nation. The impacts on developing countries is discussed in section 2.5.2.1., here, and again in chapter 5 within the context of Egypt.

On the bilateral level, investment treaties (e.g. Bilateral Investment Treaties- BITs) exert some influence on the investment policy framework by contributing to the improvement of an investment climate, and by strengthening the bilateral standards of protection and treatment of foreign investors and establishing mechanisms for dispute settlement, exerting significant impact on foreign investment flows (see section 2.5.2.1.).

Regional Integration Frameworks (RIFs) have impacts on foreign investment determinants but in themselves depend on a variety of factors mainly the scope and depth of the envisaged integration, which determines the extent of policy harmonization. For most RIFs that involve developing countries, the pre-existing foreign investment framework is typically not open to the same degree for all members, with the restrictions often reflecting the level of development and structural characteristics of their economies. A MNC interested in investing in a region with a RIF will actually have new options to choose from, such as where to locate among member countries. In choosing where to invest, MNCs will have to consider region-wide factors together with factors that apply only to individual countries.

Therefore, being a member of a RIF implies that some country-specific location advantages may decrease in importance as foreign investment determinants, while region-specific location advantages may increase. In the case of goods and services, market size is often redefined in terms of the regional market. For example, Egypt is a member in a North African RIF (among many others). MNCs might hence decide to locate their subsidiary in Tunisia, due to a more attractive investment climate. Being located in any member of that RIF grants the MNC preferential access to the large Egyptian domestic market. Hence, signing up for this RIF may result in loss of foreign investments and new, subsidized, competition for local business in Egypt. RIFs may further threaten developing countries such as Egypt, through dumping, unstudied policy acts and inconsistencies.

Potential foreign investors evaluate host countries on the basis of broad sets of policies and determinants. Host countries have increasingly come to realize the importance of adopting proactive measures to facilitate business transactions by foreign investors and of improving the economic and technological determinants of foreign investment.

3.3.1.2. Micro Level Perspectives

Along with other determinants of foreign investment, host nations must capture MNCs' motivations underlying foreign market entry (table 3/4). These may be categorized into profit-, market-, competition-, strategic-, efficiency- and economic- orientations.

Table 3/4: Motivations underlying foreign market entry

Profit oriented	
ROI	To achieve predetermined level of ROI
Early Cash Recovery	In order to improve liquidity; will require immediate increase in sales
Cost reduction	Through access to lower material costs; transport and communication costs; possible economies of scale through larger volume
Market oriented	
Market Stabilization	Market entry or development with minimum disruption to avoid retaliation
Market Skimming	Aimed at low sales volume in target markets
Market Penetration	A more aggressive approach aimed at achieving a large market share
Market seek, access and position	To acquire market knowledge expertise/distribution channels in an unfamiliar overseas market; To improve sales prospects (particularly in terms of government contracts and the public sector); To gain access to certain markets (in cases where government legislation requires local participation). Access to global markets & distribution systems and To circumvent trade restrictions
Competitive oriented	
Build permanent market	Market entry or expansion to defend or improve market share
Meet/follow competition	Market entry or expansion in response to competitor actions
Exchange of threat	A response to import competition in the local market
Prevent new competition	Market entry or expansion aimed at establishing entry barriers
Follow customers	Market entry or expansion in response to customers' internationalisation
Shaping competition	Market entry or expansion aimed at influencing industry structure (Changing nature of competition); by affecting industry cost structure, technology rivalry
Strategic oriented	
Inward technology transfer	Market entry to gain access to know-how ('ear to the ground')
Geographical diversification	Reduce dependency on certain country markets
Product diversification	Market entry or expansion to gain access/develop new products
Leverage	To achieve additional leverage for key resources and investments (R&D)
Control	To achieve market entry with close control over proprietary know-how
Code of conduct, including technology transfer	Demonstrate to the world that the company has a role in technology transfer to developing countries
Efficiency- oriented (Learning)	
Organizational	Achieve a higher level of organizational experience necessary for new market, through reengineering of the organization itself
Technology	To achieve technology development (Cross-fertilization and exchange of technology for specialization), Risk reduction (Through sharing resources and reducing the costs of R&D
Geographical	Achieve a higher level of organizational experience and learning through exposure to new situations, markets, cultures that might be common to several hosts (e.g. Arab region, African region, etc.)
Economic -oriented	
Cost minimization and risk reduction	Sourcing/production economies Through increased volume, thereby reduced large cost of R&D, capital investment; Development economies; Research economies; Marketing economies; Financial economies; Regulatory economies; Project economies; Equity economies; Transparency and predictability of government policies; Political and economic stability of the country; The existence and reliability of safeguards incorporated in the Contract with governments, such as arbitration; Flexibility for the company to divest or relocate its investment; Foreign-exchange considerations; Effects of the new investment on existing production

Source: The author, adapted from Brooke, 1986; Porter, 1986

As seen in table 3/4, corporates' motivations behind market entry are related to many factors. Further to the categorizations above, these factors may also be broader

characterized as resource seeking, market seeking, efficiency seeking and strategic asset seeking- factors (Dunning, 1993; Mirza, 1999; Ibeh, Young and Lin, 2003).

National policies are contended to be key for attracting foreign investment, but such policies have to be seen in the broader context of the previously discussed motivations of FDI, among which economic factors predominate. In the same time, micro characteristics, especially corporate motivations are also predominant during the market screening and selection phase. The overall perspective for determinants of foreign market entry is synthesized in the following figure 3/2.

Figure 3/2: Determinants underlying foreign market entry

I. Policy framework for FDI

- Economic, political and social stability
- Rules regarding entry and operations
- Standards of treatment of foreign affiliates
- Policies on functioning and structure of markets (especially competition and M&A policies)
- International agreements on FDI
- Privatisation policy
- Trade policy (tariffs, coherence of FDI and trade policies
- Tax policy

Policies impact on modes of entry and on technology transferred from these modes, through implied measures and implicit performance requirements (that may often be prohibiting), such as: Establishment with domestic participation; Requirements to export a given level or percentage of services; Employment performance requirements; Requirements of exclusivity (market, services,..); Requirements to transfer technology, production processes or proprietary knowledge; Research and development requirements; To purchase or use services provided in its territory; Appointment of particular nationalities in senior management positions; Numerical restrictions in the form of quotas

II. Business facilitation

- Investment promotion (including image-building and investment-generating activities and investment-facilitation services)
- Investment incentives
- Other costs (related to corruption and administrative efficiency)
- Social amenities (bilingual schools, quality of life)
- After-investment services

Costs and availability of trained or trainable labour, Capital costs, cost of financing and/or the opportunity cost of the capital required; The availability of costs of row materials and services; Transportation costs; Productivity; Home or host government policies; Foreign-exchange confederations; Impact of the new investment on costs of existing production

III. Economic determinants

Motivation for market entry	Economic determinants in host countries
A. Market-seeking	Market size and per capita income; Market growth; Access to regional and global markets; Country-specific consumer preferences; Structure of markets
B. Resource/Asset-seeking	Raw materials; Low-cost unskilled labour; Skilled labour; Technological, innovatory and other created assets (e.g. brand names), including as embodied in individuals, firms and clusters; Physical infrastructure (roads, power, telecomm.)
C. Efficiency-seeking	• Cost of resources and assets, productivity and labour resources • Other input costs, e.g. transport and communication costs to/from and within host economy and costs of other intermediate products • Membership of a regional integration agreement conducive to the establishment of regional corporate networks.
D. Strategic Asset seeking	• Such as Knowledge and relationship seeking

Source: the Author, adapted from WIR, 1998, Tavares and Young, 2002; UNCTAD, 2003

3.3.2. Practical Frameworks for Assessing Foreign Market Entry Mode

Root's (1994) list of entry modes initially identifies three "constructs" or foundations, namely: control, resource commitment and dissemination. For example, entry via wholly owned subsidiaries involves a high level of control, high resource commitment, but low risk of technological dissemination.

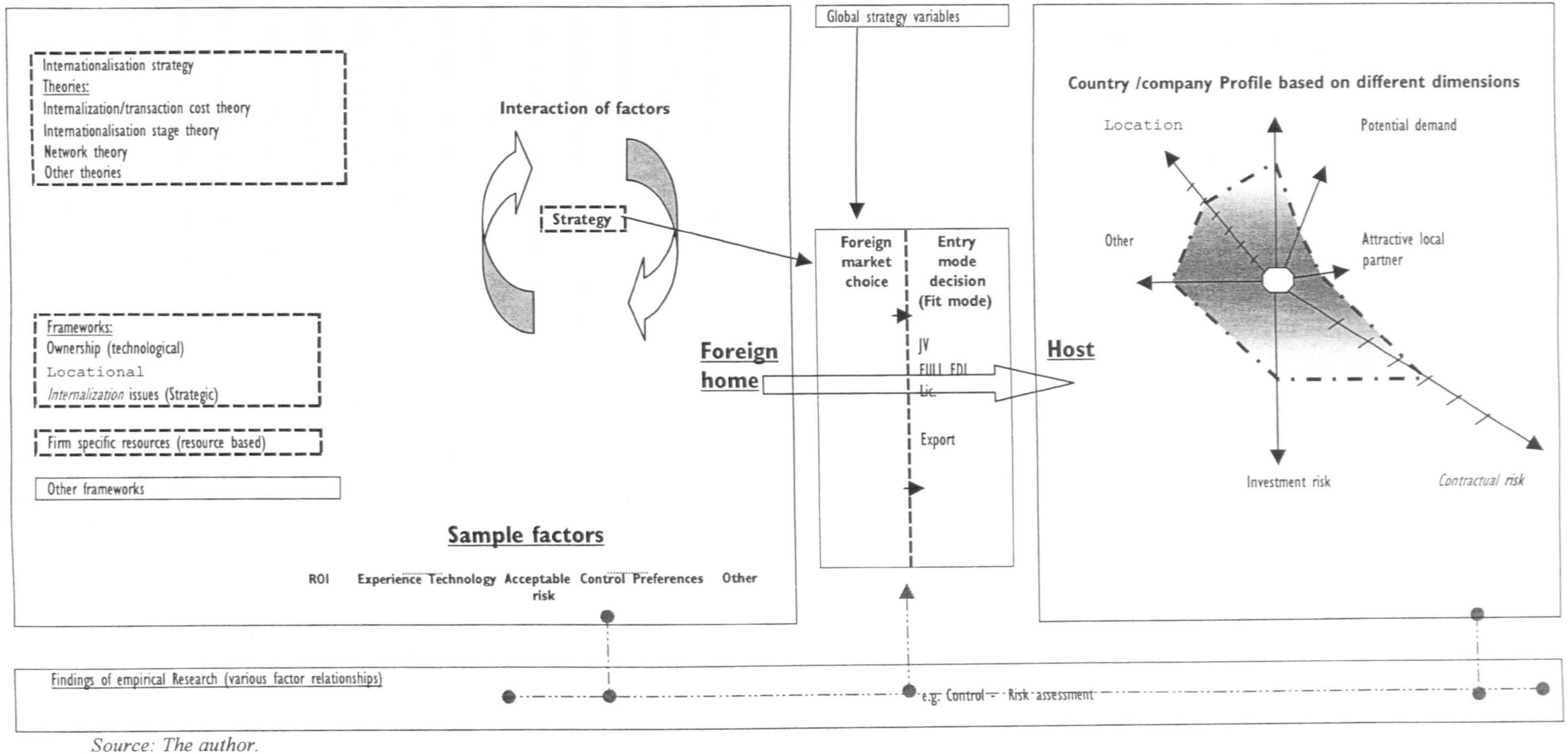
As seen earlier, many factors and issues affect the assessment that MNCs consider in regards to available choices of foreign market entry modes. Root (1994; see also Kim and Hwang, 1992) classify issues into 2 broad types, namely the external/environmental issues (size and growth rate of host market, competitive intensity in host and home markets, geographical psychic distance and host country risk), and internal company specific issues (product characteristics, services, degree of product differentiation, technology and dissemination risk and resource/commitment factors of MNC).

Foreign, and in fact host, companies approaching the mode choice issue from a strategic perspective will attempt to increase the content validity of any model they follow in assessing the mode of entry. Hill et al (1990) proposed an eclectic framework that combines strategic (Nordic internationalisation) approach with transaction cost approach. Hill's framework is based on control, resource commitment, dissemination of risk, extent of national differences, extent of scale economies, global concentration, country risk, location familiarity, demand conditions, volatility of competition, value of firm-specific know how and tacit nature of know how.

A comprehensive and holistic framework for foreign market entry and mode of entry choice is developed in figure 3/3. This framework has importantly combined the previous discussions of this chapter into one logical perspective. Micro and macro considerations are involved on the side of the foreign home. The interaction of these considerations and factors results in a context-specific strategy regarding foreign market and entry mode decisions, also subject to a set of additional global variables as well.

On the host side, an interesting representation was used to profile the host (company or country). This profile maybe later used to match profiles of partners for best fit.

Figure 3/3: A comprehensive framework for foreign market entry and mode choice



Source: The author.

Also, An important comprehensive framework for foreign market entry strategies, based on synthesis of literature, is indicated in Appendix 4.

From the previous discussions, it may be concluded that the foreign market selection and screening process and the mode of entry choice will be perceived by this thesis to be highly interlinked, rather than separate decisions, hence the importance of considering them together has been noted within the context of this research.

3.4. Policy Rationale and Mode Performance Requirements

Foreign direct investment (FDI) can play a significant role in the development process of host economies. In addition to providing capital inflows, FDI can be a vehicle for obtaining foreign technology, knowledge, managerial skills, and other important inputs; for integrating into international marketing, distribution and production networks; and for improving the international competitiveness of firms and the economic performance of countries. However, neither inflows of FDI nor the benefits from such inflows are automatic (UNCTAD, 2003).

While more and more countries welcome inward FDI, there is considerable variation in the "quality" of FDI and the associated impact of such inflows on host countries; hence there is increased attention being given to policies that can enhance the development benefits of such investment. Similarly, some host country environments are less conducive to positive impacts from FDI, irrespective of the strategy or operational behaviour of multinational corporations (MNCs). Weak domestic capabilities in a developing country may hamper its ability to reap the benefits of inward FDI and limit knowledge spillovers (Haddad and Harrison, 1993; Kokko et al., 1996; Aitken and Harrison, 1999; De Mello, 1999; and Xu, 2000). Obviously, in countries with relatively inefficient domestic enterprises inward FDI may provide examples of best practice, spurring a rise in the productivity of local competitors. Alternatively, recent empirical literature suggests that FDI under certain conditions may result in immiserizing growth (i.e. growth that reduces the welfare of the poor further) (Fry, 1992; Agosin and Mayer, 2000; Carkovic and Levine, 2002; Kumar and Pradhan, 2002).

The commercial interests of MNCs do not always coincide with a host country's developmental objectives, for example with regard to sourcing behaviour and reallocation of profit issues.

Among the range of policy options available to host governments to optimise the impact of FDI are implementing performance requirements. Performance requirements are stipulations, imposed on investors, requiring them to meet certain specified goals with respect to their modes of operations in the host country. They are and have been used by developed and developing countries together with other policy instruments, such as trade policy, screening mechanisms and incentives, to enhance various development objectives.

There are divergent views as regards the effectiveness of performance requirements to achieve this end. While some experts regard them as an essential instrument in a country's FDI policy package, others tend to argue that their impact on investments is at best limited and at worst costly and counter-productive (Guisinger et al., 1985; Rodrik, 1987; Kumar, 2001 and Moran, 2002).

Performance requirements may cover all aspects of investment. They can be imposed at the point of FDI entry and subsequent expansion or, as is increasingly the case, as a condition for the provision of some kind of advantage (UNCTAD, 2003).

Categories of performance requirements include Local content requirements; Trade-balancing requirements; Foreign exchange restrictions related to the foreign-exchange inflows attributable to an enterprise; Export controls; Requirements to establish a joint venture with domestic participation; Requirements for a minimum level of domestic equity participation; Requirements to locate headquarters for a specific region; Employment requirements. They also include Export requirements; Restrictions on sales of goods or services in the territory where they are produced or provided; Requirements to supply goods produced or services provided to a specific region exclusively from a given territory; Requirements to act as the sole supplier of goods produced or services provided; Requirements to transfer technology, production processes or other proprietary knowledge; Research and development requirements (UNCTAD, 2001a).

Based on emphasis chosen by the host government reflecting different development objectives, the approach to mandatory and/or voluntary requirements is selected. The economic rationale for applying a performance requirement depends on the objective of the measure. In general, the role of such requirements is to address some form of market or policy failure related, for example, to the presence of positive/negative externalities, information asymmetries and/or sluggishness of the MNC in responding to opportunities prevailing in the market. Performance requirements are also used to remedy distortions created by government intervention elsewhere in the economy (UNCTAD, 2003).

It should be highlighted that policy initiatives designed to stimulate particular aspects of post-entry mode operations, such as high local sourcing, is quite difficult to accept among MNCs who may be scanning globally for competitive suppliers. Bringing local suppliers to the level where they are even considered as potential supply sources is a major challenge.

Alternatively globalisation may be leading to greater central control over decision-making, thereby reducing the authority of quasi-autonomous subsidiaries (Tavares and Young, 2002), or similar investment modes.

Therefore, the effectiveness of performance requirements is context-specific. It may often occur that governments phase out their performance requirement implementations. This decision may be based on desire to comply with international commitments, regional integration and bilateral agreements; increased competition for FDI inflows; normal phase out as countries develop; or changing strategies of governments

For the requirements most related to mode choice and technology, joint venture and domestic equity ownership requirements are used to enhance the chances of technology and knowledge controlled by foreign affiliates being diffused to the domestic enterprise sector in the host country. It is assumed that by forcing MNCs to joint venture and share the knowledge and inputs they control and bring to a host economy, local firms would stand a better chance to access them (Blomström et al., 2000). The risk with such mandatory ventures is that they will suffer from a lack of trust and understanding between the partners. This especially may be the case if the local partner has little to offer to the venture (Balasubramanyam, 2002).

In India, for example, domestic equity requirements have helped to promote the formation of joint ventures that in some cases generated externalities in the form of local learning and quick absorption of knowledge brought in by the foreign partners. The South African experience suggests that mandatory domestic equity requirements in selected service industries and in mining helped to ensure new opportunities for black South African-owned business, and were not cited among the most important impediments to investments (UNCTAD, 2003).

Nevertheless, Moran (2002) has concluded that domestic equity or joint venture requirements may adversely affect the extent or quality of technology transfer. He contends that technology employed in mandatory joint ventures has been found to be behind the cutting edge of industry and the amount of technical training provided to the local managers and workers is a fraction of that received in wholly owned counterpart affiliates.

In support of this, it was also found that the number of host country employees sent to the foreign home country of the investor for training has been noted to be systematically higher in the case of wholly owned ventures as compared to joint ventures (Ramachandran, 1993). Wholly owned foreign affiliates in electronics industries producing for international markets have been found to be more eager to introduce latest production and management processes than joint ventures in the same industry who are more oriented towards host markets (Ernst, 1999).

At the same time, proponents of the usefulness of joint venture requirements argue that even if the content and quality of technology transfer is superior in the case of a wholly foreign-owned venture than in the case of a joint venture, the presence of a local partner may enhance the chances for local learning and diffusion of whatever knowledge is transferred. Others have stressed that a host country might retain a greater part of the profit within the country in the case of joint ventures (see Yun, 2002).

A study of FDI in CEE found that joint ventures in R&D intensive activities led to less technology transfer than wholly owned foreign affiliates (Smarzynska, 2000). Another study found that joint venture obligations affected adversely the quality of technology transferred by foreign firms (Lee and Shy, 1992).

In summary, in regards to the impact of domestic equity and other performance requirements on various modes- the evidence is not conclusive. Direct technology transfer performance requirements are discussed in section 4.4.

3.5. Conclusion

This chapter discussed the various issues and perspectives of foreign market strategy and entry modes. Starting by a classification of the modes, and introducing a new synthesized classification for the modes of entry from a technological perspective that will assist in this thesis. Acknowledging the importance of building upon previous research, and use of mixed methodologies to explore what is a complex issue, a comprehensive review of theories underlying internationalisation of the firm was conducted.

This established the conceptual understanding, and furnished for integrating an overall framework for foreign market entry strategy.

To that extent, the synthesis of literature indicates that it is the overall context of and interrelationships between foreign firm and host specific attributes that will affect the host location choice and mode of entry decision (in extension to the static eclectic paradigm).

Despite their importance in explaining the foreign firms behaviour that cannot be captured by independent assessment of these attributes, very limited research emerged to address the effects of these interrelationships. In fact most of the existing research attempted to set some factors as constants in order to study the rest independently. It is the contention that this approach, although useful from other perspectives, is quite flawed from the context of technology transfer and subsequent host policy aspects. This gap needs further exploration.

Several micro, macro and global issues have also emerged from the literature to specifically impact on the overall foreign market entry process (host screening, mode selection and subsequent operations and development of the mode). These include the nature of product or service, the characteristics, motivations and objectives of the foreign company and personnel, the level of involvement, control and perceived risk acceptable by the foreign company, the technology aspects, the existing technological gaps, and perspectives of attractiveness of the host (including supplier linkages, governing

frameworks, BITs, privatisation opportunities, learning patterns, etc.). The importance of partner compatibility and formalization of the various issues in the mode contract (royalties, objectives and relationships) has been identified (see section 4.2.3. for elaboration).

Importantly, it has been found that literature on foreign market entry and the internationalisation of the firm is still far from satisfactory in regards to choice of mode of foreign entry for technological content. Some empirical evidence favours fully owned subsidiaries, while others favour joint ventures. This calls for more concise research on the issue.

There is also clear divergence between the foreign firms choices and the interest of the host, which can create a basis for policy intervention. Nevertheless, the ability of host to influence market entry and mode choice for the purposes of technology transfer is not conclusive. On the practical policy front, despite the perception that performance requirements play a positive developmental role, the usefulness of general policy aiming at individual modes of entry and their performance requirements (including technology transfer) are not in fact well supported by empirical evidence, and the experience of different countries widely diverges.

Having said that, and in light of the technology policy rationale discussed in chapter 2, it may therefore be identified that an accurate assessment of integrated policy measures is needed.

Chapter 4: Synthesis of Linkages between Technological Development and Foreign Market Entry

4.1. Introduction

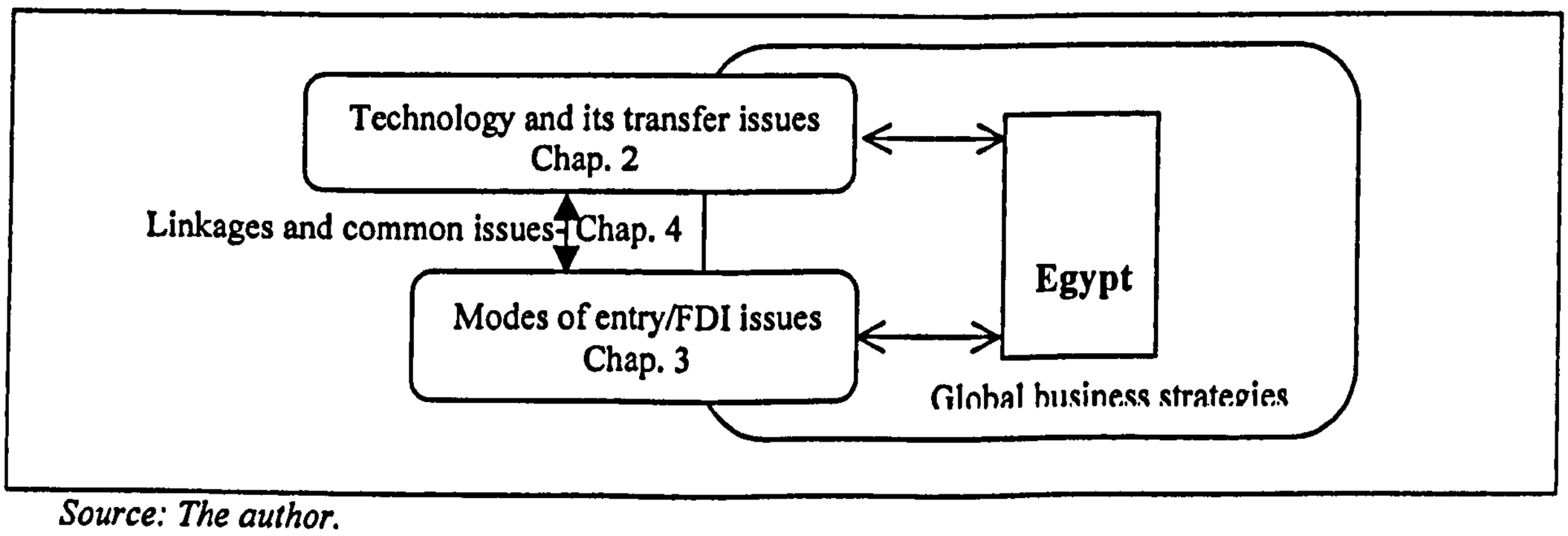
The previous chapters have separately discussed technology transfer and foreign market modes of entry. Their importance to growth, development and technological capability building of the host are highly contended. Separate issues affecting the process of technology transfer have been identified.

The first objective of this chapter is to extend and complement the previous argumentations through synthesizing interrelationships and linkages that may impact on technology transfer associated with foreign market entry (section 4.2.).

The second objective is to assess the context of developing countries in relation to global business strategies involving foreign market entry and technology transfer (section 4.3.).

The final objective of this chapter is to associate policy perspectives to the synthesized linkages and assess international empirical evidence regarding the rationale underlying integrated policy. This was decided because policies that emerged as encouraging to technology and its transfer (chapter 2), may in fact contradict with foreign entry policies (chapter 3), especially within the context of developing country hosts (section 4.4.).

Figure 4/1: Inter linkages between issues related to technology transfer content



Source: The author.

To furnish for the forthcoming synthesis of linkages, it is suitable to summarize the earlier discussions. It has been shown that when a firm decides to internationalise, it faces the decision of choosing the foreign market it wants to operate in (Yip, Loewe and Yoshino, 1988). The market selection decision involves choosing the best country market to enter based on the strategic needs and orientation of the firm (Papadopoulos, 1988; Kumar, Stam and Joachimsthaler, 1994). Once the firm has decided to enter a particular foreign market it has to determine the nature of its operations in that market depending on its choice of mode of entry, whereas each mode of entry entails a substantial level of resource commitment and considering the difficulty in changing from one entry mode to another without considerable sacrifice of time and money (Root, 1994). Firms adopt a number of different modes to enter foreign markets. These have been classified earlier, based on risk, ROI and the degree of control that the mode provides (Anderson and Gatignon, 1986).

With a significantly large number of countries welcoming foreign investment in seek of technological advances, and an increasing number of firms implementing global strategies, the nature of international business and foreign market entry is undergoing dramatic transformation. For instance, inter-firm technology agreements can become a means of controlling technological advances (see Mytelka and Delapierre, 1997), which have in turn enhanced the ability of firms to coordinate their expanded international production networks, either directly or via inter-firm technology agreements.

With such interaction between FDI and the domestic technological effort, technological capabilities have earned a central role in building competitiveness (CSTD, 2002). The form in which the technology is provided, which is determined by, among others, the motives of the participants and the characteristics of the technology, plays a central role in structuring the mode of market entry. Kim and Hwang (1992) provided substantial evidence of a relationship between the exposure of core competencies in various entry modes, and the selection of these modes.

The following section will identify and synthesize from literature the issues concerning interlinkages between technology-related and modes of entry-related aspects, including a discussion of the obstacles to technology transfer from foreign modes of entry which interestingly are expected to also involve linkages between the two disciplines.

4.2. Identification and Synthesis of Linkage Issues

4.2.1. Technological Gap and Impacts on Modes of Entry

The technological gap between the host and the foreign company has been the basis for assessing the technology transfer potential, or indeed lack of it. It also may have an impact on mode choice. Table 4/1 indicates possible technology gaps against proposed characteristics of associated transfer and modes expected to be involved.

Table 4/1: Technology transfer characteristics based on technological gaps

Technological gap	Technology Transfer Characteristics	Possible mode and objectives
Large Technological gap	Limited technology transfer potential. (Wholly consuming-dependence model)	Mostly high-tech sectors where technology transfer is based on equipment, with little potential for development or diffusion (e.g. export of products, or turnkey plants based on local market potential). Conversely, in some developed countries; political barriers have impeded the establishment of wholly owned production facilities within their own high-technology industries. Both Japanese and US governments have opposed some forms of direct foreign investment in their domestic semiconductor industries (Mowery, 1992).
Large Technological gap	High technology transfer potential- complete technology package may transfer. (Unbinding development model and Workshop transplant-accumulation model)	International market-oriented joint venture and various types of modes with strong assimilation capability of partners and export-orientation. Lightly controlled by foreign investors. Transfer across process, product and management skills. Best option from a host and technology transfer perspective.
Medium Technological gap	High technology transfer potential. (Unbinding diffusion model)	Joint ventures and more limited cooperation firms. Diffusion occurs freely but developments are limited by host capabilities.
Medium Technological gap	Medium technology transfer potential and incomplete technology package may transfer, as necessary. (Partly consuming-integration model)	Joint ventures, licensing or even wholly owned subsidiaries- Main contribution in updating products and improving the performance (in other words, it offers medium assimilation capability).
Small Technological gap	Limited technology transfer potential. (Limited transfer-localization model)	Includes speculative foreign investments and those motivated by government incentive policies. The small gap raises expectations of easier transfer from the host perspective. Alternatively, another aspect is that they are piers and hence technology transfer may be unnecessary in all but R&D activities

Source: The author, modified from Lan and Young, 1996.

The above characteristics of technology transfer based on the technological gap, are not comprehensive, and do not account for all factors affecting the content and process of technology transfer or the mode of choice. In other words, the technological gap taken alone may mislead anticipations related to the mode of entry. Technology gap issues have to be taken within an overall context. In fact, the possibility that the technological gap may have minimal impact on technology transfer has been already contended in some literature (Kokko, 1994).

Moreover, it has been noted from the literature review that the technological gap unit of analysis is barely ever discussed in literature. The most common is in time aspects, namely years (see Young and Lan, 1997).

It is proposed that the technological gap may also be measured in other time units, in major technological development units, in performance/efficiencies' units or other. Time aspects may also demonstrate the speed of mode operations, development and maturity, leading to an important linkage issue, namely the drivers that stand behind mode of entry development at the host nation. These are discussed in the following section.

4.2.2. Post-Entry Mode Development from a Technological Perspective

The longitudinal aspects of the mode of foreign entry, or in other words, the post entry operations of the foreign company within the context of its mode of choice at its decided host- represents the actual span of the technology transfer process. It is therefore important in this context to note how the modes of entry may develop. The following development types are synthesized as basis for development of various entry modes (subsidiaries, JVs and other):

1. Foreign (Home) Driven mode Development:

This can take the form of a new plant, the transfer of a proprietary technology, or the investment associated with a new product or market mandate, all of which add directly to resource base and offer the potential for future increments of investment. Alternatively, the parent company may acquire another private/privatised company in the host country or region and merge it with its existing mode, resulting in a major change in the local resource profile. The parent may even spin-off new modes out of the original.

The parent-driven processes are a function of the MNC corporate strategy, which itself is derived from a continuous evaluation of the various key elements of the global competitive environment, including the actions of competitors, emergence of new markets, technological trends, and political and economic factors at the host. There is added technology transfer content involved in such type of development.

2. *Internally-driven mode Development:*

Management of a local operation may face constraints from their foreign company in terms of decision-making autonomy and technology generation, there is strong theoretical and empirical evidence that they themselves can alternatively have the capacity to influence and develop through the control of critical resources (Hedlund, 1986; Ghoshal and Bartlett, 1991; Forsgren and Pahlberg, 1992).

3. *Host Country-Driven Development:*

This type is a focus area of this research. In many countries, direct investment may act as a spur for regional economic development. The host government's ability to stimulate an upgrading of the local environment, through a supportive macro-economic policy and investment in infrastructure and education, is an important contributor to investment development (Porter, 1990).

4. *A combination of the above:*

All parties will share in driving the development. This is obviously an optimal type.

It is clear that the approach to mode development is itself eclectic (i.e., drawn from a variety of theoretical traditions), whereas the phenomenon involves aspects related to the technology involved, the characteristics of the foreign and the local firm, their motivations and objectives, the local setting at the host country, the learning patterns of the operations employees and the formal relationship between the partners. Each one of these may hold back the diffusion of technology. The formal relationship between partners will be elaborated in the context of the following section.

4.2.3. Contractual Perspectives of Modes of Entry and Technology Transfer

The importance of contractual arrangements impacts on both the macro and micro levels. On the macro level, grants and technical assistance offered to developing countries usually involve substantial grant documentation. It is argued that such documentation must clearly state an acceptable scope of technical services provided under the grant, prior to its acceptance (AlAhram, 2001).

However, the focus of this section is mainly on the micro level, where a critical dimension in the analyses of modes of entry (from a technology transfer perspective) has emerged to be the contractual arrangements that tie-in many of the technological factors within the mode's contractual obligations. Mode of entry contracts as such may be constructive, restrictive, inhibiting or prohibiting to technology transfer issues. Obviously, contractual technology transfer issues vary in relation to the particular mode used and the interests of both parties involved. These may include: permitted size of market, transfer costs, opportunity costs, exclusivity granted, the technology itself, export potential, brand name, competition, appropriateness of technology and alternative sources of similar technologies and supply of components.

In fact, formal contractual arrangements dominate the technology transfer process, especially in loosely coupled partnerships such as licensing (Mowery, 1996; Robertson and Gatignon, 1998). Table 4/2 provides a comparison between sample modes of entry contracts, with emphasis on technology-related provisions relevant to this research. The distribution contract is indicated as a baseline of comparison only.

Table 4/2: Sample mode-contract provisions, from a technology transfer perspective

Joint venture Contract	Licensing Contract	Distribution Contract
Purpose and character of a joint venture.	Technology Package	*General Provisions*
Major goals/strategy of foreign partner.	Definition/description of the licenced industrial property (patents, trademarks, know-how).	*Identification of parties to the contract.*
Major goals/strategy of local partner.	Know-how to be supplied and its method of transfer	*Duration of the contract.*
Products/industries/markets/customers served.	Supply of raw materials, equipment and intermediates	*Conditions of cancellation*
		Definition of covered goods
Contributions of each partner:		*Definition of territory or territories*
Capital	*Use Conditions*	*Sole and exclusive rights*
Existing land, plant, warehouse, offices, other facilities	*Field of use of licenced technology*	*Arbitration of disputes*
Manufacturing design, processes, technical know-how	*Territorial rights for manufacture and sales*	
Product know-how	*Sublicensing rights*	*Rights/Obligations of Manufacturer*
Patents and trade marks	*Safeguarding trade secrets*	*Conditions of termination*
Managerial, production, marketing, financial, organizational and expertise	*Responsibility for action against infringement on patents and trade marks*	*Protection of sole and exclusive rights*
Technical assistance and training	*Exclusion of competitive products*	*Sales and technical support*
Management development	*Exclusion of competitive technology*	*Tax liabilities*
Local relationships with government, financial institutions, customers, suppliers, etc.	*Maintenance of products standards*	*Conditions of sale*
	Performance requirements	*Delivery of goods*
Responsibilities and obligations of each partner:	*Rights of licensing to new products and technology*	*Prices*
Procurement and installation of machinery and equipment	*Reporting requirements*	*Order refusal*
Construction, modernization of machinery and equipment	*Auditing /inspection rights of licensor*	
Production operations- Recruitment and training	*Reporting requirements of licences*	*Inspection of distributor's books*
Quality control		*Trademarks/patents*
Relationships with labour unions	**Compensation**	*Information supplied to distributor*
	Currency of payment.	*Advertising/promotion*
Research and development	*Responsibilities for payment of local taxes*	*Responsibility for warranties*
General, financial, marketing, personnel and other management	Disclosure fee	*Inventory requirements*
Continuous training of personnel	Running royalties	
	Minimum royalties	*Rights/Obligations of Distributor*
Equity ownership:	Lump-sum royalties	*Guarding manufacturer's interests*
Equity granted to foreign partner for manufacturing and product technology and industrial property rights	Technical-assistance fees	*Payments arrangements*
Equity granted to local partner for land, plants, warehouse, facilities, etc.	*Sales to and/or purchases from licencee*	*Contract assignment*
Ownership share of foreign/local partner	*Fees for additional new products*	*Customs clearance*
	Grant of product improvements by licencee	*Observance of conditions of sales*
Capital structure:	*Other compensation*	*After-sales service*
Equity capital, Local capital, national and foreign, Working capital	*Other Provisions*	*Information supplied to manufacturer*
Provisions for raising future local funds, Local guarantees by partner, Future increase in equity capital, Transfers of stock shares	*Contract law to be followed*	
	Duration and renewal of contract	
	Cancellation/termination provisions	
	Procedures for the settlement of disputes	
	Responsibility for government approvals	

Source: The author, adapted from Contractor, 1981.

As noted, the previous table did not touch upon wholly owned subsidiaries, where the mode contract will be highly firm specific (technically it is one party involved), but on the other hand, aspects of expatriate employee contracts may be relevant to technology transfer if they involve succession obligations involving local staff for instance.

The importance of detailing technology transfer procedures in formalized contractual arrangements is hence established. From a host perspective, contracts need to maintain flexibility and include exit-routes (the ability of a host company to detach itself from a non-fulfilling agreement). The Egyptian law #17 of the year 1999 has given this matter importance to the extent that it explicitly indicated a mandatory renewal period for all contracts involving technology transfer after which these contracts will be rendered void (irrespective of any longer durations that might be indicated in the writings). Therefore, careful balance between the flexibility of a contract and the safety it provides to both partners (including full detailing of technology transfer issues) allows for sustainable performance of the partnership.

4.2.4. Assessment of R&D Linkages

It is contended that R&D is a key factor in enhancing innovative performance and productivity as well as long-term economic growth. On a host's national level, the decision to support R&D through direct financing and/or tax incentives is taken within the context of political and economic systems. On a foreign country level, many countries are concerned about "*hollowing-out*" of their research base. Factors affecting the globalisation of mobile R&D resources are becoming important (OECD, 2002).

Host countries are highly attracted to the prestige of hosting global technological R&D, which is perceived to have many implications on competitiveness. They offer special R&D cost saving incentives to MNCs. From a MNC perspective, R&D activities are preferably home concentrated, with international 'listening posts' and adaptive capabilities maintained through small, location specific, laboratories (see Lall, 2002).

Swedish large firms reveal that they perform 30% of their technological activities outside Sweden. Hakanson and Nobel (1993) have found that political factors (particularly those related to establishment within European Community countries) have been important in more than 60% of the decision taken since 1980 to establish R&D activities abroad.

No doubt, R&D represents an important function that falls at the heart of the technology transfer process. Nevertheless, the protection of the foreign companies of their R&D rights are far more stringent than they are with technologies long released to the public, or near obsolescence. Figure 4/2 provides an overview of the overall context of internationalisation of R&D, which demonstrates the various interlinkages related to its transfer:

Figure 4/2: Overview of internationalisation of R&D, its contexts and causality

A. CONTEXTS

Internationalisation of economies (trade, Competitive relations, Interdependence, institutional structure)
Internationalisation of S&T (Sources, Flows, Locations, Exploitation and Patenting)
Internationalisation of companies (Purchasing, R&D, Production. Marketing, Personnel and finance)
Internationalisation of technology acquisition in industry (technology scanning, contracting, licensing, joint ventures, company acquisitions and in-house R&D)

C. DETERMINANTS

1. Company level

a) Stimulating (centrifugal) forces
- Demand oriented forces
- Substitute for Technology transfer from parent to Subsidiary
- Integration with local production
- Local ambitions among subsidiaries
- Government regulations
- Need for proximity to local customers and markets etc.
- Supply oriented forces
- Foreign acquisitions
- Access to foreign S&T
- Access to low cost/benefits supply of R&D personnel

b) Inhabiting (centripetal) forces
- Need for control of R&D
- Fear of leakage of information
- Closeness to domestic market
- Economies of scale in R&D
- Costs: communication & coordination
- Historical inertia etc.

2. National level
- Cultural factors (language, Nationalism, etc.)
- Institutional structures
- Government policies
- Domestic/foreign input/output market conditions etc.

3. International level
- Supra-national policies, agreements and institutions
- Trade block integration
- Internationalism
- Global environmental factors

B. INTERNATIONALISATION OF R&D

Aspects/variables
- Share of R&D personnel employed abroad
- Age of foreign R&D labs
- Geographical location and dispersion of R&D
- Decentralization of R&D
- International recruitment of R&D personnel (distribution of nationalities among R&D personnel)
- Types of foreign R&D labs & activities
- Evolutionary patterns of foreign R&D
- Intra-firm technology transfer
- International patenting
- Organization and management of foreign R&D, Etc.

D. EFFECTS

1. Company level
- Increasing costs of coordination and control
- Increased risk of loss and leakage of technology
- Improved integration with local supply, production and marketing.

2. National level
- Home country effects (effect on competitiveness of domestic firms, reverse technology transfer, Resource outflow, Foreign resource rents, Loss of host country type of benefits etc.
- Host country effects, effects on local customers, competitors, suppliers and local personnel: local externalities, supply of management, Technology and employment opportunities: partial loss of local resource rents, Disguised brain drain, Restructuring effects etc,

3. Continental/international level
- Economic integration and interdependency
- Economic differentiation
- Denationalisation etc.

Source: Granstrand, Hakanson and Sjolander, 1992.

Interestingly, an empirical examination of the aggregate R&D spending by all US MNC affiliates in 34 countries, concluded that market size, scientific resources, and cultural distance of the host country from the US are statistically significant in explaining the level

of R&D activity performed by US companies, while technology transfer policy and the intellectual protection are not (Muralidharan and Phatak, 1999).

Due to spillovers and other externalities, econometric studies find that social rates of return to R&D can be up to five times higher than private rates of return (Salter *et. al.*, 2000), hence the governments' interest in attracting R&D investments will certainly benefit from offering R&D incentives. R&D tax relief can play a role in locational decisions of multinationals. Most firms prefer to incur R&D costs where they can be offset against higher taxes. Through such provisions, R&D tax incentives can act as incentives or disincentives to entry of international foreign investment and their associated R&D transfer.

4.2.5. Additional Common Linkages Synthesized from Literature

Several additional linkages may be synthesized. These are issues that are common to multiple perspectives, and hence may have multi-dimensional impacts within the process of technology transfer associated with modes of foreign.

Human resource development and motivation

Individuals of both home and host companies alike have to be technology-transfer-motivated to share their valuable know-how. The transfer of technological know-how that is particularly difficult to transfer may be more effective when those individuals with the know-how are tightly coupled with those individuals wishing to exploit the know-how (Barton and Sinha, 1993; Rumelt, 1995; Ghoshal and Moran, 1996). The objectives of the foreign company and the host might occasionally contradict; hence coordination and motivation has to be achieved from both perspectives.

Partner relationships

In line with the previous issue, the importance of partner characteristics and relationships emerge from the literature. Increased effort is needed to smooth cultural differences and achieve cooperative behaviour and trust necessary for bi-directional knowledge transfer.
The technological status of the local partner and the assets that he provides affect the decision of the foreign company's mode of entry.

Furthermore, when the initiation of the cooperation comes from an established local company; this simplifies the costly partner selection process. The complementarity of the local partner's current activities and assets and the compatibility of his culture and human resources with that of his partner plays a further decisive role in quicker and sustained success of the partnership. A foreign/host firm commitment to technology transfer is positively associated with foreign performance (Isobe, Makino and Montgomery, 2000). Luo (1998b) provides three criteria for successful partner selection, namely: strategic (task-related), organizational (cooperation and partner-related) and financial sustainability.

Learning patterns

Further to the context of learning discussed in other perspectives, the technological learning process is multifaceted. For instance, host firms may not understand how to build up the necessary capabilities to transfer technology (learning itself often has to be taught) or the foreign firm is not experienced in internationalisation or technology transfer. From a mode perspective, not all modes of entry are conducive to indigenous learning. Some come highly packaged with complementary factors, and so stimulate less learning (Lall, 1999; WIR, 1999). Finally, cultural attitudes towards training (a task not a reward), complexity of the technology in hand, along with existing technological gaps may delay learning.

Time elapsing

A decline of cultural differences may be expected as the degree of collaborative experience increases. This is consistent with the findings that cultural differences in joint ventures will ultimately recede over time (Bresman, Birkinshaw and Nobel, 1999). This is one positive aspect of time elapsing. On the other hand, technological obsolescence and time to market are synthesized to have negative correlation with time elapsed. Empirical evidence from studies of market entry has generally suggested that early movers tend to attain market performance that is superior to late entrants especially in emerging economic regions (Szymanski, Troy and Bharadwaj, 1995; Luo, 1998a; Pan and Chi, 1999; Pan, Li and Tsi, 1999). Time elapsing impacts on mode development and the content of technology diffusion, which in itself is affected by existing technological gap.

It is noted that such content may be measured by examining its level of utilization throughout various levels (product, process and management) (Roper and Dundas, 1998), whereas using this utilization approach, knowledge gaps (Lan and Young, 1996) or lags (Mansfield and Romeo, 1980) can also be measured (Crone and Roper, 2000). Finally, time consumed by transfer of technology must be accounted for along with other time considerations.

Industry type

The industry type may impact on the mode selected. Companies operating within same industries may tend to prefer particular modes to others. For instance, only second to fully owned subsidiaries wherever possible (especially in the developed world), a mode-incorporating licence is often the choice of the pharmaceutical companies'. In support of this, empirical results of Hagedoorn and Narulaa (1996) show that the choice of a particular mode of entry varies with the technological characteristics of the sectors of industry.

IT infrastructure

Utilization of IT allows companies to better store, share and transfer knowledge. It also facilitates worldwide exchange and cooperation with piers. Facilitating the ties between the two technology transfer partners is of key importance. One increasingly common type of these ties is achieved through communications, intranet and Internet. However, the over-reliance on these systems presents a risk of loss of continuity. As such, with IT infrastructure in mind, national level infrastructure may be key determinant to the susceptibility of the local environment to technology transfer (between local modes and their foreign headquarters). It has been already indicated that the perception of MNCs of the adequacy of the general infrastructure level at the host is important in their assessment of the entire market attractiveness. This leads to the issue of appropriateness of technology.

Appropriability of Type of technology from a host perspective and technology gap aspects

Having discussed the technology gaps aspects (section 4.2.1.), and appropriateness of technology perspectives (section 2.4.2.), it may be inferred that a firm's performance in a new foreign market is a function of both uniqueness and usefulness of the technology being

transferred to host nation (advanced hi-tech, medium tech, low tech), the ability to transfer it, in addition to the ability to meet with the associated requisites such as costs of regular auditing and procurement of supplementary resources.

The parameters of competition change with the nature of technology and organization (Lall, 1998). In developing countries, the complexity of the technology may be perceived as a hindrance to an effective technology transfer, especially if the infrastructure of qualified personnel is not available and the technological gap is too big.

Complex technologies have effects on time to market aspects as well. Complex technologies may take longer to transfer, by which time newer technologies may have been released, or the market no longer needs this technology. Higher price tags for technology are associated with the latest technologies, representing an additional burden on the host. Obsolescence is another contradicting consideration, as older technologies are cheaper, easier to transfer, proven and the foreign company's interest in the process is greater as it extends the life cycle of the foreign company's product. On the other side, this will keep the technological gap as wide, and technology transfer shall not serve to narrow it.

Transfer performance

The technology transfer performance is influenced by a variety of institutional factors, which include access to R&D personnel, access to external resources of knowledge (such as firms and research institutions), the political and legal administrative environment and the process of technology transfer itself. In the past, the number of patents developed and held was the indication used for technological performance (Mowery, 1996). In a more comprehensive approach, and from a host perspective, it may be synthesized that the technology transfer performance may be assessed by enhancement in capabilities of the host company, the level of achievement of contracted technology transfer objectives, or financially through ROI in this technology.

Indeed, objectives in a technology transfer situation will likely be idiosyncratic across firms and technologies (Steensma and Corley, 2000). The determinants and performance

consequences of resource commitment to technology transfer and timing of entry indicate that both high commitment and early entry had positive impacts on perceived economic performance. These relationships were found contingent on several internal and external factors, not duly addressed in literature (Isobe, Makino and Montgomery, 2000).

Government policy prioritisations

Evidence that is in general consistent with earlier analyses of Dunning and Cantwell, shows that country-specific factors create both the general conditions that determine the volume of technological activities, and the specific inducement mechanisms that determine their direction (Dunning, 1980; Patel and Pavitt, 1988; Cantwell, 1989). It therefore becomes important to understand the nature of the country-specific factors that make up what Anderson and Lundvall (1988) called 'national systems of innovation'; including the system of education, S&T, training and basic research that forms the infrastructure for firm-specific technological accumulation.

It is not enough to study the content of the policy; one must also understand the policy-making process, alternatives to it, the execution of the policy, and how public policies are evaluated and prioritised in regards to infrastructure, institutions and foreign aspects of technology and foreign investment. This issue shall be further addressed in section 6.3.1.5. from the unique perspective of Egypt.

4.2.6. Obstacles to Technology Transfer from Modes of Foreign Entry

It is important to ascertain that multifaceted barriers and obstacles may face technology transfer from a developing country perspective. Based on the literature in the previous chapters, these obstacles may themselves be interlinked. On the macro level, obstacles may be summarized into: Government debts and stalling reform programs and Excess employment and rationalization needs or insufficient skills of labour force

The failure to deal with such obstacles may imply that public sector enterprises will be rendered out of the loop of technology transfer, unless privatised. Other macro problems include lack of regulation, lack of monitoring capability or simply having other priorities.

On the micro front, the obstacles may be divided between the foreign firm and the local firm. From the perspective of the foreign firm, obstacles may include:

- Lack of supplier sources and networks
- Lack of skilled labour
- Government inconsistencies
- Deterring policies (performance requirements of local content in the materials and local content in the equity)
- Lack of prioritisation

From the perspective of the domestic local firm, the obstacles may include:

- Discrimination in favour of FDI
- Lack of indigenous capability
- Lack of finance
- Lack of basic awareness
- Lack of bargaining power
- Lack of prioritisation

As noted, obstacles to technology transfer are overlapping and highly context specific. Therefore, it is useful to assess the strategies of MNCs in regards to developing countries and their areas of conflict and alignment. This is conducted in the following section.

4.3. Global Business Strategies in Setting of Developing Countries

Strong complementarities and mutually reinforcing linkages among capital accumulation, technological progress and structural change have constituted the basis for rapid and sustained productivity growth, rising living standards and successful integration into the international economy. In the interplay of linkages that make up a virtuous growth regime, investment generates income and expands productive capacity, and it also carries strong complementarities with other elements in the growth process, such as technological progress, skills acquisition and institutional deepening (Easterly and Levine, 2001).

There is a rich body of empirical literature on the determinants of national growth using cross-country regression analyses.

A recent review identified well over 100 economic, structural, sociological, geographical and historical variables (Kenny and Williams, 2001). However, such exercises suffer from serious methodological limitations (Ros, 2000; Kenny and Williams, 2001; Reati, 2001).

Irrespective of the number of variables, MNCs as leaders of global business strategies can certainly contribute to developing countries national growth and advancing the development impact of their investment as part of good corporate citizenship responsibilities. This could occur through voluntary action or more legally based processes. Areas particularly important from a developmental perspective are contributing fully to public revenues of host countries; creating and upgrading linkages with local enterprises; creating employment opportunities; raising local skill levels; and transferring technology. MNCs are the leading source of international technology transfers in all possible forms: internal (to their affiliates) and external (inter-firm to other companies) (WIR, 1999; 2000; 2001). The role of MNCs also goes much further than transferring productive resources (Radosevic, 1999).

Having such established importance, the attraction of MNCs for contribution in national growth entails serious host benchmarking against that of competing host countries. Measures that countries are taking vary widely.

Targeted promotion of the host needs careful management and strategy to maximize the impact. Targeting can be general (countries with which there are trade or historic connections, or which lack past connections but are ripe for establishing them), industry specific (MNCs in industries in which the host economy has an actual or potential competitive edge), even MNC specific. Targeting or information provision is not the same as giving subsidies or fiscal incentives (see section 4.3.4.), whereas incentives play a relatively minor role in a good promotion programme, and good long-term investors are not the ones most susceptible to short-term inducements.

The experiences of Ireland, Singapore and more recently Costa Rica, suggests that promotion can be extremely effective in raising the inflow of investment and of raising its quality, effective promotion goes beyond simply marketing the host into coordinating the

supply of immobile assets with the specific needs of targeted MNCs. In Costa Rica, the fact that it was prepared to invest in training to meet Intel's skill needs was a major point in attracting that investment. Singapore goes further, and involves MNC managers in designing its on-going training and infrastructure programmes, ensuring that it remains attractive for their future high-technology investments. The information and skill needs of such coordination and targeting exceed those of promotion per se, requiring detailed knowledge of technologies involved (their skill, logistical, infrastructural, supply and institutional needs) as well as of the strategies of the relevant MNCs (UNCTAD, 2002).

On a multilateral level, technology transfer efforts of MNCs were encouraged. Article 66.2 of the TRIPS Agreement stipulates that "developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least developed country Members in order to enable them to create a sound and viable technological base". The Doha Ministerial Conference then decided that this obligation needed to be strengthened through a monitoring mechanism (WTO, 2001a). This led in February 2003 to a technology transfer reporting mechanism on actions taken or planned in pursuance of the commitments undertaken by developed countries under this article (appendix 2).

A concern that arises in association with multilateral efforts and their impacts on MNCs in some developing countries is the level of IPR protection. The empirical evidence on the impact of stronger IPRs at host on MNC decisions is mixed. One study, based on firm-level data from economies in transition, indicates that a weak IPR system in a host country may discourage all investors, not only those in sensitive industries. Another study suggests that stricter contract enforcement makes MNCs better off, while the outcome for host countries depends on MNCs' reactions to such enforcement (Markusen, 2001). The host country's welfare improves if MNCs undertake local production; however, a host country may be made worse off if local production exists and stricter IPRs affect it adversely.

Referring to various studies, Kumar (2003) concludes that, in general, there is no strong link between stronger IPRs and FDI inflows, and associated technological flows, and that strength of patent protection does not appear to be a significant factor in determining the location of MNCs' R&D activities in host economies (see Muralidharan and Phatak, 1999).

Moreover, stronger IPRs can increase the scope for the abuse of market power by technology owners, and developing countries with weak competition policies may not be able to cope with this effectively. Stronger IPRs may also raise the cost of technologies (Lall and Albaledejo, 2001), without the compensation, of stimulating local innovation or international technology transfer.

Implementing the IPR regime is costly and challenging and its effects on development and on FDI flows are, as indicated, controversial.

4.4. Integrated Policy Rationale

The policy discussions in previous chapters, on the multilateral, bilateral, regional levels, aiming at technology (section 2.6.) and foreign investments (section 3.4.) have all led towards the rationality, and certainly the importance, of an integrated policy approach towards the issues concerning technology transfer from modes of foreign entry to the host nation. A truly integrated policy, in the context of this thesis, should accommodate the differing aspects of technology transfer interests and concerns.

The previous discussions have also implied that a defining feature of successful development strategies is an effective and flexible system that encourages and discipline private investors by raising profits above those generated by competitive market forces, and active policies to ensure those profits found domestic outlets that would add to productive capacity, create jobs and help technological progress (Amsden, 2001).

Policies targeting technology transfer have changed. Governments have moved from direct controls to market-friendly approaches (WIR, 1999), such as improving the business and FDI environment, strengthening legal and other institutions and enhancing skills and raising

capabilities of local enterprises. Market friendly approaches are themselves shifting to providing stronger pro-innovation (technology seller) regimes complemented by TRIPS (UNCTAD, 2001h), while continuing to encourage technology transfer policies through relaxed performance requirements and incentives. The above rationale is elaborated in the following section.

4.4.1. Overall Technology Transfer Policy Rationale

At the outset, it is important to highlight that only a few countries managed to intervene effectively in the transfer process. This was done by providing information and assistance to local enterprises in the context of strong export orientation and massive investments in skills creation and development (Kim, 1997; 2002).

Technology transfer performance requirements are negatively correlated with technology flows to host countries (Blomström and Kokko, 1995). Supporting this, one study found that intra-firm technology transfer by Japanese MNCs was discouraged when host authorities imposed technology transfer requirements as a condition of entry (Urata and Kawai, 2000). Technology transfer laws in Nigeria have not led to greater transfers of modern technology (Muchlinski, 1999), largely because local capabilities and skills are weak and the business and trade environment is not conducive to technology upgrading (Okejiri, 2000).

Nevertheless, making the best use of FDI-mediated technology transfer requires policy support in the host economy. MNCs with the most suitable technologies have to be attracted, and induced to transfer their most appropriate technologies from host perspective. If MNCs start with simple technologies suited to the low wage and low skill setting of many developing countries, they have to be persuaded to upgrade them as wages and skills rise. In more advanced economies, they have to be induced to transfer the technology development process itself, undertaking more design and R&D locally (WIR, 1999). The development impact of technology transfer through FDI goes well beyond what happens within foreign affiliates—it extends to diffusing technology and technological capabilities to local suppliers and buyers and contributing to local innovation capacity.

In all these areas, there is a risk that markets will not by themselves optimise technology transfer and development. Once transferred, the efficient use of technology faces problems that may call once again for further policy intervention. Some imperfections are inherent to transactions in information; others arise from weak institutions and markets in host countries, from a legacy of inefficient policies.

Developing countries have moved from the direct regulation of technology transfer towards a more market-friendly approach. There are now developing countries with comprehensive systems for vetting technology contracts, either between independent firms or between MNCs and their affiliates (WIR, 2003). Measures taken by developing countries span a wide range; from those directly affecting technology transfer through FDI, to broader policies on enterprise development, skill creation, inter-firm linkages and the promotion of innovation, in addition to targeting technology-intensive activities and functions by promotion agencies seeking to attract new FDI (WIR, 2002), offering incentives for existing foreign affiliates to upgrade technologies and undertake more R&D and the encouragement of greater local content and stronger local linkages (WIR, 2001).

The market friendly approach largely leaves technology contracts to the enterprises concerned, treating technology as a private asset that is traded on market principles, subject, among others, to general competition rules that control abuses. It is contended that a country's level of education and the competitive pressure faced by firms are both positively related to the amount of technology transfer (Blomström et al., 2000).

Other international initiatives based on the regulatory approach include the draft UNCTAD Code on Transfer of Technology, which did not materialize into an international agreement (Patel, Roffe and Yusuf, 2001). The TRIPS Agreement addresses some licensing practices pertaining to IPRs, which restrain competition, may have adverse effects on trade and may impede the transfer and dissemination of technology. In doing so, the Agreement provides, for the first time in a binding international instrument, rules on restrictive practices pertaining in licensing contracts (Roffe, 1998; UNCTAD, 2001f; UNCTAD-ICTSD, 2003).

Interestingly, restrictions on FDI (as the mode of technology transfer) while encouraging other forms of entry that promote local R&D capabilities has succeeded in Japan, the Republic of Korea and Taiwan Province of China as the best-known examples (Lall, 2001; Kim, 2002). But such strategies did not work well in other countries, largely because the context and the way strategies were applied differed. In fact controls on inward FDI (used, among other things, to regulate technology transfer) have declined in recent years.

Summarizing the previous discussions, and in support to arguments of previous chapters, UNCTAD/WIR (2003) contended that the special support needs of developing countries could be achieved by integrating the right mix of policy instruments and conditions. Direct controls on technology transfer and FDI do not fully succeed because they do not address two issues: the information and administrative requirements of technology regulation, and the absorption and upgrading of imported technology. It is difficult for any government to dictate effectively to private enterprises the best technology to buy, the most economical terms for procuring it and the optimal structure of transfers over time.

On the FDI front, it is similarly difficult for governments to dictate which technologies to transfer or how much to restrict entry to encourage infant local enterprises. The difficulties are far greater in developing countries, where information and skills are more scarce, institutional structures more rigid and local enterprises and institutions less developed.

Controls that tended to impose uniform, inflexible rules across industries, stipulating the duration of contracts, payment terms, foreign shares and the like without taking the specific circumstances into account have led in some cases to the transfer of older, less valuable technologies, and sometimes barring access to new technologies. The transfer process itself tended to be shallow and incomplete, because the seller had little incentive to transfer more complex segments of the technology or to help the buyer continuously to upgrade technologies over time. The outright prohibition of restrictive clauses in technology transfer contracts by some countries often raised the price of technology and reinforced propensity to provide less valuable technologies (Contractor, 1982; Desai, 1988; Correa, 1995).

Restrictive technology transfer policies gave few incentives to host firms to master and upgrade imported technologies, concealed these inefficiencies and added to the ineffectiveness of such policies (Lall, 1987; Desai, 1988). In reality, such regulations focus more on the cost of transfer, than on the conditions needed for the effective absorption and upgrading of imported technology. Table 4/3 assesses the various objectives and policies needed to regulate and stimulate technology transfer through foreign investment.

Table 4/3: Integrated policy options for technological capability building

Objectives/Strategy	Policy	Policy Instrument	Condition
Emphasize indigenous technology. (Promote domestic technological capabilities & minimize reliance on FDI)	- Conditions on FDI - Incentives to partnership agreements - Government support to domestic firms - Foster national flagship firms	- Target the mode: Foreign ownership restrictions - Financial and tax incentives to local firms - Technical support, R&D promotion programmes - Effective export promotion - Encourage hiring of foreign experts - Licensing and capital goods imports	- Exposure to international competition (as by strong export orientation) - Availability of skilled labour - Financial resources - Entrepreneur's willingness and ability to undertake risky technology investment - Institutions able to support skill, technology and export activity
Promote Mode (FDI). (Minimize government intervention anticipating fore granted technology transfer)	- Encourage large FDI inflows - Relax FDI restrictions - Ensure macroeconomic stability	- Remove FDI restrictions - Provide incentives to foreign/local alike - Liberalize trade - Foster competition and well-structured IPR regimes - Provide good infrastructure - General FDI promotion	- Efficient and credible institutions to administer market-friendly policies - High local absorptive capacity
Promote technology transfer by FDI with proactive government intervention on both mode and technology.	- Target specific TNCs - Provide incentives for TNCs to upgrade their technologies	- Industrial parks and advanced infrastructure - Well structured IPR regimes - High level skill and strong training system - Rigorous quality/standardization standards - Targeted incentives for activities/firms	- Institutions able to handle incentives - Institutions able to select technologies - Institutions for technology support and skill formation
Mixed strategy.	- Promote linkages with domestic economy - Build local technological capabilities - Encourage deepening of TNC activity	- Business incubators - Information houses - Industrial and technology parks (technology) - Supporting R&D - Supporting joint ventures, licensing (modes) - Supporting training of domestic labour	- Institution to bargain with TNCs - Institution able to plan strategically - Ability to integrate skills, financial markets, infrastructure and technological capability development

Source: The author, adapted from WTO 2002a; WIR, 2003.

The development and refinement of investment promotion tools (attraction of new investments and upgrading of existing ones) is perhaps the cutting edge of policies for technology transfer. Policies directed only at foreign investors are unlikely to work alone if the environment is not conducive to advanced technological activity (WIR, 2003). The scant evidence on technology transfer requirements suggests that, for the reasons mentioned above, they too did not work well (Kumar, 2002).

4.4.2. Mode Policies with Technological-Performance Requirements

The previous section discussed technology transfer policies, and their interlinkages to foreign investment. In this section, the reverse perspective is reviewed, namely the assessment of mode-related policies and their interlinkages to technology transfer.

Many countries sought to encourage technology absorption by stipulating foreign equity shareholding or insisting on minority joint ventures. The presumption was that greater local ownership would lead to better absorption and diffusion of technology. Where imposed on reluctant technology sellers, however, the results were often not in accordance with expectations. The strategy worked best in countries that had strong local firms, a large skills base and an export-oriented environment. It also worked in some large developing countries. For instance, in India, joint ventures—stipulated by domestic equity ownership requirements—were found to have generated substantial local learning and transfers of technology (UNCTAD, 2003f).

Nevertheless, technological performance requirements imposed on foreign investments tended to raise the cost of transfer to MNCs, inducing them to provide less valuable knowledge or invest less in rooting the technology locally. They thus appeared to be less effective than joint venture requirements.

The evidence on the effectiveness of technology transfer performance requirements imposed on foreign investments is scarce. Interviews with government officials in South Africa revealed that their system of technology transfer requirements had so far not succeeded in attracting the hoped for levels of technology transfers. Other studies lead to similar findings.

Other types of performance requirements with technological attributes often imposed on modes of entry include local content requirements, R&D and employment requirements.

Empirical studies show diverging results on the role of local content requirements (including local supplier sourcing) as a development tool. Some studies show that local content requirements have been effectively used to overcome information asymmetries and other

market failures to prompt MNCs to source locally, licence the local manufacture of components that it may not do otherwise, identify promising local capabilities and provide them with know-how and technology (Kumar, 2002b). The development of local supplier capabilities far outweigh the short-run welfare loses that local content requirements may impose (Balasubramanyam, 1991). The Korean international success was also much affected by original equipment manufacturing for foreign MNCs, through which important flows of production methods, quality control practices, and management procedures were channelled back to local suppliers (Hobday, 2000; Sachwald, 2001; Moran, 2002).

Meanwhile, a number of other studies have concluded that local content requirements can retrospectively be costly and an inefficient policy tool in terms of resources allocation and growth (see WTO/UNCTAD, 2002).

Egypt imposes local content requirements in several of its industries (Kumar and Singh, 2002). In developed countries, local content requirements are also used. In the automotive industry, Italy required 75% local content on the Mitsubishi Pajero, the United States imposed a 75% rule on the Toyota Camry and the UK 90% on the Nissan Primera (Sercovich, 1998). Australia imposed an 85% local content rule on motor vehicles until 1989 (Guisinger et al., 1985; OECD, 1989; Safarian, 1993; Pursell, 1999; Chang, 2002).

Quite relating to the stimulation of the local supply networks, but from a different perspective, and drawing on a large-scale cross-country, cross-industry data set including 233 subsidiaries in four EU host countries, empirical work by Tavares and Young (2002) presented evidence that if traditional targeting criteria (according to home country, age, entry mode and concession of incentives) do not seem to be effective, probably the best way ahead for governments really committed to stimulate local sourcing linkages would be to focus on enhancing the capabilities of the local industrial fabric.

Imposing R&D performance requirements is one approach that has been used by policy makers in various countries in order to maximize benefits from FDI, as R&D is a highly sought activity. R&D requirements are of limited scope (setting up an R&D centre, or

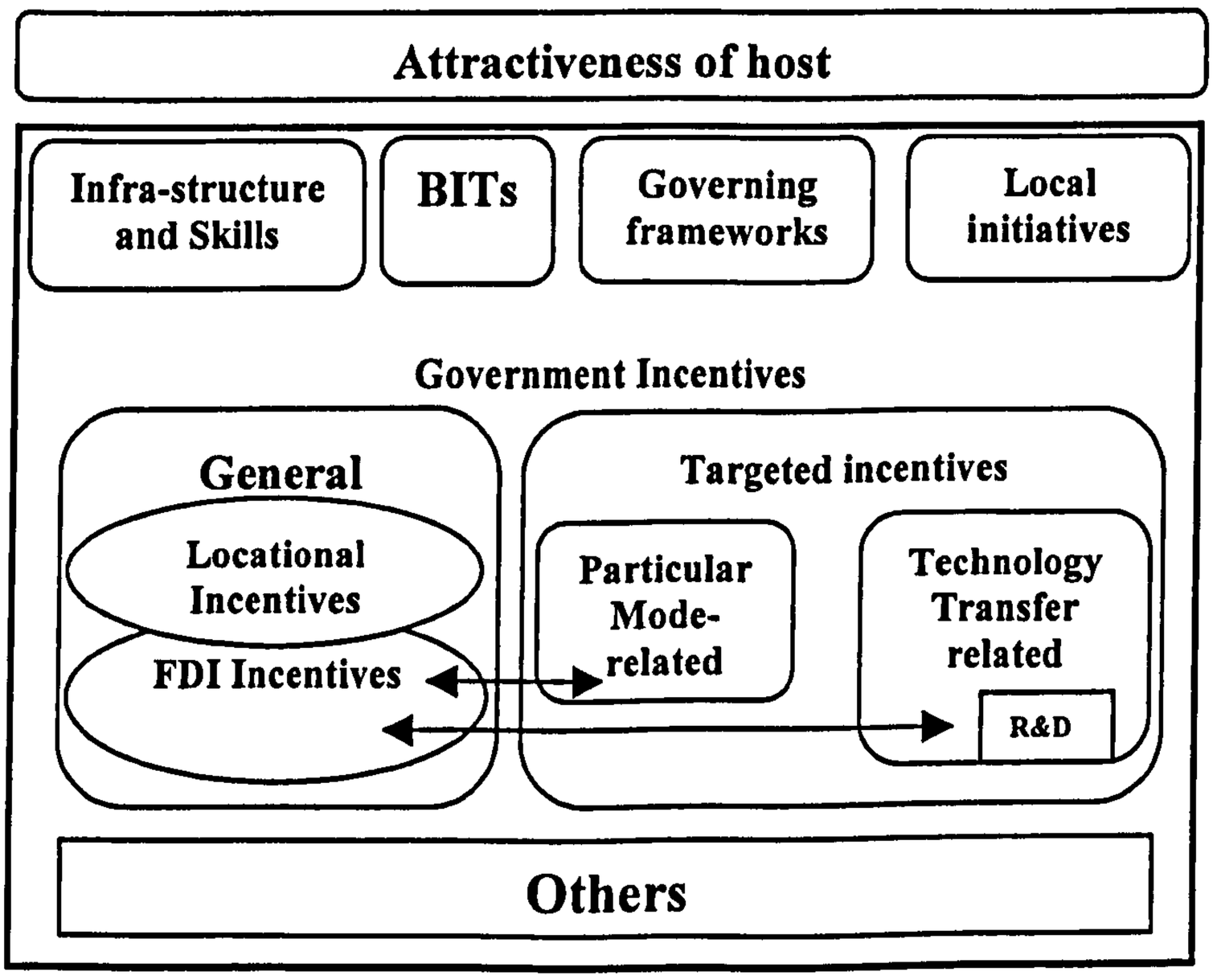
allocating a certain percentage or R&D) due to difficulties of systematic monitoring. Mandatory applications of R&D requirements appear to be rare (UNCTAD, 2003).

Employment and training requirements may be imposed for a number of reasons. The purpose may be to address various imbalances in the labour market, to induce firms to engage more actively in training and human resource development activities and/or to encourage the expansion of certain skill-intensive functions. Environmental assessments, standardization and export performance are also established and often effective performance requirements used among many developing countries (Kumar, 1998, 2002a).

4.4.3. Impacts of Host Incentives on Modes of Entry and Technology Transfer

The previous discussions indicated that the concerns prompting earlier interventions in technology transfer have not disappeared. The incentives regime is a main constituent of the overall host attractiveness. In fact incentives are heavily deployed in Egypt's policy framework. Figure 4/3 demonstrates synthesis of the incentive types previously discussed:

Figure 4/3: Incentive categories within a host attractiveness perspective



Source: The author.

Incentives may be used directly, or for various interlinked purposes. For instance, the use of locational incentives to attract FDI has considerably expanded in frequency and value. The widespread and growing incidence of both fiscal and financial incentives is well documented until the mid-1990s (UNCTAD, 1996a; Moran, 1998; Oman, 2000), and has continued (WIR, 2002; Charlton, 2003). In general, developed countries and economies in transition frequently employ financial incentives, while developing countries (which cannot afford a drain on the government budget) prefer fiscal measures (UNCTAD, 1996a; 2000g).

When considering incentives, governments account for risks in offering incentives to MNCs that would have invested anyway, so the incentive becomes a mere transfer from governments to foreign companies. Incentives may sometimes give rise to unintended distortions by discriminating between firms that are relatively capital intensive and those that are relatively labour intensive, between projects of different cash flow profiles or between large and small firms (UNCTAD, 1996a; Moran, 1998). Tax incentives may induce MNCs to use transfer pricing to shift profits to locations with the most generous tax conditions, eroding the tax base in several host countries.

The OECD has developed a comprehensive checklist on FDI incentives. This checklist assesses the costs and benefits of using incentives to attract FDI and the operational criteria for avoiding wasteful effects and potential pitfalls and risks of excessive reliance on incentives-based competition. This list may be also applied to other types of incentives, such as technology transfer incentives (table 4/4).

Table 4/4: A checklist on implementing incentives

The desirability and appropriateness of offering incentives
1. Are incentives an appropriate tool in the situation under consideration?
2. Are the linkages between the enabling environment and incentives sufficiently well understood?
Frameworks for policy design and implementation
3. What are the clear objectives and criteria for offering incentives?
4. At what level of government are these objectives and criteria established, and who implements them?
5. In countries with multiple jurisdictions, how are incentives coordinated?
The appropriateness of strategies and tools
6. Are the linkages between FDI attraction, increased technology transfer and other policy objectives sufficiently clear? Such as employment objectives for instance.
7. Are effects on local business of offering preferential treatment to foreign enterprises well understood? Such as crowding out effect on local business.
8. Do offered incentives reflect the degree of selectiveness of the policy goals as intended?

9. Is sufficient attention given to maximizing effectiveness and minimizing overall long-term costs?

The design and management of programmes

10. Are programmes with realistic assessment of the resources needed to manage and monitor them?
11. Is the time profile of incentives right? Is it suited to the investment in question, but not open to abuse?
12. Does the imposition of spending limits on the implementing bodies provide adequate safeguards against wastefulness?
13. What are the procedures to deal with large projects exceeding implementing bodies' capabilities?
14. What should be the maximum duration of an incentive programme?

Transparency and evaluation

15. Have sound and comprehensive principles for cost-benefit analyses been established?
16. Is cost-benefit analyses performed with sufficient regularity?
17. Is additional analyses undertaken regarding the non-quantifiable benefits from investment projects?
18. Is the process of offering incentives open to scrutiny by policymakers, appropriate parliamentary bodies and civil society?

Extra-jurisdictional consequences

19. Have authorities ensured that their incentive measures are consistent with international commitments that their country may have undertaken?
20. Have authorities sufficiently assessed the responses that their incentive policies are likely to trigger in other jurisdictions?

Source: The author, adapted from OECD, 2003b.

UNCTAD (2003g) indicates that investments largely determined by incentives are more likely to leave as soon as benefits expire. In Botswana for example, generous investment incentives were offered for the duration of five years for individual projects, many companies, both domestic and foreign, decided to close down their activities after the incentives had expired. In Egypt, companies in tax exempted industrial zones benefit from 10-year tax exemptions, after which they relocate or even close down, and then re-establish new companies with new names to reutilise the incentive.

Claw back clauses are indicated in incentive policies as a fall back, whereas if the company concerned did not maintain this many jobs or spend that much capital, then the government agencies had the right to ask for the money back. Employment criteria have often been attached to the granting of incentives. For example, in Ireland the grant cost per-job-created was the key guideline for offering incentives. The follow-up that occurred was also generally made with regard to the employment goal. The interest on the part of investors is also affected by the way employment or training requirements/incentives are implemented. Too much red tape and conditions attached often have a chilling effect on investor enthusiasm (UNCTAD, 2003f).

4.5. Conclusion

Having confirmed earlier the link between technological capability development, technology transfer and foreign market entry, this chapter provided an assessment of issues related to linkages between foreign investment and technology transfer. These are both direct and indirect (synthesised) linkages.

Despite the body of empirical research and given the widespread belief among policy makers that both FDI and technology are essential for growth, it is surprising that the linkage issues between technology transfer and FDI are so fragmented and un-synthesized in the literature. A collective assessment of these overlapping issues and their impacts on technological development and foreign market does not emerge from the literature. In fact, neither did a systematic approach that enables assessment of such linkages issues.

It is perceived important that such linkage issues be holistically considered in the context of assessing technology transfer form foreign modes of entry. This will complement the limited approach of inferring effects of individual linkages onto the local setting.

Successful economies have used FDI to insert themselves into global value chains as an effective way to build competitiveness in the new globalising environment. The strong case for general policy interventions was supported in this chapter.

Policy linkages discussed in this chapter necessitate that they be seen as an inherent part of integrated development policy, both to attract higher quality FDI and to induce investors to upgrade and deepen their activities over time. Interestingly, no assessment emerges from literature regarding the relative impacts and effectiveness of policy intervention (aiming at technological aspects) on various modes of entry.

The need for intervention differs according to the vision of the Government on the desirable technological and investment development path. As Meyer (2001) has indicated, the institutional context shapes the characteristics of inward FDI, notably the preferred mode of

entry. The effectiveness of incentives and performance requirements were also assessed in this chapter.

The effectiveness of utilizing policies, incentives and performance requirements will often depend on the existing environment, local supply chains and overall host attractiveness. Therefore, in order to assess that effectiveness truthfully, it should be done within the context and unique setting of the designated host. Therefore, the following chapter will assess the various issues from Egypt's perspective as a host nation.

Chapter 5: Egypt- An Overall Assessment of Foreign Investment and Technology

5.1. Introduction and Background

The previous literature review chapters provided the conceptual foundation of this thesis in the areas of technology and its transfer, modes of foreign entry and the interactions and linkages between their various issues. The current chapter is structured in a way that follows the same lead of previous chapters and is hence directly associated with perspectives raised in them. Nevertheless, due to a substantial lack of literature and consistent data in Egypt (as this chapter will clearly demonstrate), the various perspectives of technology and its transfer and modes of foreign entry in Egypt will be addressed through a holistic and contextual assessment.

Therefore, this chapter aims at providing a comprehensive assessment of the attractiveness, infrastructure, macro frameworks and policy frameworks of Egypt and their impact on investment and technology. Specific issues that affect technology transfer and modes of entry of foreign companies into Egypt will also be assessed. As such, issues unique to Egypt will be identified.

Egypt is the most populated Arabic country with a population of almost 70 million (2003), including approximately 2 million citizens working abroad, mostly in the Middle East (despite decline in job opportunities in the region since the 1990-91 Gulf conflict). Egypt's population is expected to reach 123 million by year 2029 (CBE, 2003).

The last century witnessed the start of an industrialization drive in Egypt, with tariff protection and public credit providing an enabling environment for the domestic private sector. There was significant growth and diversification into textiles, food, building materials, pharmaceuticals, fertilizers, paper, publishing and cinema industries. FDI in the form of wholly owned subsidiaries and joint stock companies was encouraged. In 1958 the open door policy ended. All joint stock companies domestic and foreign were nationalized

between 1960 and 1964. Central planning and budget allocations left little room for private initiative. However, in 1973 the openness policy started again with President Sadat's announcement of a return to free market economy. A more liberalized system of trade, investment and pricing was reintroduced, and restrictive legislative rules and regulations were reduced and replaced by clearer and more explicit ones that protect and encourage domestic and foreign capital.

The period of state intervention was short, yet it did leave a legacy of institutional rigidity, centralization and public sector domination, which has proved difficult to shake off. The transition to a market economy has taken a full twenty years. Egypt's economy still has the remnants of its economic history (Springborg, 1999), but it does appear to have largely regained the characteristics of a fully functioning market system (UNCTAD, 1998).

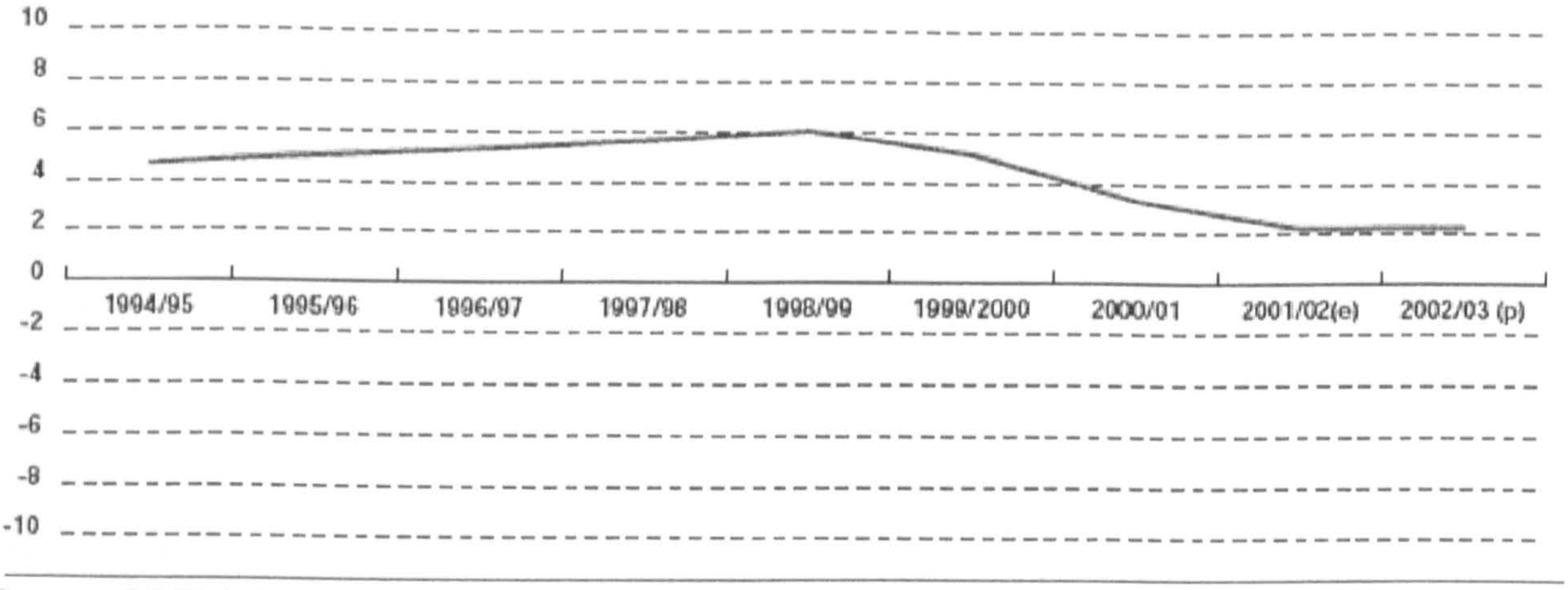
During the 1990's, Egypt was widely recognized as having achieved macroeconomic stability. It implemented a comprehensive economic reform and structural adjustment programme, starting from 1991, with foreign creditors forgiving nearly two- thirds of the country's debt. Sound fiscal and monetary policies contributed to the elimination of inflationary pressures and interest rates remained low. This unleashed an investment boom. Key Economic Ratios, GDP growth and the distribution of the GDP are indicated in table 5/1 and figure 5/1. Economic growth responded positively to macroeconomic stability and Egypt engaged in series of economic reforms and privatisations (WTO/UNCTAD, 2003).

Table 5/1: Key Economic Ratios and Long-Term Trends

	1981	1991	2000	2001
GDP *(US$ billions)*	23.4	37.0	99.3	98.5
Gross domestic investment/GDP	29.5	21.2	18.3	16.9
Gross domestic savings/GDP	14.1	13.2	11.7	12.2
	1981-91	**1991-01**	**2000**	**2001**
(Average annual growth %)				
GDP	5.0	4.7	5.1	3.5
GDP per capita	2.4	2.7	3.1	1.6
Exports of goods and services	6.3	3.1	3.8	3.3

Source: World Bank, 2002.

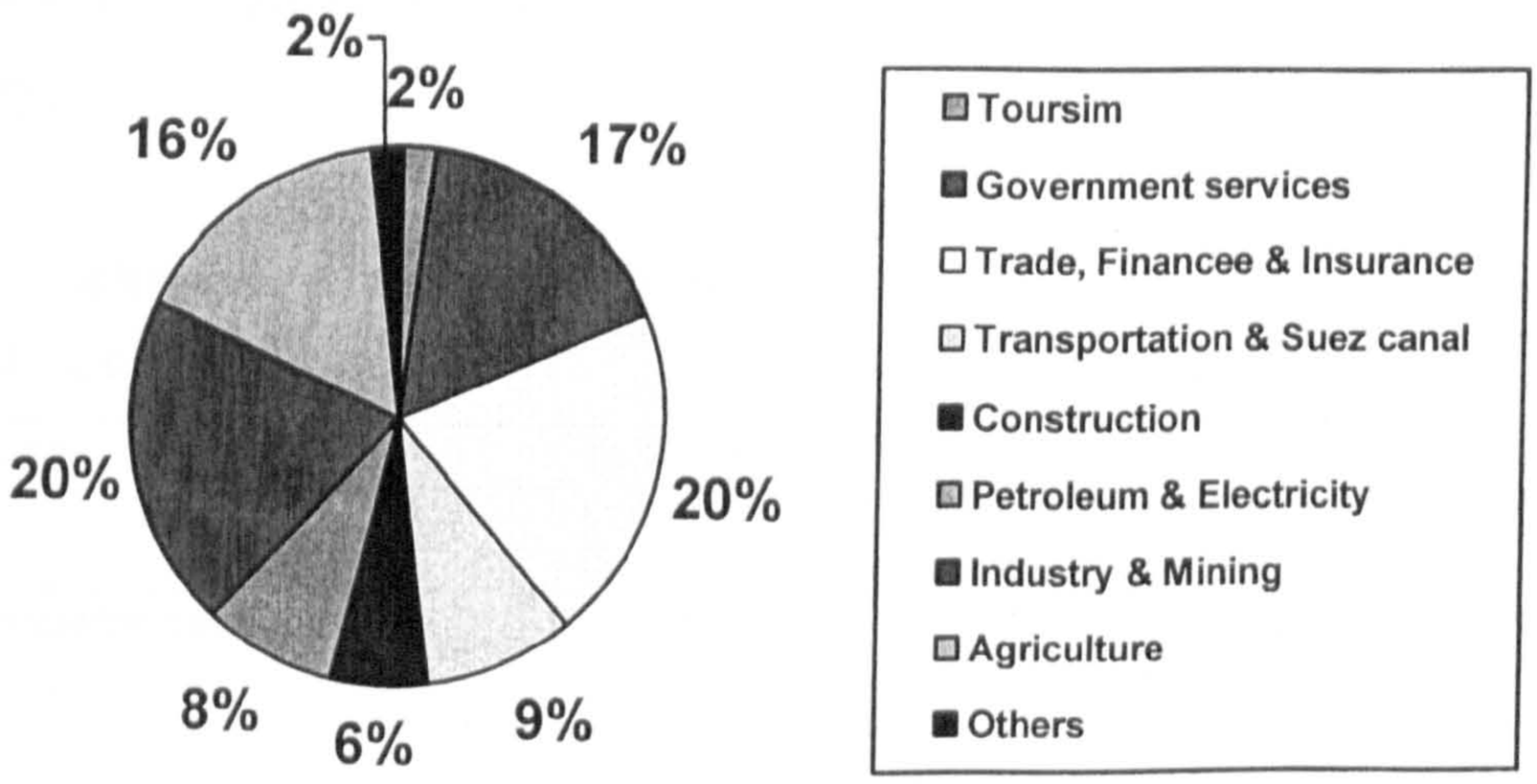
Figure 5/1: Egypt's GDP growth



Source: OECD/AfDB 2003.

Though only 3% of total land is arable land, agriculture remains an important activity amounting to 16% of GDP and 28% of total employment (figure 5/2). Industry and mining account for 20% of GDP and about 14% of total employment. The weight of petroleum and natural gas in the economy is determinant with 8% of GDP and near 60% of exports. In addition, a large informal sector is gauged at as much as 30% of total economic activity.

Figure 5/2: Egypt's GDP by sector in 2000/01



Source: OECD/AfDB 2003.

The Egyptian government in course of its macroeconomic adjustments and stabilization efforts started to redress internal and external imbalances. The government set a target of

maintaining low inflation, a stable exchange rate and prudent and predictable monetary and fiscal policies. Export oriented manufacturing industry is targeted to be the main engine of growth. In realization of the above targets and others, the Egyptian government identified several major challenges facing Egypt at the early years of the 21st century.

These challenges will require increasing vertical and horizontal expansion of inhabited land via ambitious national projects, emphasis on attraction of foreign investment, and capitalization on existing resources. Many of Egypt's ambitious national projects are in the areas of desert reclamation in Sinai and in the poorer Upper Egypt. The government has started investing in projects, such as the new Nile valley in Sinai, Toshka and Tafrieaai East.

The 2002/03 budget includes 19 billion L.E. (about $4.2 billion) for funding mega-projects such as the Toshka land reclamation scheme, the Al-Salam Canal to irrigate northern Sinai and the development of the area east of Port Said. However hindrances to these mega projects exist and affect their long-term prospects. For instance, the extended-family culture of labour workers results in reluctance of workers to move from Cairo or similar cities, a problem exacerbated by shortage of services and recreational facilities at project sites.

The Egyptian government faces important challenges that hamper its development efforts (table 5/2).

Table 5/2: Challenges facing the Egyptian government

AREA OF CONCERN	Government set targets
Birth control	To balance the rate of growth of the population, to a target of 2% or less (achieved through better and more effective publicity targeted at the lower brackets of the society).
Need to increase public literacy	An attempt to lower the astonishing current level of illiteracy of total population to a still-high 20% of total population at least, within 15 years. This illiteracy will become a dragging factor for Egypt in a world that is and will grow even more dependent on computers, Internet and telecommunications for all future dealings.
Need to scan and map available resources (Current and forecasted)	This scan should include all resources such as land, tourism, Suez Canal, infrastructure (water/energy/mineral resources, etc). This scan should include a comprehensive plan for desert reclamation, as deserts still compose over 90% of the overall Egyptian land.
Need for Adoption of consistent national scheme for technology transfer, research and modernization	For this scheme to be effected, all ministries, research centres and private sectors should be involved in one set-up. This scheme should avoid allocating most of research funds into salaries, which was one

of the different aspects of industry and economy	standard process justified at the time to avoid the brain-drain syndrome. The correct balance in the research area must be achieved. The process of technology transfer should receive importance with the final target of creating local technologies to compete internationally, and create mechanisms for transfer.
Account for the expected legislative changes associated with WTO implementations	Related to the intellectual rights and patents. This scheme should activate immediately, as within few years very little protection would be possible for the local production and markets would open.
Need to modernize education	Improved with new areas emphasized, new technologies incorporated in the process and in the content and improvement of illiteracy level.
Implementation of a privatisation programme with minimum political losses	The main issue in privatisation in Egypt, so far, has been the handling of the labour force of the current public sector companies offered for sale (being privatised). This issue in fact, is more related to the political, rather than the social acceptance of the process.

Source: adapted from Ayubi, 1998; World Bank, 2001

Attracting foreign investment to Egypt is one of the biggest interests of the Egyptian government. With a population of 70 million, Egypt needs large investments in order to upgrade it's statue among nations and improve the livelihood of the people (Higi, 2000). The government contends that investments in general, and foreign investment in specific are main factors in the improvement of economic status (both in developed and developing nations alike) and represents clear means for technology transfer, modern management techniques and others.

The government is in a continuous struggle to eliminate foreign investment obstacles and reinforce investment and saving incentives. The national saving rate is relatively low and has to increase, along with the attraction of foreign (including Arab) investments, in order to increase the development rate. The target of the government was to rise with average annual investment through raising it's own investments. The remainder of the non-privatised public sector and the private sector can increase their own investments by approximately 50%. Even so, there will still be a lot of foreign investments to be realized to achieve targets. Further debt is ruled out as a source of funds due to increased interest premiums that nullify any achieved benefits of economical reform (Higi, 2000).

Indeed, Egypt is also engaging on other fronts to achieve the balance of maintaining and developing its natural resources; the adoption of new schemes to achieve a local added

value; the narrowing of the technological gap (between Egypt and the more developed world); and the improvement of problematic areas that deplete other efforts.

On the political side, Egypt is officially a social democracy divided into 26 administrative governorates. The economic, social and political situation is complex. The country is hampered by rigid centralization and lack of co-ordination. Socially, Egypt has made significant progress in literacy, health indicators, infant mortality and access to drinking water that all have improved. Health indicators are much higher than the African average.

On the whole, 81 per cent of the population have access to drinking water, malnutrition among children under five was 4 per cent in 2000, infant mortality was 29.2 per 1000 live births in 1998 (108 in 1961) and 92 per cent of children had been immunized with the major vaccines in 2000 (OECD/AfDB, 2003). Egypt also has 23 non-governmental organizations working in human rights in 2001 (HDR/UNDP/INP Egypt, 2003).

Having provided the general background to the business climate in Egypt (see also appendix 3), the following sections will provide a detailed assessment of the frameworks governing operations of modes of foreign entry and technology aspects in Egypt.

5.2. Egypt's Economic Performance Assessment

5.2.1. Overview

The Egyptian economy began to grow following the efficient and well managed 1991 implementation of the Economic Reform and Structural Adjustment Programme (ERSAP), which significantly reduced inflation, improved the current account balance and allowed for large-scale investment in infrastructure and key projects. However, external constraints linked to the world economic slowdown and regional insecurity arising from regional conflicts, caused Egypt's growth to become sluggish. Tourist income, the main source of foreign exchange and a key motor in the economy's growth, fell by 22 per cent between July 2001 and March 2002. Since 1999/2000, revenue from oil and the Suez Canal also shrank, and growth was virtually zero in the construction, heavy industry and durables sectors.

The budget deficit was 5.5 per cent of GDP in 2000/01, compared with 3.9 per cent in 1999/2000 and 3 per cent the year before. It has been growing steadily since 1996/97, becoming a major problem. The deficit is partially funded by delaying payment to companies (particularly construction) involved in major projects and by issuing treasury bonds (17.8 billion Egyptian pounds in 2001/02 – 4.6 per cent of GDP). The government also borrowed from the Social Insurance Funds kept in the National Investment Bank, at pre-fixed, below-market rates.

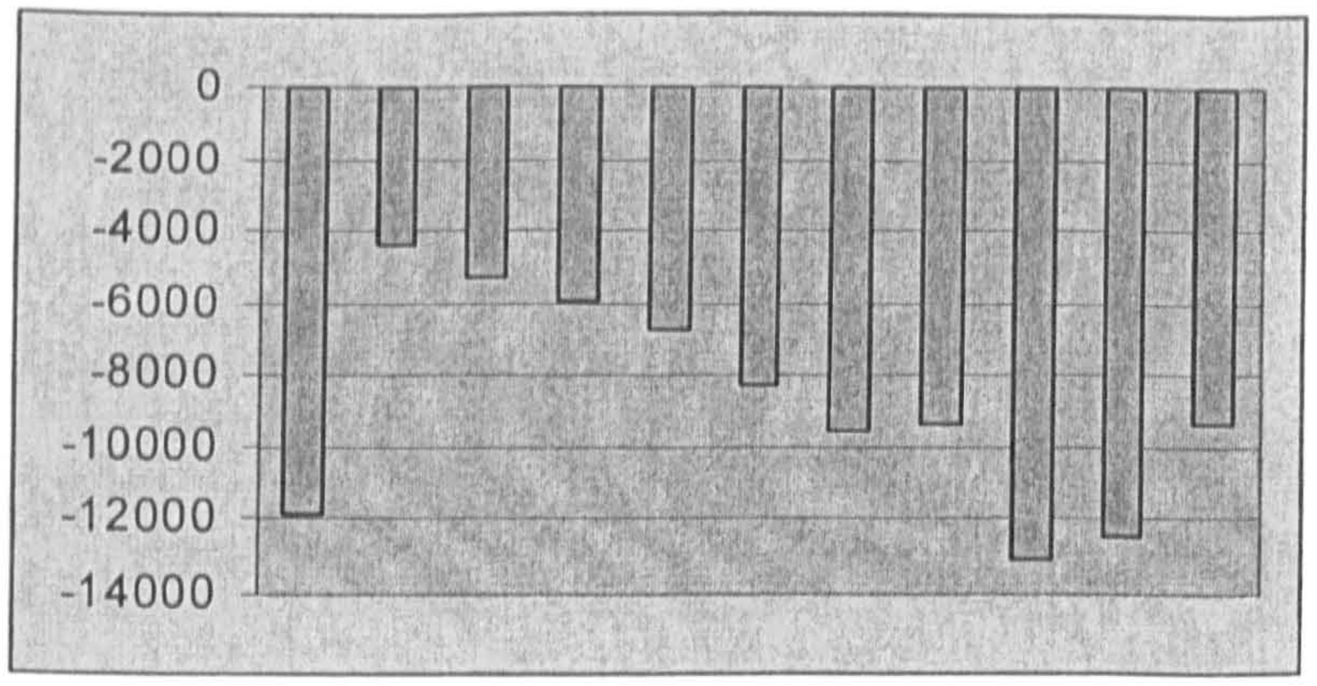
Furthermore, Egypt remains one of the world's most financially assisted economies, being the second biggest recipient of both EU and US aid. In February 2002, several international organizations (such as the IMF, the World Bank, USAID and the African Development Bank) agreed to provide the country with $10.3 billion over three years in order to help it cope with the economic impact of the September 11 attacks (OECD, 2003).

5.2.2. Attractiveness of Egypt as Host Nation

In regards to the attractiveness of Egypt as a host nation, the economic framework of Egypt is quite attractive as Egypt is the second largest economy of the Arab world. Tourism and the Suez Canal are important sectors to the overall GDP, yet the revenues from these sectors experience large fluctuations. Tourism activities in Egypt are very sensitive to security concerns, including concerns related to regional instability, and Suez Canal revenues are highly related to variations in world trade traffic, in particular in oil traffic.

The Egyptian economy is relatively closed, even by regional standards, with exports and imports amounting to 24% of GDP (2000). Consumption has largest share in demand composition, with 83% of GDP (2000). This suggests that economic activity must cope with low domestic savings ratios, and that growth performance has strong reliance on savings being generated abroad. It is fairly said that Egypt has had a chronic trade deficit (figure 5/3), almost without interruption, since before the Second World War. The deficit has been steadily increasing during the 1990's, because of a gloomy performance in exports and an uncompressible dependence on imports (UNCTAD, 2003).

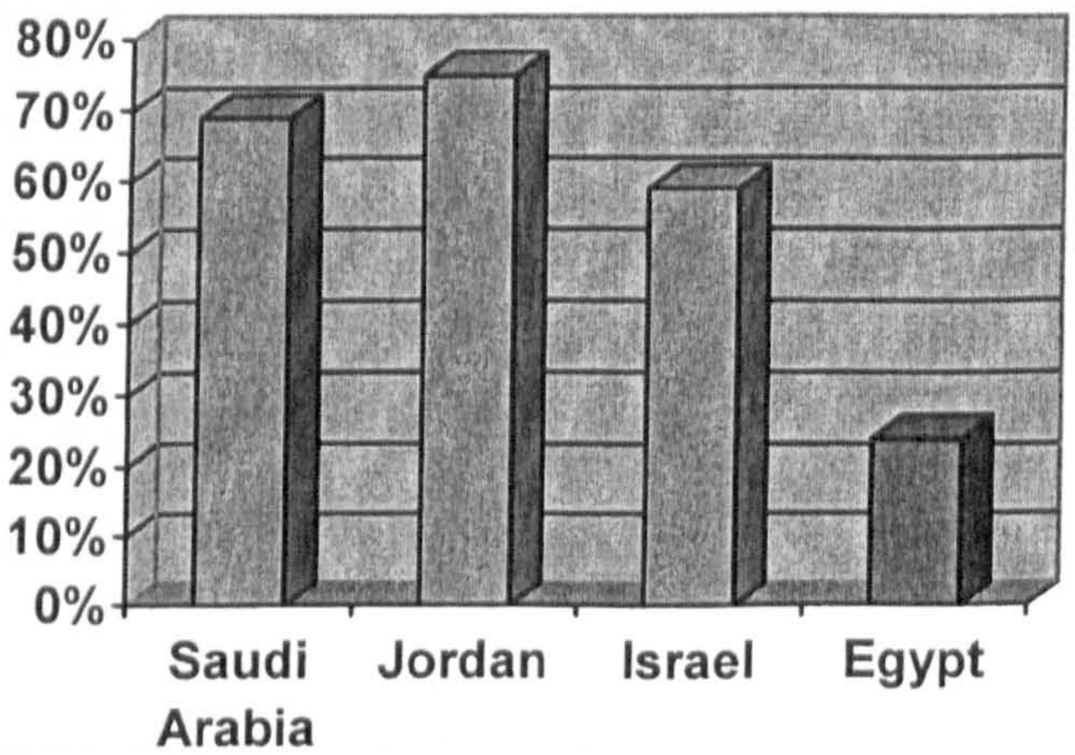
Figure 5/3: Egypt's Trade Deficit 1990-2000 (USD million)



Source: UNCTAD, 2002.

Egypt suffers from an overall imbalance in manufactured goods exports, where about two-thirds of manufactured goods are petroleum-related and agricultural material, indicating a fairly un-diversified basket. World Bank reports indicate that a large concern is that share of unskilled and skilled labour-intensive products fell during the 1990s, indicating that exports are less labour-intensive than previously- an alarming factor to a country with such a large population. In addition, Egypt has failed to position itself into fast growing markets such as high-tech market, contrary to competitors like Tunisia, India, Jordan and Israel (UNCTAD, 2003). Figure 5/4 provides a comparative assessment of trade to GDP in the region.

Figure 5/4: Regional Trade (Exports + Imports) as a percentage of GDP year 2000



Source: EIU, 2001.

On the import front, Egypt is heavily dependent of most raw materials. It needs to import its entire consumption of wood, paper, and 60% of total imports as manufactured goods. The main trade partners and sectors of Egypt are indicated in table 5/3.

Table 5/3: Merchandise trade partners of Egypt

	% of Egyptian Imports (1997)	% of Egyptian Exports (1997)
European Union	38.4%	41.5%
Rest of Europe	12.9%	6.1%
United States	13.1%	11.4%
Middle East	4.8%	17.7%
South and East Asia	14.3%	12.2%
Other	16.5%	11.1%
Total in percentage	100.0%	100.0%
Total US$ million	13'095.3	3'908.0

Source: WTO Trade Policy Review, 1999.

Egypt has several strengths, such as natural resources, large economy, and proximity to regional markets. However, other developing countries possess similar endowments and characteristics, including countries from within the region. Still, Egypt's big market (population of nearly 70 million) is enough to attract major producers of consumer and industrial goods.

Among other principle advantages offered by Egypt is the large competitively priced labour force, and competitive maritime and airfreight rates. While costs vary considerably by industry, average data provide a rough comparative measure of cost competitiveness. Thus, the cost of electricity (measured as the kilowatts per hour that a dollar buys) is competitive with other countries. Similarly, telephone tariffs are very competitive, for local calls and monthly business subscriptions (but the cost and delay in installation of a business line may be a disadvantage). Wages are significantly lower in Egypt than other countries.

Taking a more particular look on the costs side, export/import transaction costs in Egypt are high. These include cumbersome drawback and rebate schemes, expensive port and air cargo services, cumbersome import clearances, and a restrictive quality control system. The government sets separate charges for exports at an internationally competitive level and has eliminated nearly all quality control restrictions on exports, which is a policy that is currently

firing back as a result of many complaints from foreign importers whose countries take action and ban the imports from Egypt (Alahram, 2001).

5.2.3. International Cooperation and Agreements of Egypt

In respect to multilateral policy and WTO agreements, Egypt is committed to the general agreement on trade in services (GATS). In relation to the trade related investment measures (TRIMS) agreement, Egypt had already eliminated some local content requirement in 1994, but certain industries still require local content of up to 60 percent to qualify for customs duty reductions. This is positive to local modes, but simultaneously presents itself as a barrier to investment in Egypt, given the import requirements of foreign investment in the early years of operation.

The WTO launched the Doha Round, which is a "single undertaking" where consensus must be reached by WTO Members in relation to perceived imbalances that have prevented developing countries to fully reap expected benefits of the Uruguay Round Agreements. Egypt is more active in areas such as market access and anti dumping. Egypt has been very active in promoting less than full reciprocity in tariff reduction commitments. This principle is included in the Doha Declaration. According to Egypt, such flexibility should be provided to developing countries in calibrating their level of reductions for certain bound tariff lines, though product coverage should be comprehensive a priori exclusions. Egypt proposes a linear approach for tariff reduction that, according to its views, would be much more suitable for implementing the Doha Development Agenda than a formula approach or harmonization approach. It also proposes that developing countries should have longer staging periods (UNCTAD, 2003e).

Egypt, as a member of the international community, has not only played in many instances a leading political role in the Middle East but also in Africa. Table 5/4 indicates that Egypt has been very active in promoting bilateral investment agreements. It had by 1997 concluded bilateral investment treaties with 43 capital exporting countries, more than any other country in Africa. Egypt has also a leadership role in a number of regional conventions (11 in total, mainly with other Arab states), which relate to investment and its protection; and has

concluded tax agreements with 23 states with regard to the avoidance of double taxation and prevention of tax evasion. Egypt has established preferential trade interaction towards three main directions: the Arab world, Eastern and Southern Africa, and Europe reflecting both the country's geopolitical and economic interests. Also agreement with the US is underway.

Table 5/4: BITs of Egypt

Bilateral investment treaties	
Total	43
In the region	5

Source: UNCTAD, World Investment Report, 1997.

Even though inter Arab trade is only 8% of the country's total trade, Egypt has signed free trade agreements with the following Arab countries (date of entry into force): Iraq (2001), Jordan (1998), Lebanon (1999), Libya (1991), Morocco (1999), Syria (1991), and Tunisia (1999). Egypt also joined the (AFTA) Arab free trade area, and a North Africa agreement.

Within Africa, Egypt is a member of COMESA (Common Market for Eastern and Southern Africa). Within Europe, and in June 2001, Egypt has been the fifth South Mediterranean country to sign an Association Agreement (AA) with the EU – after Tunisia, Israel, Jordan and Morocco. Besides trade issues, and because of competitiveness gap between the two economies, the AA includes a series of €250m EU technical co-operation commitments targeted at modernizing the Egyptian industry. Under this AA agreement, Egyptian producers will enjoy immediate duty-free access to the EU market, but not explicit incentives (UNCTAD, 2003h). Egypt will reciprocate by dismantling all industrial duties according to a three-stage process.

Finally, Egypt would like to complete this network of free trade agreements with a preferential trade agreement with the United States (Trade and Investment Framework Agreement- TIFA). Nevertheless, the US often uses these agreements as a pressuring card on the government of Egypt to implement political and economical US regional policies. This is highly criticized by the Egyptian intellectuals and general public as being against the sovereignty of the country.

5.3. Assessment of the Investment Policy Framework of Egypt

This section will review the current regional FDI trends, situate Egypt within these trends, assess Egypt's investment environment, and critique the Egyptian government policy.

Foreign investments have flown into Egypt at a steadily increasing pace in the 1990s; however, FDI flows to some other developing countries have been increasing more rapidly. Egypt no longer ranks among the twenty largest recipients of foreign investments among developing countries. Egypt's rank among the largest developing country recipients of FDI has fallen, from 16 in 1994 to 19 in 1995 to 23 in 1997 alone, prior to a larger slide in 2001/2002. Annual inflows were below US$ 200 million in 1990, reached up to US$ 1.2 billion in 2000, but fell sharply since to reach US$ 510 million level in year 2001 at a 22.1 % of GDP falling with Egypt to the 107th worldwide rank (see table 5/5, table 5/6 & table 5/7).

Table 5/5: FDI inflows, by host region and economy (Millions of dollars)

Host region/economy	1991-1996 (Annual ave.)	1997	1998	1999	2000	2001	2002
Developing economies	91 502	193 224	191 284	229 295	246 057	209 431	162 145
Africa	4 606	10 667	8 928	12 231	8 489	18 769	10 998
North Africa	1 615	2 716	2 882	3 569	3 125	5 474	3 546
Egypt	714	887	1 076	1 065	1 235	510	647

Source: WIR, 2003.

Table 5/6: Comparative inward FDI stock, % of GDP, selected economies, 2001

Rank in world	Country	Percent of GDP
58	Nigeria	41.6
70	China	33.2
81	Argentina	28.3
107	Egypt	22.1
136	Philippines	14.7
147	Turkey	12.0
161	Pakistan	9.9
175	India	4.7

Source: UNCTAD, 2002.

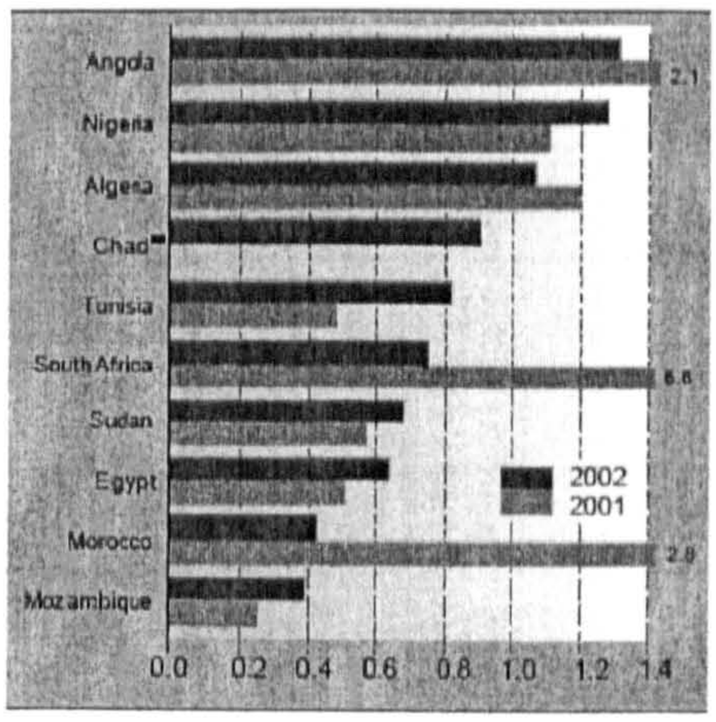
Table 5/7: Trends of Inward and outward FDI stocks, as a percentage of GDP

Region/economy	1980	1985	1990	1995	2000	2001	2002
Egypt							
Inward	9.9	16.4	25.6	24.4	20.1	20.4	24.3
Outward	0.2	0.3	0.4	0.6	0.7	0.7	0.8

Source: WIR, 2003.

On the regional level, it was observed earlier that in the period 1998 to 2000, Egypt attracted more foreign investments than any other country in the Middle East and North Africa (MENA). Egypt and Nigeria together absorbed over 50 percent of the total flows to Africa (1998). This pattern sharply changed in following years as indicated in figure 5/5.

Figure 5/5: FDI inflows to Africa of years 2001 and 2002 (billion US$)



Source: UNCTAD, 2003.

Egypt is being outpaced by regional competition from Morocco and Tunisia and possibly further new competition from Libya, having the economic sanctions against it lifted.

Egypt's large domestic market is no doubt attractive to foreign investments. The industrial base extends from labour-intensive industries through technology-intensive industries, to energy-intensive industries. There are a number of small but emerging high-skill service industries such as financial services and software development. Egypt enjoys comparative advantage not only in natural resources but also in several manufacturing industries, including textiles, engineering, metals, pharmaceuticals and food processing. Foreign investments in manufacturing for the domestic market and labour-intensive export–oriented foreign investments offer the best prospects. The distribution of FDI in Egypt in the year 1997 indicates that agriculture is approximately 1% of total FDI in Egypt, services is 37% while manufacturing is 62%.

On the micro level, in the face of the global economic slowdown, heightened competition forced MNCs to look for (or expand in) new and thriving markets, but worsening market

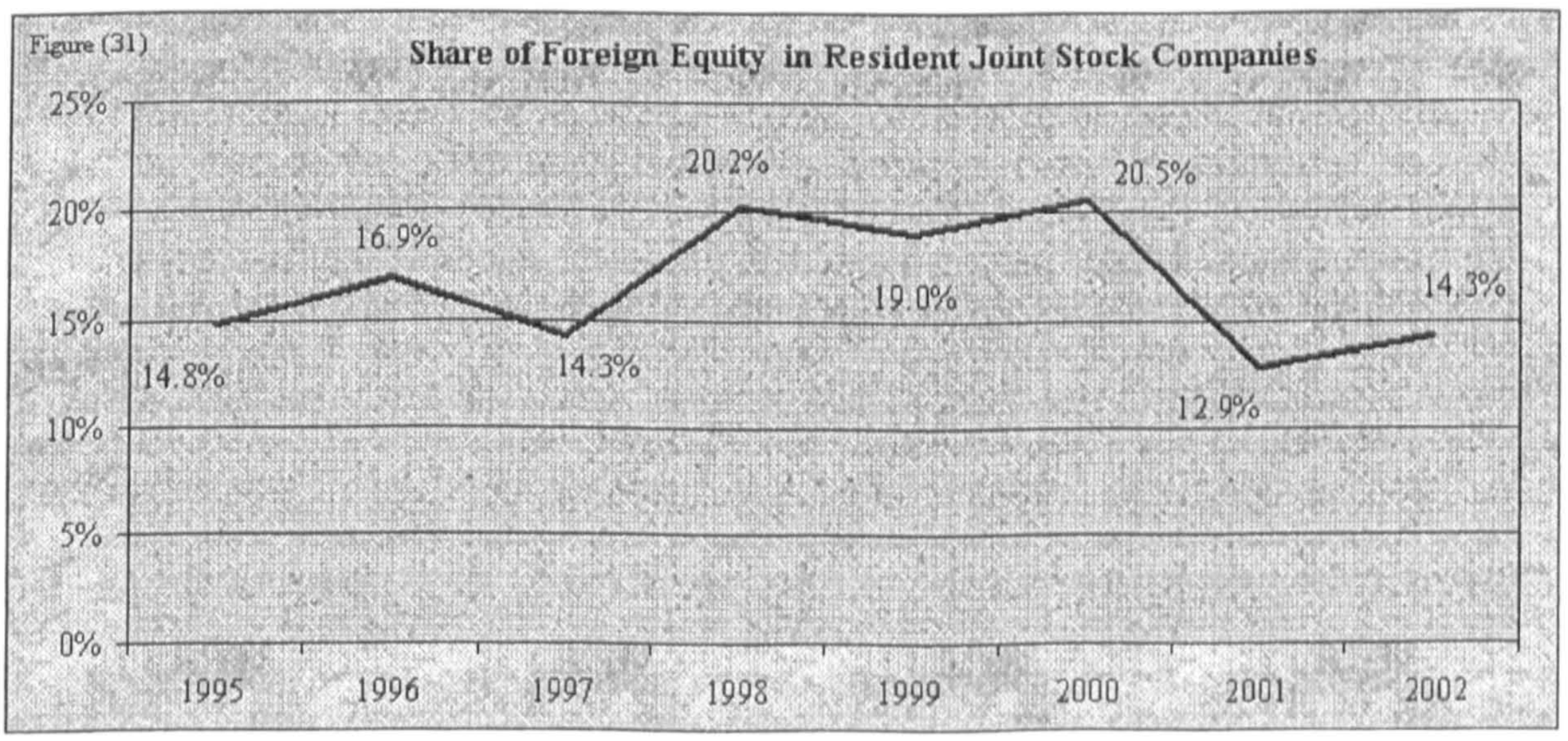
conditions in Egypt and loss prospects decreased market-seeking FDI and narrowed the scope of efficiency-seeking FDI. Recent data for foreign participation in companies in Egypt, overall values and shares of foreign equity trends support this argument (table 5/8) and (figures 5/6 & 5/7), where investors are noted to be responding negatively to current business climate.

Table 5/8: Foreign participation in companies under investment/companies' laws

(LE Million)	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002** Preliminary
General Authority for Investment and Free Zones, GAFI, 2003 (Excluding Petroleum Sector)								
Issued Capital	4,702	8,938	22,447	25,314	20,583	9,302	6,899	6,911
Foreign Participation	698	1,508	3,221	5,103	3,910	1,906	887	991
Percent to Total %	14.8	16.9	14.3	20.2	19.0	20.5	12.9	14.3
Companies Authority, 2003								
Issued Capital	2,239	5,132	5,939	6,539	4,475	2,616	1,397	1,704
Foreign Participation	89	43	142	480	538	169	255	81
Percent to Total %	4.0	0.8	2.4	7.3	12.0	6.4	18.3	4.8

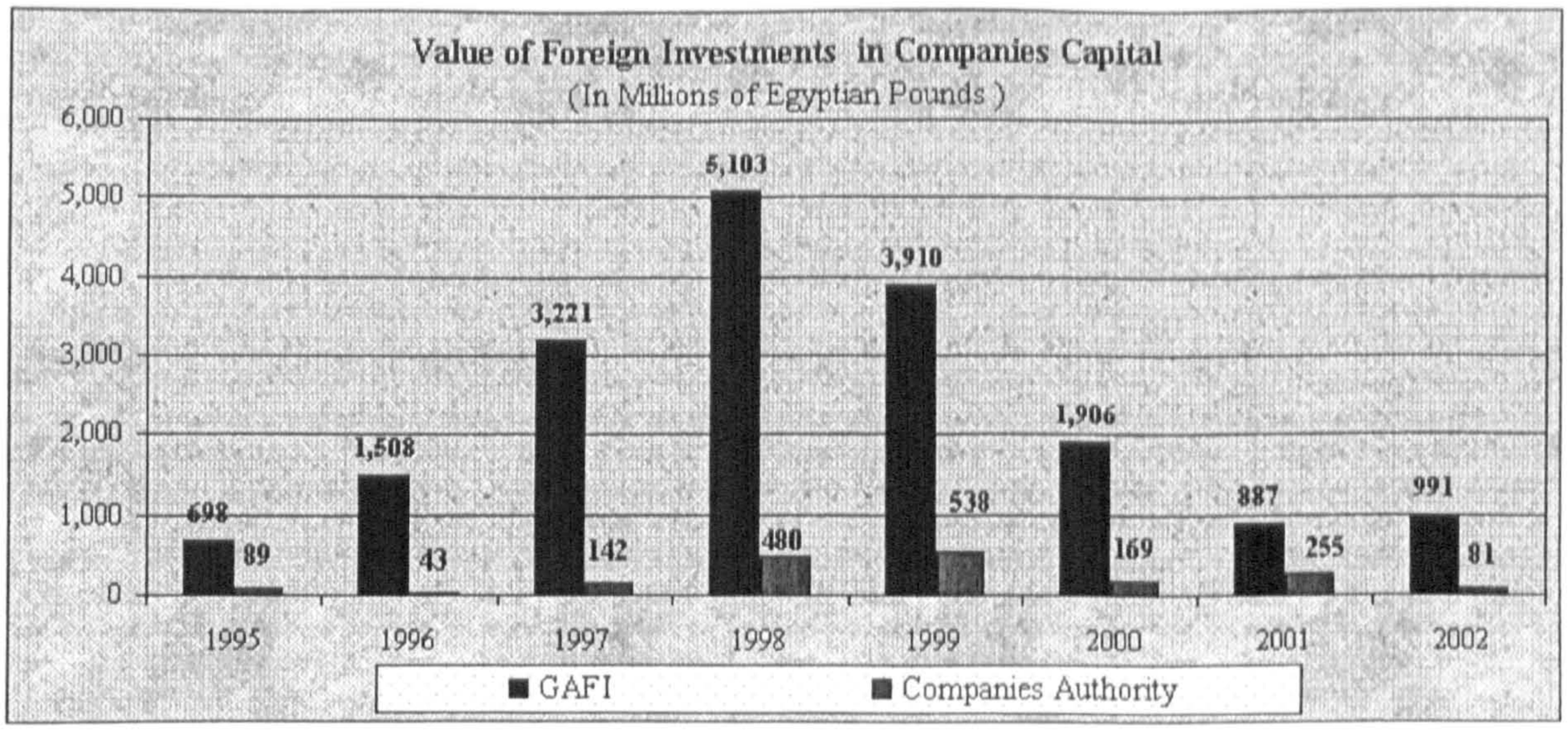
Source: GAFI and Companies Organization, 2003.

Figure 5/6: Shares of foreign equity in resident joint stock companies



Source: GAFI and Companies Organization, 2003.

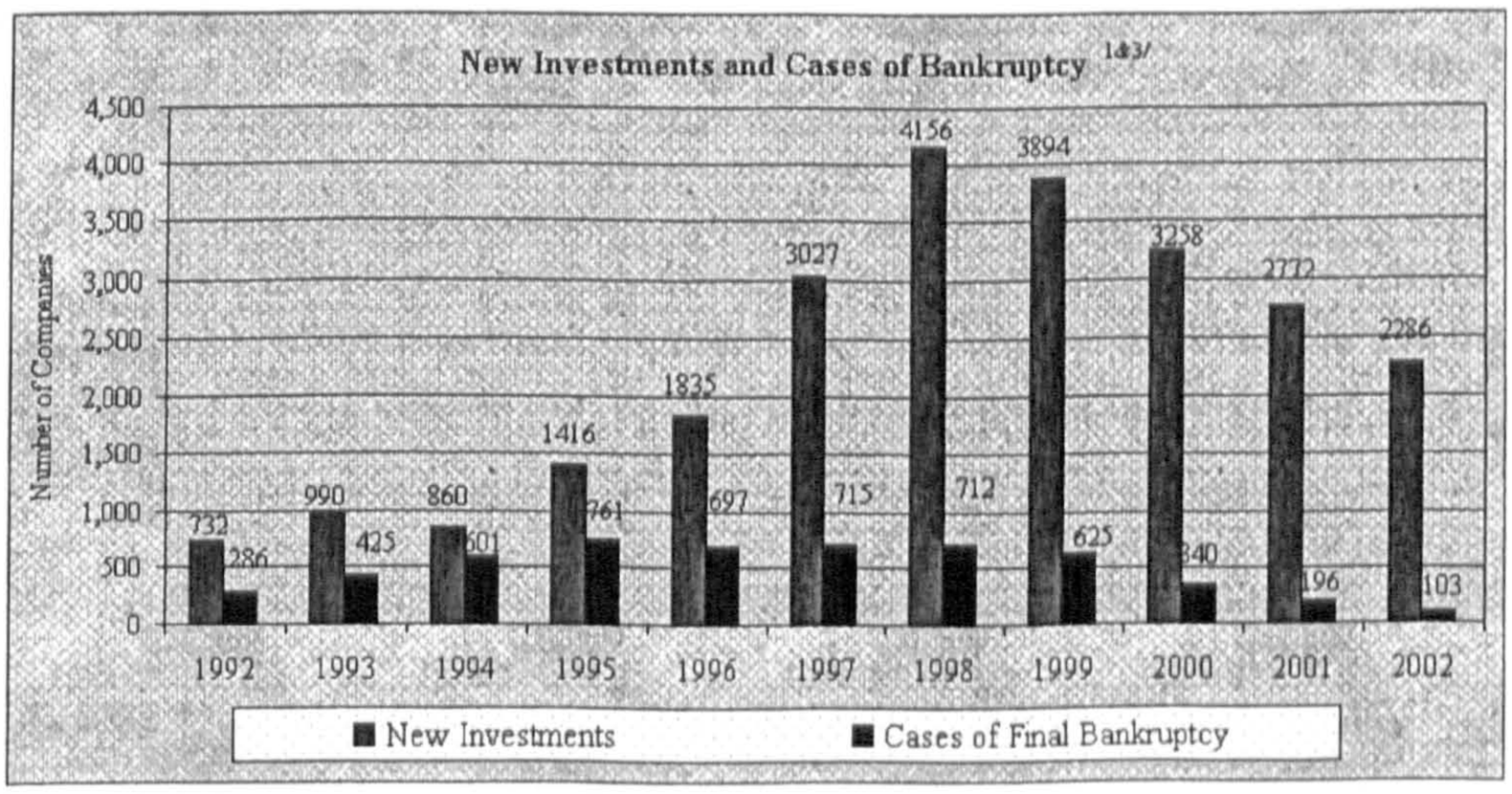
Figure 5/7: Values of foreign investment in companies' capital



Source: MOFT, 2003.

The trend in the investment approvals shows that the average value of an investment project has reached a peak in 1998 and has sharply fell afterwards in an alarming pattern of investors' perception. The number of project approvals (total of new local and foreign investments) as opposed to cases of bankruptcy gives a cause for concern in the near future (figure 5/8 and table 5/9). In 2003 (January to August) no new company was created. Meanwhile, in the same period, 95 companies applied for initial bankruptcy.

Figure 5/8: New investments/bankruptcy cases, 1992-2002



Source: Ministry of Justice, GAFI, and Companies Organization, 2003.

Table 5/9: Number of Project Approvals and Cases of Bankruptcy, 1995-2002

	1995	1996	1997	1998	1999	2000	2001	2002
Total Number of Project Approvals	1,416	1,835	3,027	4,156	3,894	3,258	2,772	2,286
GAFI	263	316	1,045	2,187	2,176	1,873	1,580	1,414
Inland Projects	246	295	982	2,092	2,113	1,777	1,535	1,378
Free Zone Projects	17	21	63	95	63	96	45	36
Companies Authority	1,153	1,519	1,982	1,969	1,718	1,385	1,192	872
Total Cases of Bankruptcies 2/	761	697	715	712	625	340	196	103

Source: Ministry of Justice, GAFI, and Companies Organization, 2003.

Confirming the above, UNCTAD's (2003) inward FDI potential index (calculated based on scores of variables, which include: Real GDP growth, GDP per capita, Total exports, Telephone mainlines, Mobile phones, Commercial energy use, R&D expenditures, Students in the tertiary level, Country risk, Exports of natural resources, imports of parts/accessories of electronics and automobiles, Exports of services and Inward FDI stock) showed a decline in the FDI potential of Egypt in the period 1999-2001.

5.3.1. Impacts of Investment Policy of Egypt

The Egyptian government contended that improvements to the infrastructure and policies were needed in order to attract both local and foreign investments and improve its FDI potential. The government announced, several decisions based on its five year overall plan, aiming at improving infrastructure and investment frameworks.

The legal aspects are key to setting an attractive policy framework, hence consideration was given to provide guarantees to foreign investors, especially in respect to nationalization and expropriation, repatriation of funds, dispute settlement and execution arbitral awards. The foreign investors need assurances in regards to political stability, legal system and overall government planning. Competition agencies need to ensure a transparent, fair and rapid process when investigating, prosecuting and adjudicating anti-competitive practices. A non-transparent and time-consuming review process in fact discourages FDI.

Progress on liberalisation, and particularly structural reform, has proved to be a slow process, frustrating both local and international investors. Economic policy has taken a back seat to social concerns, as the government has attempted to tackle strong public grievances over poverty, price increase and social inequality.

From the legislative perspective, in 1989 the general investment law # 230 was issued and approved, opening previously sealed areas to private investors. In 1997, investment law no.8 was enacted to complement and to introduce more coherence in the plethora of laws governing investment and it represents a considerable improvement on the investment regulatory framework that had evolved during the past two decades. Among the most essential provisions of investment law no.8 is the granting of national treatment to foreign investment. The government of Egypt is making efforts in the right direction to set an adequate investment regulatory framework and it shows a commitment to improving the country's business environment. The streamlining of investment entry procedures by the investment law no.8 represents a positive step. Other benefits of the new investment framework include the relative simplification of the incentive regime and guarantees offered to foreign investors (UNCTAD, 1998).

The basic law regulating and governing the establishment and operation of companies in Egypt is the Companies Law No. 159 of 1981. It sets out the rules and procedures for incorporation in Egypt and regulates taxes, fees and employment rules. Foreign companies may incorporate under the Companies Law, but there are some articles that limit foreign ownership. Thus, the majority of foreign companies choose to register under Investment Law No. 8, under the administrative authority of the General Authority for Investment and the free zones (GAFI). The law consolidates guarantees established by the Constitution and lists 16 areas/sectors, which may benefit from automatic approval and other incentives. The most notable change in the new investment law is the opening up of fields of activity which were previously restricted to foreign investors. The incentives measures under the law include export related incentives and regional development incentives. A summary of legislations that affect both foreign entry and subsequent operation in Egypt is included in table 5/10.

Table 5/10: Summary of legislations related to foreign entry and subsequent operations in Egypt

Law	Goal	Related Structure
Of 1963	Customs tariff law	Based on the percentage of local added value (content) achieved by the local manufacturer, a % of reduction in duties on his imports is granted (e.g. for 40% to 60% local content, companies get 115% of this content in the form of reductions on duties)
Of 1975	Import export regulations law	Governs the detailed related activities and duties
Law # 27 of 1994	Arbitration law	Falls in line with United Nations Commission on International Trade Law. Egypt has also signed a number of treaties for encouragement and reciprocal protection of investments (e.g. USA, UK, etc.).
Law # 38 of 1994	Foreign exchange law	No limits on buy, sell and transfer of any amounts of foreign currency, through banks.
Law # 230 of 1996	Land ownership by foreigners	Permitted for investment and accommodation
Law # 8 of 1997	Investment, incentives and guarantees law	Allows 100% foreign ownership; grouped incentives, repatriation rights, guarantees against nationalization, right to own land. In 2000 new activities were added to those subject to incentives
Law # 3 of 1998	Companies law (Amending law # 159 of 1981)	Covers investors in any sector uncovered by law # 8
Law # 4 of 1998	Environment law	Sets incentives to environmentally compliant companies, and penalties against violators.
Law # 89 of 1998	Tenders regulations law	15% preferential status for locally manufactured products (including foreign ownership companies)
The commercial code # 17 of 1999	The New commercial code	Governs many aspects of doing business in Egypt, such as banking, agency, airline transportation, and technology transfer for the first time.
Law # 80 of 2002	Money laundering law	Governs the activities related to receive, examine and investigate suspicious transactions
Law # 82 of 2002	Intellectual property rights law	All articles are in full compliance with the TRIPS
Law # 83 of 2002	Special economic zones	The law grants exemptions from sales tax, duties and prohibits confiscation.
Law # 155 of 2002	Exports promotion law	Governs the entities involved in export promotion

Source: The author.

As noted from table 5/10, Egypt does not have a specific law for foreign market entry nor for technology transfer. The aspects related to them are inherently addressed within the broader laws of overall local and foreign investment and of commercial activities. S&T laws govern aspects of technology itself.

New initiatives to facilitate export-oriented investment in the free zones are under way. These free zones function as port hubs and enjoy export-oriented services infrastructure. The "technology valley" programme has been designed to develop new zones with dedicated infrastructure to attract investment in high technology industries. Sector-specific policies are also planned to promote clusters of self-sustaining enterprises.

The efforts to diversify the geographical concentration of industry from Cairo include the establishment of industrial zones, new industrial cities, free trade zones and technology parks (table 5/11). They are administered by different entities and offer different incentives to potential investors. For instance, investment in the free trade zones grants special incentives but they have been less successful than investment made in other industrial zones in attracting investment projects. The free zones (Cairo, Alexandria, Port Said, Suez, Ismailia and Damietta) have attracted a larger share of foreign capital in terms of equity participation, but most of the projects are small scale and have lower investment costs. More than half of the approved projects are for storage and warehousing (GAFI, 1998).

Table 5/11: Project investments in Egypt (Number and millions of L.E.)

Projects	**No. of projects**	**Investments (million L.E)**	**Top 4 cities in terms of number of projects**
Manufacturing	3 343	54 320	10th Ramadan (442), 6th October (360), Cairo (369), Assiut (268)
Agriculture	399	10 011	Albihera (52), Giza (44), Sharkia (29), Assiut (25)
Tourism	797	38 977	Red Sea (241), South Sinai (192), Cairo (138), Giza (78)
Construction	251	12 155	Cairo (124), Giza (61), Alexandria (15), Red Sea (11)
Services	506	10 995	Cairo (212), Giza (93), Alexandria (134), Sharkia (28)
Finance	392	15 555	Cairo (237), Giza (114), Alexandria (19), Port Said (6)
Grand Total	**5 688**	**142 013**	

Source: GAFI, 1998.

5.3.2. Impacts of the Privatisation Policy of Egypt

Law 203 of 1991 provided legal basis for the privatisation of the 314 public-sector enterprises from the control of the Government. A series of public offerings went successfully through the stock exchange, starting in 1996. The privatisation offers the prospect of technology transfer, improved management practices, higher quality standards, upgraded marketing, large cash transfers to the treasury, a boost to Egypt's faltering stock market and, eventually, extra jobs.

Of 314 firms identified for privatisation in 1991, only 194 have been privatised: 31 in 1999, 25 in 2000, only 13 in 2001, seven in 2002 and 2 in 2003. As noted the trend is halting. Thirty-two firms counted as privatised were in fact liquidated, and 30 or so others were sold to workers' co-operatives. Though 54 state firms were sold through the stock exchange, only in 38 of these do private investors hold majority positions. Other sales were made to

either single investors (19 per cent of cases) or to the workers themselves (23 per cent) (OECD, 2003). The detailed indicators of privatisations are indicated in table 5/12.

Table 5/12: Privatisations Indicators and proceeds (Law 203 Privatisation), 2003

(By Type and No. of Companies)

Privatisation Method	1996	1997	1998	1999	2000	2001	2002	End of May 2003	Total
IPOs	20	16	9	0	1	0	0	0	54
Majority	14	14	8	0	1	0	0	0	38
Minority	6	2	1	0	0	0	0	0	16
Anchor Investors	3	3	2	9	5	4	0	0	29
ESAs	0	3	12	5	0	2	2	0	34
Liquidations	1	3	6	7	3	2	1	0	33
Asset Sale (production assets)	1	1	3	4	6	3	4	2	24
Leased Co.'s	0	2	0	6	10	2	0	0	20
Total	25	28	32	31	25	13	7	2	194

Source: Ministry of Public Enterprise, 2003.

The selection of companies to be privatised was based on two different approaches: sales to the stock market; and sales to anchor investors (the approach that could bring in new technology and foreign access to markets). The criteria developed were the following:

- For stock markets: choice of profitable companies; avoiding the sale of strategic companies or companies in need of restructuring;
- For anchor investment: tackle financial problems but not dealing with marketing problems; use of sales agents that help in identifying potential buyers.

Privatisation is a main issue on which local and international markets judge the intentions of the government, as it indicates that fundamental reform is under way. The sale of the public sector's stakes in joint venture banks as key industry is halted, and privatisation of the state banks will remain off-limits. The Egyptian government is aiming at improving its ability to implement controversial economic reform initiatives; but there are still enough vested interests in positions of influence to frustrate progress in certain sectors. Reforms can be blown off course by internal dissent or market volatility. The social aim of the government is to ensure that the mass of the lower-income population begins to feel the benefits of the

economic reform programme in order to preclude the damaging effects of widening social polarization (EIU, 2000).

However, with an annual 3.2% increase in the labour force and still high unemployment (officially 8.2%, but independent estimates rise as high as 22% in year 2000), the overwhelming priority of economic policy will remain job creation. Large portions of the implicit unemployment labour endangered by the privatisation programme are susceptible to replacement by new owners of the enterprises. The Egyptian government has offered alternative workouts such as compensating these workers, or providing new converting training to prepare them for new tasks as per required by the new owners in the same or other enterprise, or granting workers who decide on starting small enterprises some financial facilities. In addition to the above, 10% of the offered enterprise stock are allocated for the labour, with special payment facilities (Sultan, 1999). The weight of the public sector is critical for the economy, a fact noted by observing the allocation of the 18.5m Egyptian labour force indicated in table 5/13.

Table 5/13: Egyptian labour force allocation

State sector	**27%**
Formal private sector	**19%**
Informal private sector	**54%**

Source: UNCTAD, 2003.

From a technological perspective, Omran (2004) contends that for privatized firms, significant increases in profitability and operating efficiency were noted, along with significant declines in leverage and employment. No significant change in overall output performance was observed. He suggests that within competitive environments, ownership does not matter, and that both public and private ownership will yield similar performance.

Finally, analyses of the outcomes of the privatisation programme in Egypt (see also section 3.3.1.1. for links to technology transfer and modes of entry) indicates that the privatisation through the stock market of profitable companies has achieved a certain degree of success, while privatisation through the mechanism of strategic (anchor) investors did not meet the expected demand, and the programme is hence now evolving towards a greater reliance on

public subscriptions as the lead strategy. Furthermore, the law prohibiting public sector companies from investing in new resources (technological or otherwise), in preparation for their own future privatisation stopping what was already slow technological development (the promise of technology transfer negatively impacted on indigenous development).

5.3.3. Impacts of the Monetary Policy of Egypt

Liquidity problems stemming from repetitive CBE (Central Bank of Egypt) market interventions resulted in a slowdown in growth in 1999/2000 (EIU, 2000) and are threatening the national reserve of foreign currencies after the flotation of the Egyptian pound (market reserve declined from 22 billion US$ in 1997 to 13.8 billion US$ in January 2002). The Central Bank's inability to supply foreign currency has effectively paralysed the economy, pushing banks to rely on their own reserves. Liquidity shortage of foreign currency has turned out to be a serious obstacle to economic growth (OECD, 2003).

After 10 years of being tied to the US dollar (at 3.4 L.E./$), the pound was floated on stages, to 3.85 L.E. in January 2001, to 3.90 L.E. in June and 4.24 L.E. in August. In January 2002, the central bank announced the pound would be fixed at 4.51 L.E./$, with fluctuation bands of +/- 3 per cent for banks and currency exchange bureaus. Despite this 32 per cent devaluation in approximately 2 years, pressure on the pound continued and the grey market revived (the street rate settled at about 5.1 L.E. at the end of April 2002). The government shut down 51 (from a total of 126 currency exchange bureaus) for periods ranging from 15 days to six months, accusing them of speculation. In 2003, the government announced full flotation of the pound, rising with the exchange rate to 7.3 L.E./$ in the grey market. Such sharp devaluation of the Egyptian pound was expected revive exports but it did not. In fact inflation pushed domestic prices up.

5.3.4. Assessment of FDI in Egypt

As seen earlier, the large domestic market (such as Egypt's) remains a powerful magnet for investors, but is insufficient alone. Furthermore, FDI incentives do not by themselves compensate for the lack of an infrastructure framework. The East Asian experience,

particularly that of Malaysia and Philippines, shows that attracting FDI into high technology activities can happen without targeted government strategy (UNCTAD, 2003b).

Despite of Egypt's encouragement to foreign investment, it has not received its desired level of FDIs. In fact Egypt is experiencing a sharp decline in what should be its stance as an attractive market for investment. Recent regional competition for FDI means that marketing and promotion programmes have a critical role, especially in ensuring that Egypt is "on the list" when investors search for locations for new FDI projects; and also in encouraging investors to choose Egypt from the short list of potential locations. In many countries, marketing programmes are now highly sophisticated in terms of targeting countries, sectors and companies, of utilizing promotional techniques, and of linking promotions to other aspects of the investment attraction package, particularly incentives. Certain circumstances may explain the decline of FDIs in Egypt (table 5/14).

Table 5/14: Reasons behind FDI decline in Egypt

1. Political reasons, and these include:	• Giving violence/terrorism a size and importance bigger than the reality • Giving the anti-foreign cultural (mainly US) substantial importance • The non-existence of a full peace setup in the region. • Political considerations sometimes take an increased influence on Egyptian governmental economical decisions, such as Port Said city (first free zone area in Egypt) that was primarily selected both to compensate the people of the Suez Canal area who were the front end during the consecutive wars, and to protect the eastern gate to Egypt through multinational presence. • The change of government policies over short spans of time. For example, Port Said city that remained a tax free zone for decades, a stance that was recently changed throwing the city into severe recession.
2. Economical reasons and these include:	• The cost of investments are quite higher in Egypt than that in similar neighbouring countries, and this originates from the high taxation structure, that reaches 50% of income, even after the latest deductions and exemptions, while in other countries it is less than 10%, such as Tunisia. In addition to difficulties in the system itself and tax calculation inconsistency. • The unexpected stamps and charges represent a substantial addition to the initial estimation of the investment. Custom duties are also very high on raw materials and spare parts, in addition to the tedious process for any reimbursement of drawback shipments, with large deductions charged as well. The possibility of customs evasion opens the door to product dumping of imported products, severely harming the local investments. Also the tax inconsistencies whereas often the raw materials get higher duties than the semi-finished or finished product. This is attributed to RIFs, which are not applied to raw materials. This harms the local industry. • The production projects are not granted any privileges over commercial

	projects, with financial institutions (same interest rates) • All technologies are imported from abroad due to the weak R&D activities in Egypt, and the unavailability of local technologies, raising initial costs of investments (this would be clear in stream line products that investors expect to find locally); limited integration between science and technology • Red tape, bureaucracy, lack of arbitration, slow legal system • Lack of a national strategy towards investments, the unavailability of updated information except from international bodies such as UN, World Bank, etc, labour laws, human right issues, national security restrictions are all further reasons causing the slow rate of FDI in Egypt.

Source: The author.

In Egypt there does not appear to be a close association between FDI and exports. While manufacturing industries receive more than half of all investment, manufactured products account for only a third of total exports, unlike neighbouring countries in the region.

Government promotions have recently focussed on enhancing existing export oriented investments through intensifying efforts at existing free zone and industrial city investments, reinvestments from established MNCs in Egypt (non-free zone) through encouragement via incentives and reduced protection and finally via new partnerships aimed primarily at the export purposes. These may be promoted through dedicated and innovative investment vehicles (mutual funds, venture capitalism, securities,..). It is important to highlight that FDI statistics in Egypt refer to all equity and investment modes of entry.

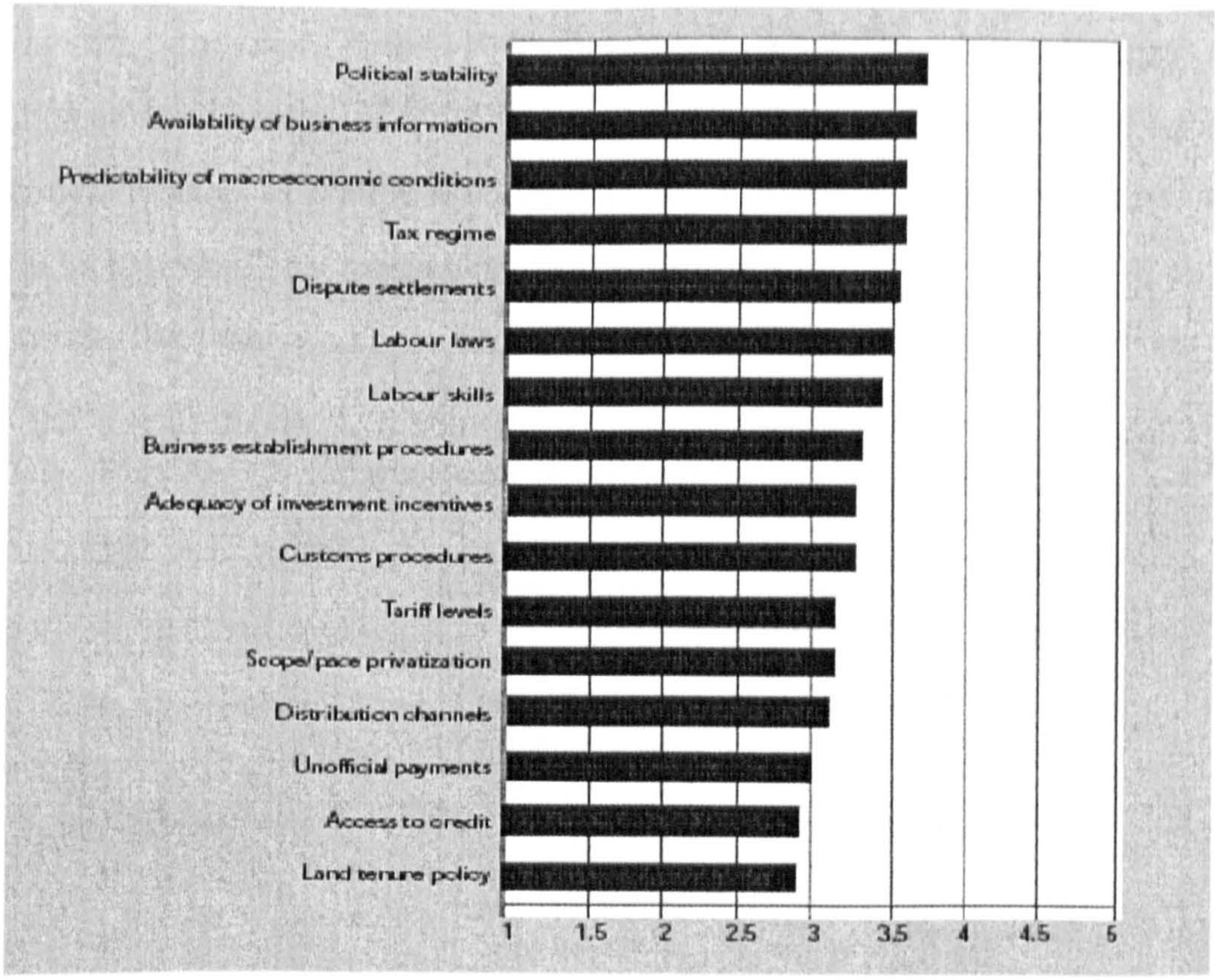
While relative import protection in Egypt had encouraged some foreign companies to establish production operations to gain market access, many others decided against investing for the same reason. In some cases, import barriers, which were lifted when firms export, impede foreign affiliate purchases of raw materials and intermediate goods from other group companies and third party suppliers when they produce for the domestic market. Reducing the level of import protection will stimulate competition and encourage firms to rationalize their operations through reinvestments, and also stimulate economic growth, thereby attracting additional market-oriented FDI in the future.

5.3.5. Assessment of MNC Perspectives and Operations in Egypt

There are three important sources for investments in Egypt, namely Europe, the United States and Arab investors (particularly the Gulf States). In overall, FDI in Egypt originates from more than 35 foreign countries. Egypt currently hosts 26 out of the 100 world's largest multinational corporations. Domestic firms benefit from a range of non-equity form arrangements with MNCs including alliances, leasing technology or brand names and marketing. The foreign firms are getting increasingly involved in joint ventures with low equity investments, and are obtaining credit from the domestic banking system. Therefore, the main contribution of FDI in Egypt is shifting towards providing technology, training and access to international markets (UNCTAD, 1998). An indicator of the potential of the domestic economy to absorb higher amounts of FDI is the profitability of FDI in Egypt. The available data in the 1995 earnings of affiliates of United States' MNC affiliates shows an average rate of return of 22 percent in Egypt, which is higher than the average rate of return of affiliates located in other developing regions, and twice as much as the average income of affiliates located in Europe (10 percent).

Many of the top MNCs worldwide are operating in Egypt, such as General Electric, IBM, Philips, Siemens and Sony in electronics. Toyota, Fiat, Daimler Benz and BMW have invested in the automobile industry. In petroleum, the players include Shell, Mobil, Exxon, BP and ENI group. Bayer, Glaxo, Bristol Myers, Hoechst, Novartis and Du Pont are in chemicals and pharmaceuticals. Unilever and Nestle are in the food and beverage sector. Nevertheless, a UNCTAD/ERF survey of foreign firms operating in Egypt in 1998 indicates various obstacles to business establishment and operation (figure 5/9).

Figure 5/9: Obstacles to business establishment and operation in Egypt



Source: UNCTAD, 1998.

As seen, investors interviewed in the UNCTAD survey (1998) scored political stability, information availability, and predictability of macro economic conditions, tax regimes and dispute settlement as the most important potential obstacles to foreign businesses in Egypt. Egypt scores positively on rankings linked to capital costs and labour supply (cost, availability and productivity). Observations by company executives stress the necessity of strong financial support to parent corporations.

Some foreign companies operating in Egypt foresee that tax holidays are to be considered of little value and preference compared to the abolition of import duties. In addition, companies with different investments modes, face problems harmonizing them together within the existing governing framework. It is argued that human resources are also costly, though there is a shortage of middle managers and skilled labour. On the revenue side, the Egyptian government attempts to reduce tax evasion, but ad-hoc policies are causing more tax evasions rather than improving the situation. This was the case upon implementing policies for phase 2 of the sales tax that has resulted in massive evasions (EIU, 2000).

Export oriented investment, ranks second to domestic market-seeking activities in the future investment plans of firms (1996-98 index of the Africa competitiveness report). Table 5/15 indicates the results of the UNCTAD survey in regards to outstanding strengths (including factors ranked as competitive advantage by potential investors) and weaknesses (including factors ranked as obstacles to direct investment) of Egypt from potential investor perspectives (see also appendix 4 for a framework on foreign market entry).

Table 5/15: Strengths and weaknesses of Egypt as perceived by foreign investors

Economic determinants	Factors	Evaluation
Market	. Market size/growth potential	Strength
	. Proximity to other nearby markets	Strength
	. Strategic business location	Strength
	. Potential return on investment	Strength
	. Financial Risk	Weakness
Cost	. Low cost labour	Strength
Policy framework	. Generally friendly regulatory environment	Strength
	. Preferential access to third markets	Strength
	. Political stability	Weakness
	. Bureaucracy	Weakness
	. Investment and business establishment procedures	Weakness
	. Dispute settlements/judicial system	Weakness
Infrastructure framework	. Good physical infrastructure (roads, IT, etc.)	Strength
	. Qualified personnel	Weakness
Business support	. Linkages/partnerships	Weakness
	. Business information	Weakness

Source: UNCTAD (survey of international investors), 1998.

The prominent modes of entry used by foreign corporates for entry into Egypt are indicated in table 5/16, with a description of the main sectors of these investments.

Table 5/16: Prominent modes of entry types and associated sectors

Selected types of entry modes	Main Sectors
Wholly owned subsidiary	IT, Engineering and Oil and Gas
Majority owned subsidiary	Pharmaceuticals
Joint Ventures	Automotive and manufacturing
Minority Foreign Ownership	Pharmaceuticals
Licensing	Consumer electronics and Automotive
Franchising	Garments and Food products
Management contracts	Hospitality

Embodied technology transfer	Manufacturing
Turnkey projects, BOT	Utilities
Export/Imports	Subcontracting and distribution

Source: Developed by researcher.

Assessing the structure of FDI in Egypt indicates that it has not attracted significant foreign investments involving integrated international production. The development of concession of "build-operate-transfer" (BOT) type contracts need to be further enhanced, facilitating the private, possibly foreign, management of infrastructure projects, especially that BOT projects are now prohibited from using local bank finance and are obliged to depend on their own finance. Sector-specific policies are also needed to promote clusters of related enterprises, especially in technologically intensive areas (Ghamrawi, 2000). A detailed assessment of technology issues in the context of Egypt is included in the following section.

5.4. Technology and its Transfer in Egypt

5.4.1. The Technology Environment in Egypt

Technology has long received priority in Egypt, but emphasis has been placed more on scientific research and less on technological innovation in the productive sphere or at the enterprise level. However, expenditures on research and development (R&D) are relatively low, especially among productive enterprises. Thus, relative to neighbouring countries, Egypt exerts considerable effort on the upkeep of scientists and institutions, but significantly lags on the actual conduct of R&D. The Egyptian science and technology (S&T) infrastructure has key characteristics, such as a ready supply of educated and specialized personnel; a network of R&D institutions; some well focused industrial R&D; and a long tradition of government commitment towards, and financial support for, S&T institutions. Negative characteristics include the inefficient management structure; inadequate resources; weak links between R&D institutions and industry; ineffective and non-motivating funding policies; and a relative isolation of S&T institutions from larger socio-economic activities.

The quantified technological objectives for a 10-year period, as stated by the Ministry of Higher Education and Scientific Research of Egypt conference (1998), are:

- Develop the industry at a rate of growth 11-12% annually during the two five year plans 1997-2007
- Increase the industrial production to the double by 2007
- Increase the exports of the manufactured goods to triple the current level by 2007
- Increase the contribution of the industrial sector to raise the GDP by 50% than its current level by end of year 2007
- Create at least 540000 new jobs related to technological development, add rapport and a social dimension to the programme, and absorb additional human resources.

Interestingly, the Ministry did not announce the action plan by which it aims at achieving its objectives.

On the infrastructure basis, Egypt's S&T institutional structure is extensive. Three government ministries deal with S&T: industry, scientific research and public enterprise sector and the export development bank and the industrial development bank maintain technical departments to assist the private sector. Seventy percent of Egypt's 300+ S&T institutions are involved in higher education, and only 16% are involved in the productive sector (table 5/17). There is a lack of institutions for quality control, design, standardization, etc. The private sector conducts little R&D, and both public and private R&D are below the benchmark of one percent of GDP set for developing countries (UNCTAD, 1998).

Table 5/17: Classification of S&T institutions (number & percentage)

Sector performance	Number of S&T institutions	Percentage of S&T institutions of Egypt
Higher education sector	223	70%
Productive sector	51	16%
General services	44	14%
Total	318	100%

Source: EPR, 2000.

The Egyptian Presidency Report (2000) indicates that the infrastructure for S&T and technological development in Egypt is composed of:

- **Universities**

These include the biggest group of entities, and scientific research units. Egypt boasts 13 universities, with 266 faculties, employing 28137 in year 1998.

- **Scientific research and technological development institutions under relevant ministries**

There are 100 of such establishments, and they differ in the sense they are totally dedicated to research work, along with training and consultancy. These establishments include research centres and authorities under the auspices of ministries, such as ministry of public works, electricity, industry and technological development, etc. Although these institutions maintain some linkages with product development and undertake joint research with private sector, the interaction with the private industrial sector is weak, and government institutions appear to provide general services to small and medium enterprise in a passive way.

As indicated earlier, most of the entities related to research and development and technological development are governmental agencies. This is significantly different from the case in developed countries, where private sector R&D constitutes the majority of R&D efforts. In order to alter this situation, the Egyptian government needs an array of policies to induce the Egyptian private sector to create and maintain their own research units.

- **Researchers and technical employment**

The government is investing most of the costs associated with the education and future employment of these technical calibres. Egypt has almost 71000 scientists and engineers along with 21658 technicians (1997). This implies that the ratio of scientist per million of population is 1128. This is a medium position following the advanced nations, preceding many countries. Nevertheless, only 13.4% of scientists and engineers in Egypt work in the productive industries. This is a very low percentage compared to an 83.5% for USA for example. The government is the main source of finance for the technological development activities in Egypt. The percentage of expenditure on R&D compared to GNP in Egypt has been 0.2 in year 1990 and reached 0.63% only in year 1996/1997.

This is minute compared to 3.4% of Swedish GNP spent on R&D, 2.2% in Israel, 2.8% in Korea. Furthermore, the GNP in these countries is also far greater than Egypt. This demonstrates the gap existing in Egypt in this respect. Egypt ranks 57 in the technology achievement index of Human Development Report, but it ranks 105 in regards to technology creation, and overall diffusion of technology (HDR, 2001).

In conclusion, the strengths of the S&T, R&D and general technological activities in Egypt include the political support for a technological revolution, increased public awareness of the importance of research, readiness of technical calibres, availability of buildings and locations dedicated to the activities, improved telecommunications infrastructure, existence of bilateral agreements that could be better utilized from the technology transfer perspective, improved investment environment in Egypt attracting FDI, and the associated technology transfer activities and the increased focus on IPR. The weaknesses include the absence of a long term strategy for technological development on all fronts, the lack of coordination between the different entities responsible for technology, R&D and S&T, obsolescence of research and lack of new-arena research, the existence of a gap between science and industry, lack of funding for improved facilities on both the micro and macro levels, bureaucracy in employment in administrative jobs and in procedures for attending conferences, no technology evaluation systems exist on the industrial level, and no research evaluation bodies exist, compromise, and lack of proficiency (EPR, 2000). Lack of dedicated international S&T collaboration agreements and lack of centralized information dissemination mechanisms are other weaknesses.

5.4.2. Assessing Issues Affecting Technological Development in Egypt

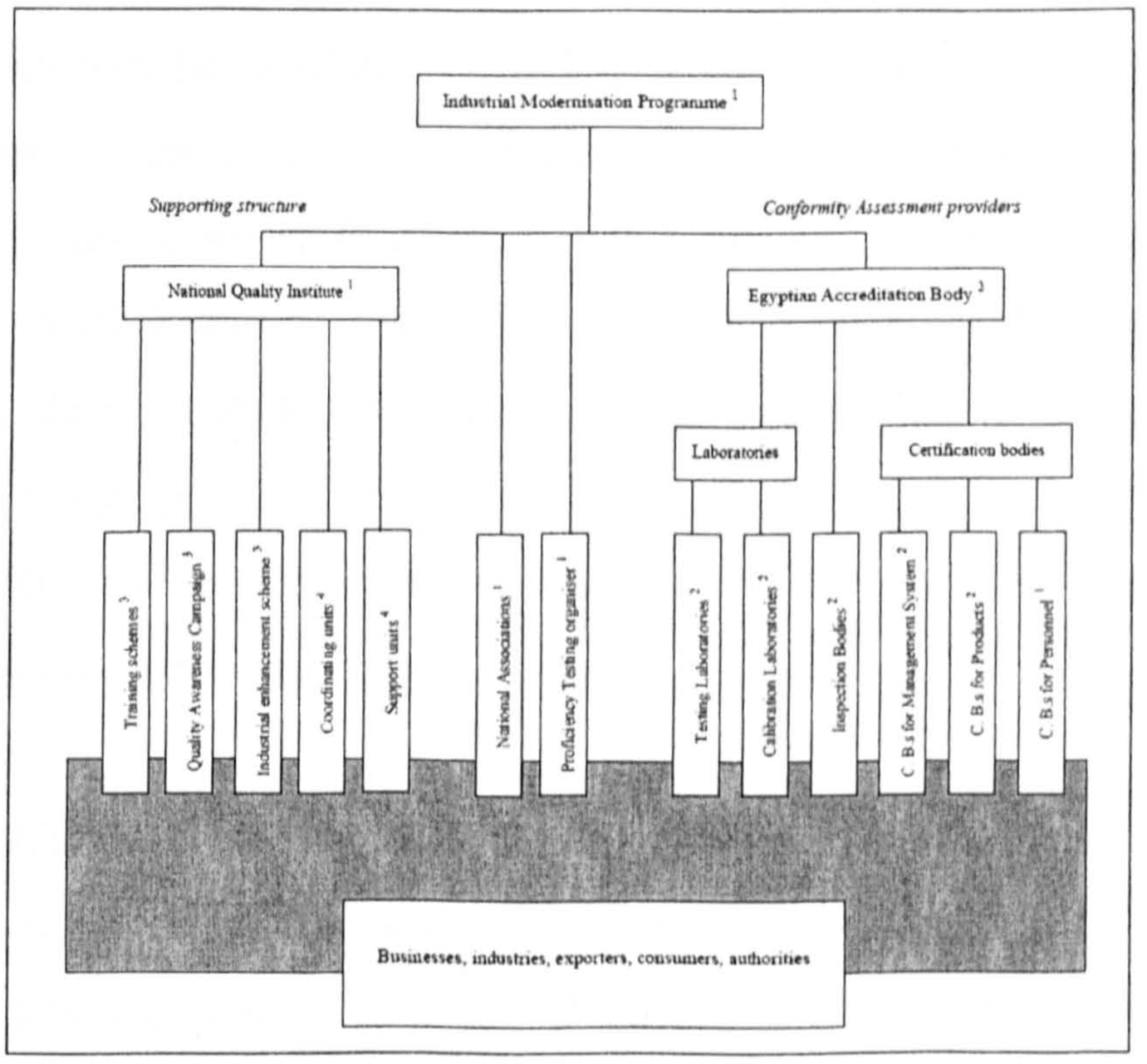
The Egyptian government announced the national project for technological renaissance in September of 1999, the Ministry of Communication was created and the Ministry of Industry was given the task of technological capacity building in the industrial sector. Nevertheless, these positive policies must be complemented with flexible mechanisms and immediate implementation, in order to catch up with the changing global scene.

The most radical legislative change, and arguably the most regressive, is concerning contracts. A number of contractual terms are listed in relevant and recent laws, such as the Commercial Code No. 17 for 1999 that may turn out to be deterrent or harmful to local interest when included in a technology transfer contract. These terms could be interpreted to legally render technology transfer contracts void and unenforceable. These include removal of any obligation on the recipient of the technology to accept modifications of the technology and to pay for them; any clause that would prevent the recipient from modifying the technology to make it compliant with the local environment; any prohibition on the recipient acquiring similar or competing technology; any restrictions on the quantity, price, distribution or export of the goods produced by the recipient using the technology; any obligation on the recipient to purchase raw materials, equipment or spare parts from the owner of the technology or from entities designated by the owner; and any restriction on the sale of the products to certain entities. These terms are so broadly defined under the Egyptian law that virtually any contract that involves some transfer of know-how falls within the category and the restrictive rules that apply. However, there are "get-out" clauses that state that such terms may be enforceable if it is necessary to protect the end-users of the product or for "a legitimate and serious interest" of the owner. The practicality is not clear and will require court rulings, but meanwhile the law's provisions seriously restrict the ability of both local partner and foreign licensor to protect their interests.

In support of technological capacity building, necessary actions need to be taken by Egypt to enhance the overall technological framework include removing legal, financial and other obstacles that hamper direct investment; providing tax incentives for private sector investment in R&D; and redressing remaining weaknesses of the patent system, particularly by strengthening enforcement mechanisms. Other issues include, restructuring of existing S&T entities, dissemination of S&T information, increasing the funding for industrial-related research, offering local and foreign company incentives, establishment of new specialized entities for research in innovative areas in order to create a competitive advantage, review of policies and regulations and regulating the technological content of new investments and creating a unified government approach and commitment to national technological capacity building programmes, and improving BIT technological advantages.

One action that the Egyptian government has already engaged in, related to the technology-specific frameworks is the establishing of the Egyptian Quality System (EQS). EQS consists of both private and governmental organizations. A strong accreditation body, aided by support functions, holds the system together. The system should be developed with due respect to existing Egyptian structures with a view to aligning it with international best practice in line with the European Union. Apart from inspection bodies, testing laboratories and certification bodies for product and system certification, which should all be accredited, the system should comprise calibration laboratories and certification bodies for personnel. A graphical representation of the structure is seen in figure 5/10. Accreditation will serve through monitoring and strengthening of the performance of the individual companies and institutions, which are taking a role in the national system. The National Quality Institute (NQI), the overseeing body of the EQS will act as a technology transfer and broker organization, which works with leading national and international technology providers and universities with the aim to identify, transfer, adapt, disseminate and implement best quality and productivity practices within Egyptian industries and institutions (EIMC, 2003).

Figure 5/10: The structure of the National Quality System



Notes: 1. New permanent structure, 2. Existing structure to be updated, 3. New scheme of support, 4. Temporary structure.

Source: EIMC, 2003.

On the micro-level, better coordination is needed. Selective industries should be targeted at the first phases, along with creation of clusters of research for the private sector, who should take-over a large portion of the efforts in the technological development direction, either voluntary, or through careful advisory services and government incentives. The strategies on the micro level include in-house R&D, reverse engineering, joint venture activities with written technology transfer clauses, export agreements with foreign companies, integration among local industries and coordinated technological training.

It is noteworthy that the current level of up-to-date training is very limited in Egypt, with very few exceptions that include Information Decision Support Centre of the cabinet of ministers (IDSC). There are many training issues in the industrial sector that need immediate addressing, in order for any technological capacity building to achieve its objectives. These issues include (EPR, 2000):

- Definition of the exact technological objectives of the training programme, with the broad sense of technological requirements and with the suitable legislative cover of policies and laws. These objectives should be categorised as short, medium and long-term objectives.
- Technology transfer regulation including screening, recommendation, procurement, negotiation, contracting, transfer, customisation and simulation.
- Training on proficient R&D activities with commercial aspects related.
- Training on rehabilitation, restructuring, management, feasibility assessment, project planning, design, implementation, auditing, social assessment and marketing of technological projects and products.
- Detailed ROI on the training activities above.
- Time efficiency on the technological training.

The industrial framework in Egypt is rather shallow on the technological level, and innovation is achieved, only, through the purchase of new equipment (without a systematic approach to the technological procurement of this equipment) or through turnkey projects conducted by foreign companies, with minimal local contribution (as opposed to technical assistance contracts), or academically with no real ties to the industrial sectors.

The structure of the industrial sector, the workforce skills, the business and social culture, the local technological capabilities and the business environment are called the drivers of competitiveness. This is because their level of efficiency determines to what extent the industrial products of a country are capable of competing in the international market. The competitive drivers in Egypt are perceived to be facing many basic problems (IMC, 2003).

5.5. Critique on Foreign Technology-Related Policy Frameworks in Egypt

Free zone investments in Egypt are concentrated in particular industries such as textiles. The technology transfer associated with these investments is minimal and the efficiency of the current investments is also a concern (Biblawi, 2000).

At the local firm level, Egyptian enterprises suffer from low productivity and poor product design. Problem solving skills in repairs and maintenance are limited. Such weaknesses prevent easy integration of Egyptian firms onto international networks. Yet, typical to cases of other emerging economies, a number of Egyptian private sector enterprises have developed a strong competitive position based upon dominance of the domestic market. But their future expansion requires the technological upgrading of processes and products, and support for their own internationalisation.

Companies in Egypt are finding great difficulties in penetrating the foreign markets, and usually in competing against advanced imports, as a result of lack of innovative capabilities within these companies. Egypt exports less than half of Tunisia's high and medium technology exports (1999).

Realizing Egypt's full technological potential implies the importance of recognition that the government role is clearly needed in setting up the legislative grounds for a national plan for technology transfer, quality and development. The Egyptian government still has the big task of the initial survey of all its resources and facilities.

This includes the S&T infra structure, the human resources, the equipment, the stocks, the organizational structures, the quantifiable capabilities and the requirements of each resource. This also applies to both the private and the public sectors alike.

Although structural, technological, workforce, cultural and business environment issues (competitiveness drivers) influence industry as a whole i.e. horizontally across all sectors; they also have features that are sector specific and enterprise specific. They overlap, interrelate and interact to add to the complexity of industrial development challenges, therefore implementation of any policy intervention related to any one of the drivers will not be confined to a single agency but rather to a number of agencies such as the ministry of industry and technological development (MITD), the FEI as the official representative of the private sector, different NGOs, different ministries, the legal system and the parliament.

It is imperative for realizing Egypt's full investment potential to recognize that the investment policy framework remains patchy and could be improved and further rationalized towards the establishment of an equal level playing field for both foreign and domestic investors. Realizing the importance of Egypt's policy implementations implies recognition of the need for a well targeted, consistent and all encompassing policy framework, and recognition that each policy issue has impacts on others. For example, strong ties exist between foreign investment and privatisation, and between each of them and technology transfer. Valid viewpoints on the government policy include that most of the investments made in Egypt, especially those attracted by the privatisation programme, are stock market investments rather than capital investments actually adding to the infra structure and technology of the country and hence lack contribution to the technological objectives of Egypt. From a technology transfer perspective; privatisation is an opportunity for imposing technology transfer commitments upon potential anchor buyers.

Realizing Egypt's commitments to the global business environment implies a better implementation and utilization of BITs that are currently more perceived as a macro marketing and promotion tool than they are enhancers to technology or investment flows.

5.5.1. Incentives and Performance Requirements in Egypt

Incentives to investors are granted under the various laws discussed earlier, but as a result of inconsistencies, these incentives are given with one hand while extra taxes; complicated procedures and macroeconomic ambiguity discourage investors on the other hand.

An illustrative example of incentive regime in Egypt is the automotive industry, which hosts 8 top worldwide manufacturers. The governmental publicised figures indicate a 40% local content of the overall assembly works done in Egypt. Nevertheless, this figure is challenged, as this content is only achieved through sourcing of low-tech components such as tyres, batteries, etc. The Egyptian government assists this prestigious sector by imposing high duties and taxes on automobile imports, lowering manufacturing supplies' import duties, providing export incentives and finally limiting all government purchases to local produce.

This supports the investors, but it also monopolizes the existing industries, and weakens it against international competition. The automotive industry in Egypt needs to evolve from the government protection into the competitiveness of export foreign markets. The comparison between the revenue of duties on finished cars, versus the duties on the components and the savings of the local car is not in favour of the local manufacturing. In fact, the government is reviewing that the industry should be subjected to disincentives if export targets are not achieved.

5.5.2. Modes of Entry and Technology Transfer in Egypt

Until its "open door" policy, the government of Egypt had a restrictive policy regarding the importation of technology. However, law no. 43/1974 provided the basic legislative right for the government of Egypt to authorize on a selective basis technology transfer through joint ventures. Thereafter technology was one of the main factors taken into account when compiling applications for investment projects. Of major importance is the regime for the protection of intellectual property rights. Patent protection in Egypt has been based on patent law no. 132/1949 which provides a standard term of 15 years from the date of application (compared with the international norm of 20 years) and includes broad provisions for compulsory licensing. Exceptions are made for pharmaceutical and food

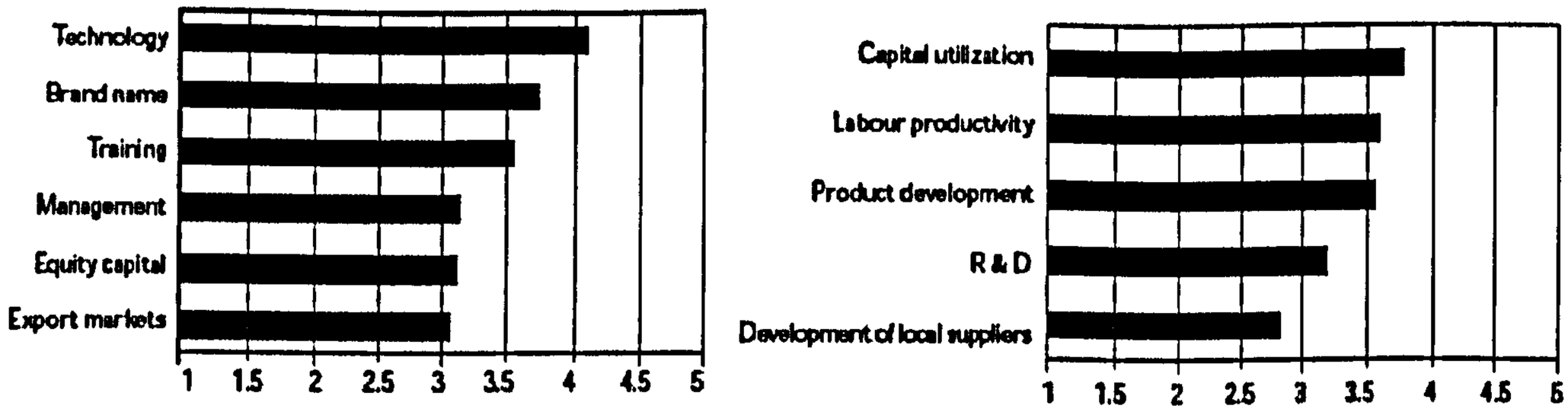
products for which the patent period is ten years. Aside from the short patent terms, one potential problem relates to the fact that the law's definition of infringement does not include the use; sale or import of a product using a process patented in Egypt. Such situation creates some uncertainty regarding the effectiveness of patent protection (UNCTAD, 1998).

The lengthy debates between the Egyptian government, public manufacturers and private sector contribute to a slow pace in the liberalisation and Egyptian reform (Weiss and Wurzel, 1998). After almost nine years of discussions and revisions, and 22 parliamentary sessions, the Commercial Code, Law 17 of 1999, was passed by the Majlis al-Shaab (People's Assembly). This replaces Egypt's antiquated legislation of 1883, which was viewed by the business community as ineffective. The new code, a massive 772 articles, is largely based on French and Belgian models, as is much of Egyptian legislation, and came into force in 1999. Many of the provisions of the old Commercial Code have been retained, although several have been modernized to reflect current commercial practice, while Law 17 covers for the first time modern means of communication, such as the fax, so that these can now be use as evidence in court (EIU, 2000). The impacts of Commercial Code Law 17 of 1999 on technology transfer are discussed in section 5.4.2.

Although Egypt is a signatory of major international patents, trademarks and copyrights conventions, however, copyright piracy, in particular video and audiocassettes and disks, medical textbooks and computer software, has been acknowledged as a problem both by business circles and government. As a consequence, Egypt has been in the United States 'watch-list' and 'priority watch list' of countries, which provide inadequate intellectual property protection under section 301 of the United States trade act of 1998. Egypt implemented law no. 82/2002 for intellectual property rights, and all the articles of the law are compliant with WTO's requirements. This law represents a good basis for governing riskier subcontracting activities.

Linkages of MNCs operating in Egypt with the local suppliers (local supplier networks) can give rise to externalities and has many benefits including technological ones (figure 5/11), but subcontracting is not well developed in Egypt (UNCTAD, 1998).

Figure 5/11: Technological benefits/improvement introduced through MNC linkages



Source: UNCTAD survey, 1998.

Another obstacle to increased subcontracting in Egypt is the limited availability of technically skilled (with shop floor experience) local suppliers. The majority of Egyptian manufacturing enterprises are small and medium-size firms, which are generally lagging in operating technology, organizational and managerial capabilities, and have difficulty in meeting the quality standards and delivery targets required by foreign companies. Local MNC affiliates' rate positively the benefits gained from their parent companies. Affiliates of firms operating in Egypt acknowledged benefits from linkages with foreign firms through technology acquisition and training, and by association with an international brand name. Accelerating technology transfer and enhancing international cooperation is the establishing of joint ventures under international economic cooperation agreements, especially those aimed at technology transfer to Egypt and the training of Egyptian scientists and engineers.

Some forms of entry to Egyptian market (such as wholly owned subsidiaries and joint ventures) tend to be more conductive to the transfer of advanced proprietary technological (by host country enterprises) to Egyptian enterprises. Transfer of tacit technologies through informal exchanges between managers at same firm (MNC or joint venture) is likely to be more intense than between firms, as in licensing arrangements (UNCTAD, 1998).

Finally, a recent survey (subject to limitations- see section 7.2.) indicates that companies working in producing primary goods, IT, intermediate products, machinery and equipment industries and pharmaceuticals identified technical know-how to be one of the most important resources of success. The technical know-how helps the incoming companies in securing a niche in the Egyptian market and thus become a source of success. The second

most important is the brand name, training came third and managerial capabilities came fourth. The results of the same survey showed that, whereas both Greenfield and JV firms depended primarily on technological know-how as their sources of success (followed by managerial capabilities, marketing capabilities, brands and business networks), acquisitions and partial acquisitions (referring in this survey to licensing) depended primarily on brand names (followed by technological know-how, managerial capabilities, marketing capabilities and business networks). In Egypt, successful partial acquisition in pharmaceutical, beverages, tobacco companies and hotels depended mainly on getting hold of famous and successful brand names (Mahdi et al, 2002).

5.5.3. Rationale for Integrated Policy in Egypt

Substantial FDI, efficiency and technology transfer still remain national targets that seem far from attaining. Doubts about the stability of the exchange rate and the dragging privatisation programme have discouraged foreign investors, while the Government is caught between contradictory pressures. It needs to remain rigid on the monetary policy front in order to prevent a confidence crisis in the Egyptian Pound, yet it cannot afford to lose ground on inflation in the context of already undermined living standards. The policy of ad hoc adjustments of exchange rate resulted in continuous slowdown in the economy.

Attempts by the governments of Egypt to put in place policies aiming at increasing the contribution of the industrial sectors in the national income have also been inconsistent and thus far from being effective.

In fact some times they even have a negative impact on industrial development. For instance, the present quality of the educational system cannot adequately support governmental efforts to encourage innovation, R&D or technological improvement. To be an investment magnet, and positively integrate in the world economy and benefit from the opportunities it avails, there is a need to create a positive and active attitude towards globalisation and enhance the country's promotional image. The stages of policymaking process should be to review specific policies and dynamics, to establish a vision/position, to align the industrial competitiveness drivers (structure, culture, workforce, technology, business environment),

and to implement/build dynamic policy capabilities and institutional infrastructure. These need continuous follow-up and revisions to be able to automatically accommodate and deal with internal and external shocks in a timely and proactive manner (IMC, 2003).

A large number of diverse institutions are responsible for setting and implementing policies in Egypt (table 5/18). That leads to contradictions, inconsistencies and wasted parallel efforts by different institutions. With such an inadequate institutional framework, Egypt has always ended up with "occasion policies" as opposed to a set of consistent and integrated policies. The inadequacy of the institutional framework is being manifested in a problematic business environment. There is a need for centralized coordination.

Table 5/18: Institutions responsible for policy implementations in Egypt

Policy Action	Responsible Institutions in Egypt
Incentives for manufacturers and exporters	Ministry of Finance, GAFI, MOFT, MITD, Cabinet.
Finance	Banks, Ministry of Foreign Affairs and International Cooperation.
Data collection and publishing	MOFT, CAPMAS, IDSC, GOFI.
Training	MITD, FEI, SFD, Ministry of Higher Education and Scientific Research.
Fairs and Exhibitions	MOFT, IMC, FEI, SFD.
Research and Development	MITD, Ministry of Higher Education and Scientific Research.
Industrial Zones	MITD, GAFI, Ministry of Finance, Ministry of Housing and New Urban Communities, governorates.
Drafting of Laws and decrees	People's Assembly, FEI, MITD, MOFT, Cabinet, business associations.
Marketing and Road Shows	GAFI, MOFT, MITD, Business Associations, Exporters Associations.
Environment	EEAA, MITD, FEI.
Standardization	MITD (IOS), Ministry of Higher Education and Scientific Research (National Institute for Standardization).
Treaties and Agreements	Cabinet, MITD, MOFT, Ministry of Foreign Affairs and Int'l cooperation.
SME Development	MOFT, MITD, SFD, FEI, NGOs, etc.
Privatisation and Restructuring	Ministry of Public Enterprise, Ministry of Finance, Central Auditing Agency, Investment banks, Stock Market.
Clustering	MITD, MOFT, CAPMAS, GAFI, GOFI, Ministry of local development.
Mining and exploration	MITD, Ministry of Petroleum, Ministry of Culture, Ministry of Tourism, Ministry of Defence.
Foreign Direct Investment	MOFT, MITD, Ministry of Petroleum, GAFI, The Cabinet, MOF.

Source: IMC, 2003.

The activities of GAFI (the General Authority for Investment and Free Zones) are of particular importance to foreign investment and associated technology transfer. GAFI is the primary governmental authority concerned with regulating and facilitating investments. GAFI aims at the target of offering a 'One Stop Shop' for investment into Egypt, covering the entire scope from promotion of Egypt as an attractive host, through to company

registration and licenses acquisition. Currently, GAFI hosts offices for Customs Authority, Sales Tax, New Communities Authority, Capital Market Authority, Authentication Authority, Foreigners Work Permits, Animal Wealth Sector, Lawyers Syndicate, Travel Documents, Immigration and Nationality Administration (Passport Authority), Commercial Registry and Corporate Tax. Special Technical Cooperation Desks are also included to coordinate bilateral activities, such as the Italian and Japanese Desks.

The appealing objective of having all these offices in one place is to provide an environment that is conducive to investment, eliminating investment impediments and encouraging foreign investment within the boundaries of the investments and incentives laws. Nevertheless, without due restructuring of these hosted institutes themselves and limiting their numbers, GAFI is liable to turn itself into 'One More Stop', where having all authorities in one location has not encouraged investment, simplified processes or shortened time scales. All the procedural steps that investors have to go through regarding permits still remain the same. This supports the argument for a flexible and integrated review of all issues that have an impact on the attractiveness of the environment, especially those associated with bureaucracy and government procedures.

5.6. Representative Sectoral Overview

Particular sectors in Egypt provide a more complete and accurate assessment of the foreign market entry and investment and technology environment in Egypt, than others. The sectors reviewed in the following section are the most representative ones, based on their contribution to the economy, diversity, level of foreign investments and perceived contribution to Egypt's technological capacity. These sectors are Manufacturing, Pharmaceuticals and Insurance.

Prior to addressing these sectors, a few methodological issues should be discussed. There are differences in the definitions of the sectors in Egypt as opposed to internationally contended definitions. Internationally, sectors should be defined according to the ISIC UN Rev.2 Classification, but most of the Egyptian data comes from GAFI, which is using its

own definition to the sectors of the economy. This may lead to sectoral bias. Taking services sector as an example; in Egyptian public records, this sector includes: financial services (excluding funding services: e.g. banks and investment firms), transportation, consultancy, health, petroleum services and other services, while internationally, this sector includes: business services and real estate (Mahdy et al, 2003).

There is an extremely limited number of the empirical research on sectoral level in Egypt, most of which are subject to limitations due to the exclusive use of questionnaire-based quantitative research, which is problematic in Egypt (see section 7.2.).

5.6.1. Manufacturing Sector

The manufacturing sector accounted for about 20% of Egypt's GDP in 2000/2001 and employed about 14% of the workforce. The private sector contributes 65.5% of total manufacturing output. This marks a strong evolution since the 1970's and early 1980's when most of production was under the public sector responsibility. The vast majority of private companies are SMEs, with 93% of employment being in companies of 15 or less people. Food processing accounted for 15% of value added and 20% of employment in the manufacturing sector in 1996. Private sector dominates the industry with the exception of wheat milling companies, which have been only partially privatised through minority shareholdings. The Egyptian industry produces a wide range of goods (table 5/19).

Table 5/19: Egyptian industrial production

'000 tonnes	1996/97	1997/98	1998/1999	1999/2000
Cotton yarn	325	275	305	280
Silk and artificial fibres	46	28	29	95
Ready-made garments (m)	193	204	222	242
Cars (units)	36,276	36,713	43,000	48,167
Buses (units)	3,660	2,802	4,200	4,872
Trucks (units)	13,158	13,872	N/a	N/a
Washing machines ('000)	283	316	334	385
Refrigerators ('000)	417	495	568	570
Aluminium	180	170	185	195
Cement	19,800	21,600	22,900	26,000
Phosphate fertilisers	1,210	1,380	1,430	1,550
Nitrogenous fertilisers	6,800	6,935	7,225	8,100
Soap	400	416	437	450

Source: Ministry of Planning of Egypt.

Manufacturing growth rate was at 5.4% per annum during the 1996-2000 period. Cheap labour in the manufacturing sector is an advantage; however high skills and productivity are necessary to maintain competitiveness on a long-term basis in international markets. In exports, Egypt's manufacturing sector's share is in decline.

5.6.2. Pharmaceuticals Sector

With the number of universities indicated earlier, Egyptian universities graduate thousands of doctors, engineers, pharmacists and skilled technicians every year. These are all necessary for pharmaceutical business.

The main stimulus for growth in the established Egyptian pharmaceuticals market is domestic demand, which is fuelled by expanding coverage of health care services and rising per capita drug expenditure. Typical of the pharmaceuticals industry worldwide, production in Egypt is characterized by a relatively high degree of concentration.

The Egyptian pharmaceuticals manufacturing market includes 23 pharmaceutical companies, categorised as follows: Nine government owned companies producing 1300 products (almost 50% of products sold in the market) at an average unit price of 3 L.E.; three joint ventures with 51% foreign ownership producing 210 products at an average unit price of 6 L.E (Hoechst, Pfizer and Swiss Farma/Novartis); eight MNCs and three private sector companies- collectively producing 700 products at average unit price of 7 L.E. Importation of pharmaceuticals involves approximately 490 products, sold at an average unit price of 30 L.E. The annual sales volume of the Egyptian pharmaceutical industry is valued at 4.4 billion L.E. and grows at above 10% per annum.

The pharmaceuticals industry in Egypt imports nearly 90 percent of its raw material and intermediate inputs with its total import bill reaching $221 million in 1995. The export market is small: only 5 percent of total production is exported. The industry has achieved limited success in developing backward linkages, with little local production of intermediate inputs. Companies attribute this to un-encouraging pricing regulations and inadequate economies of scale (Correia, 1997).

Investment opportunities in Egypt in the pharmaceutical industry are closely linked to three main factors: market growth; privatisation in pharmaceuticals industry; and patent law. The government of Egypt is committed to a privatisation programme, which cuts across all sectors of industrial activity. Several public sector pharmaceutical companies have been privatised; representing about 40 percent of total proceeds from privatisation. While change in ownership may be an investment opportunity, it is not strictly a "new" investment.

In 2006, Egypt is expected to extend the period of exclusivity of patent holders from 10 years to 20 years, in line with obligations under the Uruguay round trade related intellectual property rights (TRIPS) agreement. A number of measures in response to the TRIPS agreement have been already adopted in Egypt. In the field of drug R&D, the steps include the setting up of a high-level "steering committee for drug technological development", specialized working groups and the establishment of a national R&D strategy can be completed with parallel and mutually reinforcing actions promoted by MNCs in the industry to develop, for example, clinical testing in Egypt.

Product quality is vital in pharmaceutical production, and particularly for acquiring regional product mandates. MNCs based in Egypt are working to raise quality standards, to achieve ISO 9000 certification and eventually aspiring to full (United States) FDA approval. Based on the UNCTAD survey (1998), pharmaceutical companies operating in Egypt are growingly more aware of issues such as:

- Local management: (most of these companies are now fully run by Egyptians).
- Total quality management system.
- Regional co-ordination: (the Egyptian affiliates are attempting to become fully integrated in their corporate regional players).
- Learning experience: (in order to develop the principal segments of pharmaceuticals in which these companies have a leader position such as generics, innovation-driven products, and off-patent drugs.
- Training of personnel to achieve high standards.
- Future investment plans of pharmaceutical companies in Egypt include clinical testing and clinical trials, related research and development, exploiting the synergy with the

high-skilled local medical community and the medical schools. By performing clinical testing, the Egyptian affiliate will benefit from international know-how, scientific exchange and technology transfer.

Nevertheless, Egypt faces competition from other host locations to attract pharmaceutical FDI. Competition is particularly fierce for MNCs that have technology and product mandates to offer. In the region, Jordan is an attractive alternate location. While competitive in labour cost and availability, Egypt should improve its competitiveness in terms of expanding R&D support services and reducing transaction costs. In addition, a strong domestic private sector is desirable in order to provide potential joint venture and alliance partners for incoming MNCs. Table 5/20 includes a SWOT analysis of the Egyptian pharmaceuticals sector.

Table 5/20: SWOT for Egypt's attractiveness to FDI in pharmaceuticals

Strengths	**Weaknesses**
Low labour cost, supply of pharmacists/doctors, access to Arab and African markets, generic production and regional product mandates from MNCs	Quality standards, lack of local R&D, high transaction costs
Opportunities	**Threats**
Domestic market growth, export platform investment and tropical drug market	Competition for MNC investment (Jordan), TRIPS

Source: UNCTAD Survey, 1998

Finally, the strategy of the Egyptian pharmaceuticals industry has been largely driven by a health policy related target of providing affordable medicine to the population, rather than by an industrial policy which aims at shifting the focus of the industry away from sheer manufacturing activities and towards higher value added research-based production.

5.6.3. Services Sector: Insurance

The services sector in Egypt account for more than half of the total GDP, with government services, trade, finance and insurance representing over three quarters of the sector's contribution to total GDP. Although Suez Canal and tourism are the traditional contributors to the sector, yet insurance is significant in foreign currency earnings and foreign entries.

Insurance industry was introduced in Egypt in the late nineteenth century by various foreign branches and agencies, mainly from the United Kingdom and France. In 1901, the first local insurance company was established in the market. In 1956, following the Suez crisis, all-foreign companies were nationalized and all companies became public. In 1976, the monopoly of nationalized companies was relaxed and the government allowed local private companies to enter the market. In 1998, new legislation was effected in order to ease conditions of foreign ownership in the insurance market, hence boost the prospectus of the state owned insurance companies seeking privatisation under the Egyptian government's privatisation programme. The Egyptian insurance industry is, therefore, in transition from an essentially state-run industry to an open market, where foreign MNCs are invited to have their own fully owned subsidiaries if they wish and they can freely bid for full purchase of privatised Egyptian companies.

The insurance industry in Egypt involves 13 main companies. Four companies are public sector companies, namely: Misr Insurance, AlAhlia Insurance, Elshark Insurance and Elmasria Reinsurance. Nine companies are private sector companies, including four MNCs. These MNCs are Alico (USA subsidiary- working in Life insurance only), AIG (USA subsidiary- working in full portfolio of insurance services), ACE (majority holding of shares of a Joint Venture with CIIC company- working in the full portfolio of insurance services) and Alpha- AIIC and AILC (German subsidiary- working in full portfolio of insurance services). Other Egyptian private companies include the Suez Canal Company, the Elmohandes, the Arab Group and the Cooperative.

The Egyptian insurance industry witnessed growth in various insurance areas. The total investments growth in insurance industry in Egypt is highlighted in the following table:

Table 5/21: Total Investments growth in Insurance Industry in Egypt

Year	1950	1960	1970	1980	1990	2000	2001	2002
Value 000 L.E.	8437	59015	87290	356145	2872857	12041943	12765790	13547789

Source: Egyptian Insurance Supervisory Authority, 2003.

5.7. Conclusion

This chapter has discussed the host attractiveness that Egypt presents to foreign companies, the defining challenges and the characteristics of the economic and policy environments of Egypt. Many issues emerged to possibly have a positive impact on the attractiveness of Egypt as a host nation, such as its geographical position, the large size of the local market, various international cooperation agreements that Egypt has lined up and others.

Other reasons were found to obstruct and limit Egypt's share of foreign entries and investments. These include many political and economic reasons.

Many obstacles to foreign business establishment and post-entry operations were identified, such as tariffs, labour, bureaucracy and others. In all reasons, the government's policy has had significant impact on local operations, and modes of entry, mostly through a variety of laws and authorities governing, and confusing new investments.

It may be concluded from this chapter that the policy environment in Egypt in general, and the technology and investment frameworks in particular are highly fragmented, inconsistent and characterized by occasional incentives. This needs to be much improved, coordinated and rationalized.

No integrated understanding of the government to the dynamics of technology transfer associated with foreign market entry does emerge from the literature. In fact, there is no readily available governmental data on the types of existing modes of foreign entries in Egypt, and an assessment of their technological contributions. Needless to say, there is no robust planning in regards to the technology transfer content associated with foreign entries.

The data presented in this chapter had to be crosschecked from various resources and databases, especially in light of inconsistencies in data estimates emerging from the different authorities in Egypt. Even international data on Egypt has been affected by this inconsistency. The sectoral data in particular was very limited. Stern (2003) confirms that in Egypt there is an absence of investment climate research that may hopefully appear in the

future. It is only through empirical research on the firm level that governments gain the insights to what the actual problems are, and could hence define its priorities accordingly.

The issue of inconsistent definitions of sectors should be also carefully noted by any research on the macro level of Egypt, whereas comparing sectoral data against other countries, based on different definitions, is in fact faulty. And any attempt to homogenize or smoothen such differences may result in quite misleading results.

On the policy front, as a result of the absence of direct Egyptian government policy related to technology transfer or modes of foreign entry, the effectiveness of the government policy in these regards was assessed through the holistic review of local setting, overall government policies, existing frameworks, international cooperation perspectives and involved authorities that may impact on investment, technology, foreign modes of entry and subsequent operations.

Nevertheless, the influence and importance of government policy is undisputed. For example, the government's decision to float the currency had shockwave impacts on investment (local and foreign), technological aspects and others. The flotation resulted in a landslide of the Egyptian pound, and hence increased cost of raw material and technology imports to the highly dependent local industry. This resulted in shrinkage of production and unavailability of resources, hence further limiting any ability to conduct often expensive, transferring activities such as training, purchase of new equipment etc. Furthermore, due to market price increases, the purchase ability of the consumer was lowered, which negatively affected the attractiveness of the domestic market itself as host to new foreign entries. On macro level, and noting that its revenues from taxes are declining, the government devised new regulations to increase inflows (such as the regulation obliging exporters to deposit their foreign currency export earnings in local banks and converting them at bank's rate of exchange to Egyptian pounds). This compounded matters for all concerned even further, and resulted in massive evasions.

Clear absence of any organized understanding or effort to counter these policy impacts from a technology or mode of entry perspective could not be overlooked.

Having assessed the macro context for this research, it is now important to conceptualise the issues that have emerged from literature reviewed in the previous chapters, into one integrated and systematic framework. This is conducted in the following chapter.

Chapter 6: Research Conceptualisation

6.1. Literature Synthesis

The literature reviewed in the previous chapters shed light on the facts that, first; there is a need in international literature for a systematic framework (model) that allows for dynamic assessment of technology transfer associated with foreign modes of entry. Second, no clear assessment emerges from literature on the extent of impacts and relative importance of the many, often interlinked, issues that are perceived to affect both the process and content of technology transferred. As indicated, some of these issues are related to the mode selected, others to technological aspects, indeed many are related to host's characteristics and finally common issues. Third, the assessment of effects of the Egyptian setting and many national policies on foreign modes of entry and their associated technology transfer are almost non-existent. Finally, sectoral data in Egypt is extremely limited.

These gaps in literature along with the abundance of interlinked issues are shortcomings that blur the understanding of technology transfer dynamics, on both macro and micro levels. Such understanding is much needed for Egypt, and could only be achieved through research that explores these many issues and identifies a concise list that is relevant to Egypt as a host, and hence could be realistically targeted by policy in the future.

The objective of this chapter is to address the first gap, incorporating the learning from previous chapters and building upon it a conceptual model of international technology transfer from foreign modes of entry. The model should allow incorporation of various issues emanating from literature, in a holistic manner that also permits inclusion of aspects and parties such as preferred mode of entry, host requirements and others.

Accordingly, this model will serve as basis for a coherent approach to the empirical work of this thesis that will enable the exploration of the remaining gaps and identification of concise issues relevant to Egypt. The model developed in this chapter shall be further optimised by evidence resulting from this empirical work. Once achieved, such coherent perspective will represent an important tool for policy makers in Egypt, enabling them to implement informed, well targeted and effective policies, from the standpoint of technology transfer and modes of entry to Egypt combined, not from one or the other.

6.2. Development of the Research Objectives

Having outlined several gaps in literature, and further to the aims stated in chapter 1, the main objectives of the current research are as presented in the following table 6/1:

Table 6/1: Development of research objectives

Research Aim	Research objectives Sub-objectives	Research Questions
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- The aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 1: To develop a dynamic conceptual framework that allows for systematic representation and exploration of the process of technology transfer associated with different modes of foreign entry into a host developing country (Egypt). *Based on this,* Objective 2: To explore the dynamic process of technology transfer associated with foreign market modes of entry into Egypt.	
	Objective 2-a: To assess the defining characteristics of technology transferred from foreign modes of entry in Egypt.	1. What are the main technology components being transferred, and what are the means and purposes of that transfer (content) from various foreign market modes of entry into Egypt?
		2. What are the dynamics of the technology transfer process in association with the post-entry operations of the mode in Egypt?
	Objective 2-b: To explore and identify the most relevant issues that affect technology transfer and modes of foreign entry in Egypt.	3. What are the main categories of issues that affect technology transfer associated with foreign entry in Egypt?
	Based on findings above, Objective 3: To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer.	
	Objective 3-a: To assess the attractiveness criteria of Egypt as a host nation.	4. What are the main pre-entry motives behind foreign entry decisions into Egypt, and did government policy have an influence?
		5. What are the perceived technological contributions of foreign mode operations in Egypt?
	Objective 3-b: To assess the Egyptian government frameworks and policies affecting the process of technology transfer and modes of foreign entry.	6. What is the perception of effectiveness of existing Egyptian national policies and frameworks on mode choice, subsequent mode operations, and technology transfer?
		7. What are the impacts of Egypt's international policy (bilateral and multilateral cooperation) on technology, its transfer and mode of foreign entry into Egypt?
	Objective 3-c: To recommend policy perspectives that could improve competitiveness through affecting technology transfer potential from modes of foreign entry to Egypt.	8. What are the types of targeted policies that can improve technology transfer from modes of foreign entry in Egypt?

Source: The author.

6.3. Research Model Development

Among the main considerations for developing the model are the importance of clearly distinguishing between: The spectrum of issues that affect technology transfer and foreign modes of entry (these have emerged from literature review chapters and are summarized in the following section); The representation of the different players involved in the process of technology transfer; The clear representation of the dynamics of the technology transfer process (see section 2.4.1.); The final mode used (see section 3.2.); and the specific setting of Egypt (see chapter 5). Moreover, dynamics for post-entry mode development (or mode change) needed to be incorporated into the model; the entire conceptualisation of which is made from a host perspective.

6.3.1. Issues and Determinants Governing the Research Model

As noted, the current global context considers technology critical to development. This context, which some call a new "technological paradigm" (Freeman and Perez, 1988), is rapidly transforming, and developing countries have the task of maintaining a reasonable and consistent technological development pace (see sections 2.4.4., 2.5 and 4.3.). Studying technology transfer independent of the surrounding issues is largely shortcoming of the potential that technology transfer has in contributing to the economy of the host, across many aspects. Conversely, ignoring such issues might have damaging implications on the process of technology transfer itself.

The literature on the internationalisation of the firm focussed largely on issues such as motivations, mode of entry choice, subsidiary development, etc. with lesser emphasis on technology transfer associations with these issues (see section 3.2.3.). On the other hand, empirical research on international technology sourcing has focussed on factors that determine in part the choices that firms make between various organizational modes, but fewer studies, however, have examined outcomes of choices in terms of benefits gained by hosts from a technology transfer perspective. Furthermore, researchers have tended to even overlook the interdependence of technology attributes when examining technology transfer situations (section 2.7.; see also Steensma and Corley, 2000).

Therefore, in summary, literature relating to technology transfer has touched upon a large number of diversified issues, which have various levels of impact on the technology transfer

content, but all these issues and factors are not a comprehensive list and many others have possibly been overlooked. Furthermore, many of these issues were identified using different research methodologies.

In assessing the content of technology associated with modes of foreign entry, certain issues may emerge from literature to have more importance than others in their impact on technology transfer content, within the context of the host (Egypt for example). These have to be reconsidered collectively to avoid methodology discrepancies regarding their importance and context.

The conceptual model developed in this chapter places the various types of modes of foreign entry on a continuum with the issues that affect technology transfer, all within clearly set boundaries of Egypt (for the purpose of this thesis). Theoretical synthesis of literature reviewed in chapters two, three, four and five of this thesis have lead to identification of gaps, that necessitated setting the objective of developing such a model, that complements existing frameworks, and also provides basis for a subsequent assessment of the particular array of issues relevant to Egypt.

Notably, chapter 2 provided the necessary foundation for the technology aspects of such model. It was crucial to initially set the working definitions of technology and technology transfer, separate technology components, and identify the various means and purposes pertinent to their individual transfer, in order to understand the dynamics of the technology transfer process. The players involved in the process included the host and foreign firms. Government policies were identified to have substantial impact on the process. This chapter confirmed the interlock between technology, foreign investment and capacity building of developing countries, highlighting the influence of MNCs, international cooperation and host macroeconomic conditions.

Chapter 3 provided the foundation for the issues and aspects related to foreign market modes of entry and the motivations and associated issues of internationalisation of the firm, and the determinants of the entry decision that may be targeted by host nations and characteristics of modes of entry based on a comprehensive assessment of these modes. In chapter 3, multi-dimensional perspectives emerged to impact on the choice of host nation and mode of entry. These include several micro level perspectives, including: Aspects

related to technology (such as the product and the industry); Aspects related to the foreign company (such as the experience in internationalisation, the desired level of control, etc); Aspects related to the host partner (such as his experience, compatibility and learning patterns); Aspects related to the mode selected (such as the contract formalization, the obligations of parties and royalties paid). On the macro level, aspects related to host nation were noted (such as attractiveness of existing frameworks, incentives, BITs, RIFs, WTO stance and existing supplier linkages). These aspects are diverse and often overlapping.

Chapter 4 offered additional perspectives confirming important linkages between technological development (through technology transfer) and foreign market entry. Such synthesized linkages may have serious impacts on the technology transfer process. These linkages involve issues such as the effects of existence of a technological gap between the host and the foreign countries, the importance of contractual arrangements and additional common issues that have been synthesized to affect both technology transfer and mode of entry performance. A strong case for technology policy was established in this chapter, especially after considering perceived obstacles to technology transfer within the context of current global strategies.

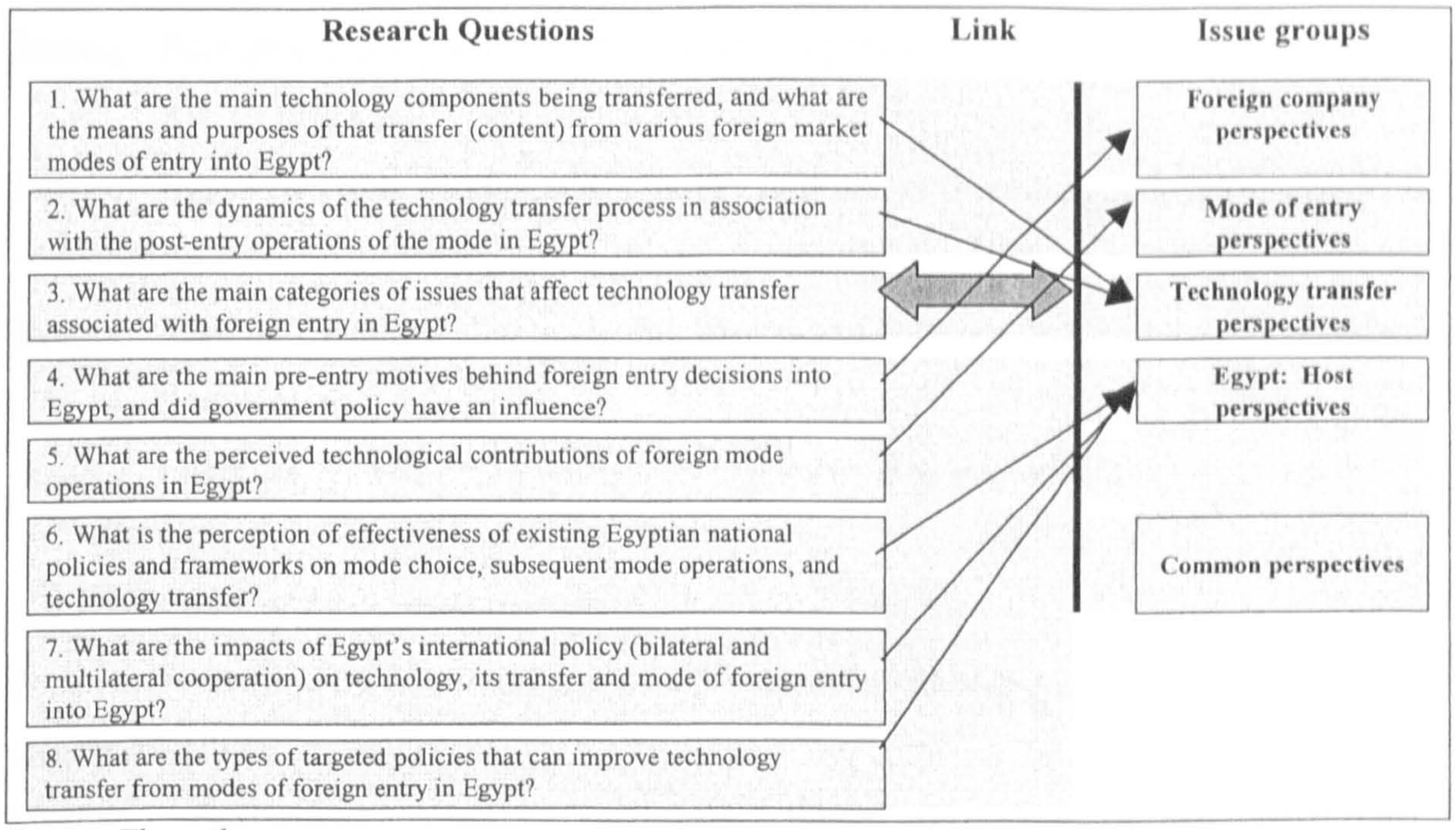
Chapter 5 provided evidence of many issues and aspects that are unique to Egypt and may affect the overall process of technology transfer, such as the extreme emphasis of all Egyptian governments on importance of the social aspects of policy implementation, the rigidity of the existing administrative system, often unique characteristics of the Egyptian partner and major effects that government policy has on companies' operations in Egypt. The absence of an integrated approach to foreign investment, mode of entry selection, technology transfer content or even sustained attractiveness of Egypt as host nation is noted.

In conclusion, many interlinked issues and determinants emerged directly, or were synthesized from the literature review to impact on technology transfer from foreign modes of entry into Egypt. For the purposes of developing a meaningful model for a systematic approach, these issues are categorized from five main perspectives, tightly linked to the research questions (table 6/2), as follows:

- Foreign company perspectives (section 6.2.1.)
- Mode of entry perspectives (section 6.2.2.)
- Technology transfer perspectives (section 6.2.3.)

- Egypt: Host perspectives (section 6.2.4.)
- Common perspectives (section 6.2.5.)

Table 6/2: Sample links between the Research questions and the issues



Source: The author.

It is important to reiterate that the issues discussed in the following sections are not intended to represent a short list of the issues governing technology transfer. Rather, they are a comprehensive selection of the issues that have contended importance to the process. Obviously, there are additional issues that are not involved, such as the foreign country policies governing the internationalisation of its firms for example. Furthermore, these issues do have clear overlap areas. It was decided to address each issue in the particular context within which it emerged in literature (hence there certainly exists the possibility of having multiple group perspectives for the same issue). This was decided in order to avoid making any wrong or premature omissions, inferences or affiliations. Finally, the section referrals indicated with each of the following issues is for selected discussions related to it.

6.3.1.1. The Foreign Company (home to technology) Perspectives

Pertinent issues and foreign company' related dimensions emanating from the previous chapters include:

Issue.$_{1.}$ The experience of the foreign company in internationalisation (mode and technology transfer related). See sections 3.3.1; 3.3.2.

Issue.$_{2.}$ The objectives and host-market entry decision process of the foreign firm. See section 3.3.1.2.

Issue.$_{3.}$ The characteristics/preferences of the foreign firm. See section 3.3.2.

Issue.$_{4.}$ Initiation of cooperation (foreign or host). See section 4.2.5.

Issue.$_{5.}$ Foreign company's involvement in local operation (Auditing and benchmarking). See section 4.2.3.

Issue.$_{6.}$ Interaction with foreign Headquarters (culture, brain drain and loyalty). See section 2.4.2.

Issue.$_{7.}$ Aspects for addressing the technological gap between host and foreign companies. See sections 2.4.2.; 4.2.1.

Issue.$_{8.}$ Local company's operation/quality standards. See section 4.2.5.

6.3.1.2. Modes of Entry Perspectives

Pertinent issues and modes of entry related dimensions emanating from the previous chapters include:

Issue.$_{9.}$ Host-governing frameworks (legal, political and economic). See section 3.3.1.1. 3.3.2.

Issue.$_{10.}$ Host mode preference, policies and related incentives. See section 4.3.; 4.4.3.

Issue.$_{11.}$ Mode development over time (ownership, learning, product development). See section 4.2.2.

Issue.$_{12.}$ Mode evolution and transition. See section 3.2.3.

Issue.$_{13.}$ Mode Contractual issues related to technology transfer and vice versa (contracts, clauses, royalties, training). See sections 2.4.3.; 4.2.3.

Issue.$_{14.}$ Impacts of the level of technology on mode selection (hi-Tec hard to learn, IPR, cost). See sections 2.5.2.1; 3.2.2.; 4.2.5.

6.3.1.3. The Technology and Means of its Transfer Perspectives

Pertinent issues and technology and technology transfer related dimensions emanating from the previous chapters include:

Issue.$_{15.}$ Technological appropriateness and fit. See section 2.4.2.

Issue.$_{16.}$ Means and purposes of technology transfer. See section 2.4.1. (see also 6.3.2.3.)

Issue.$_{17.}$ Unique learning patterns of the local staff on the various levels of company (Top management, Finance, Administrative, Marketing, Technical staff, Labour). See sections 3.3.1.2., 4.2.5.

Issue.$_{18.}$ Implications of local learning patterns on staff mix (expatriates/local). See section 2.4.4.1.

Issue.$_{19.}$ Costs, durations, benefits, drawbacks and pre-requisites of different types of training (foreign, local, on job). See sections 2.4.2.; 5.4.2.

Issue.$_{20.}$ Current technological level compared to foreign pier levels and current operation technological level compared to same operation's start-up level. See section 2.4.2.; 4.2.1.

Issue.$_{21.}$ Importance of staff's original determinants and local partner characteristics (know-how, equipment age and export potential). See section 3.4.; 4.2.5.

Issue.$_{22.}$ Technology transfer events (triggering factors, timing, relation to mode, personnel involved, formalization and other requirement). See section 2.4.1.

Issue.$_{23.}$ R&D integration or localization and impacts on local operation (new product development and product localization). See sections 2.4.4.1; 4.2.4.

Issue.$_{24.}$ Internal factors hindering technology transfer. See section 2.4.2.; 4.2.6.

Issue.$_{25.}$ Implementation of technology recommendation system, quality, standardization and environmental issues See section 2.5.2.2.; 5.4.2.

6.3.1.4. Egypt: The Host Perspectives (micro and macro)

Even though the literature does not reflect the dramatic changes that are reshaping the international public policy environment within which multinational firms make knowledge transfer decisions, firm-level theorizing has not either recognized the importance of Macro-level government policy (Nollen and Brewer, 1999). The technology related policies; mode incentives and the various frameworks of the host nation play an important influence in the process of technology transfer through their effects on mode choice and mode development. Nevertheless, Egypt has not, so far, implemented selective policies targeting improvements in technology transfer associated with modes of entry.

The pertinent issues emanating from literature related to Egypt on both the micro and macro perspectives include:

Issue.26. The criteria of host attractiveness that Egypt presented to the foreign company (general frameworks). See section 5.2.2.

Issue.27. Egyptian government policy effectiveness regarding mode selection incentive and needed improvements. See section 5.3.1.; 5.5.2.

Issue.28. Egyptian government policy effectiveness regarding technology transfer incentives and needed improvements. See section 5.5.1.

Issue.29. Issues and policy effectiveness regarding investments and technology transfer aspects, and needed improvements. See section 5.3.1.

Issue.30. Transfer of technology to the Egyptian supplier networks, and linkages to international supply networks. See sections 5.2.3.; 5.5.2

Issue.31. Egyptian Host company characteristics for partnering/operation (Industry, local Size, and years in business). See section 5.5.2.

Issue.32. Suitability of existing policy framework of Egypt to post-entry operation of company. See section 5.5.3.

Issue.33. Importance of technology for foreign existence in Egypt. See section 5.4.1.

Issue.34. Suitability of existing investment framework of Egypt to post-entry operation of company. See section 5.3.1.

Issue.35. Importance of existing economical framework of Egypt to post-entry operation of company (exchange rate policy and long term consistency). See sections 5.3.2.; 5.3.3.

Issue.36. Improvements needed on Egyptian policy framework in relation to technology transfer. See section 4.4.; 5.4.; 5.5.

Issue.37. Improvements needed on Egyptian policy framework in relation to foreign investment attraction. See sections 5.3.; 5.5.

Issue.38. Improvements needed on Egyptian policy framework for specific mode promotion. See section 4.4.; 5.5.

Issue.39. Effects of international cooperation and BITs on mode of entry choice, operations and technology transfer in Egypt. See sections 2.5.2.1.; 3.3.1.1.; 4.3.; 5.2.3.

Issue.40. Future prospects of Egypt's competitiveness in the global international business environment. See section 5.4.2.

6.3.1.5. Additional linkages (Common) Perspectives

The distinction of several common and interlinked issues has been highlighted in section 4.2.5. This was found useful in capturing the full scope of possible perspectives, as follows:

Issue $_{41}$. Human resource development and motivation

Issue $_{42}$. Learning patterns

Issue $_{43}$. Time elapsing

Issue $_{44}$. Industry type

Issue $_{45}$. Contractual arrangements

Issue $_{46}$. IT infrastructure

Issue $_{47}$. Partner relationships

Issue $_{48}$. Appropriability of Type of technology from a host perspective and technology gap aspects

Issue $_{49}$. Transfer performance

Issue $_{50}$. Egyptian government policy prioritisations

This issue of government prioritisation was touched upon in section 4.2.5. but was intentionally left to this chapter, in order to incorporate the specific aspects of Egypt. Analyses of Egyptian policy in chapter 5 discussed the state's role and its responsibility to meet the basic social needs of its citizens and the means used to allocate limited resources according to priorities. Obviously, the success or failure of any policy is judged according to how well it meets basic needs of the population and realizes an equitable and just distribution of resources. The political ideology held by the state plays an important role in defining development priorities and choosing among alternative policies. Ideology may determine fields for investment and strictly define the roles of the state and private sector (Mahmoud, 2003). The Egyptian government is currently caught between contradictory pressures. On the one hand, it needs to remain rigid on the monetary policy in order to prevent a confidence crisis in the Egyptian Pound, and because it cannot afford to loose ground on inflation in the context of already severely undermined living standards. On the other hand, ad hoc policy adjustments of exchange rate imply higher interest rates and slowdown in the economy.

The privatisation programme, once a top-priority of the Government (law 203 of 1991) came to near halt in its midway. The government's attempts to deal

with exchange-rate issues and potentially unpopular structural reforms, such as privatisation and trade liberalisation, took second place to social stability concerns. Difficulties in the process relate to inadequacy of management, technology and marketing. In addition, a number of these companies suffer from overstaffing and high indebtedness. Consequently, the privatisation of currently remaining companies would alone imply laying-off several hundred thousand workers. In that context, the Government avoided worsening social conditions and slowed down the programme.

Issue $_{51}$. Potentially new issues may arise from other contexts or overlaps

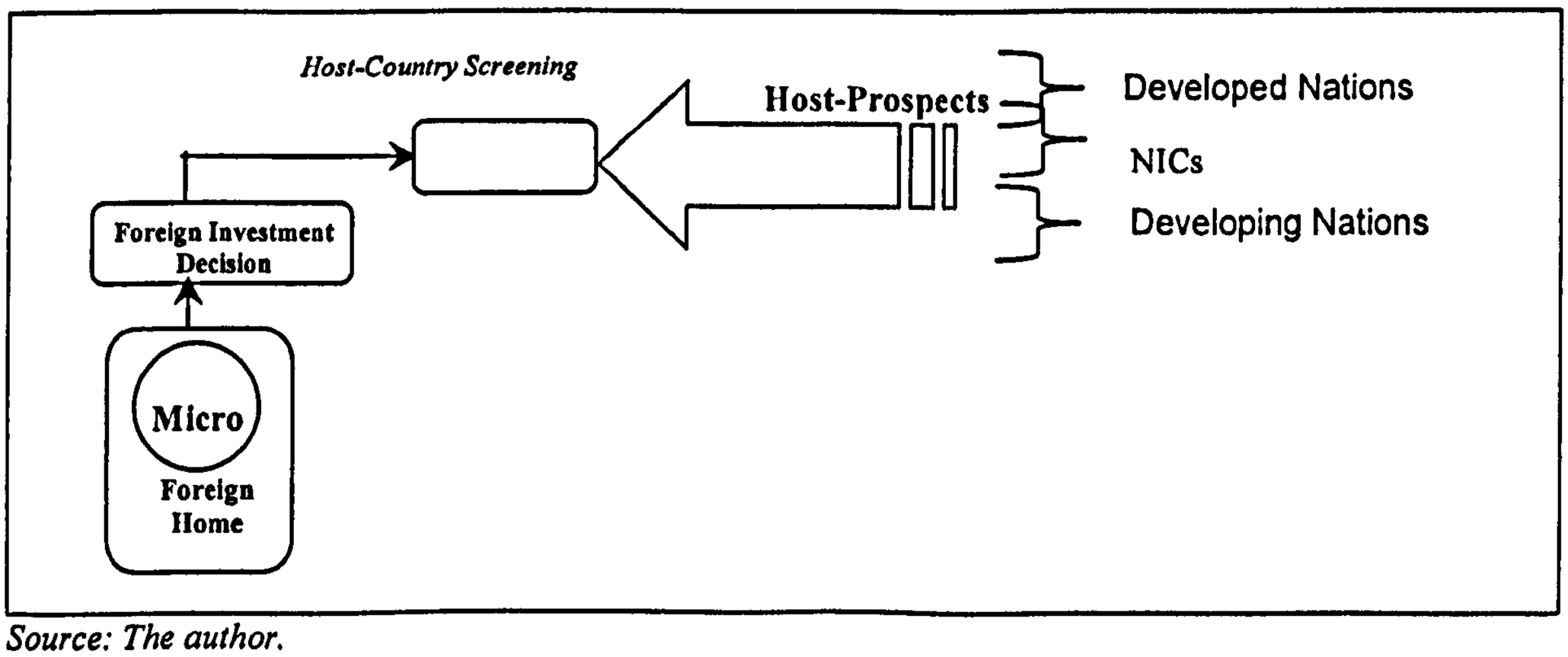
6.3.2. The Model Representations

It is noted that any conceptualised model for this thesis needs to be representative of the various players and perspectives, the various routes and the issues involved in the process of technology transfer from modes of foreign entry.

6.3.2.1. Foreign Company Perspectives' Representation

As could be synthesized from earlier discussions, several perspectives are related to the foreign company. It is important to highlight that the foreign home country may add further perspectives that are out of the scope of the current thesis, which is focussed primarily on technology transfer from the host perspective. In a typical scenario, and based on the foreign firm internationalisation strategies, a decision is made on the host location, mode of entry and timing. In today's global environment, many potential developed and developing host nations compete for foreign investments and entries (figure 6/1).

Figure 6/1: Representation of foreign company perspectives

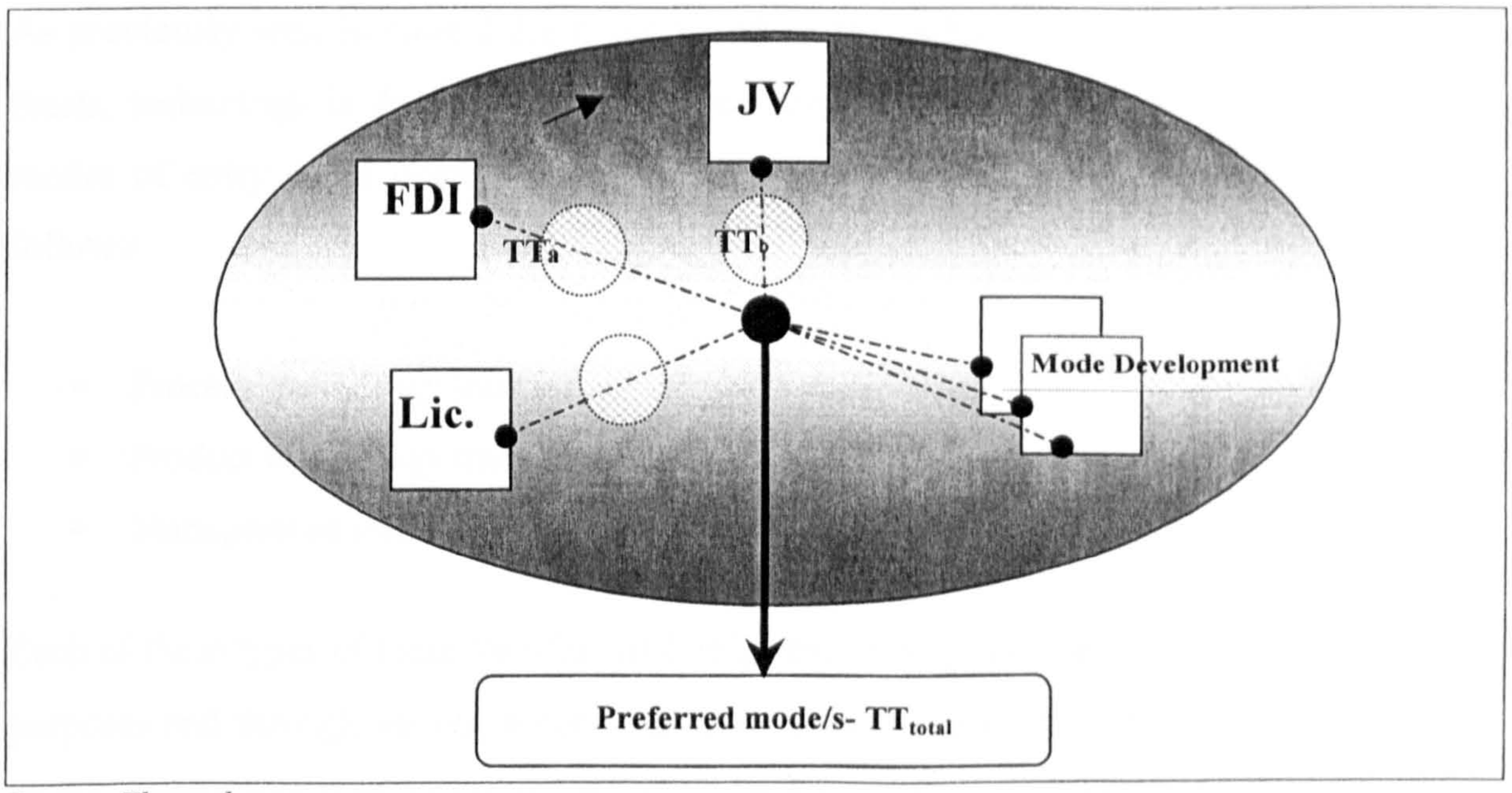


Source: The author.

6.3.2.2. Modes of Entry Perspectives' Representation

Foreign companies have a variety of options for their modes of entry to host countries. They may decide to engage in one mode, review it and develop it over time. Alternatively, other MNCs may have multiple modes of entry to the same host country, such as MNCs with large product ranges. Therefore, the form of representation of foreign mode of entry perspectives must incorporate representation of single and multiple mode situations, new and old modes of entry, alongside with cases of mode transition or mode development (increase in foreign shareholding for example). All these have been incorporated in a carefully designed 'dial' format (figure 6/2).

Figure 6/2: Dial Representation of modes of entry and development



Source: The author.

Based on this representation, the modes selected by the foreign firm are put in a dial, whereas the development of one mode to another could be illustrated. The rotation of the modes on the dial is best made clock wise to demonstrate the development over time (like a clock). A company with several modes could be represented in chronological order.

Each mode of entry is contended to have technology transfer content associated with it. These are the dotted circles on the links. In case of a mode development into another mode, or in case of multiple modes, the technology transfer content may increase (subject to empirical investigation). Therefore, TT_{total} will be the sum of the technology transfer content associated with the preferred mode/s. As such, the different associations could be:

- Single mode

  e.g. $TT_{total} = TT_b$
- Mode transition (mode change)

  e.g. $TT_{total} = TT_{FDI \rightarrow JV} = TT_a + (TT_b - TT_a)$
- Multiple modes

  e.g. $TT_{total} = TT_b + TT_a$

Finally, if a mode is characterized to have no purposeful technology transfer content associated with it (such as exports), then the connecting link on the dial will be removed.

6.3.2.3. Representation of Technology and Means of its Transfer:

As previously seen (section 2.2.1.); and based on the technology definition adopted by this thesis, technology is decomposed into three components, hence its transfer from foreign modes of entry could occur for any of these components or a combination of them, as follows:

- Process technology transfer
- Product technology transfer
- Management technology transfer

Each of these types of these transfers of foreign technology may be experienced for different purposes and through various means, based on both the separate and common perspectives of the parties involved in the technology transfer situation (foreign and host). These are collectively synthesized from literature in the following table 6/3:

Table 6/3: Technology transfer means/purposes categorised by technology component

Management Technology Transfer Situations	**Product Technology Transfer Situations**	**Process Technology Transfer Situations**
Purposes: Increase general profitability Improve services rendered to customers Corporate strategy understanding Supplier development Increase entrepreneurial skills Increase creativity and drive Increase Environmental consciousness Raising national Reputation	**Purposes:** Increase product range Ownership of localized modifications rights Increase quality perception Enhance speed to market Export of end products	**Purposes:** Re-export of machinery Cost reduction Improvement of performance standards Lowering of transport costs Lowering of labour costs Developing of technology-recommendation systems Improve materials procurement

Best practice awareness		
Means: Human Resource Development Staff general training and orientation Local training (administrative and technical) Foreign training Onsite-training Mobility of HR Employment of Expatriates Conferences and seminars Legal and Administrative interactions Code of conduct obligations Technology Transfer contract clauses	**Means;** Product designs Product blue prints Product training	**Means;** Equipment design Improve supplier linkages Production technology detailing Maintenance equipment Training/learning Installation of equipment Alterations and additions to equipment Plant designs, documents, drawings, layouts Inspection systems implementation Control systems implementation

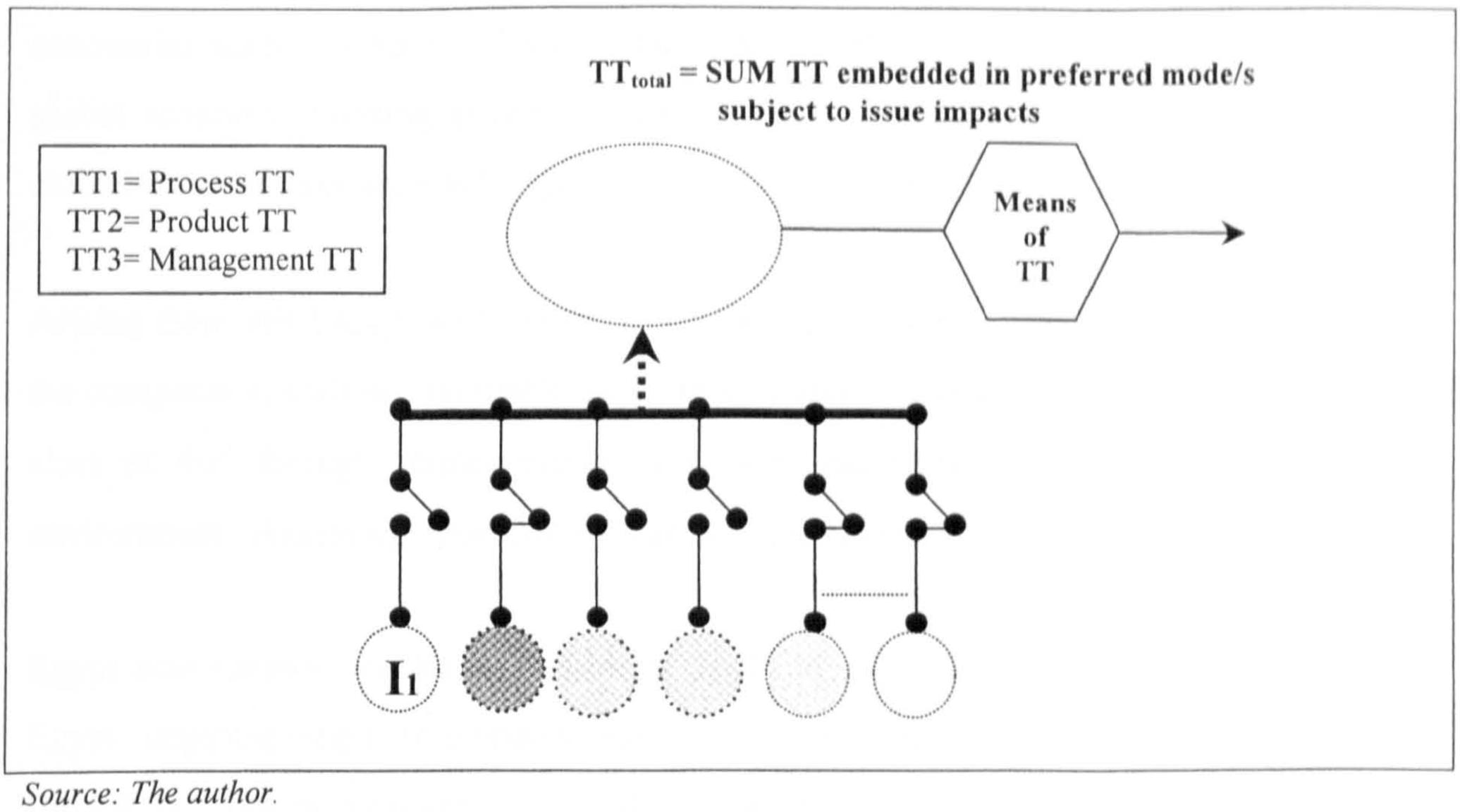
Source: The author.

As contended from earlier chapters, many issues impact on the components of technology transferred and the process of technology transfer itself, and may hence affect several of the attributes of this process, resulting in a different overall content transferred to the local operation. In cases of developing countries, such as Egypt, some of such issues emanating from international literature may not be applicable, while new ones may emerge. In addition, compounded issues may also result from new linkages.

Therefore, a need arises for a form of representation that allows for the incorporation of issues and factors affecting technology transfer in combination with each other or separately. This representation was designed in this thesis as a 'switch', whose links are connected for relevant issues and disconnected 'open links' for irrelevant ones (figure 6/3).

In this thesis, the issues that have emerged from literature, may, or may not, have an impact on the content of technology transferred through foreign modes of entry into Egypt. Nevertheless, with the Switch format, and depending on the empirical work, the links will be connected or simply left open.

Figure 6/3: Switch representation of issues impacting on technology transfer



Source: The author.

It is noteworthy that each individual issue may be expanded to accommodate an entire sub-switch of its own, with a new set of determinants affecting this specific issue alone. Furthermore, related issues may be grouped together in separate switches or extensions to the switch itself.

In regard to the technology transfer content:

$I_{i,j,...}$ = Issues that affect the technology component or technology transfer process

= I_1 to I_{51} in this thesis

TT_{total} = Sum of technology transfer content resulting from the mode of entry phase subject to issue Switch

= Process TT_{total} + Product TT_{total} + Management TT_{total}

6.3.2.4. Egypt: The Host Perspectives' Representation

Egypt may find itself competing against developed countries for FDI, but mainly it is more likely to compete against piers across three fronts, namely: countries within the MENA region which opened up their economies early and took positive measures to increase their competitiveness such as Tunisia and Morocco; East Asian economies and European transition economies which exert pressure on Egypt through their more efficient productive structures using skilled labour and capital intensive activities to produce higher value added

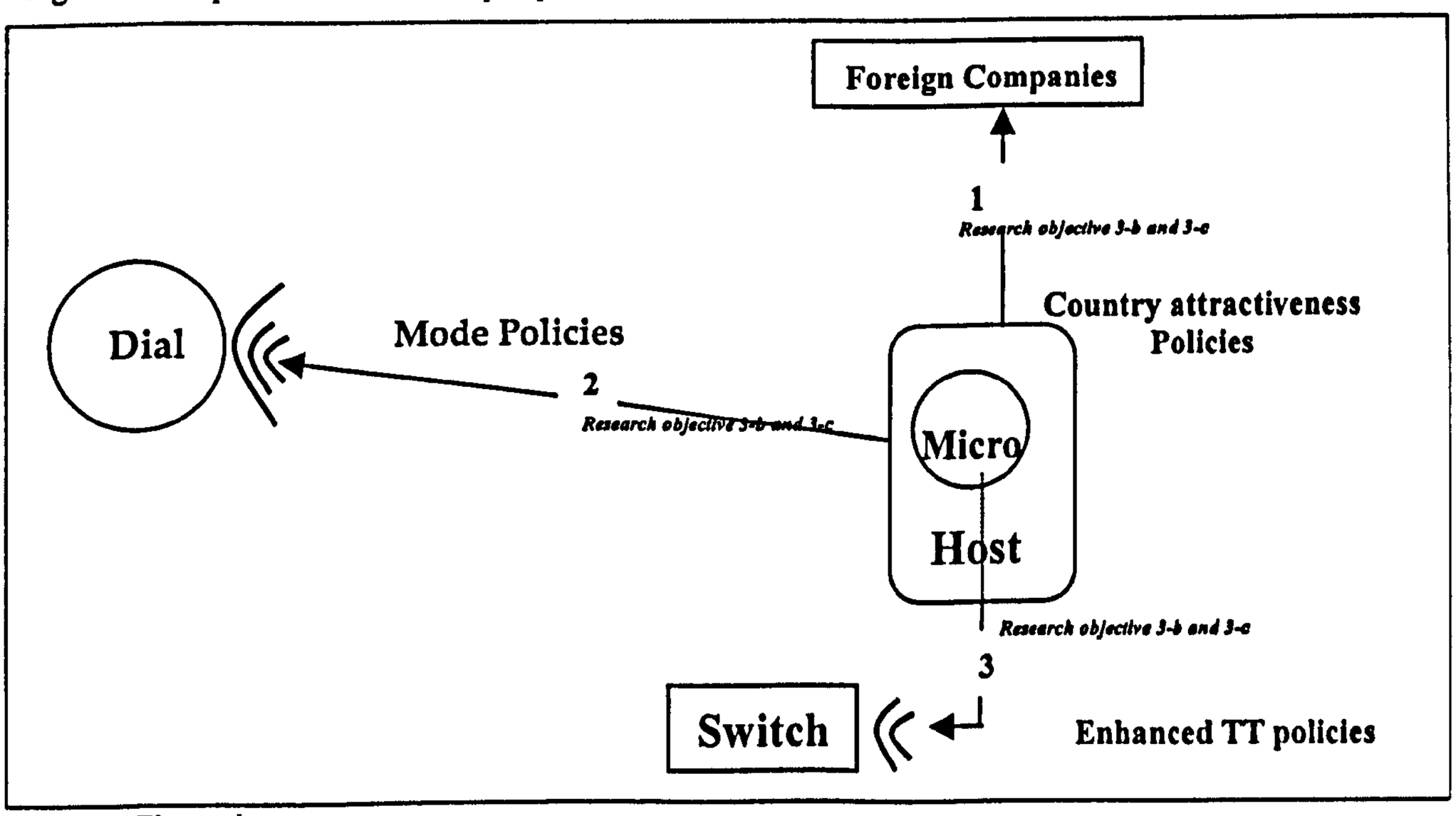
and better quality goods; and finally, the large unskilled, labour abundant, low wage economies such as China, India and Bangladesh that have been integrating rapidly in the global economy, exerting growing competitiveness pressures on countries exporting low-skilled manufactures such as Egypt.

Arising from this background, on the macro level, Egypt attempts to stand out from among the competition with its favourable opportunities and unique attractiveness (link # 1). Egypt aims at this through implementing incentives and working at optimising the overall environment. Assessing these efforts is among the objectives of this thesis.

Egypt also emphasises the improvement of the quality of the modes of foreign entry to Egypt, targeting larger investments, more job opportunities, better technology transfer, etc. (link # 2). The government aims at this through several measures including performance requirements such as local content. Assessing current policy and viability of alternative recommendations (from a technology transfer perspective) is among this thesis objectives.

Finally, as elaborated earlier, many issues impact on technology transfer content. The extent that these issues apply to Egypt will be explored empirically, but one key objective of this thesis is how policy can affect those issues that are relevant to Egypt, in a manner that maximizes technology transfer (link # 3- figure 6/4).

Figure 6/4: Representation of Host perspectives



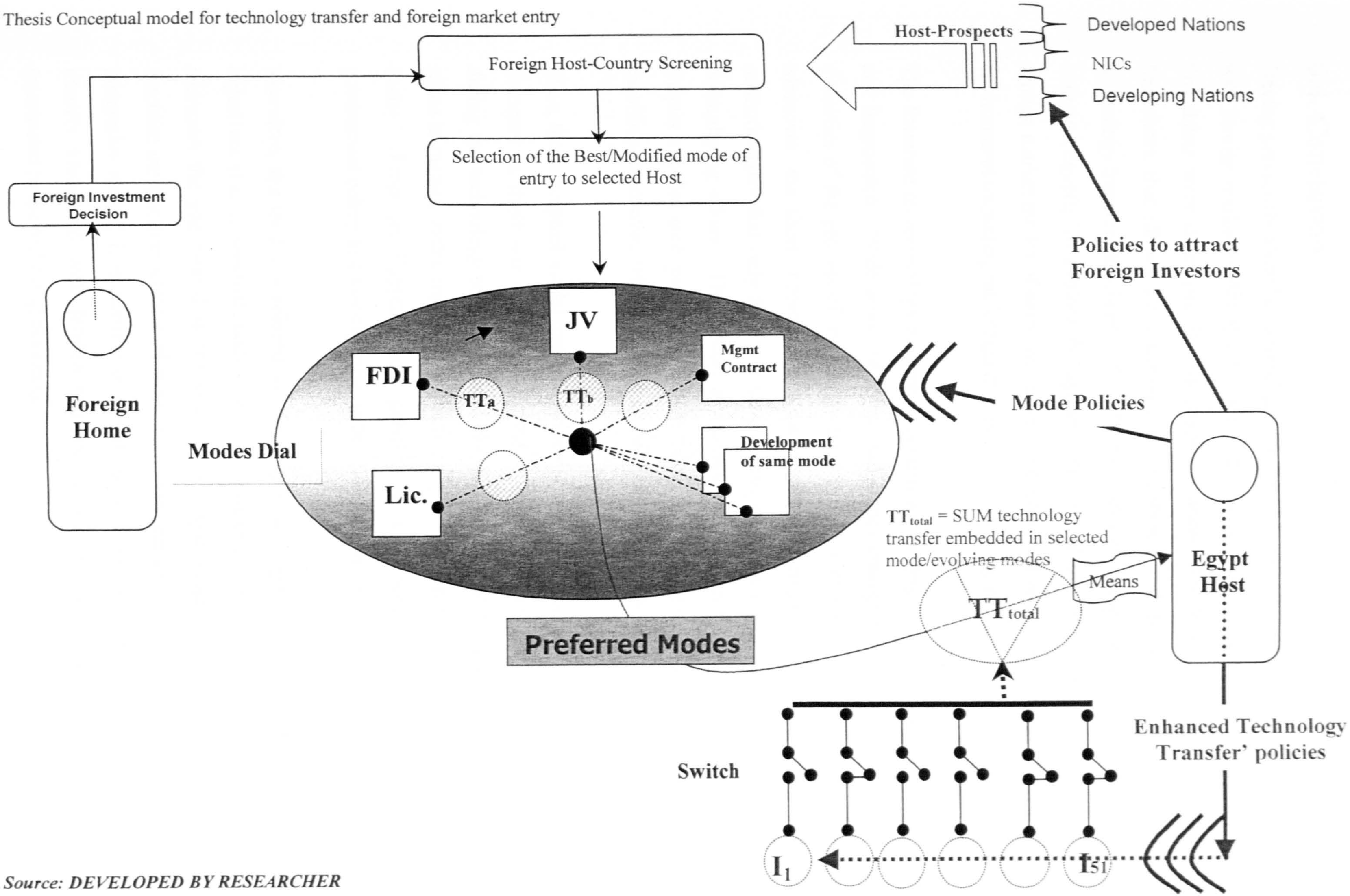
Source: The author.

6.3.3. Overall Research Model

Having incorporated the various perspectives into meaningful sub-representations; it is possible to combine these together (figure 6/5), noting that the dynamism of such a model is an essential consideration, in order to truthfully represent a process that is dynamic and highly contextual such as technology transfer associated with modes of foreign entry.

The holistic view provided for each of the model sub-representations, has allowed for short-term rigidity in each route, yet embracing a dynamic notion when combined together. For example, mode evolution may be incorporated onto the 'Dial', while new issues arising/fading from a changing global setting may be simply incorporated through adding/removing links onto the 'Switch'.

Figure 6/5: Thesis Conceptual model for technology transfer and foreign market entry



Source: DEVELOPED BY RESEARCHER

6.4. Conclusion

Having previously identified several gaps in the literature on technology transfer associated with foreign market modes of entry within the aim of this thesis, the specific objectives of this thesis were developed in this chapter, namely "To develop a dynamic conceptual framework that allows for systematic representation and exploration of the process of technology transfer associated with different modes of foreign entry into a host developing country (Egypt); To explore the dynamic process of technology transfer associated with foreign market modes of entry into Egypt; and To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer".

The literature on technology transfer associated with foreign market modes of entry is short and fragmented. Wide arrays of interlinked issues emerge to impact on the content and dynamics of the process of technology transfer. These issues are often under-investigated. Moreover, the short literature on these provides findings that are built upon different methodologies that only focus on certain aspects of the issue, while possibly missing or downplaying others. This occurs at various levels of analyses (macro or micro). This chapter avoided such pitfall through synthesizing the issues and sorting them within their specific perspectives, without infringing on them in any manner.

Then, the conceptual model that will guide the empirical work of this thesis and fill a gap in literature in itself was developed, providing representations for routes that are followed during the technology transfer process through a mode of foreign entry. The issues that relate to parties, technology and modes of entry are all represented (on the above described basis). From an Egyptian host perspective, the model also incorporated Egyptian government policy as a key objective to be addressed in this thesis.

Therefore, the model developed in this chapter conceptually accommodates the research objectives (i.e. conceptual model-objectives assessment is attained). Clearly, this model addresses the gap related to the absence of a systematic framework that integrates the essential perspectives associated with technology transfer. Only when put together in one integrative model, is it possible to reveal the real dynamics of the process of technology transfer associated with foreign markets modes of entry, through empirical research (conducted in the following chapters).

Chapter 7: Research Methodology

7.1. Introduction and Alternative Research Designs

Achieving an analysis that is of highest quality requires an appropriate methodological approach and research design to ensure that the data gathered is sufficient, valid and reliable. A research design can be viewed as forming the blueprint for the entire research process and as guidance for completing the study successfully (Churchill, 1987; Chisnall, 1997; Aaker et al, 1998). Making a decision on which research design to apply pre-determines how the data will be collected and what kind of data will be collected. The research design would describe the procedures for collecting and analysing the data.

Various research designs (and their combinations) are available, depending on the aims and context of the research. Klein et al (1991) suggest that sound methodologies and research designs are neither wrong nor right until applied to a specific research problem.

The objective of this chapter is to review alternative research designs and based on that review, and previously stated research objectives, the adopted research design is selected and justified (section 7.2.). In addition, the data needs required to address the research aim, and the data frame of this data and selected research instruments will be discussed.

7.1.1. Research Methodologies: Overview

An objective research method can be distinguished from a subjective one (Burrell and Morgan, 1979), or methodologies can be classified according to the researcher taking an outsider perspective (Morey and Luthans, 1984). In fact, research methodologies can be categorised in various ways and at different levels, amongst which the most widely contended include: descriptive research designs, causal or explanatory research designs and exploratory research designs (Hartman, 1979; Tull and Hawkins, 1990; Aaker et al, 1998).

7.1.1.1. The Descriptive Research Design

A descriptive research design is used to qualitatively or quantitatively describe the nature and magnitude of a situation as accurately as possible. This is done without specific regard for how the units under investigation might be tied together or what relationship they might have with each other (Hartman and Hedblom, 1979; Chisnall, 1997).

Descriptive designs are relatively rigid and tend, as a result, to miss correlations of the phenomenon under investigation.

Technology transfer, as indicated earlier, is a dynamic and continuous process, whose data requirements and causality are not preset, controlled or even readily known; hence the descriptive design is not really suitable for the present research.

7.1.1.2. The Causal Research Design

Causal research designs, also termed explanatory, analytical or experimental research designs (Hartman and Hedblom, 1979) are viewed as a specific sub-form of conclusive research designs (Kinnear and Taylor, 1991), and are used to link variables to one another and assume the existence of causal connections between such variables. Causal research designs are usually based on the assumption that the area of interest is known enough to designate specific theories or models and to test their plausibility, as well as evaluating relationships and their possible interactions (Chisnall, 1997). Nevertheless, in such research designs, the quality of the research results are very much dependent on how well the researcher can control important research parameters like the population and the various sets of independent and dependent variables that are of particular interest within this population. Failure to do so can lead to misleading results (Brock, 2000). Furthermore, this design does not allow for conclusions about either the existence of causality or direction of flow.

Had this research been focused on explaining the relationships between the various issues that emanate from the literature to impact on technology transferred from a foreign company, then causal design would be suitable, especially in areas of identifying which relationships impact on technology transfer, more than others. Nevertheless, this research aims at the process itself (the gap), not on the issues as per se. This implied less control on the population involved and limitation of using any probability statistics.

7.1.1.3. The Exploratory Research Design

If few precedents exist, or if information on the specification of a study is not available, then an exploratory research design is best employed (Hartman and Hedblom, 1979). The general goal of the exploratory research design is to gain new insights and ideas. Versatile research approaches are typical in exploratory research designs (Churchill, 1987; Kinnear

and Taylor, 1991; Chisnall, 1997; Aaker et al, 1998). Due to the exploratory nature of this research, it is characterized by flexibility and sensitivity to the unexpected, as opposed to descriptive designs (Hartman and Hedblom, 1979).

The use of secondary data (data already in existence) is an important part of the exploratory process. Depth interviews and discussions are used to explore respondents' opinions and attitudes on key issues. When the topic is subject to exploration, it is imperative to state the purpose, as well as the criteria by which an exploration will be judged successful. An exploratory research may be preceded by statements about (a) what is to be explored, (b) the purpose of the exploration, and (c) the criteria by which the exploration will be judged successful, as replacement to propositions. Exploratory studies may also have a legitimate reason for not having propositions (Yin, 2003).

7.1.1.4. The Case Study Research Design

Case studies can be used for exploratory, descriptive, or explanatory research, but for its importance to the present research, it will be addressed as an individual design in this section. The works of Yin (2003) are outstanding in this area.

The case study has been a common research strategy in psychology, sociology, political science, social work (Gilgun, 1994), and business (Ghauri and Gronhaug, 2002), whereas the case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2003). This is very important to the process of technology transfer from foreign market modes of entry, where the boundaries are blurred between parties, issues and contexts. Furthermore, the boundaries in a technology transfer process overlap and often interact as noted in earlier chapters.

Historically, the greatest concern with case study research has been lack of rigor, the provision of little basis for scientific generalization and the association of massive documentation. This perception has changed, whereas the case study (as a research design) is now viewed to comprise an all-encompassing method, covering the logic of design, data collection techniques, and specific approaches to data analyses. In this sense, the case study is neither a data collection tactic nor merely a design feature alone (Stoecker, 1991) but a

comprehensive research strategy. In fact, a single case study can be the basis for significant explanations and generalizations (Allison and Zelikow, 1999).

Case studies are not "sampling units" and choosing them to conceive 'statistical generalisation' is flaw. Rather, multiple cases should be considered like multiple experiments. Under these circumstances, the mode of generalization is "analytic generalization," in which a previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication may be claimed. The empirical results may be considered yet more potent if two or more cases support the same theory but do not support an equally plausible, rival theory. As indicated, this replication logic, whether applied to experiments or to case studies, must be distinguished from the sampling logic commonly used in surveys.

The sampling logic requires an operational enumeration of the entire universe or pool of potential respondents and then a statistical procedure for selecting a specific subset of respondents to be surveyed. The resulting data are assumed to reflect the entire universe or pool, with inferential statistics used to establish the confidence intervals for which this representation is actually accurate. The entire procedure is commonly used when an investigator wishes to determine the prevalence or frequency of a particular phenomenon (Yin, 2003).

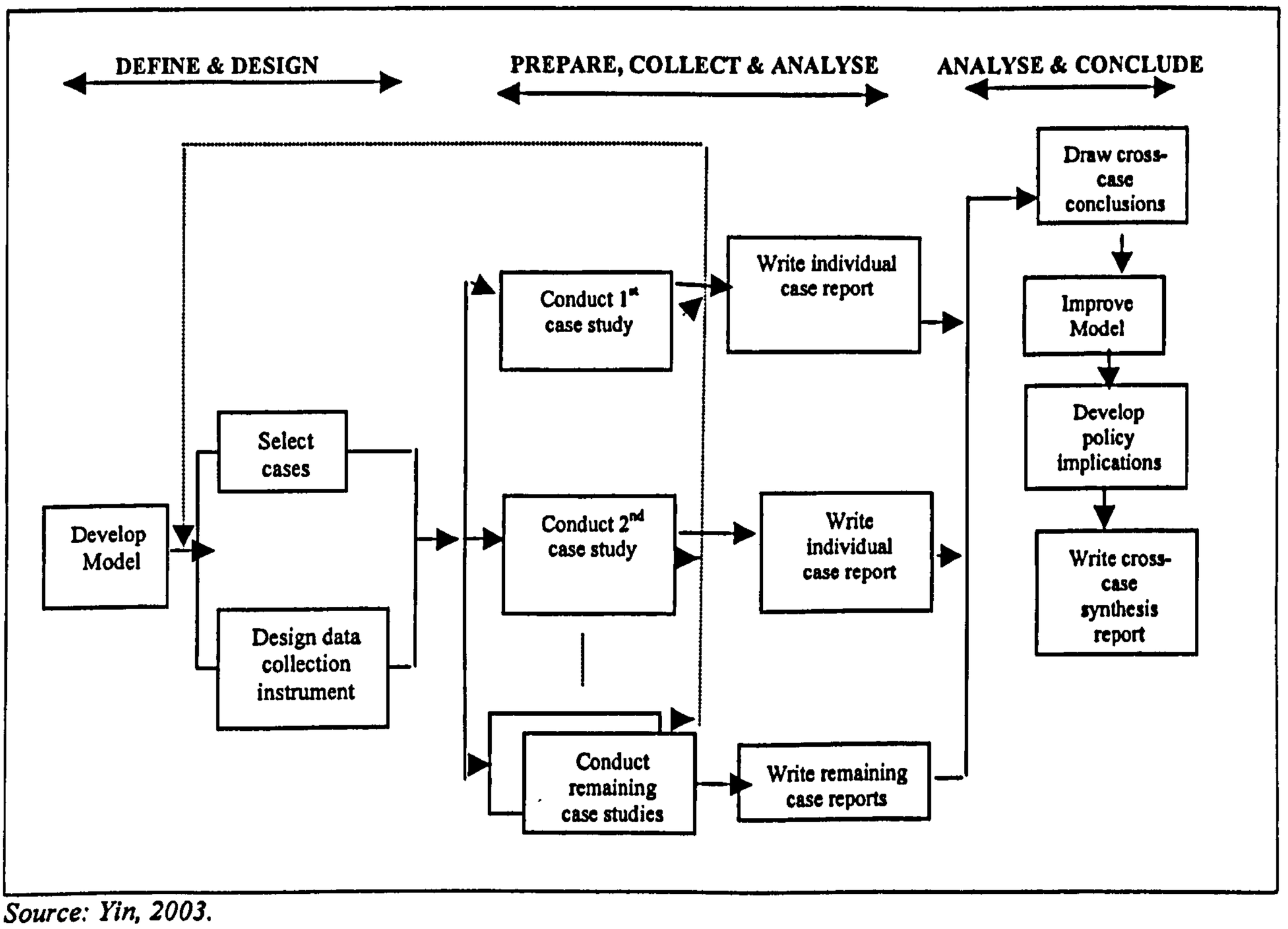
The classic (single) and the multiple-case designs are variants within the same methodological framework. Nevertheless, the evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust (Herriott and Firestone, 1983). Every case should serve a specific purpose within the overall scope of inquiry and provide "replication" logic. As indicated, multiple cases are not similar to multiple respondents in a survey.

The replication logic is analogous to that used in multiple experiments, where for example, upon uncovering a significant finding from a single experiment, the immediate research goal would be to replicate this finding by conducting a second, third, and even more experiments. Some of the replications might have attempted to duplicate the exact conditions of the original experiment. Other replications might have altered conditions to the original ones, to

see whether the finding could still be duplicated. Only with such replications would findings be considered robust and worthy of continued investigation or interpretation (Hersen and Barlow, 1976).

A main concern in all of these replication procedures is the development of a rich theoretical framework, that needs to state the conditions under which a particular phenomenon is likely to be found (a literal replication) as well as the conditions when it is not likely to be found (a theoretical replication). The theoretical framework later becomes the vehicle for generalizing to new cases (similar to the role played in cross-experiment designs). Yin's (2003) representation of the case study method is indicated in figure 7/1.

Figure 7/1: Case study research method



Source: Yin, 2003.

The same case study may involve more than one unit of analyses. This occurs when, within a single case, attention is given to subunits (embedded design). In contrast, if the case study examined only the global nature of an organization or of a programme, a 'holistic design' is used. The holistic design is advantageous when the relevant theory underlying the case study is itself of a holistic nature.

A multiple-case study may consist of multiple holistic cases. The contexts of the cases are likely to differ, but if under these varied circumstances common findings could be reached, then they will have immeasurable external generalizability. If the subsequent findings support a hypothesized contrast, the results represent a strong start toward theoretical replication, vastly strengthening external validity of findings compared to those from a single case alone (Yin, 2003).

On the technology transfer front, unlike expectations resulting from literature, the embedded case study design tends to be unsuitable for a research on technology transfer process in its association with modes of foreign entry and national policy. For example, if cases at sub-micro level are taken as units of analysis (such as a highly specialized business unit project for instance), then a major pitfall could occur when the case study focuses only on the subunit level and fails to return to the larger unit of analyses, at both company and national levels. Therefore, a multiple-case holistic design is hence the most appropriate methodology for research involving both micro and macro levels. Furthermore, holistic case studies will enable the exploration of those situations, common to technology transfer, in which interventions (by policy) has no clear, single set of outcomes (see sections 7.2.).

7.1.2. Data Needs

The appropriateness of any of the reviewed research designs (or of any combination) depends on the nature of the data needed to address the specific research aims, which has to be congruent with the aims of the study (Kinnear and Taylor, 1991). The literature usually distinguishes between two data sets, namely qualitative / quantitative data set and cross-sectional / longitudinal data set.

7.1.2.1. Qualitative versus Quantitative Data

A Qualitative approach helps to give an understanding of *why* something happens, where instead of facts one may have to record stories, anecdotes, conversations. Qualitative research produces a wealth of detail and enriches understanding. Qualitative data is usually viewed as non-numerical representations of a phenomenon (Stablein, 1996) and can be very attractive due to its contextual richness that allows for preserving chronological flows, assessment of local causality and enables the deriving of fruitful explanations for the

phenomena under investigation (Miles and Huberman, 1994). It produces findings difficult to derive by means of statistical quantification (Strauss and Corbin, 1990).

In terms of primary data collection (data collected for the first time specifically for a particular research exercise), the qualitative research methods are more often employed than quantitative methods. Therefore, qualitative data can provide a richer representation of the phenomena and maybe particularly helpful in theory building, traditional preliminary explorations, as well as exploring and explaining complex behaviour (Hart, 1987). However, analysing qualitative data is the central difficulty with methods of analyses not well formulated (Miles and Huberman, 1994). Due to its interpretive nature, a major concern may relate to lack of objectivity and bias (Hart, 1987).

Patton (1990) describes qualitative data as an interpretive paradigm focusing on the whole (holistic) while still accepting context-bound understanding preserving the highly complex interactions and relationships (what we don't know that we don't know). This long-standing view is well supported in literature, and relates well to technology transfer issues.

The obvious strength of quantitative data lies in its comparability due to its standardized numerical format (Hart, 1987) and well-formulated analysis techniques, thereby reducing the potential bias of subjective interpretations. Feasibility of having greater sample sizes allows for better assessment of generalizability. The increased numerical accuracy offered by employing quantitative sets of data has to be related to its loss in perspective. Quantitative data usually lacks the contextual sensitivity and scope of qualitative data and are especially appropriate for testing hypothesis and synthesizing a large number of variables (Hart, 1987). Research designs employing quantitative data do not suffer from a lack of analytical procedures (Hair et al, 1998).

Notably, qualitative data can have a quantitative (enumerative) structure imposed on it, quantitative data cannot be made to yield qualitative explanations. Evidence suggests that a growing number of management researchers now subscribe to the view that quantitative and qualitative methodologies are not, necessarily, mutually exclusive in practice (Smith, 1975; Straus and Corbin, 1990). Multiple methods encourage researchers to explore their intellectual puzzles in a multi-faceted way, enhancing the research validity (Mason, 1996).

7.1.2.2. Cross-Sectional versus Longitudinal Data

The time frame of the research is the basis for two alternative data types, namely cross-sectional and longitudinal data. Research may involve processes that take place over a period of time, as opposed to static, snap shot, research (Franz and Robey, 1987; Markus and Robey, 1988).

In longitudinal studies, repeated measurements of either a quantitative or qualitative nature are made at a regular, or irregular, time periods across the sample. If multiple samples are assessed for correlations over a period of time, it is referred to as quasi-longitudinal model (see Hartman and Hedblom, 1979). Longitudinal-based research maybe more useful than other types in understanding processes and linking them to outcomes that occur over time (Pettigrew, 1997). The actual data collection process can be either passive (longitudinal observations) or active (longitudinal action research). Longitudinal research approaches are mostly used in population and census research.

Several disadvantages arise for longitudinal research. First, if multiple samples aren't used, inferences from longitudinal samples may be relevant only to that single sample. Other disadvantages include the high cost and the need for significant changes to occur.

Cross-sectional studies are the norm in academic marketing research in general (Kinnear and Taylor, 1991) and international business research (Macharzina and Engelhard, 1991) in particular.

7.1.3. Research Instruments

Data collection instruments fill the data needs of various research designs. Secondary data provides readily available information from sources that may include company literature, public databases, etc., while primary data requires direct involvement in the process, and may be collected by any combination of several methods (each with its own subsets of instruments), namely: observation, experimentation and surveys/questioning (Chisnall, 1997). Other data collection instruments exist, but are less applicable to the current context, such as simulation.

7.1.3.1. Observation

Observation essentially consists of observing the phenomena of interest; either by watching people's behaviour manifestation or by analysing recorded data (Chisnall, 1997), but preconditions exist for using observability as the selected data collection method, namely that observed behaviour must be repetitive, frequent or otherwise predictable to avoid excessive loss of time and that the observable event must cover a reasonable period of time.

Observing extremely short or long events can be very time consuming and expensive. The advantages of the observation method over other data collection instruments lies mostly in cases where observation is the only possible technique that can be used (Tull and Hawkins, 1990), such as in cases involving bias, inability or unwillingness to respond.

7.1.3.2. Experimentation

The experiment is designed to aid in testing of specific hypothesis by means of consciously manipulating and controlling variables (the independent variables) and measuring its impact or effects on pre-specified variables (the dependent variables), in a controlled environment. Thus cause-and-effect relationships are at heart of experimentation (Phillips, 1966), but experimentation in the field of social science is problematic (Chisnall, 1989), or possibly impossible in research on topics involving global aspects.

7.1.3.3. The Survey

The main data collection instruments in a survey include, among others, personal surveys and telephone surveys (Crimp, 1990; Tull and Hawkins, 1990; Aaker et al, 1998) and mail surveys (normal and Web-based e-mail). Due to their very nature, personal surveys are associated to qualitative research, while mail surveys are often associated to quantitative research. Both the personal and telephone surveys will be discussed due to their relevance to this research, along with the emerging Drop and Collect survey method.

- **The personal survey**

By personal interviews, the researcher collects data by asking questions, in attempt to reconstruct an experience, or describe behaviour. Personal interviews offer the advantage of interaction with the interviewee, allowing the interviewer to probe responses, explain

questions and explore new dimensions. However, this potential requires considerable skills of the interviewer (Crimp, 1990; Chisnall, 1997).

The overall process of conducting face-to-face interviews (locating, visiting and interviewing respondents) is labour intensive and time consuming (Crimp, 1990), and subject to possible bias on part of the researcher and the respondent. Personal surveys can be sub-categorised into structured, unstructured and depth interviews (Hart, 1987), or a combination of these, such as semi-structured in-depth interviews. All these are based on the form of asking the questions.

Structured interviews follow a pre-specified structure and standardized question are asked, thereby increasing data comparability across interviews (Nachmias and Nachmias, 1976). In unstructured interviews most questions are open and designed to encourage the interviewee to freely elaborate on each question in a non-pre-specified way. While decreasing comparability due to its lack of rigidity in structure, its flexibility allows the collection of richer data, allowing for a fuller understanding of the respondents' views relating to a phenomenon of interest. In-depth interviewing is the most fundamental of qualitative methods (Easterby et al, 1991). In these interviews, indirect questioning leads the respondent to free expression of motives, attitudes, opinions, experiences and habits in relation to adverts, products, brands, services, etc. Depth interviewing is based on the psychoanalytical principle of 'free association' interviewing.

The elite interview is a specialized case of in depth interviewing that focuses on a particular type of interviewee. King (1994) gives some advice on the role to adopt when interviewing high status interviewees; he suggests that in order to avoid offending respondents, there is a need to refrain from being over familiar or to give the impression of being over expert. On the other hand, in order to be treated with some credibility, there is also a need to avoid being nervous or submissive. Elite individuals are considered to be the influential and the well-informed people in an organization or community and are selected for interviews on the basis of their expertise in areas relevant to the research. The outcome of elite interviewing is that valuable insight and overall view of their company as well as history and future plans (Andriopolous, 2000). However, there are some problems associated with elite interviewing, mostly related to interview duration and topics allowed.

- **The Drop and Collect survey**

Developed in the eighties, this type of survey substantially overcomes the lack of personalisation in mail surveys through personal delivery and collection of the research instrument (Brown, 1984). Nevertheless, it was not until recent efforts that researchers have seriously noted the fatigue in effectiveness of ordinary mail surveys, and started responding to calls for offering operational guidelines to the merits and appropriate usage of the more personal drop and collect surveys (Ibeh, Brock and Zhou, 2004). The significantly higher response rate of this survey over normal mail surveys demonstrates the importance of personal and face to face contact in obtaining richer data.

- **The Telephone survey**

Although conducted on a one-to-one basis, yet the telephone survey misses many advantages of social interaction and observation, and hence is inappropriate for long and complex interviews. Its main advantage is the low cost and speed. It is often used as a pre-notification technique only, with the subsequent use of another research instrument (Hart, 1987; Mitchell and Nugent, 1991), or as a valuable tool for follow-up on discussions of a previous personal interview.

7.2. Justification for Adopted Research Approach

Having discussed the main objectives of the current thesis in section 6.2, it is concluded that such objectives require detailed contextual and situational knowledge of the dynamic process of technology transfer in Egypt.

To grasp the "whats" of the technology transfer interdependencies involved in the process, it is also necessary to explore the issues associated with the parties, the various components of technology transfer process, the mode characteristics and the wider holistic perspective of the surrounding environment of Egypt. This research addresses circumstances where the decision makers make their choices in different contexts. No phenomenon, such as technology transfer content embedded in the various modes of entry to a developing country such as Egypt, can hence be explained in isolation. It must be itself embedded in a detailed account of the entire surrounding environment that contains a record of other issues.

One main concern at this stage was the selection of the key issues, in order not to bias the investigation in one direction or the other, and yet explore for all necessary and sufficient issues. Guidance was needed. This guidance was the conceptual model (section 6.3.3.). This is in line with recommendations of Yin (2003). The model managed and systematically classified the issues and parties that impact on the process of technology transfer.

It is important to highlight that studying empirically such issues highly depends on the richness of data available at a suitable level of aggregation. Unfortunately, such richness is missing in the literature on Egypt.

The difficulties in obtaining reliable quantitative data make it necessary to remain within the boundaries of logical analysis and qualitative information.

Furthermore, and quite interestingly, the downturn from the September 11th tragedy added to the negative conditions of the Egyptian economy, resulting in an increased pervasive feeling of pessimism, not only in the business community, but also among ordinary people and the population at large. This mood of general depression reflects negatively in quantitative surveys. Already low response rates of surveys among companies in Egypt tended to also be biased towards negative opinions. In some instances only positive or negative responses would be given on whether the criteria were applicable or not, rather than exact figures (Mahdy et al, 2003).

Moreover, quantitative methods appear to be perhaps more suitable to measure frequency of occurrence of technology transfer events, had these events been monitored longitudinally. Quantitative indicators concerning the content and process of technological transfer are difficult to establish for a variety of additional reasons, including the numerous definitions used for the term "technology" itself, and the lack of a consistent interpretation of concepts such as technological change, technology transfer process, technology flows, etc. Moreover, as the literature indicated, there are numerous technological, national, international, bilateral, multilateral, organizational, structural, attitudinal and social issues, which crucially affect the process. These issues may in many instances strongly influence quantitative analyses of technology transfer.

This thesis requires a method that allows for identifying and exploring complex behaviour, and is suitable for inquiries that are exploratory in nature. Based on Hart (1987), qualitative techniques are more suitable in such cases.

Therefore, in selecting the approach for this research, and in light of earlier review of literature and research designs, qualitative methods were found to best enable examination of the development of technology transfer process in association with modes of foreign entry. Qualitative measures allow for investigations over a period of time which is necessary concerning mode development and technological learning. This provides more depth, richness and unique insights (see Easterby-Smith et al., 1991).

Yin (1984) contends that to understand the complex cobweb of issues and to conceptualise and structure the numerous components of the research problem into a framework amenable to further inquiry, it is recommended to use qualitative data through in-depth case research method. It is agreed that case research methods can supply a deep understanding, a wealth of detail about the subject, and a fuller contextual meaning of the phenomenon under research (Miles, 1994). A case study annotates or records in varying degrees of detail, the activities, events, transactions and contexts of an organization. It has the advantage of exposing the researcher to the real world (Perry, 1998) and all relevant variables associated with the research problem, and address contextual factors, and through this provide research findings, which emphasize policy relevance (Brown and Frame, 2000), and hence an important link to this thesis and match to its objectives. Based on earlier review of methodologies, and above discussion, it was decided that the qualitative technique through in-depth interviewing would be used (see figure 7/1).

Having made this decision, this research attempts to draw more precise conclusions through examining various phases of mode development and through variation of the research sample. The selection of data collection through depth interviews is appropriate since:

- The aim is to develop an understanding of the unique issues involved in process of technology transfer content associated with the mode of entry
- The step-by-step rationale of technology transfer situations is not clear nor structured
- The area under investigation is highly confidential and commercially sensitive

- The interviewee may be reluctant to be truthful about the issue in question, due to cultural and corporate concerns

A single case study sometimes makes it difficult to know whether results are exceptional or typical, where the challenge becomes that of identifying the extent to draw accurate inferences of wider significance and use from findings of case studies. This necessitated increasing the number of cases interviewed in this thesis, in order to draw more general inferences that are significant to more sectors. The extent to which conclusions of qualitative research can be "transferred" is dependent on provision of a rich description of the research context, sufficiently rich in detail for the person in the new context to assess how similar it is and what features it shares. The purpose is not to generalise to a broader population, but rather to maximise richness and depth of understanding of a phenomenon in all its complexity "claiming a wider resonance".

Convenient to this thesis, it is noted in Egypt that impacts resulting from government policies and existing frameworks, and even incentives apply across the board to various populations (different modes and sectors), due to the rigidity of the system.

Therefore, the conceptual model incorporating various issues (emanating in part from investigations conducted in earlier chapters) and their overall applicability to the Egyptian setting will be primarily investigated. Afterwards, and through exploratory research, key issues of the technology transfer process and new perspectives shall be identified and finally the impact of government policy on the cases shall be assessed. It was important at this stage of deciding on the research approach; to set tracks for the research progress, in order to be able to trace back the route by which interpretations will be reached. The data sections had to be woven together. It was decided at this stage to do so both cross-sectionally by theme, and holistically by 'case' in order to produce an interpretation of the process of technology transfer content across modes and sectors. Conducting cross-sectional themes on one hand, and holistic analyses on the other support different analytical logistics. This would provide richer data, and help to establish reliability and generalizability of findings.

A summary of the research context is indicated in table 7/1.

Table 7/1: Summary of research context

	Present Research
Main focus	Technology transfer content
Geographic Focus	Egypt
Industry Focus	Cross-sector.
Company Focus	Medium sized companies operating in Egypt- Various types of entry modes, such as joint ventures, licencees, fully owned subsidiaries, technical assistance.
Research design	Exploratory, multiple-case study research.
Data collection methods	Holistic In-depth interviews with top management.
Validity of measures	Three subsequent and interdependent rounds of data collection methods, one validating the other, in addition to expert witnesses, which served as an additional basis for synthesis and interpretation.
Data Frame	The data frame is cross sectional, but the time dimension is directly addressed in both mode development and technology learning perspectives.

Source: The author.

7.3. Research Methodology, Design and Analytical Framework

The decision to adopt a multi phased research approach allows continual ongoing confirmation of methodology and subsequent availability of data at desired level of aggregation. Therefore, this approach involves consecutive phases, each with specific objectives (figure 7/2).

Figure 7/2: Research Approach (Design)

Research phase	Phase	**Phase Objectives**
Phase 1: [chapters 1-5] Critical preview of the literature	①	Focus and homogenize the different research perspectives, namely: modes of entry and technology transfer within setting of Egypt. Identification of gaps in literature.
Phase 2: [chapters 6 and 7] Formulate research objectives Isolation of pertinent issues Decide on approach to the research	②	Model conceptualisation. Review methodologies and designs. Ascertain research design. Selection of sectors and companies.
Phase 3: Field Work Stage I [chapter 7] Design and Validation of research instruments (Interview guide) Research administration Operationalizing of the research	③	Verification of final selection of cases. Implementation of various research perspectives in the interview guide. Securing understanding and cooperation of available contacts.
Phase 4: Field Work Stage II [chapter 8] Conduct two primary in-depth interviews Conduct second set of in-depth interviews Tabulation of remainder data Analyses of cases	④	Collection of data. Refinements on reasoning. Improve interview guide. Improve ties between issues. Improve model. Develop individual case observations.

<u>Phase 5: Field Work Stage III [chapter 9]</u> Synthesis of research findings and supporting expert opinion offering the governmental perspective to research Policy implications and contributions [chapter 10] Areas for future research [chapter 10]	↓	Develop findings. Obtaining expert witness opinions on findings "Profiling". Reassess model and issues. Synthesize cross case findings. Develop broader conclusions.

Source: The author.

7.3.1. Research Phases 1 and 2

- **Phase 1: Critical preview of literature [chapters 1-5]**

A host firm's motive for seeking a high-technology-transfer-content mode can not be separated from the foreign firm's mode selection based on it's own motives and decisions for normal business, internationalisation and competitive strategies. Unless technology transfer is the gateway to activities at host, or to savings in some form, not much importance is attached to comparing profits and costs of alternative technology transfer modes. Knowledge of the content of technology transferred from a particular mode of entry is relatively limited since previous research had not addressed technology transfer as a distinct variable affecting any foreign market entry decision or choice, rather than a by-product. These and other gaps in literature have been identified (see a summary in section 6.1.), and represented the first phase of this thesis.

- **Phase 2: Set research objectives, isolation of issues, review methodologies, and decide on research approach [chapters 6-7]**

Having identified the gaps in literature, the objectives of this thesis were set in chapter 6, and it became necessary to categorize outstanding issues affecting these objectives. The issue-isolation phase was particularly essential to provide a common understandable ground for the researcher and subsequent interviewees; otherwise the research would be misled by many conceptions of too many diverse issues. Chapter 6 also included the conceptual model design, and a detailed description of those players/issues involved. It assimilated sample paths of mode development. These paths guide the interview guide of the fieldwork.

With the previous background, Chapter 7 presented a critical review of alternative methodologies and research designs. A qualitative design was selected and justified for this research where data will be acquired through in-depth interviews at a selected sample of

companies. Based on the initial phases of this thesis it was possible to pre-identify suitable sectors and cases with particular investment modes. The decision was to select multiple sectors of significant 'technology' content. The decomposing of technology into management, process and product technologies facilitated cross sector sample selection and data collection and furnished for subsequent synthesis. This attempt proved to be practical and useful, because it avoided vagueness and was readily understood by interviewees, each in his respective field, and assisted in isolating issues involved in various types of technology transfer. Several important determinants were considered in sectors' choice:

- They should be relatively technology dependent
- Have strong potential for growth, investment attraction and export
- Have established, current and researchable experience with foreign investment
- Represent priority development area for the government and link to privatisation policy

Secondary data sources and preliminary discussions with key informants indicated that the sectors that have been selected hereafter (table 7/2) meet these criteria. Furthermore, these sectors are projected to continue expanding rapidly in Egypt (UNCTAD, 1998).

In Egypt, previous studies have focussed on single traditional industries (textiles and so forth), yet have adopted neither embedded nor multi-sectoral approaches, hence the decision to address multiple sectors was suitable. As indicated earlier, the embedded design (of case studies) was unsuitable for this research because of its pitfalls. A major pitfall occurs when the case study focuses only on the subunit level and fails to return to the larger unit of analyses. The holistic design is advantageous when the relevant theory underlying the case study is itself of a holistic nature, such as the research in hand. Therefore, the holistic view of the cases was decided, as opposed to sub-micro projects within each organization. By focusing more on the whole entity, a better sense of how the activity under investigation works can be provided (Yin, 2003). Table 7/2 provides the research cases selection:

Table 7/2: Selection of the research cases (sample)

Sector	# of cases	Selected Investment types (Main modes Of Entry)
Pharmaceuticals	2	Fully owned subsidiary and Joint Venture
Insurance	1	Fully owned subsidiary
Manufacturing	4	Licensing, Technical Assistance and Joint Venture
Total cases	7	

Source: The author.

The choice of cases include pivotal ones, based on the interviewee who has particularly rich, first hand experience of the phenomena, and has been involved for a substantial period of time. Seemingly negative cases (cases which challenge and extend the explanation developing from other cases) provided evidence that this analyses is not biased. This is evident in the variety of modes selected and the sectors involved.

7.3.2. Phase 3: Design and Validation of Research Instrument, Research Administration and Operationalization [Fieldwork Stage I]

7.3.2.1. Design of Research Instrument (Interview Guide)

An interview guide was used for all in-depth interviews (appendix 5). An interview guide is a list of questions or issues to be explored in the course of the interview. It is a semi-structured type of personal interview, which serves as a memory aide and clarification tool. An interview guide was essential in this research since:

- It ensured that essentially similar information is gained from the participants by discussing the same issues (especially with anticipated confusion related to technology components definitions, linkage issues, etc.).
- It served as a fundamental checklist during the interview to ensure that all predetermined topics are covered.
- It ensured to make interviewing different people more systematic and comprehensive by delimiting the issues to be discussed in the interview.
- It kept the interaction focused, but at the same time gave the flexibility for different perspectives and experiences to be put forward, openly.
- It provided a framework within which new leads from interviewee may be systematically pursued.

After considering the key variations in each sector involved in the sample, design of the interview guide was unified for all sectors, in order to provide basis for assessment of common issues. The interview guide addressed various data needs regarding the firms' background; their foreign levels of international activity; technology issues; host problems, obstacles, operations, and satisfaction levels. It was designed to elicit general information at the start and become increasingly specific with regard to core issues, without intimidating the respondents. A profile of the firms, its age, size, experience, and perceptions of government issues and services was provided.

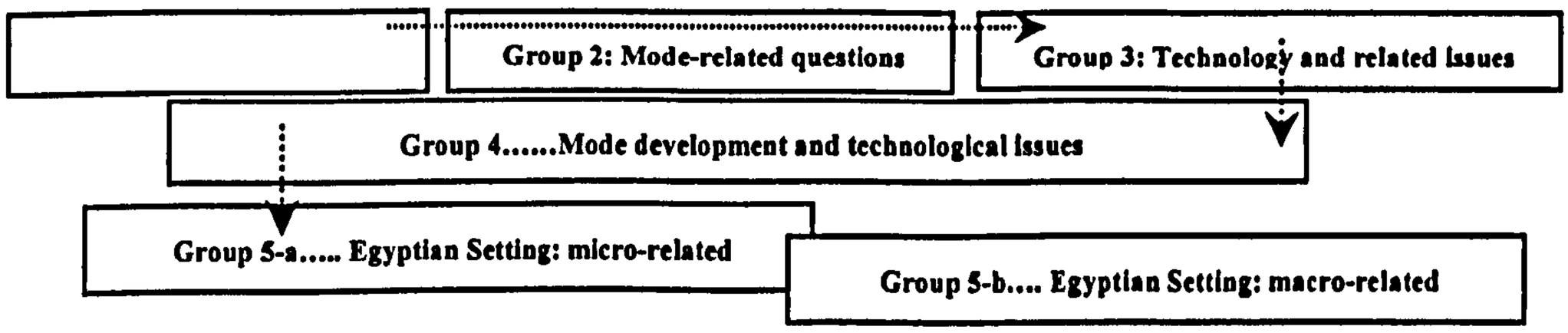
The interview guide instrument contained mostly qualitative open-ended questions, but as it was quite long, ease of completion was paramount and wherever possible, especially in areas including multiple issues, respondents were asked to tick a response out of a list. Respondents were invited to express their opinions and give reasons for their satisfaction or dissatisfaction with the various issues such as government policy. The structure of the interview guide was designed in an attempt to get as many questions answered by possibly sceptical respondents. It was noted in the design of questions that questions, asked too directly to Egyptian interviewees may result in cautious responses of inconvenient level of detail. Therefore, the information collected had to be accurate and holistic.

The design of the interview guide received great attention and was consisted of questions that have the same meaning, a single meaning and the intended meaning to everyone. Questions were numbered. The types of questions used were open-ended questions; unaided recall questions; dichotomous questions (two choices of answer, 'yes' and 'no') and checklists were used as a way of prompting the memory of a respondent without being biased by the interviewer. The rules that were applied for questioning design are:

1. Short and Simple words that are familiar to everyone were used
2. Careful attention was made not to offend the interviewees by subtle questions
3. English/Arabic languages were used, to the preference of the interviewee
4. Indirect questions were used in order to elicit the desired level of detail (whenever direct questions did not provide this)
5. Only questions that respondents can answer from knowledge/experience were asked

In summary, the interview guide is divided into 5 distinctive groups, as follows:

Figure 7/3: Interview guide sections



Source: The author.

Group I..... Background data

The questions of this group address the background data of the company, including company name, industry, establishment, and interviewee data: name, function, employment date, etc.

Group 2..... Mode-related questions

The questions of this group address the identification of the entry mode decision motivation (a list of motivations was given to the interviewee) and criteria (competition, timing, initiating party,..). The nationality of foreign corporate, exact mode of entry selected (legal form, foreign shareholding-demonstrating confidence and control level,..), firm short and long-term objectives after entry, mode evolvement over time, corporate experience in that specific mode and criteria for its preference were questioned. It is noteworthy that the interviewees were also questioned about any changes in their assessment of their motivations at the current date as opposed to the date of entry. This demonstrated impacts of change of government policy on corporate motivations. Impacts and assessment of the value of government incentives on market entry, and hence exact mode of entry choice, and assessment of mode issues and review of mode related decisions after a period of time of continuous operation is of key importance, to demonstrate the incentives that actually influence market entry and/or associated technology transfer.

Group 3..... Technology and related issues

The questions of this group address the fit of the company's technological level in respect to the industry, competition, foreign corporate, current and future needs of domestic market, etc. This includes know-how, equipment, processes, etc. An assessment of the existence, size and reasons of any technological gap in the software, hardware and process components of technology used in the company as opposed to foreign technology levels. The importance of technology in Egypt and hence the importance of technology transfer, and the impacts of government policies on technology transfer were then addressed. Responses to these also shed light on issues such as technology appropriateness, cost and recommendation systems. At this stage, the various means and purposes associated with technology transfer situations were questioned. These were subdivided into: management technology transfer situations, product technology transfer situations and process technology transfer situations. It was necessary to question the identification of technology transfer situations, the people involved, the timing, the time span it took, the functions involved, and evaluation system.

Group 4..... Mode development and technological issues

The questions of this group address the links between the technology level of the local partner and of Egypt as a host, and the selection of Egypt for market entry and the selection of the mode of entry. The triggering of technology transfer situations had alternated in literature between the host and the home. This needed specific elaboration in the context of Egypt and in relation to particular modes, whereas the hindrances to technology transfer situations were discussed, along with the catalysts to these situations. The impacts of mode evolvement on technology transfer were addressed which assisted in further explaining the tie between technology transfer and different modes of entry. Exploration around other mode-related issues such as size of investment at host, staff mix (expatriates versus local) and their learning patterns and technological impacts of mode on national development-allowed yet better understanding of mode-technology transfer ties. The questions that targeted the headquarter involvement in the local operation allowed investigation of the level of control, brand name protection, quality, process control, R&D, etc., desired by HQ. These questions explored the level of learning by training or on the job, of the procedures that allow learning (e.g. by new accountants of international practices).

Group 5-a..... Egyptian Setting: micro-related (Post-Entry)

The questions of this group address the importance of key characteristics of the local partner company (in cases such as JVs and Licensing), and the importance of interactions between staff members on improving the level of technology transferred, involvement of the foreign HQs and the interpretation of their actions and selection of areas of audit and intervention.

Several questions of this group addressed the issues of learning patterns, cost-benefit of the various learning methods with special emphasis on training (local, abroad, on-the-job) and R&D and its content, impacts and association to mode of entry. Furthermore, the type of work done in the product R&D departments highlighting the level of product technology transferred to the local operation (localization, customisation,..). Similar emphasis was made on quality perspectives and development of supply chains. Contractual issues also received specific attention of the questioning in this group.

Group 5-b.... Egyptian Setting: macro-related

The questions of this group address the macro issues of the host that may hinder or affect the technology and the mode of entry. These issues include those arising as result of BITs between host and home nations, global environment, political/economic frameworks existing in Egypt. Impacts of various policies, laws and incentives are of key importance to this research and the exploration around their impact on the process of technology transfer associated with particular modes of entry was explored by many questions. The determinants of technology transfer and the ability to affect them from a macro level, along with the determinants of foreign market entry into Egypt and mode choice and mode stability/development and also the ability to affect them from a macro level were assessed.

Therefore, as seen, the specific areas of exploring of the interview guide are tightly coupled to the issues emanating from the literature, and the research questions. These areas of probing and issues addressed in the interview guide are categorised in a manner that allows the cross validation of the responses against the research objectives as follows:

Table 7/3: Areas of probing and issues addressed in the interview guide

Technology-related ❑ Current technology level ❑ Current technology gap ❑ Transferability and Appropriability ❑ Importance to business ❑ Future outlook and others **Mode-related** ❑ Type of mode used ❑ Reasons for selection ❑ Foreign ownership issues ❑ Nature of operation ❑ Occurrences of transitions ❑ Planned transitions ❑ Export potential of mode ❑ Years in market ❑ Role of technology, if any, in mode selection ❑ Recruitment of top management ❑ Future outlook and others	**Foreign firm- related** ❑ Involvement in operations ❑ Industry ❑ Priorities in Egypt ❑ Level of internationalisation ❑ Type of technology (patented,..) ❑ Value of technology ❑ Guarantees of produced goods ❑ Future outlook and Others **Egypt- macro related** ❑ Country selection criteria ❑ Overall attractiveness ❑ Problems and risks ❑ Investment Incentives ❑ Technology incentives ❑ IPR ❑ Policy framework ❑ Governmental Controls ❑ BIT effects ❑ Domestic added content ❑ Future outlook and others

Technology transfer-related	Egypt-micro related (local partner)
❑ The individual definition of TT ❑ Types and areas of TT experienced by host-firm (manufacturing know-how, management, R&D, marketing,.. ❑ Time of occurrence of TT ❑ Static/dynamic process ❑ Costs ❑ Contracts ❑ Mode-related deterrents to TT ❑ Mode-related facilitators of TT ❑ Added TT on transition incident ❑ Future outlook and others *(TT=technology transfer)*	❑ Technology recommendation system ❑ Performance standards ❑ Type: public/private ❑ Size and experience of local partner ❑ Internal capacity and learning patterns (HR, complementary and compatibility) ❑ Competition ❑ Relationships with supplier networks, local government and financial institutions ❑ Technology evaluation system ❑ Future outlook and others ❑

As the conceptual model includes representations of the research objectives and clear linkages with the question probing areas conducted in the fieldwork, it becomes possible to trace backwards the entire process of technology transfer (including the parties, issues synthesized from previous empirical efforts and new issues that emanate from fieldwork).

Validation of the research instrument was necessary. In fact, a number of steps were taken to validate the entirety of research interview guide. Drafts were carefully reviewed and improved to ensure that their details were accurate; that respondents would recognize questions and that elements whenever verbally translated would give the same meaning.

The Stage I of fieldwork involved the first two interviews, and revealed no significant problems concerning the content validity or structure of the interview guide or the terms used except for occasional rewording of some of the questions. Data obtained was comprehensive and "fit for the purpose" and there was no evidence that respondents had difficulty with any questions, except for occasional explanations needed for (Not-Applicable) questions. Nevertheless, this was accommodated to unify interview guide questions across multi-sectors and multi-modes. Occasional confusion was remedied by verbal clarification.

7.3.2.2. Research Administration

A major objective during the third phase prior to operationalising the research was to secure the ongoing consent of key informants in the various cases, not only in order to confirm access to information but also to gain support throughout the ensuing phases of the research process. Due to difficulty in gaining access twice, the interview guide design had to address all the issues identified from the earlier phases at once, and in an understandable comprehensive manner.

The interviews were done personally, to avoid the pitfalls of postal delivery of a mail questionnaire, where the pitfalls in this case would include delivery to the wrong person or the delivery occurs to the right person, while the response be delegated to another person. It could also be possible that the right person might need translation to Arabic on some questions or might need a smoother less formal approach to avoid sensitivity and confidentiality concerns. Any of the above severely affects quality of responses acquired. Shuffling of the questions occurred to get better responses as opposed to firmly grouped questions that tended to be less appealing and raised scepticism from respondents.

An explanation of the purpose of the research, confirming the interviewee's awareness of its national usefulness and guaranteeing absolute confidentiality thereof was given. Permission was gained to tape-record the interviews, even though taping provokes 'proper line' data (i.e. interviewees become conservative regarding which issues they should mention and which to avoid due to recording). Nevertheless, with one exception, the interviewees were free and open in expressing their opinions as a result of utilizing personal contacts to emphasize truthfulness. Furthermore both the interviewer and the interviewee make brief notes during the interview.

At the end of the interview the main answers are reviewed, compared and summarized, whenever time allowed. In several cases additional telephone conversations took place to request additional information, if necessary.

7.3.2.3. Operationalizing the Research

The nationality and hierarchal level of the interviewees and interview duration summaries are indicated in table 7/4:

Table 7/4: Interviewee data and durations

Interviewed partner nationality (Foreign or host)	Level of interviewee	Interview duration
Egyptian (Beta) – MNC staff	V.P. Technical director	2 hours
Egyptian (Gamma)	CEO	3.5 hours
Foreign (Alpha) + Egyptian (MI)	V.P. Bus. Development + CEO MI	6 hours total
Egyptian (Epsilon)	CEO	3.5 hours
Egyptian (Zeta)	CEO	2 hours
Egyptian (Pi)	CEO	2.5 hours
Egyptian (Phi)	CEO	3 hours
EXPERT Opinion (see chapter 9)		2 hours
Total	**24.5 hours**	

Source: The author.

From table 7/4, the following observations can be made:

- The above selections cover main sectors involved in Egypt's development plans.
- The selection of companies from within each sector has attempted to cover and give particular emphasis on those modes with increased potential for purposeful technology transfer (FDI, JV, LIC) (see table 3/3).
- The industries selected for the sample are in manufacturing, pharmaceuticals and insurance sectors. Based on published data, these industries are among important industries to receive government attention (see figure 5/ 2).
- These industries involve established levels of local competition and are geared towards continuous development rather than decline. For example, the pharmaceuticals industry involves 23 companies, the insurance involves 13 companies and the manufacturing, obviously, involves much more within each manufacturing category. Each of these industries involves the complete mix of operations, namely: government owned companies, MNCs (various modes of entry) and local (privately owned companies).
- As shall be presented, the foreign companies involved in the selected cases constitute a broad representation from developed countries (USA, Germany, UK, The Netherlands, Denmark, Sweden, Switzerland,..)
- Most of the selected companies had been established for more than 10 years, with the exception of insurance company Alpha, which is a fully owned subsidiary that was spinned off from a joint venture that started since more than 25 years and still exists. The former majority holder in this JV was co-interviewed to complement and strengthen the mode development perspective of this case.

- It can also be noted that all the foreign partners involved in the cases are established MNCs with long experiences in internationalisation and are of substantial size. They are true representation of MNCs worldwide.
- The number of manufacturing companies interviewed was larger than the other sectors because the technology component was more evident. In three of the 4 manufacturing cases, the companies experienced multiple modes in the single case. This allowed for better assessment of mode transitions and mode developments.
- With no exception, all the interviewees were at the highest corporate level. They hence were capable of providing the holistic view needed for the topic. These individuals were the only people who simultaneously oversee the mode related issues, the technology transfer issues and the impacts of government policy. Obviously, this created an accessibility concern due to their busy schedules. As indicated, a major criterion for selection of the sample was existence of personal contacts that would guarantee access for interview (see additional problems/limitations related to the sample in section 10.4.).
- All the interviews were conducted in the business offices of the interviewees, and were all conducted in the period 2001-2002.
- The overall response level was at the high end of expectations, where the questions adopted widely recommended guidelines for ensuring a high response, along with other indicated measures.
- In the case of the insurance fully owned subsidiary Alpha, the interviewee was foreign and the interview was conducted fully in English.
- All other interviews were conducted in both Arabic/English together with an Egyptian interviewee. This was one of the problems that limited usefulness of CAQDA software (Computer-assisted qualitative data analyses) programmes in case analyses of this thesis.
- CAQDA programmes such as Nudist/NVIVO automate analyses procedures through the use of linked coding schemes, hypertext, and case-based hypothesis testing, hence diminishing the amount of labour needed to organize and code data, but they do not fundamentally change the process of analyses. In this thesis, the analyses in the following chapter were conducted by traditional methods that provided closeness to the data. Such closeness balanced between over simplification (resulting in loss of subtlety and insight into complex processes), and over coding (where the themes and trends are still obscured by too many sub categories).

This is in line with the fact that different interviewees may have different definitions for the same word or use different vocabularies for describing the same thing, especially when dual languages are used. Needless to say that the area of technology transfer already suffers from such a problem in the first place. This predicted inconsistencies in standardizing code for software to analyse. Burawoy (1991; 1998) contends the same. He concludes that researchers relying on extended-case methods find that analytical principles of this context-dependent method are more difficult to codify.

- The interviewee who provided the expert opinion (see chapter 8) is Dr. Eng. I. F., whose suitability for this expert opinion interview is excellent, because he has combined experiences very much related to this research's scope. Dr. I.F. was a recent chairman of GAFI (General Authority for Investment), which is the main governmental body, assigned to investments in Egypt including permits for setting up of new companies and fully owned subsidiaries in Egypt. In his other post, Dr. I.F. was the Minister of Industry, overseeing the country's industrial policy and technology related aspects (strengths and weaknesses of the Egyptian industry and the opportunities and threats facing Egypt on both the macro and micro levels). Naturally, as a cabinet minister, he had a direct say in regards to policy recommendation and implementation procedures related to the investment, industrialization and industry modernization of Egypt and had witnessed (first hand) the impacts of these policies.

7.3.3. Phase 4: Conduct Interviews and Analyse Cases [Fieldwork Stage II]

Each interview took between 2-4 hours at the respondent's instigation. In addition, phone conversations were used for setting appointments, briefing on the research scope, and follow up calls were conducted for additional information after the interview. Great attention was given to logistics of timing, handling and directing the interview. Procedures adopted reflect guidelines regarding the collection of interview data. As indicated, the main guidelines of the case study method (Yin, 2003) were implemented. Two companies were selected from the sample to start with. The purpose was to truly pinpoint the correct approach to investigate in full depth, along with identification of new issues and confirm the existing identified ones.

The experience gained by first set of interviews resulted in minor revisions on the interview guide. In fact, the pilot cases assisted in refining data collection plans with respect to both the content of the data and the procedures as well. The first (pilot) cases were chosen for

several reasons. The interviewees at the pilot sites were congenial and accessible, the sites were geographically convenient and the interviewees expressed willingness to provide unusual amounts of documentation and data. These cases also represented challenging cases, so that nearly all-relevant data collection issues were to be encountered. Otherwise, the format and case analyses report of all cases remain the same for cross synthesis.

The cases summaries and codes (for confidentiality purposes) are indicated in table 7/5. Each case will be fully analysed and presented in individual case reports in the following chapter 8 (phase 5 of the research). A cross-case synthesis will be conducted in chapter 9.

It is important to highlight that the given company codes have been unified for the foreign corporate and local operation. This was done in order to avoid confusion resulting from excessive code names within each case report.

Table 7/5: Codes for sample cases and relevant mode information

Case	Sector	Selected Investment type (Mode Of Entry)	Company Code
Case # 1	**Manufacturing**	2 Licences (know-how transfer and technical assistance)	**Epsilon**
Case # 2	**Manufacturing**	2 Licences	**Pi**
Case # 3	**Pharmaceuticals**	Fully owned subsidiary	**Beta**
Case # 4	**Pharmaceuticals**	Joint Venture (majority foreign)	**Gamma**
Case # 5	**Insurance**	Fully owned subsidiary	**Alpha**
Case # 6	**Manufacturing**	Multiple joint ventures + licence	**F (Phi)**
Case # 7	**Manufacturing**	Joint Venture	**ZetA**

Chapter 8: Multiple-Case Analyses

The following sections include the separate case analysis reports for the sample companies. These comprehensive reports are very largely drawn on the primary data resulting from the in-depth interviews. These reports are occasionally supported by company data. In some cases, the interviewee provided confidential documents, increasing the depth of the analysis by the assessment of such documents.

8.1. Case#1: Epsilon Company

1. Background

Epsilon was founded in the year 1948 and it was composed of two plants for grey cast iron and steel. In the year 1985, the company started to establish a third plant for ductile iron pipes in Giza. The president of Egypt inaugurated this plant officially in the year 1988.

In 1991, the company succeeded in establishing a fourth plant for the production of high quality ductile iron casting and valves in Alexandria. The mechanical properties (tensile strength, proof strength, elongation, and toughness) of the fourth's plant production exceed those of any other cast ferrous alloy. From the commercial and technical perspective, ductile iron is now replacing the grey cast iron and steel castings in numerous applications. Also, welded steel products (up to medium sizes) can be easily replaced by ductile iron. The ductile iron has applications in automotive components, water pipes, valves, textile machinery' spare parts, rolls for steel and non-ferrous metals industry, etc. These technical attributes of the ductile iron need advance production facilities to make them possible, and that level did not exist in Egypt prior to Epsilon's investment.

Hence, Epsilon is considered as the pioneer in the metal casting business in Egypt. The company produces 75000 tons from the different classes of pipes ranging from 100 to 10000mm diameter and valves ranging from 65 to 600mm, as well as fittings up to 1800mm in diameter and other special castings required for various industrial sectors. This production covers the needs of the infrastructure projects in the local market, especially in the areas of potable and wastewater. Furthermore, Epsilon has also succeeded in exporting to Europe, Asia and Africa.

Epsilon is currently a privatised company (a former public sector company), whose shares are currently held by the National Investment Bank of Egypt, Alexandria Bank, Misr Bank and the Employee Stock Association (ESA). This relatively new private sector nature of Epsilon supports their newly set objectives of delivering water services to the entire nation, and increasing confidence and satisfaction in Epsilon's products by efficient implementation of contracts and by keeping continuous intensive contact with customers. Regarding the Epsilon owners' interests, the policy is to continuously increase the market share, diversification of products, minimizing of costs/increasing of revenue and continuous upgrading of technology and human resources. Finally, regarding the interests of the Epsilon employees, the company policy is to improve the working conditions setting an environment to improve and motivate employees towards creativity and innovation. The Epsilon management is continuously working on achieving their company's objective by implementing both financial and technology transfer strategies.

This interview was conducted at the main factory premises in Tanash. The interviewee is the Egyptian CEO and chairman of the company, and he had been in this position for approximately 10 years.

2. The foreign company and entry decision perspectives

In the mid seventies, a large French manufacturer (currently the world's virtual monopolist) approached the Egyptian government to establish a joint venture with Epsilon, which was a public sector enterprise at that date. Although this was an attractive offer at that time of liberalisation, but the government refused in fear of being accused of politically "selling out the country", especially after a long period of socialist rule under the Nasser regime. From the perspective of the interviewee, this refusal turned out to be beneficial to the preservation of the local industry, because the French company demonstrated afterwards a worldwide pattern of acquisitions/shutting down competition, in its attempt to achieve the monopolistic position that it currently enjoys.

Epsilon decided in the early eighties that the market was ready for the ductile iron products, so Epsilon issued a public tender for the turnkey supply of the plant needed. The tender was awarded to a German company. This company was acquired itself by the French tycoon shortly after the Epsilon contract award, and the German company was forced (by new

French management) to decline from fulfilling its commitment to Epsilon; despite having to sacrifice its substantial performance bonds in the process.

Finding itself in this situation, Epsilon management decided to embark on a multi-phased approach, conducting detailed screening of the remaining international leaders in this field, mostly in UK, France, Germany and Switzerland. Epsilon invested in visiting a short list of foreign companies and started initial negotiations with them. This process took almost one year. Finally, a German company, called TRT was selected. Epsilon management's decision at that time was affected by the benefits that they planned to gain from the German AID (at its peak to Egypt at that time) under a German-Egyptian bilateral agreement (BIT). In fact Epsilon managed to get part of the contract financial obligations waivered. Nevertheless, the BIT was not utilized beyond that contracting phase.

At this stage, Epsilon decided to secure its position and guarantee continuity of its new technology by signing, simultaneously with the equipment purchase, a know-how transfer agreement and a 5-year technical assistance agreement.

From Epsilon's management perspective, this was the most appropriate (combination) mode of cooperation that guarantees continuity in face of a hostile acquisition of TRT, if that happens. In fact, the French Tycoon did actually acquire TRT later on, but that fortunately occurred only a few months prior to the conclusion of their 5-year technical assistance contract with Epsilon, as indicated by the interviewee.

On the other side of the Epsilon activity, in 1991, Epsilon opened a new plant for the manufacturing of valves in cooperation with a Swiss company called GFFS. Epsilon followed with GFFS the identical route that it had followed with TRT, namely: purchase of equipment, know-how transfer followed by technical assistance period- all combined!

3. The mode of entry perspectives

As indicated, Epsilon was the initiating party of the cooperation with both its foreign partners, and this cooperation (between Epsilon and TRT and GFFS) has been contractually formalized in equipment purchase, know-how transfer and technical assistance contracts.

The first know-how transfer and subsequent technical assistance contract for the foundry for ductile iron pipes with German partner TRT was established in 1986. The objectives of this contract was that TRT provides the know-how necessary to enable Epsilon to produce the ductile cast iron pipes according to DIN 28600 in the range of 100mm to 1.000mm DN.

TRT warranted to Epsilon that the written know-how documents to be handed over are complete, and that they represent TRT's best own practice (TRT stated in the same contract that its liability would not exceed 50% of the Know-How fee).

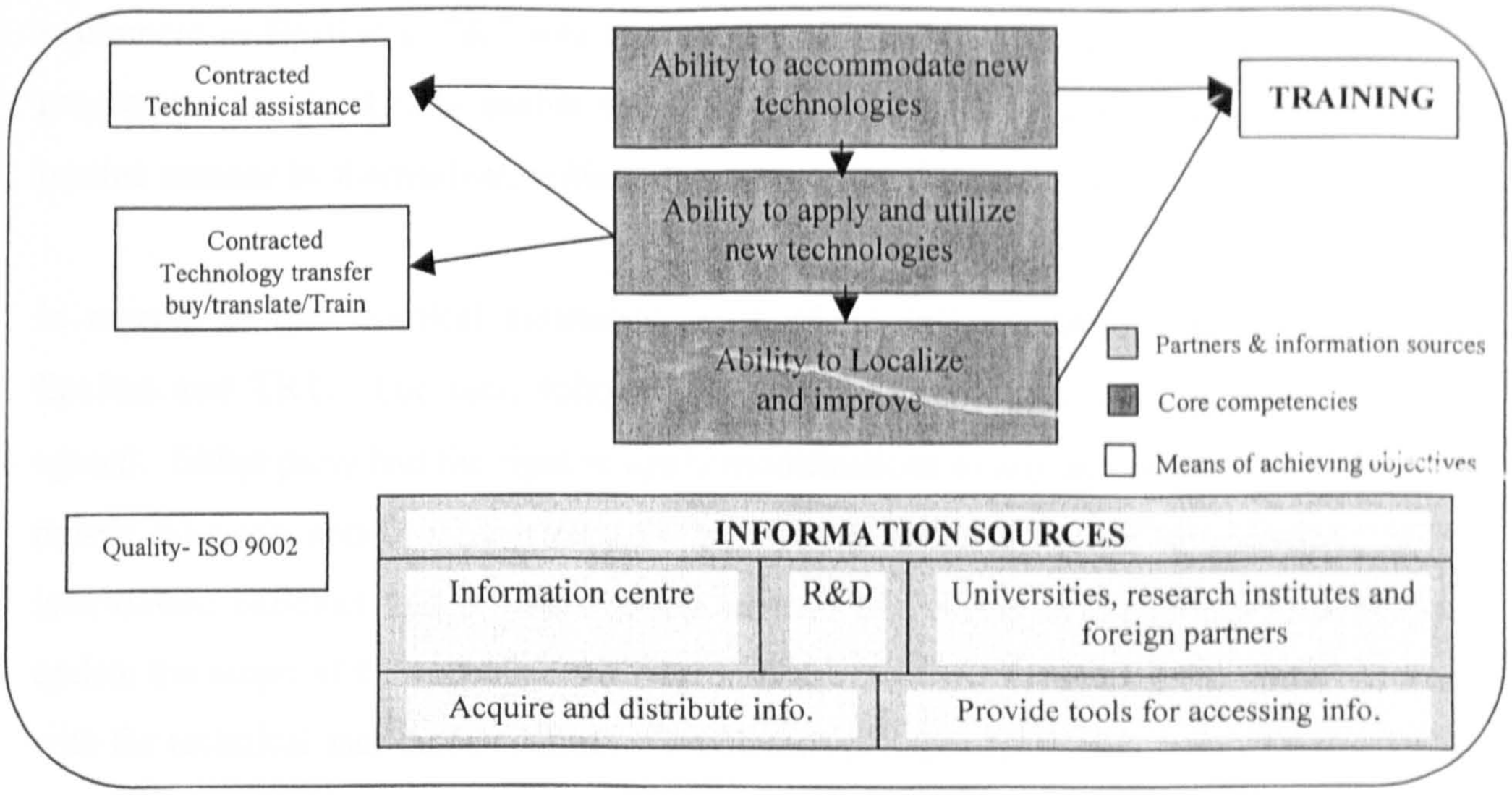
It is noteworthy that for the plant of valves and fittings in Alexandria, the transfer of technology and technical assistance contracts between Epsilon and the Swiss company GFFS (signed in 1991) listed scope of services/know-how documents that are identical word-to-word with those documents of the TRT contract (appendix 6). For the purposes of this research, the interviewee kindly provided the confidential contracts (after obscuring the financial figures). These demonstrated that Epsilon implemented literally identical contracts between itself and each of TRT and GFFS. In fact, the GFFS contract included additional clauses that relieved them from responsibility of the success of the technical assistance offered to Epsilon. This was attributed to the foreign supplier having concerns with the governmental type of operation at Epsilon.

On the financial side, the overall cost of technology transfer contracts (both contracts) amounted to 5.2 million L.E. This cost represented only 2% of Epsilon's added sales of 223 million L.E. after operating the two new plants, and implementing the know-how transfer contracts (with the technical assistance contracts in effect).

4. The issues of technology and means of its transfer

The interviewee advised that Epsilon has a clear understanding of technology-related needs necessary to serve its developmental objectives (figure 8/1).

Figure 8/1: Representation of Epsilon's technological needs assessment



Source: The author, derived from company data.

Based on this understanding, the interviewee advised that Epsilon viewed technology assistance and technology transfer as the two key components needed to fulfil the Epsilon objectives. Upon implementing this understanding, the table below represents the chronological assessment of technology transfer events that Epsilon achieved at the pipes plant (with TRT):

Figure 8/2: Chronological assessment of technology transfer events with TRT

Training on the German language	■	■	■	■	■	■					
Internal specialized training for preparation of project					■	■					
Equipping the training Centre								■	■		
Local training sessions at training Centre (local and 2 foreign instructors)					■	■	■	■	■	■	
Foreign training in Germany (175 man month)							■				
Ongoing training courses (originally local institutes then the returnees from abroad training)										■	■
Technical assistance (309 man month)							■	■	■	■	
Actual production							■	■	■	■	■
Year	**'81**	**'82**	**'83**	**'84**	**'85**	**'86**	**'87**	**'88**	**'89**	**'90**	**'91**

Source: The author, derived from company data.

As observed from the table, most of the events that took place were related to formal training. This training was part conducted locally and part abroad, in addition to on-the- job training. The training abroad was agreed upon under the contract, and covered the production process, operations control, maintenance, machining and other treatment of moulds, inspection, quality control and instrumentation. The training locations were

classrooms, equipment manufacturer facilities and production plants using similar equipment as Epsilon's. TRT was requested to draw up a suitable training and monitoring programme to specifically enable the Egyptian employees to operate the plant in normal routine manner by themselves, without the assistance of TRT experts.

In regards to the technical assistance, an implementation scheme was devised between Epsilon and TRT. For each following year, an implementation scheme was separately agreed. Either party had the right to apply modifications to any agreed scheme with a three-month advance notice. Even though this was a relatively loose arrangement, but the interviewee believed that it protected the interest of Epsilon in the ability to dynamically update the scope of the technical assistance. The actual know-how transfer areas associated with the technical assistance contract are indicated in appendix 7.

On the other front, Epsilon implemented a very similar pattern of technology transfer events at the valves plant with GFFS. The chronological assessment of technology transfer events at the valves plant is indicated in the table below:

Figure 8/3: Chronological assessment of technology transfer events with GFFS

Internal specialized training for preparation of the project (127)	■									
Specialized training locally at research centres (205)	■									
German language training (163)	■									
Setting up the training centre		■								
Technical assistance				■	■	■	■	■	■	
Actual production and independent learning curve					■	■	■	■	■	
Year	**'87**	**'88**	**'89**	**'90**	**'91**	**'92**	**'93**	**'94**	**'95**	**'96**

Source: The author, derived from company data.

It is noticed in the above table that the specialized internal training preceded the German language training. This allowed the Epsilon management to give German language training to the qualified staff members only. This was an experience that was gained from the pipes plant (TRT know-how contract). The final list of staff specializations and technology transfer events schedule, associated with the training and the technical assistance, are indicated in Appendix 8, whereas two main staff categorisations were involved, namely: engineers and foremen.

Based on the interviewee, the technological gap between Epsilon and its foreign partners at the time of contract was assessed to be at least 50 years, because Egypt never did have the technology of ductile iron before. Even after implementation of the contracts, the gap narrowed down to10-15 years with Epsilon still lagging.

This was mostly attributed to fast developments, which Epsilon could not keep up with, especially in the capital-intensive equipment of this industry. Another reason attributing to this relatively large gap is the prolonged durations of training foreseen necessary by the Epsilon management's perception at the time of implementation.

Complementing technology transfer and technical assistance contracts, the interviewee advised that additional perspectives were needed in order for Epsilon to achieve its technological needs, these include internal company-wide training, quality control and R&D.

Training:

In preparation for local implementation of the contract, Epsilon's experienced engineers engaged immediately on an internal study phase of the then available know-how documents in order to identify the key areas that they shall stress upon during the presence of the foreign experts. Immediate German language training was also conducted. Afterwards, foreign experts from TRT were requested to select a short list of local staff to be trained as trainers. These foreign experts were also assigned to supervise the setting up of the training centre (established for the purpose). The training centre in Epsilon's opinion served the purpose of providing continuous qualification of staff, which in turn buffers labour turnover.

Training is considered by Epsilon as the core to its technology transfer and technical assistance agreements. Accordingly, Epsilon established two training centres in Giza and Alexandria in cooperation with its German and Swiss partners. These centres were provided with the most recent tools and training programmes in order to raise the skills of the technical working staff. Following the training received by Epsilon under its agreements, the company engaged in offering added-value training services to other industries in Egypt and abroad (such as Libya and Iraq).

Epsilon's own staff, along with qualified university professors; currently conduct the instruction and training at these centres. The training centres often utilize cooperation protocols existing between Epsilon and various research institutes and universities, such as the Research Institute of Cairo University, Sadat Academy, Faculty of Engineering– Alexandria University, Metallurgical Research and Development Institute, etc.

The view of Epsilon management is that highly technological areas always need attention both prior and during the training offered under the technology transfer agreements.

Quality control:

It is Epsilon's understanding that for a product such as their own, which is highly used in infrastructure projects, quality control is essential for the production of the soundest castings. Accordingly, Epsilon imposed quality checks at every stage of the production, from raw materials to finished product. For instance, the determination of the main elements of the molten metal is carried out using optical emission techniques. The molten metal temperature is continuously monitored during melting and pouring. Pressure tests are performed to every pipe, fitting and valve. Visual inspection and measurement checks are carried out throughout the process. All efforts are pooled to fulfil technical quality parameters and meet international standards.

Epsilon was granted a quality assurance certification ISO 9002 in the year 1995. This certification was renewed in year 1998 and renewed every 3 years afterwards. It is the perception of Epsilon that quality consciousness was vital to the success of technology transfer and technical assistance contracts and hence achievement of its objectives.

R&D:

Epsilon regularly undertakes research work to ensure that all its products meet the required national and international standards. The company works in close coordination with research and scientific organizations, such as the NRC (National Research Centre) and the CMRDI (Central Metallurgical Research and Development Institute) and various faculties of engineering at Egyptian universities.

Among R&D projects that were initiated at Epsilon, some specifically targeted the improvement of existing products and cost effectiveness, such as:

- Fuel consumption improvement
- Use of computers in Metallurgical operations (better utilization of materials)
- Production and usage of local Furan to replace the imported Furan
- Utilization of alternative wood in packing the pipes for transportation
- Preparation of an In-house manual for Die Casting problems and causes

Other R&D projects targeted the development of new products/processes, such as:

- Design of Heat treatment Furnace for cylinders
- Production of welded pipes using flexible cast-iron
- Production of Tropical pipes, for export to Kuwait, by making adjustments to the inner cement lining techniques and external isolation
- Production of connections in diameters up to 1000 mm using reverse engineering

On another front, Epsilon gained first hand R&D experience through a separate cooperation with a German entrepreneur company. Epsilon and this company started efforts to co-develop a new pipe socket. Epsilon's role was mainly to test the research prototypes at its own factories. This implied stopping of normal production and rigging the equipment to install the prototype under test. The resumption of operation required reinstallation of normal components and recalibration for return to production. This process was repeated on several iterations, but was foreseen worthwhile because the new product carried an excellent potential. Unfortunately, as per the interviewee, the French tycoon acquired this entrepreneur company and Epsilon was deprived of its share in development rights because no formal R&D contract was in place.

From the overall management perspective at Epsilon, the technology transfer means and purposes that were observed by the interviewee are:

Table 8/1: Purposes and means of technology transfer at Epsilon

Management Technology Transfer	**Purposes**: Increase general profitability *[by increasing number of offered quality products while remaining under government protection of local manufacturing]* Improve services rendered to customers *[developing skilled marketing and quality control departments to render a better service]* Raising national Reputation *[high profile exporting and ISO accreditation]* **Means**: HRD *[by continuous development of staff, and by the securing of the staff through establishing an employee fund owning shares. This guarantees lower turnover, loyalty, better morale and continued investment becomes rational]* Staff general training and orientation: Local training *(administrative and technical)* Training abroad On-the-job training Employment of Expatriates (*under technical assistance contracts)* Technology Transfer clauses (*technology transfer and assistance contracts)*
Product Technology Transfer	**Purposes:** Increase product range Increase quality perception Export of end products **Means:** Product training R&D development
Process Technology Transfer	**Purposes**: Cost reduction Improvement of performance standards Improve materials procurement **Means:** Equipment design Maintenance training/learning for equipment Installation of equipment Alterations and additions to equipment Quality systems implementation Plant designs, documentation, drawings, layouts

Source: The author.

5. Egypt: the macro perspective

Epsilon management perceived that they were daily under pressure from a far larger competitor, and that the Egyptian government needed to step up its protection of unique local companies. Obviously, Epsilon is perceived to be in need for protection. In the year 2000, Epsilon management assisted in issuing an executive order #1664 from the Prime Minister of Egypt, prohibiting the governmental purchase of imported goods in several industries, including Epsilon's industry.

The views of interviewee, based on his local experience, is that leaving private investors select their own modes of entry and technologies without any leads from the government has led to many problems such as obsolete factories being imported, finance abuse at Egyptian banking system, etc. In his opinion, the macro component (expressed in the government) leading the investments in Egypt ought to be increased. The interviewee names the automotive industry as an example, whereas the government has restricted the importation of foreign cars dated more than one year earlier, stating "this regulation, accompanied with extremely high custom duties has allowed the local industry to thrive, and export as well".

6. Case observations

- The interviewee expressed a few remarks in relation to the research's scope, namely:

The hardware technology changes every 5 years, but even though this clearly contradicts with Epsilon's logic of having periods of training and technical assistance extending over many years (as in this case), the interviewee indicates that he is satisfied with Epsilon's current level of equipment which he foresees adequate for the Egyptian market. He believes that training enables his staff to implement new technologies with ease, whenever this new technology will be purchased. In regards to his own investments, he comments that costs of technology transfer and technical assistance contracts have been recovered, in various forms.

- The local component of the technical assistance extended over a long period of time and often came in parallel with the training abroad, hence was missed by the number of senior staff members still abroad, who were supposed to be key to the local process. The interviewee advised that this did not affect the overall process, because the trainees acquired abroad what other staff members locally observed. This was achieved by training abroad in factories similar to Epsilon's.
- The interviewee believes that MNCs incorrectly down play the importance of social aspects of local operations in Egypt.
- The interviewee has made a recommendation that the Egyptian government should strengthen its protection to unique local companies (even private sector ones).
- Finally, MNCs seek to achieve true globalisation of its operation, and Egypt needs to position itself with specialized productions to fit in or else its industries may be subject to acquisition and closure rather than integration.

8.2. Case#2: Pi Company

1. Background

Pi is the leading paints and printing inks manufacturing company in Egypt. Pi was originally a governmental public enterprise, and is now a joint stock company with an annual sales turnover of 300 million pounds. The full privatisation of the company was announced on October 1997. The Egyptian Chemicals Industries Holding Company sold a part of its stake in Pi in the form of Global Depository Receipts, representing 26.7% of the Pi's total capital. Pi managed the sale of part of the 68.7% of its shares (previously owned by the government) in form of GDR at the London exchange, after conducting an extensive road show. The shares of the company are distributed between the Egyptian Government (40%) and private investors owning 60% of the shares (GDR investors as described, Bank Misr, Americana Kuwaiti group and SG bank).

Historically immune to foreign competition (due to a high 30% tariff on paint and ink imports), Pi operated as a relative monopoly in the Egyptian market. Currently, a new breed of local competitors threaten Pi's market share. Multinational paint and coating giants are entering the market, often in partnership with local firms. For instance, El-Mohandes/Jotun, a joint venture with Jotun S.A., has expanded from originally only marine paints into architectural paints as well, and International Paint Egypt has also gone into partnership with Courtalds, one of the world's major producers of marine paints. As the number of competitors entering the Egyptian market increases and tariffs gradually eliminated by end of 2004 in line with GATT, prices and margins will come under attack and more multinationals may target the market. The paint industry in Egypt is a well-established and attractive industry that is expected to grow at an annual rate of 8% over the next five years. Pi holds a market share of approximately 30% of the Egyptian market.

The business of Pi covers the manufacturing of two product ranges, namely paints (decorative and industrial) and printing inks. In the field of decorative paints, Pi is a licensor of a Danish company named Dp and a British company named Ic, while in the field of printing inks; Pi is currently seeking a licence.

Pi's paint plant and inks plant are independent operations but they are tightly coupled together through share of resources such as top management and general facilities, even though the sales of printing ink amounts to 13% only of Pi's total sales.

The interview was conducted with the Egyptian CEO and chairman of the board of the company. He has been in this particular position for the past 9 years. The interview was conducted at the Pi headquarters.

2. The foreign company and entry decision perspectives

Dp, the paints partner of Pi, is an established multinational corporation producing all products of the paint industry. Dp usually selects licensing as their preferred mode of entry into the Middle East region (they have current licensing presence in Egypt, Saudi Arabia, Jordan and Iran).

For Dp, the mode of entry in Egypt has largely remained unchanged over the years. Initially, Dp was a shareholder of Pi in the year 1958, but in 1961 the company was nationalized under the Nasser regime. Since then to date, Dp has selected to remain as a provider of know-how to Pi under a licensing contract only, enabling Pi to use Dp's brand names.

Historically, the decision of Dp taken in 1958 to participate in Pi's equity with a share of approximately 10% was considered as a sign of confidence in Egypt as a host at that time, and implied confidence in the opportunities offered by the Egyptian market. Further assessment of the original entry decision of Dp was difficult due to the long time elapsed since entry, nevertheless the continued interest of Dp in the guaranteed business generated from the Egyptian market is well noted since that date. This interest was strong enough to overcome various difficulties faced throughout the period from 1958 to date. Many of the difficulties that arised were result of succession of governments and regimes with different political, economical and investment frameworks. Their attitudes towards foreign investment varied largely (for example, the transfer of royalties abroad was an issue that obstructed operations during some periods). Dp's licence also survived various difficulties imposed by a largely changing technological scene over the many years.

In fact, the interest was mutual. Pi's management, over these many years, carefully renewed the consecutive licensing agreements in advance of their maturity dates, and carefully honoured the payment of royalties on time. With a large share of Pi owned by the government, these renewals represented guaranteed business to Dp.

On the printing inks side, in 1969 Pi had an agreement with CB-UK who later became CLx, which was later acquired by SC. The licensing agreements for printing inks lasted until 1996 in an extended 40-years partnership (similar to the case of Dp). Nevertheless, after 1996, SC expressed lack of interest in continuation of the agreement. The interviewee advised that Pi's market was not big enough for them.

Accordingly, Pi is seeking to initiate a new agreement with one of the major players in the world market of printing inks. It is the significant change in the international industry of printing inks in the late eighties and nineties that has made it essential for local companies such as Pi to associate themselves with MNCs in this field. The industry has become highly correlated to MNCs and to their globalisation of activities. A few MNCs currently control worldwide international standards, based on their own alliances with printing machine manufacturers; hence, these MNCs are in position to co-define the trends and standards.

These MNCs establish monster specialized factories capable of producing nearly 100,000 ton/year of printing ink intermediate concentrates, achieving economies of scale and consistency levels unbeatable worldwide by any individual manufacturer. Current intermediates manufactured by these MNCs are produced in single batches (i.e. no deviations in quality or colour shades). On the other side, Pi is still using the older process involving grinding of raw materials then mixing of the components in small batches in light of a standard formula with a maximum production capacity of 3000 ton/year.

Accordingly, and in order to supply various companies operating in Egypt with their brands' specific colours, Pi reached the conclusion to associate itself to a MNC in this field. The colour palettes and varnishes instantly provided from databases of MNCs, provide new access for Pi to worldwide colour coding standards for brands such as Pepsi, Coca Cola, etc.

It is noteworthy that even with 30% custom duties on imports of inks, yet imported foreign products hold 60% of Egyptian ink market. Pi holds 30% of the remaining 40% of the market. The printing ink market in Egypt is approximately 10,000 ton worth 150 million L.E. annually. The main ink categories produced at Pi are offset inks, liquid inks, metal, silkscreen inks, in addition to additives and reducers. Pi is promoting itself to prospect licensors of printing inks as the biggest company in Egypt with possession of the largest market share, a strong technical/commercial team and unrivalled local reputation.

3. The mode of entry perspectives

Unlike the case of printing inks industry, where Pi initiated a licensing agreement in search for technological advances, economies of scale and access to international standards, the decorative paints market did not experience major operational-technology changes over the years. The decorative paints market featured mainly developments in logistics, handling, marketing and distribution. The interviewee explained that the most important reason for continuation of the licence agreement with Dp over such a long period (1961-2003), despite the fact that the decorative paints market had not changed much over these years, was that Pi built it's local market recognition as the manufacturer of key brand named products that are proprietary names of Dp.

Pi's major hold of market share is based on the local recognition of these names, built over many years. Interestingly, these products and brand names are obsolete and no longer used worldwide by Dp itself. This extended the products' life cycles.

Interestingly, the Egyptian government green lighted to Pi management to try to acquire the ownership rights to these brand names through full purchase of the obsolete patent from Dp, in order to protect the main strength and leverage of Pi in the Egyptian market. This would allow the government to ask for a premium price for Pi when sold under the privatisation programme. Dp refused the offer of a flat lump sum or even a lifetime licence to Pi. Dp feared that Pi (had they been granted ownership of the trade names) be sold later to a competitor of Dp who can hurt their image. Therefore, Dp refused all forms of cooperation other than a renewable licence agreement, which they believe protects their interests most.

This put the Pi management in a dilemma, because under the licensing contract, in case Pi's public shares are sold to a competitor of Dp, it becomes subject to losing the licence (and hence the right to use the brand names). This meant to Pi that their core strength (brand awareness in the Egyptian market to the extent of being the market benchmark standard) would be lost and hence the company valuation of Pi is decreased. Furthermore, Dp also refused to acquire Pi themselves and the reason was that the size of Pi and excess-employment issues would render the price of the entity too high.

Contractually, the licence with Dp demonstrates many clauses that restrict Pi and position Dp in the stronger stance. Nevertheless, substantial amendments have been implemented in the consecutive contracts over the years demonstrating accumulative learning of Pi's management in the contracting area. A brief of the key contract clauses relating to the licence agreement (with emphasis on technology related areas), along with a comparative assessment between the 1995 licence agreement and the 2001 agreement is included in the following table 8/2. This comparison outlines the restrictions, differences and developments in these two contracts. The interviewee admitted to the restricting clauses. He indicated that they were imposed on Pi (the weaker party) during the negotiation phase.

Table 8/2: Comparative assessment of the licensing contract at Pi

Contract Clause	1996 Licensing Contract	2001 Licensing Contract	*Observations based on interviewee's opinions*
Definitions	Were not listed in this contract	The new contract included the following definitions: "Know-how" shall mean the technical documentation, specifications, technical data and formulations, samples, photographs, and similar materials, as further described, and which are not in the public domain and/or used by third parties in the paint industry, developed by Licensor for the manufacturing of the products and in possession of licensor and being employed in the ordinary course of its production relating to products under which licensor has the right to grant freely use.	*The inclusion of definitions was a result of Pi's improved contracting skills.*
Grants	Briefly indicates that Pi has exclusive manufacturing rights, and non-exclusive sales rights.	Dp may participate, directly or through its affiliates, in future possible demands from the private sector in the territory for import of finished products. In case of such participation, Dp shall pay to the Pi a commission at a rate of 5% (five per cent) of the FOB price of Dp's products imported into the territory.	*Dp did not commit itself to the exclusivity licence, not even after so many years of cooperation, signalling a problem. Pi managed to negotiate a territory percentage to be paid by Dp in case products are sold directly. This is in return for the market awareness built by Pi.*
Know-how And Technical Assistance Services supplied by Dp as part of the agreement	Were not included in this contract	1. Dp will provide Pi with all complete information, general know-how, special know-how and technical assistance required to allow Pi to prepare, manufacture and market the products within the territory. Such information and know-how shall not be extended to products for which Dp is not free to grant a licence or has patent restrictions so far as such freedom is restricted and/or such patent restrictions are in existence. 2. The information and know-how shall include: • Technical documentation, samples, photographs, and similar materials • Technical data • Design of formulae • Manufacturing procedures • Raw materials specifications, test methods and approved suppliers • Evaluation and adaptation of substitute raw materials when required • Laboratory analyses and consulting services in case of problems • Production technology, machinery and equipment • Updates, improvements and technologies relevant to the products. 3. The information and know-how may be conveyed in several forms such as printed or written material, computer disks or electronic transmissions of data, samples and models of product, lectures to Pi's technicians, photographs, visits to plants or to equipment suppliers or tooling sources, and others. Pi acknowledges that any such know-how expressly delivered by Dp or in any manner acquired by Pi from Dp hereunder shall continue to be proprietary information of licensor. Pi agrees to return to Dp all information and materials received which contain know-how.	*The increase in level of detail is obvious; nevertheless, all the controls are still put into Dp's hands and based on their judgment alone.* *On the other hand, disinterest in all but the brand name is evident from Pi's side, and the limited level of specification confirms this.*
R&D	R&D activities were not addressed in this contract	This contract includes references to R&D, as follows: If Pi develops, invents, implements or commercialises any improvements (as hereafter defined) to know-how belonging to Dp and licenced to Pi during such time as Pi is using such know-how, all such improvements devised, developed or applied by Pi shall automatically, without further action, be available for use by licensor and its affiliated companies under an irrevocable non exclusive royalty free right and licence,	*Local R&D at Pi represented no cost to Dp, yet control over the new products was included in full detail. As noted in this clause, unlike other clauses, clear wording and identification of the meaning has been used.* *Interestingly, as per the interviewee, the contract binds Pi*

		and in such event Pi agrees to promptly communicate all details of such improvements to licensor. For these purposes the term "improvement" shall mean any further product, or any technology or intellectual property or any right associated with the Dp know-how, including without limitation any invention, technical data, technical information, design, material, model, technique, process, copyright, method, work, software, know-how or trade secret which derives from or is based on any of the Dp know-how to use, manufacture, fabricate or sell. Dp shall make available on an annual basis to Pi, a total of 200 hours of technical support time. This service shall cover research and development and logistic and production planning. Technical support contact representatives shall be assigned from Dp and the names of these representatives shall be communicated to Pi. Dp or its representative shall be at liberty to make copies of or take extracts from said records and books of accounts	*to handover its limited improvements on local products, new products and inventions, free of charge, even though this should have been Pi's added value gained from extended, paid, technical assistance and experience.*
Quality	Same	Pi guarantees that the products to be manufactured by Pi will be manufactured in strict accordance with Dp's know-how and that Pi shall use the raw materials and manpower as needed to manufacture product of quality and performance standards equivalent to that of Dp.	*Quality and consistency were major and consistent concerns of Dp*
Arbitration	Not detailed (Stockholm)	Detailed and in Cairo	*Improved learning on Pi's part*
Consultancy And Technical Assistance Support At Pi's Place Of Business	One technical expert is offered to Pi No specific person is assigned to liase with Pi	Dp offers to review production and planning processes and procedures on an annual basis. A senior production planning and logistics manager will liase with the Pi's technical and production personnel. The Dp representative will develop, in conjunction with the Pi's personnel an annual production planning and logistics report and plan. The senior production planning and logistics manager, will visit the Pi's place of business and will make comments and recommendations on the report during a one-week stay. Dp offers to review the assortment of production recipes and dependent raw materials on an annual basis. Senior R&D managers will liase with the Pi's R&D personnel. The Dp representative will develop, in conjunction with the Pi's personnel an annual production recipe and materials review report and plan. The senior R&D manager, will visit the Pi's place of business and will make comments and recommendations on the report during a one-week stay. Dp shall send to Egypt, at least two times per year, a senior area manager. The purpose of these visits shall be to liase with the Pi's sales and marketing personnel and to develop agreed upon operational marketing plans, which will be eligible for Dp marketing funding.	*The wording "offers" is not binding unlike other clauses of this contract. The interviewee noted this.* *The duration of local stay is very short and does not allow for real updating of the activities especially on product and R&D activities.* *Two visits for sales demonstrate a higher interest in increasing the sales, rather than developing Pi's product range and technical capabilities.*
Consultancy And Technical Assistance Support At Dp's Place Of Business	Two technicians were to be trained at Dp's. No exact schedule of training durations and content was included	Dp will train the Pi's personnel on an annual basis, as follows: **Logistic and production planning** Dp will receive for up to one week per year, 3 suitably qualified technicians at the Dp plants in Copenhagen or in another Dp plant facility. The objective of this training will be to keep the Pi's personnel up-to-date with industry standards and Dp technology and know-how in logistic and planning. **Research and Development** Dp will receive for up to one week per year, 3 suitably qualified technicians at the Dp plants in Copenhagen or in another Dp plant facility. The objective of this training will be to keep the Pi's personnel up-to-date with industry standards and Dp technology and know-how in Research and Development.	*The increased detail is evident in the duration and logistics of training, rather than the actual content of this training.* *The interviewee advised that the staff consider these abroad training sessions as a reward rather than actual training.* *Language barriers needed particular attention by Pi in most of the instances*

		Sales and Marketing Dp will receive for up to two weeks per year 2 suitably qualified sales and marketing representatives at the Dp plants in Copenhagen or in another plant facility. The objective of this training will be to keep the Pi's personnel up-to-date with industry standards and Dp and know-how in sales and marketing. **Factory Technical Support** Factory technical support covers requests in written or verbal format requiring direct assistance from Dp technical representatives for information and help in solving specific technical problems relating to the manufacture of the products.	
Marketing	Marketing related areas were not addressed at all in this contract.	On an annual basis, Dp will make available 5% of the previous year's net royalty payments for the development, implementation and execution of agreed marketing programmes between Dp and Pi. Pi agrees and represents that the nature and quality of the products (including samples thereof and advertising material used in connection therewith) produced pursuant to any technology or know-how granted to Pi by Dp shall conform to the standards, specifications, colour chart and requirements as to quality as may, from time to time, be established by Dp which Dp hereby acknowledge to be in conformity with EC standards.	*Pi originally preferred that the amount of 5% be directed to R&D and technical activities, but was offered by Dp towards marketing only. Naturally, this aimed at boosting sales and new royalties.* *On the other side, the business of selling decorative paints is currently defined as "selling a way of life" and the technological developments especially in decorative paints are mostly in areas of marketing. Accordingly Pi appointed a new competent sales and marketing manager who is costing Pi double the salary of his predecessor. Marketing areas were completely overlooked by previous contracts but have been added to latest ones.*
Royalty	All royalties are transferred abroad twice/ year. No specific calculations were made addressing foreign exchange	A royalty of 1.5% calculated on Pi's accumulated net annual sales of the products, less accumulated import from Dp. The reference for royalty payment is 1,930,000 Egyptian pounds and the exchange rate for the Egyptian pound to the Euro is fixed at 3.5. This equates to a minimum payment for the first year after the coming into effect of this agreement. For future years, the value of the minimum annual royalty in Euro shall be calculated annually using the following formula based on the inter-bank rate of exchange announced by the Central Bank of Egypt on the first day of the year in question i.e. 1st July: Ry is the rate applied to the contract in the previous year. Ry+n is the rate announced by the Central Bank of Egypt. Rc is the rate applied to the contract as a result of the calculation If Ry+n is inferior or equal to Ry+20% then Rc = Ry If Ry+n is superior or equal to Ry-20% then Rc = Ry If Ry+n is superior to Ry+20% then Rc = Ry+ ((Ry+n-Ry)/2) If Ry-n is inferior to Ry-20% then Rc = Ry- (Ry+n)-Ry)/2) Royalties are transferred to Dp twice a year. Duration of this contract is 10 years.	*The new contract guaranteed sales for Dp, along with a guaranteed minimum royalty, in a fairly safe operating environment for them. The 1.5% was not included in the original contract but arised when Dp noted many local Egyptian companies interested in their licence. All monies were transferred abroad, with no local re-investment of any kind and no depositing at local financial institutions. The recent contract also offered a partial solution to the exchange rate issue. The Exchange rate of 3.5 L.E./Euro indicated in the 2001 contract is just half of the current rate of 8 L.E./Euro.* *Even though Pi pays 1.5% royalty of net sales of Dp's brands yet continuation of the licence is still a financially viable decision for Pi. The interviewee assesses brand names to be 70% of the reason to renew the licence. Many competitors tried to buy the licence from Dp, (kicking Pi out in the process). Signing the agreement prevented that.*

Source: The author, derived from company data.

The interviewee indicated that the contractual learning gained from drafting so many contracts with licensors over the years, is applied to their new printing inks contract.

Pi is currently in the final stage of contract negotiations with a German MNC who is a market leader in the field of printing inks, and has 27 subsidiaries worldwide, 200 sales offices and many representatives. The sales volume of this MNC is 500 million US$ achieved in production of 120,000 tons annually.

Based on the interviewee, the upper hand in the printing inks contract also remains with the licensor. The German licensor suggested the following as basis for collaboration with Pi:

- Establishment of a joint venture entity, with Pi-inks participating with 90% of the equity, and the German company 10% only.
- Indicate bilateral right of first refusal if one of the partners intends to sell its participation in the joint venture.
- Indicate bilateral veto right against sale of joint venture shares to a competitor.
- The joint venture uses trademarks owned by the German company.
- The German company will solely supply the concentrates and intermediates.
- The overall profit distribution will be calculated as follows:

  Net sales of joint venture, minus direct cost by the German licensor (materials, packaging, direct manufacturing, freight and import duties) are split into two equal halves for Pi and the Licensor.

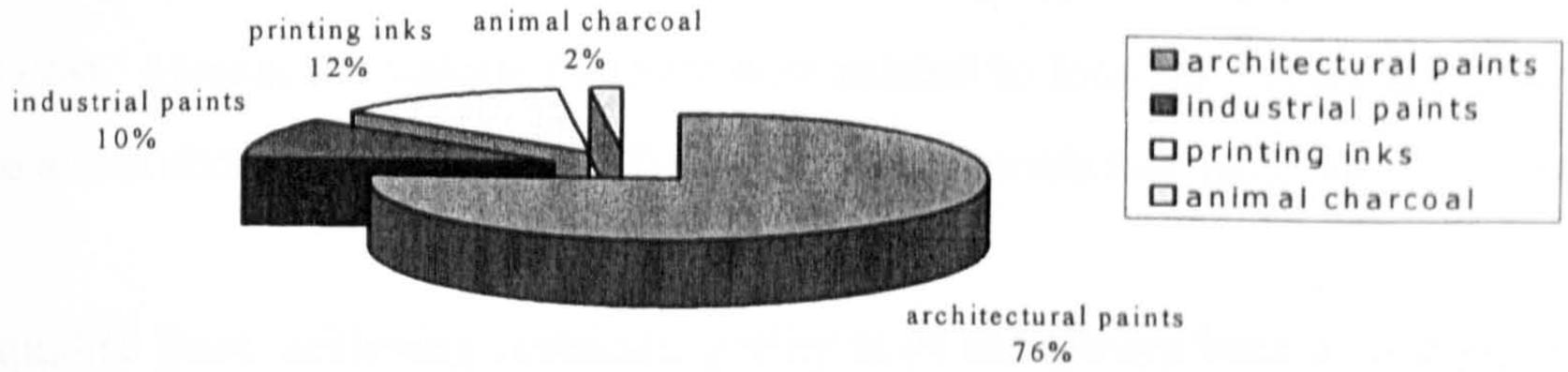
4. The issues of technology and means of its transfer

The interviewee advised that on the paints front, there existed no hardware-related technological gap between Pi and Dp. He did express though that there are managerial and organizational gaps such as team spirit concerns, individualism, and lack of administrative efficiencies.

The product:

Architectural paints represent 76% of Pi's sales value. The 12.2% share of printing inks is increasing especially in light of Pi's plans for signing with a new licensor, as indicated in the following figure:

Figure 8/4: Sales value breakdown figure for the year 2000/2001



Source: The author, derived from company data.

The transfer of technology at Pi has been mostly through receiving technology support, raw materials procurement guidelines, methods of manufacturing and quality assessment, brand-name usage and finally permission to exclusively export under trade names to Libya and Sudan.

The hardware part of technology (machinery) used in the paints industry can be considered a low technology, which is also relatively low in capital costs. Most of the new developments and investments go into manufacturing concepts and automation of handling and dispensing to improve efficiencies, quality and decrease losses. Pi has implemented many of these concepts in its new facility currently under establishment at a new industrial city (the decision to relocate was made in order to make use of government tax-exemption policy at new cities). The equipment sought for the new facility was acquired using the advice of the licensor in direct utilization of the licence agreement beyond the traditional benefits of brand names use.

Pi has a strong and long established relationship with its raw materials supplier networks. The materials involved in Pi's products are:

Table 8/3: Raw material assessment at Pi

Raw material	Status	Interviewee comments
○ Resins	Import	The Supplier was named by licensors
○ Pigment	Import	The Supplier was named by licensors
○ Extenders	Import/local	The Supplier was named by licensors, or chosen locally
○ Packaging	Local	Originally, Dp approved prototypes. Currently, Pi is planning to implement new Transparent canisters designs

Source: The author.

In regard to local raw material supply, there exists within Pi a protocol for qualifying and approving local suppliers. This protocol is carefully coordinated under the licence agreement. It is noteworthy that the raw material costs represent almost 60% of the final product cost. Hence, the unique Pi know-how related to local raw materials procurement serves to avoid shortages and to identify alternative materials and suppliers if necessary.

On the quality front, achieving sustained quality at Pi has always been a concern of Dp. In line with this, Pi acquired ISO 9002 certification since 1997. Originally, Pi considered the ISO certification as a strategic move that was useful to strengthen its image upon exportation, and also ISO certification was highly desired by the Egyptian government to improve the valuation prospectus of Pi upon privatisation.

R&D:

Pi has highly equipped research laboratories, which are continuously being upgraded. R&D is one of the activities that Pi considers crucial to its business. One line of R&D activity was tailoring the licenced products to Egyptian market taste and specifications (colour shades, drying time, application techniques..). For example, the process of introducing extra white paint specifically demanded in Egypt required extensive research because this level of whiteness is not requested in Europe, and hence was not readily available within Dp's original formulations. The second important line of R&D activity was the modification of product formulas in light of available raw material quality.

On the new product development front, 20% of Pi's product offerings are non-licence, locally developed products, as a result of expertise built over the years, especially that Pi had not suffered from brain drain prior to the early nineties. Nevertheless, when several private companies were recently established, many Pi scientists left for better salaries.

Training:

The training that Pi receives under its licensing contracts is mostly done abroad and is conducted once a year, for 3-4 chemists, for 2 weeks of duration. The training abroad is mostly focused on widening the perspective of conducting an international business rather than learning totally new technologies. Additionally, Pi receives on site technical assistance, on quite widely dispersed periods, as follows:

Table 8/4: Actual technical assistance received under licence agreement of Pi

	Frequency	Duration
Manufacturing	Once/Year	One week
Laboratory	Once/Year	One week
Marketing	Twice/Year	Less than one week
Logistics	Once/Year	Less than one week

Source: The author.

The interviewee describes that the competition in the recent years and frequent shortages of certain raw materials sometimes obliged laboratory staff to exploit their training and learning in making temporary modifications to the formulas, without sacrificing the reputed good quality of the brands.

The interviewee perceives that the technology transfer events mostly occurred within the training sessions, or through the formal exchange of documents. No gaps in learning have occurred in the recent years. A list of purposes and means involving overall technology transfer events are indicated:

Table 8/5: Purposes and means of technology transfer at Pi

Management Technology Transfer	**Purposes**: Increase general profitability Improve services rendered to customers Raising national Reputation **Means**: HRD Staff general training and orientation Local training (administrative and technical) Training abroad On the job-training Technology Transfer clauses in mode contracts
Product Technology Transfer	**Purposes:** Increase product range Ownership of new modifications/localized rights Increase quality perception Export of end products **Means:** Product designs Product blue prints
Process Technology Transfer	**Purposes**: Cost reduction Improvement of performance standards Lowering of labour costs Improve materials procurement **Means:** Improve supplier linkages and raw material planning

	Production technology detailing Plant designs, documentation, drawings, layouts,.... Quality systems implementation

Source: The author.

5. Egypt: the macro perspective

Pi recently established a new plant and a new company in order to relocate its old facilities from its current location into one of the new industrial zones. This allowed Pi to benefit from the advantageous 10-year tax exemption permitted under investment law for these zones. The relocation process involved making many new investments and implementing several technological upgrades.

From the interviewee's perspective, there is ineffectiveness of government policy against globalisation forces. He believes that the government should promote preferred modes to new comers into the Egyptian market, where in his industry and similar, the licensing mode is the best vehicle to join the MNC's chains of production and become integrated within them. The royalty charges are usually not significant compared to the prospect benefits of being integrated, or of gaining access to popular brand names.

In the context of Pi's ties with Ic and Dp as licence providers from the UK and Denmark, bilateral treaties between UK/Egypt and Denmark/Egypt have not helped Pi financially. Nevertheless, BITs have occasionally helped on return of taxes, where prevention of tax-duplication agreements are already in effect between Egypt and UK.

On the other hand, the partnership between Egypt and the EU, and some bilateral and regional agreements with Arab nations are perceived as a threat to Pi (and other local operators), especially with their accompanied lowering of the custom duties. This poses a higher threat on the established business of paints more than on printing inks.

Although the foreign exchange issue was addressed in Pi's contracts with its licensors, yet this did not buffer against the unfavourable position that Pi currently faces. Pi included a specific formula for foreign exchange calculation in its contracts, but the reference in these contracts was to the exchange rate announced by the central bank, which was beneficial to Pi, because the central bank rate was lower than the actual dollar rate in the market. This position has been recently reversed when the Egyptian government announced the flotation

of the Egyptian pound. This resulted in an instantaneous plunge of approximately 30% in the value of the pound. This means that Pi's profits will decrease substantially.

From the interviewee's perspective, the fact that Egypt is a signatory of GATT and is implementing IPRs in its various frameworks assures the foreign supplier, but does not have any direct impact on any other issue in Pi's operation.

6. Case observations

The interviewee expressed a few interesting remarks in relation to this research's scope, such as:

- The new Egyptian commercial law #17 of year 1999 allows in its clause#86 the termination of technology transfer contracts in 5 years, irrespective any contract clauses indicating longer durations. This was originally designed to protect local companies from being abused by foreign companies, but in the same time, and in cases like Pi, this is not useful in their seek of continuous rights to use brand name only. It is Pi's experience that formal contracts are key components to guarantee continuity and success of business, and hence successes of technology transfer activities.

- In the interviewee's opinion, the government should focus in its national promotion on particular industries that could achieve an added value that is complementary to supply chains of MNCs, and hence remain attractive to foreign investments.

- A key disadvantage of Pi's government pattern of conducting business is that they do not make good use of the mode of cooperation with their foreign partners in technical aspects. The management of Pi were historically interested in the licence in order to acquire rights to use brand names only. The Dp personnel did not make any initiatives, and simply limited their role to responding to questions whenever asked. This situation is the same with all Pi's other licensors as well, throughout the years.

The interviewee describes that Dp once expressed to him that the Pi-file that they keep is empty, compared to Dp's India-file that is loaded with correspondence. This is attributed to a cultural aspect of local Egyptian employees, often under estimating the benefits that they could gain from their foreign partners. Bureaucracy was also to blame for lack of use

of foreign licensor services, whereas only the director general of Pi is authorized to communicate with foreign bodies including the licensor. Accordingly, if a floor engineer in a plant has a technical inquiry, he has to write a request to his boss, the boss writes to the superior management and so on until it reaches the director general of Pi. A lot is lost in the process, and by the time a response arrives, it is usually too late or miss conveyed. Dp never complained at times when traffic with Pi was busier.

8.3. Case#3: Beta Company

1. Background

Beta corporate is a US pharmaceuticals and related health care products MNC, who is the world's number one provider of cancer therapies. The mission of Beta is to extend and enhance human life. It employs 46,000 employees worldwide and achieved 19.4 billion US$ of sales in 2001, of which 3.6 billion US$ represent the share of Europe, Middle East and Africa.

Beta corporate established its market entry into Egypt in the year 1977 as one of Egypt's first fully owned subsidiaries (called Beta). The interview was conducted with the Egyptian technical director of the company. He is also the technical director for the Middle East region. The interview was conducted at the AlAhram headquarters and manufacturing facility of Beta.

2. The foreign company and entry decision perspectives

Beta corporate is a true MNC, with subsidiaries in over 60 countries and different forms of representation in almost 200 countries. Beta corporate is at the forefront of its industry and was also one of the first companies in the world to self-declare that its management system meets or exceeds the requirements of ISO 14001, a voluntary, international specification for environmental management systems.

The interviewee described that Egypt represented to Beta's corporate a promising investment host mainly because of its large market potential and the attractiveness that the open door policy presented to the corporate at time of entry. The central geographical

location and availability of skilled local personnel (production pharmacists and marketing staff) further enforced the early entry decision and associated investments.

In planning its operation in Egypt, Beta corporate set several objectives such as profit; increase market share (local and regional) and achievement of Beta's social and sustainability objectives.

3. The mode of entry perspectives

The Beta mode of entry significantly developed from its very first modes of operation as exporters of pharmaceuticals to Egypt during the early seventies (the export activity was coordinated by a simple local scientific liaison office that coordinated purchase orders and deliveries to and from Beta warehouses). In 1977, Beta was the first foreign company to receive a presidential clearance for 100% foreign ownership of its planned manufacturing subsidiary.

Similar to all foreign investments entering Egypt at that period, this entry mode was both praised and criticized on various political and social levels. The criticism was mostly based on fears of a sort of foreign industrial occupation by MNCs ("selling out the country") had these MNCs been allowed full ownership. The praise was based on the start of harvesting the rewards of the "open door" policy, and ending the remains of the years of socialist regime.

Beta's activities are divided into 2 separate operations (business units), namely: technical operations and sales and marketing operations. The interaction between the two separate operations is in the areas of projecting local and export markets, capacity planning, budgeting and new product launching.

The employment structure at Beta is composed of 280 full time employees, in addition to 80 part-time workers. No expatriates are currently working at Beta and none have worked on a permanent basis for many years. The management does not believe it is any longer necessary since the local staff have developed over the years the experience necessary for both current and near future activities.

Based on the interviewee, the Beta employees now master the process of calibration of the machines to suit the exact contexts of each current and foreseen future medicine. This represents the ultimate skill in the pharmaceutical industry and is a complex process that differs each time based on quality of inactive material, weather, etc. The turnover of Beta staff is minimal and doesn't exceed 2% and this is attributed to the agreeable working environment, the offered benefits and compensations and the profit sharing schemes.

Despite of the above, the headquarters conducts an annual technical audit on Egyptian subsidiary operations, and a financial audit is conducted every 2 years. The key factors investigated by the HQ are mostly that quality of end product is uniform worldwide and that GMP (Good Manufacturing Practice) is being implemented. In indication of compliance and clear grasp of these measures, the Egyptian facility is one of few centralized worldwide operations (similar only to 2 factories in France and Italy currently serving the entire of Europe).

4. The issues of technology and its transfer

The typical process in pharmaceutical manufacturing operations involves specific components, namely: product and process know-how (patents, formulas and active ingredients), the proper equipment and the staff technical know-how. The product and process know-how is provided by the corporate, and so is the entire bulk of active material that is also imported from the corporate.

The interviewee indicated that there exists almost no gap between technology used in Beta in Egypt today and that used by HQ in regard to staff knowledge, contribution to corporate strategy, quality issues and product technology. He extends his argument and states that nearly all of the pharmaceutical MNCs in Egypt share similar product technology. The hardware gap of process technologies between those used in Egypt and the HQ is estimated to be no more than 3 years. The interviewee indicated that Beta is classified as a level 2 subsidiary based on the Beta performance evaluation system for its subsidiaries (where at this level, performance relies on management systems, rather than individuals, to maintain continued compliance and to evaluate products and processes). In order to maintain this level, the management at Beta are regularly orientated towards corporate values through training, seminars and conferences.

The interviewee indicated that all products (patents, active ingredients, necessary equipment specification, etc..) are being made available by the corporate to Beta, with no restriction, if seen needed by specific terms of 'justifiable local demand'.

The company's sales business unit usually spots a local demand and devise a market projection study that is advised to technical operations that initiates a costing procedure. The management of technical operations then either recommend a particular technological upgrade needed to meet the new demand and then await authorization from HQ or alternatively they request a technical recommendation and then source from a recommended list of suppliers directly, at corporate rates. Beta does not have preferences on which of these routes to pursue and neither does the corporate. The decision is usually based on the price, quality and the strength of support offered by equipment supplier's representative in Egypt.

Quality:

Beta endorses the Business Charter for Sustainable Development, a voluntary code of environmental management. Beta has also developed Quality Codes of Practice that set forth the quality requirements for all Beta operations and facilities worldwide. They facilitate increased productivity, growth, and customer focus by building quality into research, products, and processes. These codes define the core elements of a quality management system, including management commitment, personnel qualification and motivation, facilities, equipment, critical systems, and operational elements. These codes also define the guidelines for effective and efficient compliance, demanded across worldwide operations, and is made available to all corporate personnel.

In Egypt, third party ISO certification has been acquired by Beta and very strong adherence to quality and corporate code of conduct are identified as corner success factors regularly emphasized by management. The Intranet/Internet facilities connected to HQ, grants quick and effective means of interaction, learning and observing of quality guidelines.

Training:

The local training levels, staff know-how and efficiency are perceived to often exceed that of many other subsidiaries of Beta worldwide. The interviewee estimates that 65% of the overall training conducted at Beta are done locally and 35% abroad. In case of training

abroad, all returning trainees deliver lectures to other staff members to guarantee maximum exposure of all members. Areas of focus during foreign training are mostly on new products that have just been approved for local release, in addition to time management training. Senior staff members conduct the local training for new employees.

It is noteworthy that Beta corporate's following investment made (in the region) was in Pakistan. The same path of the Egyptian subsidiary was pursued. The Pakistani investment also benefited from the many experiences of Egyptian staff where several of these members were employed in Pakistan for training of the local staff there.

Beta also participates in many conferences and provisions free training for student pharmacists in Egypt as both a social component to the business and to gain first hand access to the best calibres for future recruitment.

R&D:

Beta's corporate R&D addresses areas such as site of action of old medicines and new medicine development. The Beta Pharmaceutical Research Institute (PRI) is one of the world's most productive, respected, and innovative research organizations, dedicated to discovering and developing innovative, cost-effective medicines that address significant unmet medical needs that extend/enhance human life. The R&D budget is 2.1 billion US$.

R&D at Beta in Egypt is mostly focussed on localization of medicine to Egyptian conditions. Localization of medicines is based on stability tests conducted at the highly equipped R&D department at Beta. Effects of subjecting various medicines to light, heat and other environmental conditions are studied and various measures are taken to adopt the medicines developed abroad to the local conditions (localization). In light of these factors and studies, the results are submitted to Egyptian Ministry of Health for approval. R&D procedures and routines are provided to Beta from the corporate.

Other areas of development at Beta include recycling, waste disposal and compliance to environmental standards. For instance, employees at the Giza facility have initiated a feasibility study for recycling the plant's industrial effluent water. Currently, industrial

water effluent is sent to the city sanitary drainage system. A pH control system has been installed at the plant to adjust the wastewater effluent prior to sending it offsite.

Employees who handle, inspect, or manage hazardous waste receive appropriate training on proper waste handling and spill control. Other measures are also used in the plant, including use of a shredding machine for solid waste to reduce the volume and cost of waste disposal, and also monitoring systems of the boiler for combustion efficiency and to meet local environmental standards.

Means and purposes involving technology transfer at Beta are indicated in table 8/6:

Table 8/6: Purposes and means of technology transfer at Beta

Management Technology Transfer	**Purposes**: Corporate strategy understanding *[to assist in local operations]* Local Supplier network development *[in line with the corporate charter]* Increase general profitability *[in line with the corporate's objectives]* Improve services rendered to customers *[in line with quality codes]* Increase Environmental consciousness *[in line with the ISO 14001]* Best practice awareness *[in line with company's code of conduct]* **Means**: HRD *[detailed in training section]* Staff general training and orientation Local training (administrative and technical) Training abroad Conferences and seminars

	Code of conduct obligations *[Beta has a strong commitment to business ethics and regulatory compliance. Beta has developed Standards of Business Conduct to help employees live up to these standards in daily business life. The standards also help employees comply with various laws and regulations pertaining to corporate ethics and responsibilities. The company's Business Conduct Guidelines also cover issues such as marketing practices, antitrust compliance, and the prohibition of payments to government officials. The issues addressed in Beta's code of conduct are (detailed in appendix 9):* • *Programmes and Procedures.* • *Integrated Management.* • *Continual Improvement.* • *Employee Education.* • *Acquisitions and Divestitures.* • *Products and Services.* • *External Customer Support.* • *Business Activities and Operations.* • *Research Support.* • *Precautionary Approach.* • *Contractors and Suppliers.* • *Emergency Prevention, Preparedness and Response.* • *Transfer of Technology and Best Practices. Each business function and facility shall participate in the transfer of technology and best practices related to performance and management systems. Information transfer shall occur both internally and externally.* • *Common Effort: Good Citizenship.* • *Communication with Stakeholders.* • *Measurement and Reporting.*
Product Technology Transfer	**Purposes:** Develop new modifications and localizations *(product adaptation to local conditions and local health needs)* Increase quality perception Enhance speed to market **Means:** R&D projects
Process Technology Transfer	**Purposes:** Improvement of performance standards Developing of technology recommendation systems Improve materials procurement systems **Means:** Improve supplier linkages Plant designs, documentation, drawings, layouts Production technology detailing Maintenance training/learning for equipment Inspection systems implementation Control systems implementation Quality systems implementation Evaluation systems implementation *[For each of the 16 codes of conduct, Beta have charted its overall company wide performance evaluation system on a scale of 1 to 4:*

	▪ *Level 1 performance involves achieving compliance with laws, regulations, and company policies* ▪ *Level 2 performance relies on management systems, rather than individuals, to maintain continued compliance and to evaluate products and processes* ▪ *Level 3 performance integrates responsibilities across all functions and levels within the businesses* ▪ *Level 4 performance innovates to continually improve products and processes and to enhance efficiencies and competitive advantage]*

Source: The author.

5. Egypt: the macro perspective

The interviewee believes that Egypt is providing a climate that is positive and investment inviting. He believes that the political situation of Egypt does not negatively affect either investment or technology transfer in the pharmaceutical industry. On the other hand, economic factors such as exchange rate fluctuations are very damaging to the investment and its operation. All imported components are directly affected by the budget fluctuations resulting from dollar to Egyptian pound exchange rate turbulences. This has been temporarily stabilized by recent flotation of Egyptian pound, but the foreign exchange market remains volatile, due to difficulty of having to actually source the foreign currency through the black market (irrespective of exchange rate). Nevertheless, as a result of a 22 billion $ corporate size, the effect of local exchange rate on capital investments is low.

From the perspective of Beta, bilateral agreements between Egypt and USA (USAID) poses administrative formalities that far exceed the benefits of its use and had no implication on any component of the Beta business in Egypt. The interviewee believes that USAID is more useful to joint ventures rather than fully owned subsidiaries.

Among restrictive laws affecting the pharmaceutical industry, the government imposes a law that prevents medicines from being introduced to Egypt except after it has been marketed for 2 years at least in its country of origin. The law implementation is informally easened when the FDA approval is submitted. Furthermore, the government restricts the number of suppliers who are allowed to offer their products in the market for each classification of medicine to 5 suppliers only, but with right justification studies, this may be easened also.

The interviewee foresees restrictions imposed by the government on end-user price (price ceiling) as a major hindrance. This has resulted in an inclination at Beta corporate itself not to locally produce except what market directly demands and whose price ceiling allows them to still be profitable. The preference of Beta is that these and similar laws should be left out all together, to allow for free competition.

The interviewee believes that government incentives do not positively trigger Beta to further investments; rather, the market potential (either local or regional) is the main trigger, but some laws and regulations may negatively obstruct development plans.

The Beta relationship with the local suppliers is quite strong in the field of raw materials supply, even though Beta very seldom out-sources production itself and intentionally avoids it for quality purposes. The relationship with government bodies and financial institutions is also quite strong and regulated. There are no hindrances on transfer of funds in either direction and there are no foreign currency transfer blockages.

The interviewee sees that many hazards face the pharmaceutical industry in Egypt, such as medicines being reverse engineered or simply the patent files at the Ministry of Health be copied. Nevertheless, matters are improving with IPR implementations.

6. Case observations

The interviewee expressed that areas of highest technological capability at Beta are:

- Local experience in evaluation of quality of local raw material supplies
- Local experience in calibration of equipment for local raw material supplies
- Local experience in localization of products to Egyptian weather, standards, etc..
- Local experience in implementing manufacturing new products and implementing new quality measures

From the interviewee's perspective, the fully owned subsidiary mode of foreign entry to the pharmaceuticals sector has resulted in full process and management technology transfer but limited new product technology transfer. This, in his opinion, is mostly due to the nature of the pharmaceutical industry itself that is dependant on patents, and active ingredients mostly developed abroad.

The interviewee has commented in regards to his investments, as follows:

- New investments at Beta-Egypt are related only to new product offerings regardless of the technology transferred.
- The code of conduct governed and regulated many of the functions needed for the technology transfer process at that earlier stage.
- The learning was greatest at early stages in process and management technology transfer. Due to low staff turn over, Beta soon experienced saturation in the basic learning. New learning is now mostly in R&D and in newer organization skills for senior management, achieved through attending conferences.
- Even though the company started with plans for exports, but in reality the higher emphasis was to satisfy the local market.

The interviewee has made several policy recommendations, such as:

- Recommended simplification of company establishment procedures in order to simplify new investments
- Recommended simplification of patent registration, in order to protect the interests of MNCs and safely drive new products into the country.

8.4. Case#4: Gamma Company

1. Case background

Gamma corporate is one of the world's leading research-based pharmaceutical and healthcare companies. Gamma corporate is a true MNC based in the United Kingdom with a wide geographical spread. It is the market leader in 4 of the 5 largest therapeutic categories in the pharmaceuticals industry, namely: anti-infectives, central nervous system, respiratory and gastro-intestinal/metabolic. The company also holds a leading position in vaccines, consumer healthcare and over-the-counter medicines.

Gamma corporate has over 100,000 employees worldwide including a sales operation of 40,000 employees, supplies products to 140 countries. The R&D budget is 2.3£ billion each year, which is a reflection of Gamma's corporate Mission Statement "we are a research-based company whose people are committed to fighting disease by bringing innovative medicines and services to patients throughout the world and to the health care providers who serve them".

Originally called Gamma Egypt, then GammaW Egypt, now called GammaCorporate Egypt, was established in Egypt since 1991 as a joint stock company. The interview was conducted with the Egyptian CEO and chairman of the board of the company, at his downtown office.

2. The foreign company and entry decision perspectives

Prior to setting up in Egypt, the (now called) Gamma corporate addressed the Egyptian market through a representation scientific office (local distributor), as usual with foreign pharmaceutical companies at their early stages of addressing the Egyptian market.

In 1991, the demand of the Egyptian market was perceived as stable, and very large, and the entry to Egypt entailed lower risks to the new investment entry. Furthermore, Gamma corporate was conscious of the fact that they were much later than its competitors into the Egyptian market and accordingly, in order to jump-start its operation in Egypt (to catch up with competition), Gamma corporate bought into a local company. This was perceived to be more attractive than a Greenfield start-up.

As indicated, the decision for market entry and investment into Egypt was aimed to address the large market size in the most quick, effective and economical manner. Political and economic stability were perceived to be preconditions rather than a motive. In addition, a main corporate objective in Egypt was to achieve a major market share.

3. The mode of entry perspectives

Gamma's chosen mode allowed a near-immediate start of operations without the lengthy time necessary to set up the premises or the bureaucratic delays associated with new start-ups in Egypt. These delays may consume several months in completion of necessary permits from many governmental bodies. Interestingly, despite that the interest in the market had already existed at Gamma headquarters in its regular expansion plans, but the actual entry occurred in response to an initiative by the local partner.

Gamma's corporate decision was to address the Egyptian pharmaceutical market as a minor shareholder (10%) in a local pharmaceutical company known as Advanced Biochemical Industries (ABI), which was inaugurated itself in 1985 with 30 licences and 10 locally developed products. Afterwards, Gamma acquired increased shares (20%), and the

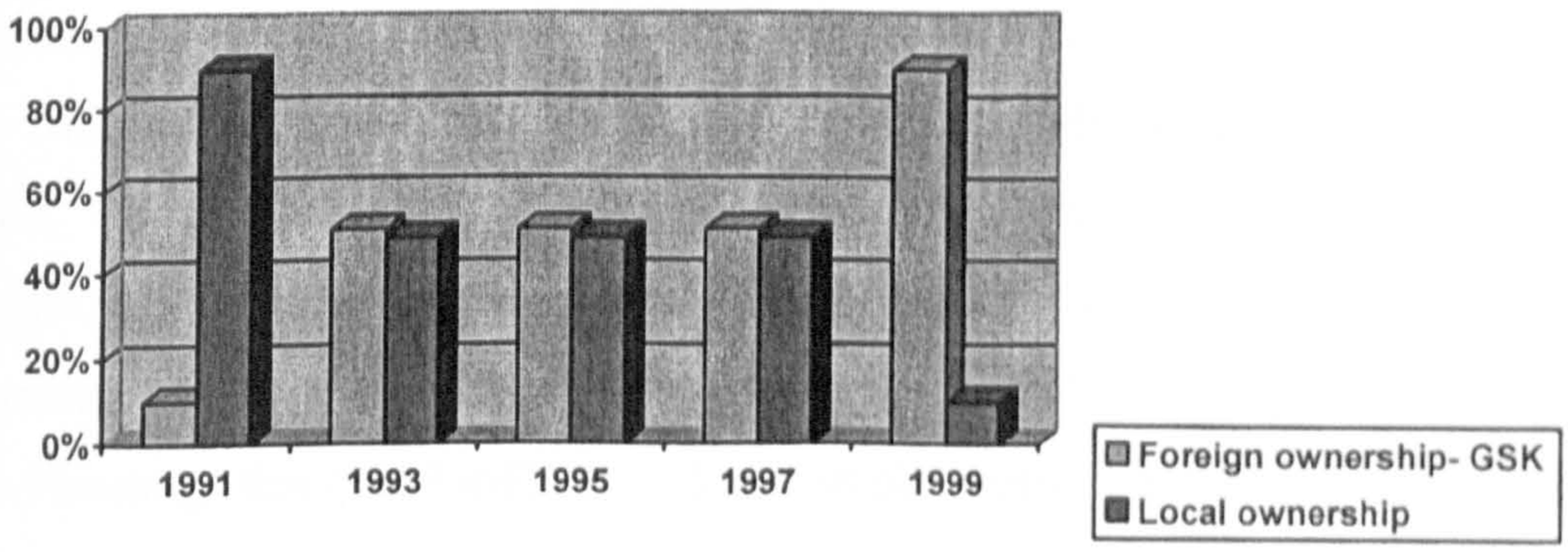
company became known as Gamma-ABI. At that time, with this entry mode, Gamma-ABI was ranked 22nd in the market, with an Egyptian market share of 1%. By December 1992, Gamma's controlling interest was again increased to a majority share of 51% and the company was re-launched as Gamma Egypt S.A.E., ranking then as 12th in the market with 2.8% market share.

The local company, Gamma Egypt, developed its mission to be "To establish a leading position in the Egyptian pharmaceutical market through the provision of safe and effective quality medicines and ensure outstanding customer satisfaction".

In August 1995, the global merger between Gamma and W (each a large pharmaceutical company on its own) took place. This marked yet further expansions in the short history of the local company in Egypt. The company's name became, GammaW Egypt, S.A.E. Since year 1999, Gamma corporate eventually acquired ownership of approximately 90% of shares of the Egyptian operation, through capital injection of LE 387,202 million (approximately $ 112 million) for the purchase of a geographically neighbouring factory, namely: Amoun Pharmaceutical Industries Company (APIC).

The contract was signed in December 1998 and was finalized in January 1999. Other shareholders in this new company are Misr International Bank, Banque Paribas, and Mohandes Insurance Company in addition to individual investors. The graphical representation of the development Gamma corporate's mode of entry and shareholding in Egypt is indicated:

Figure 8/5: Development of Gamma corporate's equity in its mode of entry in Egypt



Source: The author.

The graph demonstrates the increase in Gamma shareholding in Gamma to 90% in 1999, which marks a large increase in the corporate's investment in Egypt. As such Gamma grew to become the 2nd in the market, with a market share of approximately 9%. It is noteworthy that the investment developments in Egypt, made by the Gamma corporate, took only the form of acquisitions or increase in the number of shares. This is attributed to importance of time-to-market to the corporate. A summary reasoning for Gamma's mode of entry developments is as follows:

Table 8/7: Reasoning behind mode development at Gamma

Year	Acquisition of	Reasoning
1991	10% of ABI- Advanced Biomedical Industries	The late entry of MNC Gamma into Egypt demanded demonstration of their commitment and long-term interest in Egypt and this was quickly achieved by purchase of shares in ABI.
1992	Achievement of 51% controlling ownership of Gamma-ABI.	
1993	Share splitting was conducted.	
1999	Amoun	Expansion of facility area (Amoun was adjacent to Gamma and added 11000 sq.m to the original 33000 sq.m.). It also increased Gamma's market share and product offering and personnel resources. Gamma applied the same concept of instant growth via acquisition, without bureaucratic delays.

Source: The author.

When making their investment decisions, Gamma corporate's key criteria for selecting the local partner (ABI, followed by Amoun) were mainly rotating around local initiation and the availability of physical resources. An aspect such as the existing level of know-how of the staff was not that much of specific importance upon entry, however it proved to be problematic at later stages.

From a process perspective, Gamma's corporate developed significantly over the 12 years of its existence in Egypt. Gamma currently covers an area of 44,000 squ.m and has 6 scientific offices and 6 distribution branches: Nasr City, Mohandessin (both in Cairo), Alexandria, Tanta, Mansoura and Souhag. The computing resources of the company include eight AS400 IBM computers and 320 nodes, connected via a fibre optic network, which facilitates on-line market-driven production. An MRP2 system (Manufacturing Resource Planning) that cost 3 million US$ was implemented, governing 28 parameters of the organization at all times. This has rendered a highly automated process giving less subjective influence to manufacturing personnel.

Other perspectives:

Many of Gamma's employees were inherited from Amoun Company upon its acquisition. This was perceived by the corporate as an obstacle rather than an asset, as the majority of these employees were not productive (family relatives). The employee structure of Gamma employees in Egypt is indicated in table 8/8.

Table 8/8: The employee structure at Gamma

Manufacturing and Supply	**429**
Other	**97**
Sales and Marketing	**834**
Other Selling	**235**
Total	**1595**

Source: The author, derived from company data.

Drastic measures were taken and several hundred employees had to be made redundant and many were laid-off. The remainder, along with new recruits were described to be well educated and loyal. In the interviewees opinion, Gamma staff rank very high in respect to technical competency, learning and level of training. In support of this argument, sterile products whose worldwide supply is manufactured centrally at the Gamma headquarters has been approved for manufacture in Egypt, in confidence of the capability of the Egyptian operation.

The relationship with the corporate HQ:

The relationship of Gamma with the HQ is a very professionally conducted relationship throughout the phases of development of Gamma. The corporate conducts regular semi-annual audits on finances and quarterly audits on technical and quality issues. The marketing, legal and economic considerations of the local operation are all dealt with locally. Other than technical and quality issues, the local operation is fairly decentralized. The relationship with local suppliers of materials and their development is also governed by MRP2 (Manufacturing Resource Planning packages) with its embedded regular training and quality assurance measures. The relationship with financial institutions is good, especially that the company has been debt free since year 2000.

The progressive and significant investment in Gamma reflects the Gamma's corporate view that entry into an emerging market is a long-term commitment and needs substantial support to overcome the problems of existing host frameworks.

When Gamma's ownership in the joint venture became a majority holding, the headquarter trained and empowered the local team to almost completely run the operation and effectively transfer to them its technology. Prior to that, more costly expatriates (from the HQ) were involved in the daily management. Those expatriates left in 1992.

As indicated earlier, the entry and large investment made in Egypt was mainly aimed to address the local large market. Neither regional expansions nor exports were planned. Exceptional cases of exports to countries within the region occurred, but under the overall corporate strategy. There are hopes that Gamma Egypt will be granted a regional mandate to become a supply source for Gamma in the Middle East and Africa. In these regions, Gamma corporate has only two other investments, namely Saudi Arabia that is estimated to have a capacity of only 10% of the Egyptian operation, and South Africa with capacity 25% of that of Egypt.

Having experienced a payback period for the Amoun acquisition of only 8 years (including fixed assets), Gamma's future plan envisages continual upgrading of existing facilities.

3. The issues of technology and means of its transfer

Annual sales of Gamma Egypt have increased dramatically over its years of operation from 1991 to date, mostly due to key success in sales and marketing strategies, quality assurance, financial structure, production and management information. A totally integrated, quality-based approach across all technological issues is attributed to be the basis for the company's progress.

Training:

Regular training is conducted at Gamma, with local on-site training representing 80% of overall training, while training abroad comprised only 20%. There are no expatriates involved in the process, which is believed to represent that, a large portion of the know-how on the process and management technologies have been transferred successfully. The training on product know-how is related to the skill of applying the correct composition as per directives (patents) provided from the HQ. There are no language barriers, especially that all key staff are university graduates with good command of English language. No frictions occur with headquarters on account of employees, which implies stability of management systems. The interviewee indicated that it was inevitable on such a large-

scaled investment to rely on locals. It is in the subsidiary's best interest, because locals are less expensive and certainly more sustainable on the long run.

Quality:

The company's persistent efforts to attain, and maintain, excellence were rewarded as it became one of only 512 companies worldwide to be certified with MRPII-"Class A" (Manufacturing Resource Planning) in 1994. ISO 9002 was achieved in 1995 and ISO 9001 in early 1997, all awarded by the renowned British Standards Institution (BSI).

ISO 14001 followed later in August 1997, only to underline the company's commitment to preserving, and controlling the impact of its activities on the environment. Finally, the company was awarded the BS 8800 for Occupational Health and Safety Management and was found fully complying with, and integrating of the above systems (ISO 9001, ISO 14001 and BS 8800) into a smooth-running operation.

Thereupon, BSI granted the Egyptian operation the Integrated Management Systems Assessment Certificate, only the eighth of such certificate to be issued in all industries worldwide, and the first in the pharmaceutical industries. All this had its positive impacts on employees and on company's continuous ability to absorb even further process and management technologies necessary to operate the Egyptian venture.

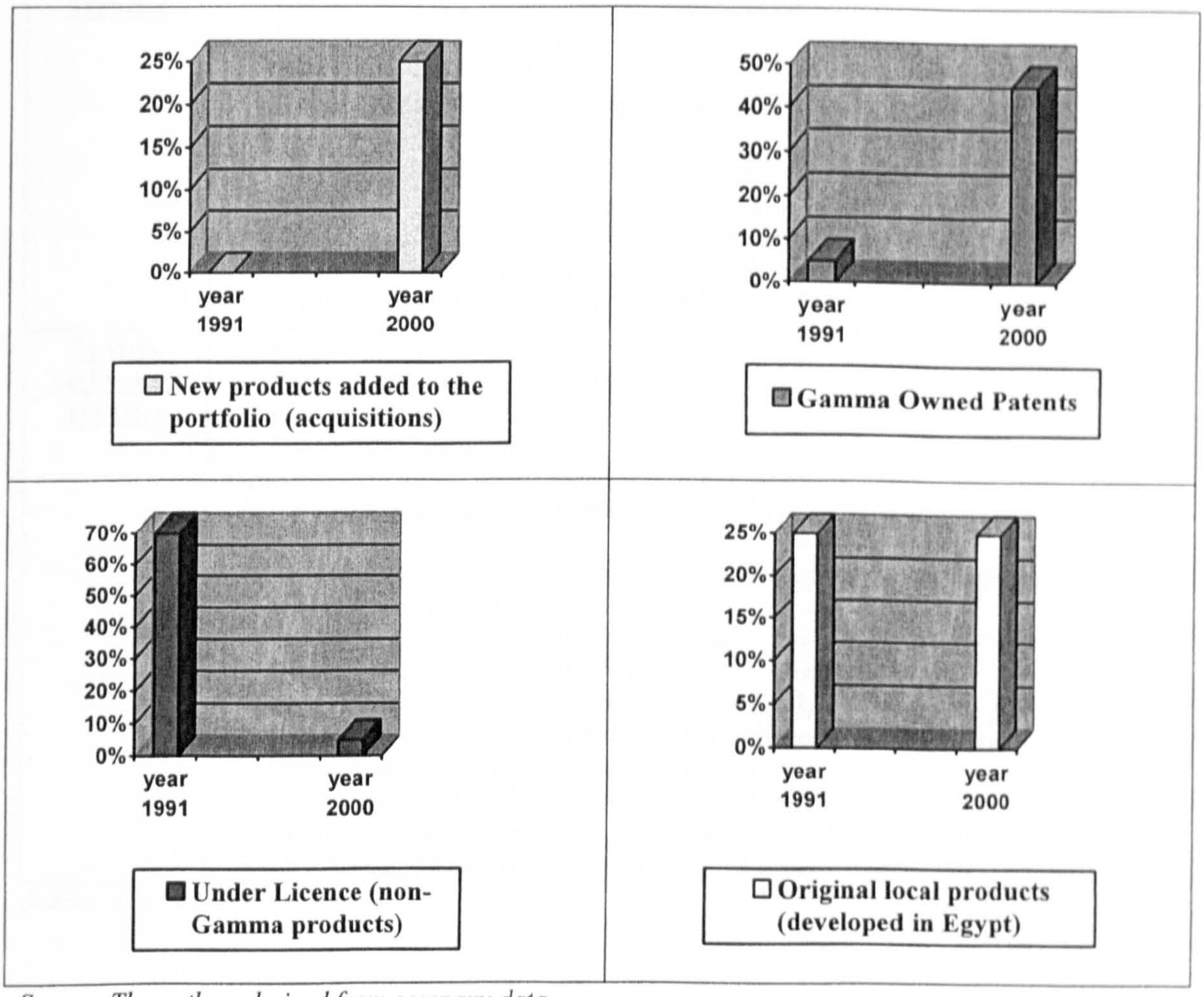
R&D:

The R&D activity at Gamma focussed on the localization of some products, the monitoring of end product quality standards and in some cases conduct test on replacements of raw materials. The active ingredient, as usual in cases of multinational pharmaceutical companies, came from headquarter. Nevertheless, the large investment, autonomy, quality training and financial backing of their MNC, empowered the staff to develop new localized products complementing the stream offered by Gamma locally. It is perceived that having management and process technologies transferred without constraint implicitly enabled product development. So, the Egyptian local operation utilized this potential and developed new local ranges such as non-alcoholic cough mixtures (for religious purposes) and others.

From the product development perspectives (product technology), the company added 54 new products in 2 years. This rendered a well-balanced offering. The share of the Gamma

overall offerings has increased and the share of products under licence from other manufacturers has been diminished as the company approached full foreign ownership. The evolution of Gamma's product mix is indicated in the following figure:

Figure 8/6: The Gamma product mix



Source: The author, derived from company data.

The interviewee assesses the technological gap between the Egyptian operation and the headquarter operation, both on the staff know-how and hardware to be zero. In fact, in some occasions, hardware is possibly more up-to-date at the local operation than at the headquarters. The specific technology transfer situations that were observed had occurred for specific purposes. The Gamma management identified these as follows:

Table 8/9: The purposes and means of technology transfer at Gamma

Management Technology Transfer	**Purposes**: Increase general profitability Improve services rendered to customers Increase entrepreneurial skills Best practice awareness

	Means: Code of conduct obligations *[enforced by the MNC onto local operation mainly in commitment to quarterly quality audits]* Conferences and seminars for top management *[these are conducted on a regular basis for senior management]* Training *[local and occasionally abroad]*
Product Technology Transfer	**Purposes:** Increase product range Ownership of new modifications/localized rights Increase quality perception Enhance speed to market Export of end products (regional mandate)
	Means: New Product development *[enforced by establishing a local laboratory for R&D and the acquisition of local product licences and widening the product offering and training on Product development disciplines]* Product troubleshooting training *[enforced by the local and foreign training programmes that are regularly scheduled for all employees]*
Process Technology Transfer	**Purposes:** Improve materials procurement Cost reduction Lowering of labour costs
	Means: Control systems implementation *[enforced by accredited integrated management systems]* Evaluation systems implementation *[enforced by accredited integrated management systems]* Quality systems implementation *[enforced by accredited integrated management systems and continuous internal audits conducted randomly]* Improve supplier linkages *[enforced by the MRP2 overall system that governs and audits the training and quality standards achieved at the suppliers]* Developing of internal technology recommendation systems Maintenance training/learning on equipment *[the company makes its purchases from a short list of manufacturers provided by the HQ. The maintenance schedules and training are accounted for in the quality systems]*

Source: The author.

It is noteworthy that the interviewee indicated that most of the experienced technology transferred was highly correlated to the quality systems and the integration with MNC operations. This was not evident to him in the earlier years of operation; rather it increased along side with the increase of foreign ownership of shares. The interviewee highlighted that he was personally present throughout these phases.

4. Egypt: the macro perspective

The main concerns of Gamma Egypt with the policy framework of the Egyptian government were the price controls inflicted by the government on all pharmaceutical products and the lack of protection of Intellectual Property Rights. The interviewee believes these are the biggest hindrances to new up-to-date technology transfer, as new

products are not released by the MNC except after careful scrutiny, and an absolutely guaranteed demand.

For the pharmaceutical industry in general, including Gamma as a main player, the political situation does not have any effect on their business, neither do bilateral treaties. Gamma as the largest single British investment in Egypt has also played a leading role in advising British MNCs upon their screening for entry to Egypt (e.g. Jaguar and Sainsbury). Both have in fact followed the advice and have actually entered into Egypt (even though Sainsbury pulled out later-on sacrificing millions of pounds in the process).

From the investment environment perspective, Gamma suggests value adding and export-driven incentives.

From Egypt's host perspective, the interviewee indicates that 80% of the Egyptian management and staff working at Gamma have acquired technology components that will enable them to operate similar capacities, in other companies, if necessary. It is such a level of technology literate and professional labour that he feels Egypt is in desperate need for, in order to drive any national plan for technological capacity building in Egypt. This is a clear national benefit of FDI that the interviewee perceives alongside with the employment opportunities offered in manufacturing, distribution, etc.

In the interviewee's opinion, targeted governmental policies in respect to mode and technology transfer are non-existent, with the exception of company establishment laws, and raise of capital economic laws. The company has benefited from tax holidays granted in relation to the capital increase in the year 1993, and these are perceived suitable.

5. Case observations

The interviewee expressed a few conclusive remarks, such as:

- The dynamic development of the joint venture mode pursued by Gamma in Egypt (from arm's length to minority to majority) granted Gamma the quickest market entry and the necessary control over the various development stages of the mode of entry. Their mode developed from a minority holding in a joint venture to a majority holding in the joint venture (nearly a full transition, rather than development, to a fully owned subsidiary).

- Transitions in the mode allowed the employees to develop substantial knowledge that enables them to currently produce new products with ease. Otherwise they would have been confined to implementing corporate products only.
- The interviewee sees that the most important component of technology that companies in Egypt need to emphasize is related to personnel. In his opinion, he sees that improving employment standards is the route to achieve all types of technology transfer.

  This could be achieved through:

  - Recommendation of promoting an entrepreneurial culture among Egyptian managers, both in MNCs in Egypt and on the supply chain-side, through governmental top standard orientation programmes for elite management.
  - Recommendation of developing value chain activities, such as promotion of budding, quality-literate, professionals.
  - Recommendation of the encouragement of research collaboration with universities, through targeted incentives associated with new products developed and very importantly commercialised collaboratively.
  - Recommendation of increase export-related incentives and lowering bureaucracy in processing export orders
  - Recommendation of maintaining the current incentives, which seem sufficient for their purposes, such as tax holidays.
  - Recommendation of ease of pricing policy that governs consumer prices
  - Recommendation of improvement of IPR protection

8.5. Case#5: Alpha Company

1. Background

Alpha group is the German insurance multinational giant. Alpha has a worldwide reputation in offering sound insurance business since it was established in 1890 to date. This long life span crossed many milestones (appendix 10).

Originally, Alpha started its business in Egypt by acquiring minority shares of a local company AIIC. Then Alpha acquired majority shares of AIIC (through the acquisition of shares of MI Company (which is the biggest governmental insurance company that was

forced to sell out its shares in other insurance companies, such as AIIC, in compliance to a new government policy). Alpha further expanded their presence through creating a fully owned subsidiary called AILC (as a life-insurance specialized spin-off AIIC).

This case interview was expanded and conducted with two key interviewees. The first is the vice president of AILC who is an Alpha group expatriate and has been working at AILC (Life insurance) since its establishment (3 years); and the second is the chairman of MI Company for the past 7 years, and he provided the important information on governmental perspectives and policies regarding foreign investments in insurance and first hand information in regards to the backgrounds of the Alpha development in Egypt. The interviews were conducted at the main AILC offices at Dokki and at MI Chairman's office.

2. The foreign company and entry decision perspectives

The potential of the Egyptian life-insurance domestic market was the main reason for the most recent added entry made into Egypt via a fully owned subsidiary. To the management of Alpha, Egypt was and still remains a virgin market with a very large uninsured population.

The initial market research conducted by Alpha indicated that Egypt was historically a closed insurance market, depending entirely on government insurance. Hence from the Alpha perspective, it was the right time to enter the virgin market of Egypt in respect to life insurance (a very large population). The decision was made easier with recent encouragements offered by the Egyptian government and possible gains in the privatisation programme of governmental insurance companies. It is noteworthy that the general Alpha corporate trend is to expand via acquisitions whenever legally possible. This is clearly observed from their international expansion activities included in appendix 10. China was one of the exceptions where the Chinese government directed the preferred entry mode option towards a Joint Venture.

3. The mode of entry perspectives

Alpha started its business in Egypt approximately 25 years ago with a minority 10% shareholding in a local company called AIIC (established on 14/3/1976). MI Company held majority shares of AIIC at that time. The 10% share held by Alpha represented the maximum permissible foreign ownership allowed under the Insurance law at that time.

This percentage was later relaxed to 20% foreign ownership (provided special prime minister permit).

AIIC had been a highly successful provider of insurance solutions and services to business organizations operating mostly in the Egyptian Free Zone area. This sustained success led Alpha to not hesitate on acquiring a majority interest in the company during the year 2000, as soon as the law permitted full foreign ownership of insurance companies.

Shortly afterwards, AIIC seeked and obtained authorization to provide services throughout the whole Egyptian market (effective from January 1st, 2001). This authorization comes in the form of a licence to conduct insurance business from the Insurance Supervision Authority. It is noteworthy that a financial bond of 30 million L.E. is requested from any company wishing to obtain a licence to working in general insurance services (an additional 30 million L.E. guarantee is requested from any company wishing to add life insurance to its portfolio).

Later in year 2001, Alpha started a fully owned subsidiary, named AILC to focus on the un-addressed segment of 'life insurance'. Alpha has similar experience in establishing fully owned subsidiaries in this region such as in Lebanon and Dubai. The Alpha interviewee indicated that Alpha set their objective in Egypt to be profitability and growth. An objective of educating the people of "life is better with insurance" is considered as a sub objective that is achieved along with the main objectives.

Alpha's employment structure (at AIIC) included 83 staff members in year 2000/2001. This increased to 260 in year 2001/2002. Alpha's employment structure at AILC includes a total of 110 staff members in year 2001/2002, among which are only 4 expatriates. Each one of them is on a 2-year contract. In regard to the employment of local staff members, Alpha experienced many issues, such as:

- Employee emphasis on non-crucial working issues (title, office space, etc.)
- Younger employees were easier to teach than elder ones
- The education system in Egypt does not provide added value to new graduates and all the actual learning they get is on-the-job
- New employees have bad IT skills
- Right-to-a-job is historical belief at the Egyptian youth, rather than earning-a-job

The Alpha operation in Egypt is very independent, and is subject to only one annual headquarters' audit, checking against: compliance to standards, procedures, quality and financial aspects. Internally, Alpha conducts 4 audits per year, especially to address integration issues between AIIC and AILC.

The chairman of MI added that unlike governmental insurance companies working in Egypt, Alpha's (AIIC+AILC) investments are mostly in form of government investment bonds and deposits. Alpha did not get into any loans, mortgages or fixed asset investments, despite the fact that loans and mortgages are often more profitable.
This implied to the local industry that they were more concerned with establishing the business while maintaining a relatively easy exit route. The chronological size of investments of AIIC and AILC are as follows:

Table 8/10: Chronological Investments growth of Alpha

Value in 1000 L.E.	97/98	98/99	99/2000	2000/2001	2001/2002
Alpha (AIIC+AILC)	74022	77129	79873	91387	109548

Source: Company data

Whereas the detailed breakdown of the year 2001/2002 investments is as follows:

Total investments in government bonds	28 855
Total deposits in banks	80 693
Total Investments in Egypt (in L.E. 1000):	109 548

4. The issues of technology and its transfer

Based on comprehensive research into the needs of the Egyptian individual consumer, Alpha is able to launch a wide range of personal insurance packages (products), created for those individuals whose life styles demand quality and protection. The clients in Egypt, in the Alpha interviewee's opinion, are very uneducated in regards to insurance and are usually concerned about the religious aspects of insurance, and whether or not it is permitted under the Islam religion. Furthermore, Alpha research revealed that the Egyptian culture lacks the social planning knowledge (which necessitates the education of the customer, during the process of selling the Alpha insurance service).

The development of a localized range of new products and services based on the needs of customers is a new approach to insurance in the Egyptian market. This approach emphasizes the provision of quality service and professional advice to customers, delivered by a team of well-trained employees. Such training at Alpha takes several forms, namely:

- On job training (the Alpha interviewee advises that the largest portion of technology is transferred here, often involving a two way experience exchange)
- Foreign training locally conducted, where instructors are brought in from the HQ to train the local staff mostly on IT and S/W products
- Management training (seminars, senior staff planning)
- Time management training (conducted by local professional training companies and given to all staff members)

The local staff members are subject to year-over performance appraisals, benchmarked against objectives set by their management. These include: Achievement of personal targets tailored for each individual, such as improvement of teamwork and improvement of IT awareness; and Achievement of company objectives such as development of new lines of business (approaching a new customer sector, developing a new offering, etc...). The reward to these staff members usually comes in the form of salary increases.

The Alpha interviewee believes that two years are quite enough for a complete transfer of know-how to the local staff, especially that the technological gap between the Egyptian operation and foreign operations lies mostly in planning, marketing techniques, internal operations and IT.

In regards to planning and marketing, often the expertise of Egyptian staff members is of specific importance, especially in informing and advising the Alpha expatriates of more suitable activities within context of local culture to be taken into consideration. This allows for better planning and targeting of the market. In regards to IT and overall quality of internal operations, the Alpha interviewee indicates that the technical know-how in Egypt is lagging 4-5 years behind corporate operation levels.

Each expatriate employee has clear succession duties, listed as concise know-how related clauses in their contracts. Prior to the renewal or end of term of their contracts, the level of fulfilment of these duties is reviewed. There is clear pressure from the MNC on their

expatriates in Egypt to transfer their know-how to the local employees because this represents a great cost saving element to the MNC.

All technology aspects of the subsidiary operations originate from the Rules and Standards book set by the corporate. This is fully accessible to all employees at all times. This includes communication standards, IT standards, technology recommendation and reporting systems. The means and purposes involving the transfer of technology that occurred at Alpha AILC are indicated as follows:

Table 8/11: The purposes and means of technology transfer at Alpha

Management Technology Transfer	**Purposes**: Corporate strategy understanding Increase general profitability Improve services rendered to customers Increase creativity and drive Best practice awareness **Means**: HRD Staff general training and orientation Local training (administrative and technical) Conferences/seminars for top management On-the-job training Initial employment of expatriates Legal and Administrative interactions Code of conduct obligations Technology Transfer clauses in contracts
Product Technology Transfer	**Purposes:** Increase product range and variety Enhance speed to market **Means:** Product training
Process Technology Transfer	**Purposes**: Improvement of performance standards **Means:** Quality systems implementation Evaluation systems implementation Documentation

Source: The author.

In the opinion of the chairman of MI, the attempt to achieve substantial technology transfer from MNCs (such as Alpha) was the main reason behind Egyptian government's liberalisations in insurance industry. Allowing full foreign ownership was intended to promote the industry and reassure foreign investors, in all types of modes of entry.

The main areas of technology that are carefully monitored and imitated by the giant government insurance companies (such as MI) include:

- Marketing techniques (MNCs in Egypt use marketing techniques that are totally new to MI and other governmental companies)
- Staff selection (MNCs in Egypt employ less people hence have lower operating costs. Better training and better salaries are also given to the employees, which directly reflect on gaining the 'higher quality clients', and 'better employees'. On the other hand, governmental companies are troubled with over employment and bureaucracy).
- New product offering (new products such as group insurance policies, better terms such as lump sum pensions,..)
- Portfolio management (Alpha's assets are mostly cash and bonds while government companies are tied down to fixed assets and long term bonds).

The main results of the technology transferred from MNCs to Egypt on the macro level is assessed to include:

- Market development achieved in the form of better awareness of insurance and its importance. This is perceived to be a result of the marketing efforts of the MNCs "flyers everywhere", along with the efforts of other companies trying to imitate. Furthermore, ten universities in Egypt currently have insurance departments, which is assisting in the education of youth on the importance of insurance and breeding professionals.
- Increase in "Sums Insured". For instance, the family sector of the insurance portfolio is experiencing a significant boom, especially because the insurance companies are now offering insurance policies that provide both insurance coverage and an interest on the premium (equivalent to the interest offered by banks on saving accounts).
- Increase in life insurance products. Insurance companies are experiencing major increases in this sector resulting from increased interest of businessmen and in line with increase in income of the insurable population.

5. Egypt: the macro perspective

From the Alpha perspective, the economical environment in Egypt is highly affected by the government bureaucracy and is a contacts-based business environment "whom you know, rather than what you offer".

So, in order to penetrate the market, Alpha presented themselves effectively through a fully owned mode, in order to establish the confidence and impressive knowledge base needed in such a market. Alpha initially conducted targeted market research followed by planning (mostly done by expatriates), then job training and then extensive promotion of their product. Technology was transferred in planning know-how through offering new services and through the training needed to implement it.

Based on Alpha interviewee, it is important for Egypt to develop a more flexible perspective to MNCs, especially those coming to work in insurance. Insurance provides peace of mind to entrepreneurs, which encourages them to invest in industrial and commercial projects, hence more jobs, more goods and lower demand on imports, which will lead to increase in the public wealth. Furthermore, the time gap between the receipt of premium contributions and the payment of claims gives the insurance company the chance of investing its own money in helping Egyptian population (borrowings) and helping industry and commerce (loans).

The Alpha interviewee advised that they are facing problems with government owned and backed insurance companies who are still bureaucratic and have less interest in improving their offerings, however, they bully the new comers to the market and attempt to hinder MNC initiatives to change the industry. For instance, when Alpha set for signing a contract with a few banks offering exclusive services, the government insurance companies blocked the deal. Furthermore, the big government business is only made available to governmental insurance companies.

Amongst other problems facing insurance MNCs in the Egyptian market is the problem of corruption in governmental circles. This is a problem of special concern to the management of the subsidiary.

Even though the stable political environment in Egypt has assisted in the stability of the operations of the subsidiary, but the economic environment is not favourable, especially when it comes to the exchange rate issues that has severely hurt the company (for instance, Alpha had to honour outstanding offers made in foreign currencies prior to unfavourable exchange rate swings). The bilateral agreements between Germany and Egypt did not offer any opportunity to this subsidiary.

Based on MI's chairman, the insurance industry was one of the fastest industries to adapt itself to GATT's open market requirements, by radically modifying its governing laws. In line with demands of the World Bank and the IMF, the privatisation programme of governmental insurance companies started since year 2000.

MNCs working in insurance in Egypt are sceptical regarding the real opportunities that the privatisation programme offers, so in order to reach to a realistic valuation of companies to be privatised, the government requested a full valuation report from Morgan Stanley covering the four governmental insurance companies, namely: Misr Insurance, Elshark Insurance, Alahlia Insurance and Masria Reinsurance. But the process of valuation took a long time due to the complexity of valuation of goodwill and the wide spectrum involved in the portfolios held by these giant companies. For instance, these portfolios include: life insurance (due to long term premiums, present value calculations are needed), general insurance (segments include: fire, theft, automotive, etc...) and other investments (segments include real estate, bonds, etc...).

The social aspect of laying-off employees is also a hindrance expected upon selling the insurance companies under the privatisation programme. This issue did arise when MI was obliged to sell AIIC and Elshark sold ACE (in accordance with the new insurance law prohibiting insurance companies from owning shares in other insurance companies). Nevertheless, the MI interviewee indicated that laying-off employees is usually acceptable upon offering these employees an early pension option.

6. Case observations

In the opinion of the Alpha interviewee, Egypt imposes employment laws that restrict the benefits expected from expatriates working at any subsidiary in Egypt (limiting it to only those who have unique experience needed by the local business environment). This deprives a lot of the technology transfer prospectus of having more expatriates and Egyptian employment working together. Nevertheless, it is acknowledged that such a law protects the local labour against being replaced by other lower cost nationalities that might not necessarily add to the business, and would complicate an already complex unemployment problem. A review of these employment laws is due.

Interestingly, Government regulations affected and nearly governed all of the mode development phases of Alpha in Egypt:

- Government imposed a 10% max foreign ownership- Alpha acquired 10%
- Government relaxed the percentage to 20%- Alpha increased its share to 20%
- MI was obliged to sell out all the majority shares of AIIC by government regulation
- Alpha (and foreign corporates in general) were allowed to acquire 100% ownership by government new investment law- Alpha bought the MI shares in AIIC and opened an additional fully owned subsidiary (AILC)

8.6. Case#6: Phi Company

1. Case Background

Phi is an Egyptian, Kuwaiti and Dutch joint venture, established in 1988 as a closed shareholding Egyptian company, with 35% of its shares owned by phi corporate of The Netherlands, 55% by Kuwait Food Company "Americana Group", and 10% by individual shareholders. Phi has a paid-in capital of $10.2 million, and is one of many Phi corporate affiliated plants all over the world. It is specialized in the production of quality pre-fried frozen potatoes (1kgm-bags). In addition to being the leading producer of frozen potatoes in the region for the past ten years, the company has developed new lines for producing and packaging other frozen fruits and vegetables, to serve more purposes of the household.

Creating a two-fold integrated operation in Egypt, Phi established a spin off agricultural business for farming potatoes and strawberries for fresh produce export along with vegetables and potatoes for processing. The two businesses are tightly coupled and integrated and are managed by same top management. Phi set their mission to be "to achieve maximum market coverage of Egypt and the Middle East by offering quality products, sharing experience and providing solutions for Phi partners and to maintain market leadership by being creative, pro-active and innovative".

The interviewee is the Egyptian CEO and chairman of the board of Phi in Egypt. He has been with Phi in Egypt since its establishment (15 years). The interview was conducted at the Phi office building in Cairo.

2. The foreign company and entry decision perspectives

Phi corporate of the Netherlands, founded in 1971, is one of the top three potato processing companies in Europe. Its activities consist of the production and sales of chilled and quick frozen potato products. Yearly over 900,000 tons of potatoes are processed into 450,000 tons of potato products. Around 80% of the required potatoes are purchased directly from farmers in the Netherlands, Belgium, France and Germany. Phi corporate is an independent, financially sound MNC. It formed an alliance with the American agribusiness company J.R.S.. The alliance enables both companies to maintain their strong positions within the existing markets by means of exchange of technology across the board, while also enabling them to build and tackle emerging markets with joint operations.

The Phi corporate reasoning for entry into Egypt was based on the large local market potential, availability of an initiating, willing and capable local partner and an excellent geographic location, that would enable them to address neighbouring regions from their base in Egypt while the HQ's attention can hence be focused elsewhere. The Dutch MNC Phi had substantial internationalisation experience in countries such as Saudi Arabia and Iran. They have demonstrated a specific pattern of internationalisation, whereby they select joint ventures as their preferred mode of entry when outside of Europe and they select fully owned subsidiaries in Europe. The characteristics of the local partner that the MNC seek are mainly financial viability, sustainability and commitment to the venture. The local partner is usually perceived to be better aware of local difficulties. Phi corporate realized the necessity of partnering with a local partner to relief itself of such difficulties.

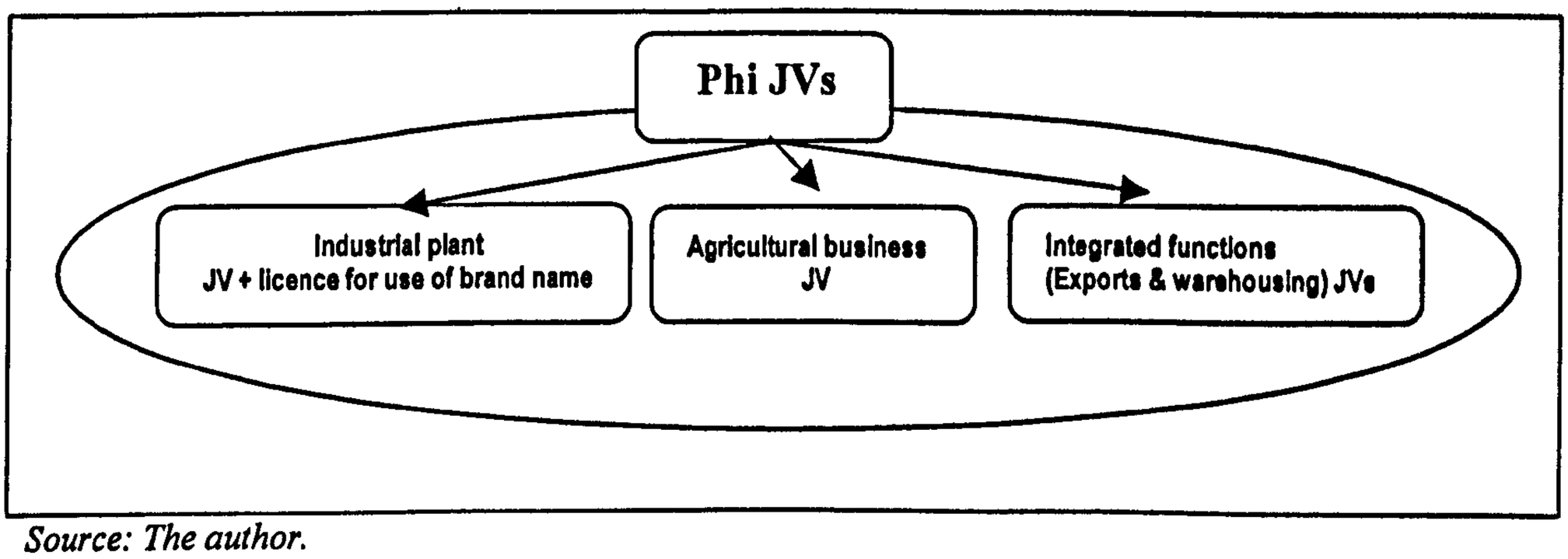
3. The mode of entry perspectives

The original balance of shares held by members of the joint venture remained the same since start of operation to date, in an indication of stability and satisfaction. Nevertheless, the Phi joint venture experienced many expansions that were coupled with product range expansions, from only potatoes processing to farming, vegetable processing and fresh exports. Credit for these expansions was attributed to the management's futuristic outlook, and shareholders support (no dividends were given during the past 15 years, whereas all returns were approved to be reinvested into the company).

In fact Phi corporate categorises their Egyptian operation to be among their top 4, based on worldwide benchmarking of affiliates, joint ventures and subsidiaries.

The Phi integrated operation involves several modes of foreign entry (figure 8/7), as follows: the original joint venture and licence for the industrial plant (potato chips and frozen vegetables), a joint venture for the agro business and several additional joint ventures in supporting functions such as warehousing and exports. Phi are true believers in the benefits of JVs and they implement a strategy of setting up new JVs with respective international market leaders in each new function that they introduce as complementary to their existing business.

Figure 8/7: Modes of foreign entry at Phi



Source: The author.

In the opinion of the interviewee, joint ventures represented the optimal buffer to local problems that generally de-motivate MNCs prior or even after market entry. He believes that JVs are the greatest route to technical updates and technology transfer for the local partner and guarantees continuity of the interests and commitments of MNC. This opinion is based on a very smooth relationships with the corporate HQs that Phi has experienced with its foreign partners over the past years.

It is noteworthy that Phi corporate receives an additional royalty of 1.5% on gross sales for use of technology know-how and use of brand names. This is separate from their 35% ownership in the joint venture. The interests of the MNC in regard to their holdings and licence are well managed by regular audits and representation on the board. The technology issues are coordinated with a liaison officer at HQ.

4. The issues of technology and means of its transfer

The factory in Egypt started production in 1990 and reached 50% of its production capacity within the first three years. It was forecasted and achieved to reach full capacity of production by the year 1996. Phi has maintained a 100% output capacity ever since.

The interviewee attributes this to successful know-how transfer in key functions, such as qualification of raw materials, storage functions (raw potato, vegetables and end frozen product), manufacturing process, distribution and quality implementation.

Originally, the raw potatoes were purchased from many farmers in the Egyptian Delta. The heterogeneity in quality and fluctuations in price led the management to decide to grow themselves the main part of needed quantity. Nowadays, Phi depends mainly on its own production of raw potatoes. In 2001, around 50000 tons of potatoes were processed in the factory out of which 70% was grown by Phi, 20% delivered by contract growers and 10% purchased on the spot market.

Egypt's climate gives the privilege of having two crops per year, but in order to process potatoes year round, computerized, mechanically cooled and ventilated cold stores have been built near the factory and at Obour facility in which raw potatoes can be stored for periods up to 8 months. The storage capacity in all locations totals 25,000 tons. Potatoes from the winter season store better as they are grown in cooler temperatures. Accumulative learning, and trial and error mostly achieved the technology transferred in this function.

The experience of MNC expertise was useful in better classification of raw material qualities, and in the installation of the MNC- recommended cold store systems. The company set a policy to minimize the storage of end products yet maintains safety stock levels. Therefore, the cold storage located on factory premises was upgraded in 2001 to utilize its maximum efficiency. A new racking system was applied increasing the storage capacity by over 25 % as well as reducing manoeuvring and idle time for forklift.

Phi's processing of potato and other vegetable products is completely automated to increase the productivity, enhance the quality control and ensure top hygiene for the end product. The core technology transfer occurred in the training phases on operating the equipment, maintaining it and verification of the final product.

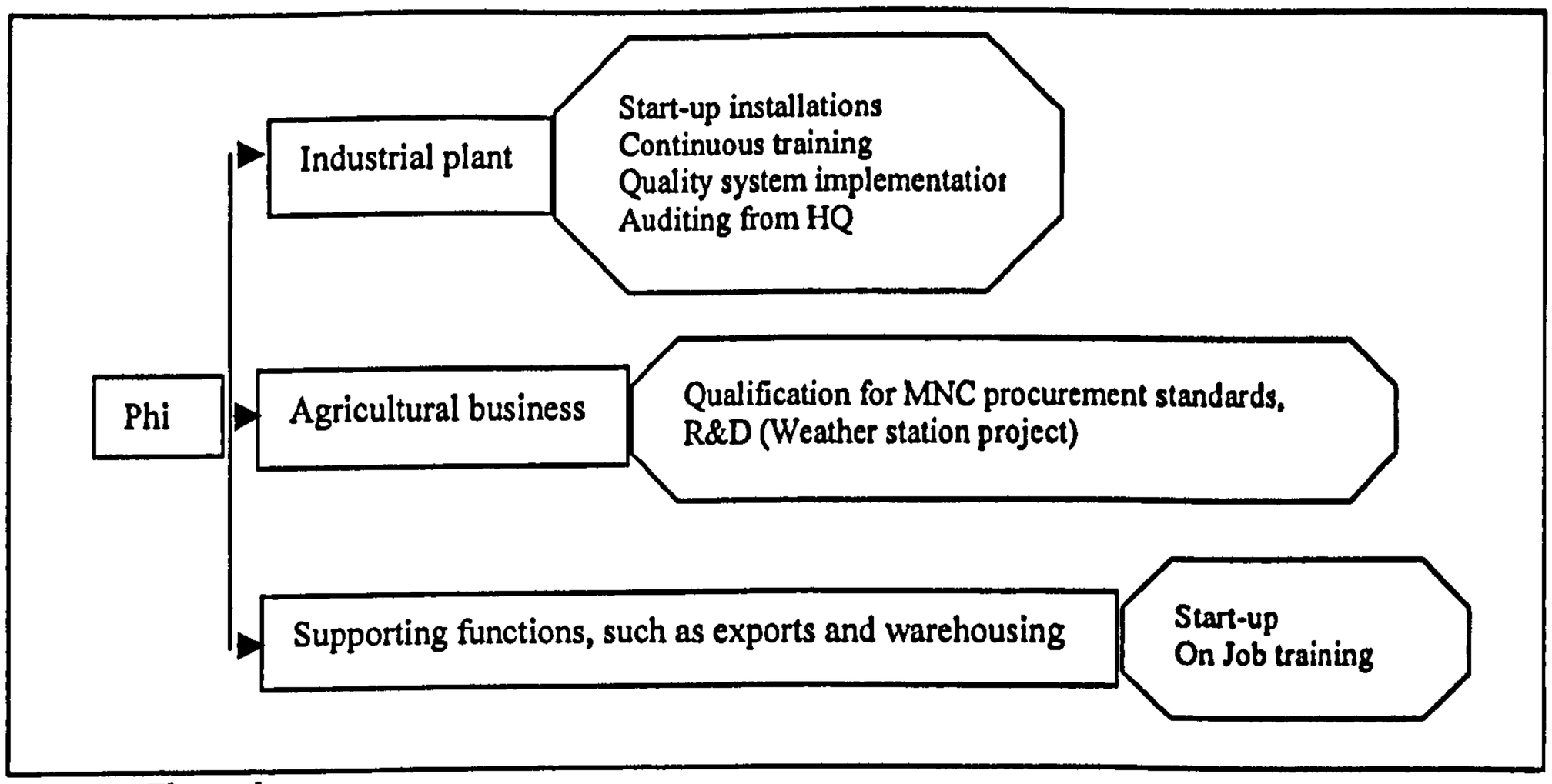
Phi has also invested heavily in its distribution fleet of refrigerated vans, and in establishing a good personal contact base with the retail outlets, which provides an opportunity for continued growth and diversification. Phi currently have more than 18 local distributors spread throughout the country, a fleet of 39 vans, and a plan to increase the number of vans by 7. The experience of Egyptian staff members in local conditions and limitations (infra structure, capabilities of distributors, etc.) and the experience of Phi corporate in conditions of refrigeration needed for the products during transport, were both complementary in this distribution function.

On the agricultural side of the operation of Phi, this venture was initiated to satisfy local demand of Phi itself and enable Phi to address the export market aiming at giant international retail/supermarket chains. These supermarket chains are true MNCs in their own right and they engage in global procurement of their needs of fresh produce (such as Phi's potatoes and strawberries), for their vast, worldwide outlets. These chains have clear quality standards that must be met by their suppliers. Phi foresaw that this route presented a potential for sustained and annually contracted exports. Accordingly, Phi initiated contacts with several MNCs, and engaged in the route of compliance with their supply chain requirements and with international procurement quality standards.

The interviewee noted that international retail and super market chains that were surveyed by Phi, offered to provide the financially capable prospect partners such as Phi, with fully detailed listings of specifications and recommended practices that these chains seek in their suppliers, free of charge. In fact, the MNC (supermarket chain) also provided detailed technical assistance in the form of sending experts into Egypt to assist in qualification of Phi. This occurred when the seriousness and commitment of Phi (the local partner) was established. Nevertheless, no pre-approval was granted from the MNC. Phi believes that they really tapped themselves into a serious process of technology transfer when they engaged in supply to supermarket chains.

As opposed to the industrial plant where technology transfer was most intensive during start-up (but relatively slowed down afterwards); the interviewee described his agricultural operation as an exhaustive and continuous process of technology transfer. The observed technology transfer situations are summarized in figure 8/8:

Figure 8/8: Areas of highest technology transfer occurrences at Phi



Source: The author.

Quality:

The interviewee stated that Phi owes to it's foreign corporate that they have effectively conveyed the clear practices that must be followed (and certifications needed), in order to achieve the desired quality accreditation, but the interviewee attributes the real success and added value of Phi to be the result of Egyptian staff's understanding and capable implementing of quality in every detail, from growing to harvesting, from potato storing to production, from organization to employees and from logistics to service. This was all done with the drive of the management at Phi and has led to certification for ISO 9002, GMP, ISO 14001, and HACCP. On an overall basis, the following international bodies periodically audit Phi's factory located in 10th of Ramadan: GMP; HACCP; Independent surveyor from Holland; M.F.O; and Tricon.

These bodies have granted Phi its quality certifications. Additional quality measures are assured by rigorous client audits (such as McDonalds). Regular monthly audits from HQs abroad (3-4 days long each) are conducted, in addition to random internal audits conducted whereby actual performance is compared to prepared compliance lists. The random audits are conducted within the factory itself on a rotating zone-by-zone basis. This wide array of different audits is believed to have substantially upgraded the level of discipline and preparation of employees.

Export potential:

Phi has developed and secured a particularly solid base for its supply chain throughout the Middle East and Africa exporting to over 20 countries with a total volume of 20,000 ton annually. This volume is expected to grow by 5% annually. Annual contracts with restaurants and fast food MNCs total 12,000 tons per year for the Middle East region alone. This is an indication of Phi's strong presence in the supply chain of MNCs by a service that is second to none.

On the export front, around 3000 tons of baby potatoes are yearly grown, in addition to 15,000 tons of different varieties of fresh potatoes. These potatoes are mostly exported to England in the period January – March in accordance to EU regulations. Phi's exports are constantly reviewed against the standards of EUREPGAP. The EUREPGAP Protocol describes essential elements and develops best practice for global production of fresh produce (Fresh Fruit and Vegetable) and horticultural products. It demonstrates to customers a company's commitment and ability to produce safe and clean food, under an exhaustive system (HACCP) verified by an internationally recognized independent body. EUREP (Euro Retailer Produce Working Group) represents leading European food retailers and uses GAP (Good Agricultural Practice) as a framework for verification. It is specifically designed for retailers in the fresh produce supply chain.

Co-Packing is available as a premium service offered by Phi for long-term clients. In addition to Phi's own presence in the region, further expansion in market share was gained by branding of frozen potatoes under third party name.

Phi attributes their success in exports to a perfect potato produce, modern production lines, motivated workers and reliable partners in export regions, each of whom is competent in his own area.

R&D:

In overall, approximately 5000 feddan are cultivated by Phi yearly. Two main potato-farming seasons can be distinguished. The season for production of raw potatoes for processing generally takes 120 days. The average yield is in the range of 12-14 tons per feddan (4200 m2). The winter season is planted in September, October and harvested in the period January up to March. In this season locally grown seeds are planted. Due to

favourable temperatures at second half of this growing period and during harvest, this is the main cultivation season. The summer season usually is planted end of December, January and harvested in April, May. For these plantations, seeds are imported from Europe (mainly Holland). For a healthy produce a seed programme is implemented, including sprays against aphids, rouging and killing the haulms after 90 days. An R&D programme for producing seeds through tissue culture and mini tubers is executed for the last 2 years. The results so far are encouraging. Yearly a new varieties' trial is carried out (such as Diamant, Asterix and Santana).

The main R&D functions at Phi are hence in the areas of process engineering, farming variety selection, farming applications, storage techniques. Phi created their own R&D laboratory employing part-time consultants highly paid for introducing new ideas. These consultants receive training themselves, to provide them with the necessary corporate orientation and updated knowledge of systems installed. Their training is done locally in Egypt in association with new installations or audits (to save on costs), and is conducted by the foreign expert who is assigned to these functions. Currently, the Phi laboratory is promoting its capability of diagnosing fresh produce and soil samples to third parties on commercial basis.

Training:

The benefits of training the Phi employees abroad is that their scope widens as opposed to the case when foreign employees come to Egypt. Training abroad eliminates cultural barriers and grants exposure to quality "seeing is believing". The local employees who receive foreign training become instructors in their own right upon their return. They are culturally more accepted by their colleagues than foreign instructors, and have better impact on them. In the opinion of the interviewee, training abroad is the best route to technology transfer that he has experienced because they get first hand training (technology transfer) guaranteed by joint venture contract and exhaustive training materials. Phi sends staff members abroad for periods of 2 weeks in average. Upon their return, these trained staff are monitored themselves to confirm that they transfer their knowledge to their colleagues through internal audits twice a week.

On company level, it is noticed that local employees are very receptive to training and when the work environment is professional, financially stable and allows no glitches, they commit to it.

The interviewee advised that the Phi joint venture experiences almost a zero employee turnover, but the employment issue was still critical for Phi, especially on the technical/labour side. There is a specific lack of good agronomists in Egypt. The problem is less obvious on the middle and top management levels. In fact, Phi depends on in breeding of at least 3 generations of middle and top-level management from within the calibres. The learning and technology transferred to the employees has earned them unique experience that allowed them to be commissioned all around the region, in collaboration with Phi. Purposes and means involving transfer of technology at Phi are in Table 8/12.

Table 8/12: The purposes and means of technology transfer at Phi

Product Technology Transfer	**Purposes:** Increase product range Increase quality perception Export of end products **Means:** Product-related training (quality standards, quality criteria and packaging)
Process Technology Transfer	**Purposes:** Cost reduction Improvement of performance standards Improve materials procurement Lowering labour cost and idle time (e.g. fork lift) **Means:** Improve supplier linkages Production technology detailing Training (Maintenance /learning for equipment installation) Alterations and additions to equipment Inspection systems implementation Plant designs, documentation, drawings, layouts Control systems implementation Quality systems implementation Evaluation systems implementation

Management Technology Transfer	**<u>Purposes</u>:** Corporate strategy understanding Supplier development [*In regard to supplier Networks, the machinery suppliers have their machines localized to the needs of the J.V. and offer contractual upgrade commitment, which allowed the J.V. to upgrade their sorting machines into laser sorting M/Cs offering optical accuracy to the sorting. This has allowed the tolerances to drop down to 1gm / 2.5kg bag of potatoes, versus a 3-4gms/bag. Obviously the saving of less than one year. Supplier relations have grown strongly, and accordingly, Phi suppliers have embraced quality in their own way.]* Increase general profitability Improve services rendered to customers *[Customer satisfaction programmes are regularly implemented.]* Increase entrepreneurial skills Increase creativity and drive Increase Environmental consciousness Best practice awareness **<u>Means</u>:** HRD Staff general training and orientation Local training (administrative and technical) Training abroad Conferences and seminars Legal and Administrative interactions

Source: The author.

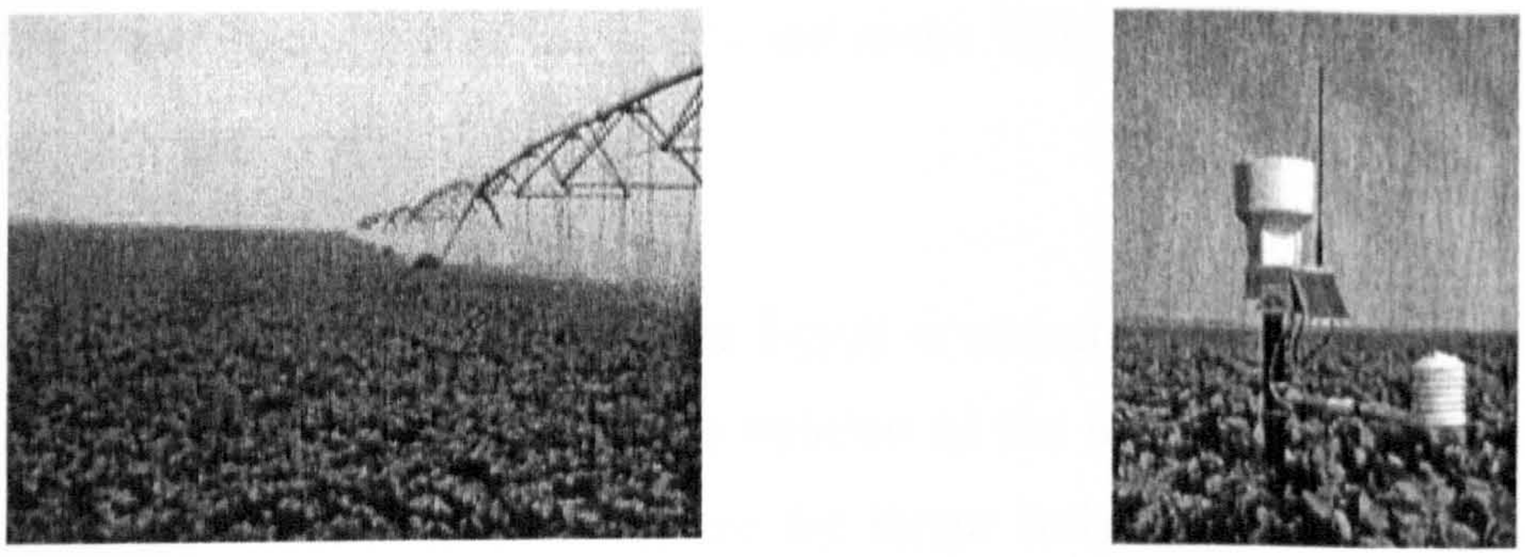
The interviewee foresees no specific black boxes of technology that were hidden away from the Egyptian venture. He believes that it is very important that the local venture takes the initiative in pursuing the technology, and the MNC will help. He referred to the new weather station project as a case of self-motivated technology transfer project.

<u>Weather Station Project:</u>

As indicated, the potatoes necessary for the industrial plant are for the most part grown in desert-reclaimed land using pivot irrigation systems at 3 main locations namely Salhia, Dina-Farm and 6th October-farm. The irrigation water comes from the river Nile or is pumped up from wells (Dina-Farm). In utilization of state of the art technology, fully mechanized cultivation is implemented, starting from soil preparation all the way to the storage of raw potatoes. This includes the use of decision support systems based on weather stations fighting Phytophthora infestans and Alternaria solani, driving computerized air supported sprayers, side dressing devices at planting and water management equipment (Enviroscan, Diviner, and tensiometer). In this way the input of chemicals, fertilizers and water is limited and optimised. For this also N-tests of petioles and soil water analyses are carried out in a fully equipped laboratory present on the site. Diagnostic of most diseases is being done on site as well.

This state of art system is also capable of daily sending an automatic e-mail to an institute in Holland. This institute would e-mail back the daily recipe of pesticides. The local employee trained on the planter equipment would hence apply this precision recipe to computer-controlled sprayers.

Figure 8/9: Weather station project at Phi



Source: Company data.

For this project, a consultant was requested from the MNC to recommend the most suitable technology, in close coordination with Phi Egyptian consultants. The MNC provided schematics and prerequisite forms for installations. The Phi engineers made all necessary preparations. Then the foreign USA supplier of weather stations came and installed his equipment in attendance of 10 staff members. The system was purchased at low corporate rates under a worldwide agreement of the MNC with manufacturers of the weather stations.

The training for this major project took two weeks only, and covered the main topics of:

- Installation and Operation
- Trouble shooting
- Preventative maintenance
- Calibration

The most critical component to the success of this project was the calibration, because it repeats in almost all phases and involves all the various components. The project was operational in two months only, and is being completely operated by Egyptians.

5. Egypt: the macro perspective

The interviewee has expressed that no government regulation existed to affect the market entry mode of the foreign partner of Phi, neither positively nor negatively. From his

perspective, incentives or promotions may have a good impact on technology transfer issues of any individual mode of entry, but not on entry decision or mode choice, which are more based on other factors such as market stability.

On the business level, the interviewee believes that the joint venture mode has kept the business going, because the local partner barriered the foreign partner from long standing government bureaucracy that may have led some fully owned subsidiaries to leave the country (e.g. Sainsbury).

To MNCs, the business environment in Egypt is attractive to joint ventures (and similar less risky modes of entry). But, in the opinion of the interviewee, the market still has a long way to go in order to be attractive for larger fully owned subsidiaries that are the preferred mode in Europe and USA. This implies that the market itself defines the nature of the mode of entry of preference, which means that today Egypt is attractive to joint venture, but it must target the fully owned subsidiaries in order to develop its long term potential. The government should decide to differentiate between its short term planning needs and its long term ones.

Main areas for improvement in Egypt are related to easing government bureaucracy. For instance, the customs authority in Egypt presents itself as a major obstacle, and its attitude is to "treat the investor as guilty of customs evasion until proven innocent". The health permits needed for producing new food products are lengthy and need to be easened. Similarly, export procedures are problematic and are not geared to the nature of exporting food and fresh products. Finally, lack of arbitration mechanisms and existence of corruption concerns are problem areas in Egypt. The interviewee believes that the Egyptian government lacks vision to capture the importance of establishing complete integrated businesses or clusters, complementing the main stream of business in Egypt. In his opinion, this may result in creation of entire supply chains, established to international standards, and serves MNCs and other businesses as well.

In respect to bilateral agreements, although an agreement is in effect between Egypt and The Netherlands, but Phi have not made use of such BIT because they perceive the procedures necessary for making use of it to be problematic and time consuming.

6. Case observations

The interviewee expressed a few conclusive remarks in relation to this research's scope, such as:

- The interviewee advised that when a particular interest of foreign partner existed for developing a local partner, and based on this local partner's capability, the technology transfer continued until it reached a saturation level after which the role of the foreign partner became limited to regular auditing only.
- The existence of a local partner in the joint venture was a buffer against local harassment (in different forms such as bureaucracy, red tape, fraud, etc.) that was deemed necessary for the success of the venture, without which the foreign partner would have long parted.
- The issue of custom duties 'price improvement' was one other obstacle that needed modification, whereas the customs authority will increase the invoice value of any imported good, hence increasing the duty on it.
- The high frequency of conducting audits built quality appreciation into local staff.

8.7. Case#7: Zeta Company

1. Case Background

Zeta serves its customers in the fields of electrical power generation, transmission and distribution, automation, oil, gas and petrochemicals, industrial products and contracting services. Zeta is a 30 billion US$ multinational group that employs 200,000 people in more than 100 countries worldwide.

Since the beginning of the century Zeta entered Egypt through a local partner (distributor). Over the years, this partnership was successful and built an impressive list of achievements such as the first combined-cycle plant in the Middle East and Africa, the world's largest electrolysis plant and the world's largest short wave transmitter. Egypt has been a successful example for Zeta's proclaimed policy "Thinking globally and acting locally". The distribution setup continued until 1979, when the first joint venture (now known as Zeta Egypt Arab) was formed. Zeta's local presence in Egypt had since grown into ten companies. These companies are engaged in engineering, manufacturing and service, and

employ over 1800 permanent staff. Zeta in Egypt (through its local companies) can now execute specialized turnkey projects to an international standard.

This interview was conducted with CEO of Zeta Transformers, Egypt (part of Zeta, Egypt). Zeta Transformers was established in 1998. The scope of work of Zeta Transformers in Egypt includes:

- Manufacturing of oil immersed distribution transformers.
- Service and repair of oil immersed transformers.
- Supply and service of other dry type transformers and oil immersed transformers not covered by locally manufactured range.

On a global scale, Zeta is the largest producer of distribution transformers in the world, with an annual turnover close to 1 billion US$. Zeta covers the full range of oil immersed and dry type transformers. Zeta's biggest worldwide competitors in the field of transformers are Howard-USA, Alison and Siemens. These competitors are all present in Egypt either as fully owned subsidiaries or joint ventures.

2. The foreign company and entry decision perspectives

Zeta's main criteria for entering, and then continuously expanding, in Egypt were mostly to address the large domestic market. The central geographic location of Egypt was also an attraction from the potential export perspective. The interviewee expressed that the interest of foreign company is always in a stable profitable operation, while the interest of the local partner maybe to add a top brand name such as Zeta to his portfolio (for prestige or for overall bank facilities based on an impressive portfolio), or to genuinely conduct serious technology transfer and address the market from a local facility and utilize the benefits of local manufacturing.

Zeta corporate prefers setting-up fully owned subsidiaries, but within the MEA region they often operate via joint venture, such as cases in Saudi Arabia, South Africa and Tanzania.

Operational obstacles, such as government bureaucracy, affected Zeta's selection of joint ventures as its mode of entry into Egypt (as opposed to fully owned subsidiaries). It is the belief of the corporate that such obstacles may be relatively buffered by the presence of a powerful local partner in the venture. In case of the fully owned subsidiary, the MNC will

have to deal directly with all obstacles. The Egyptian partner initially submitted a detailed feasibility study along with his own financial position and possible contribution to the prospect business. After review, Zeta responded favourably to local partner's initiation for creation of a joint venture.

3. The mode of entry perspectives

The following figure provides the complete chronological development of Zeta's modes of entry in Egypt. It is noteworthy that the balance of ownership shares at each of Zeta's companies had not changed from their respective establishment to current date. Zeta possesses majority holdings in all the companies. As indicated, Zeta Transformers is a joint venture, with 65% owned by Zeta and 35% owned by the Egyptian investor.

Figure 8/10: Chronological development of Zeta's investments in Egypt

Zeta S.A.E.		Date of Establishment	Activity	No. of Employees
80%	[redacted] Arab S.A.E.	1979	Manufacturing, erection and maintenance of electricalswitchboards LV & MV up to 36 KV, transformer kiosks and a variety of electrical equipment e.g. miniature circuit breakers, load break switches, luminaires, wiring accessories etc.	1090
100%	[redacted] Electrical Engineering L.L.C.	1989	Marketing & Sales of Power Segment products, systems, services and turnkey projects for both utilities and industry. A newly created Boiler Service provides locally a range of services and studies for better boiler performance.	30
100%	[redacted] High Voltage S.A.E.	1994	Manufacturing and marketing of High Voltage switchgear up to 220 KV, protection and control boards. Engineering and execution of turnkey substation projects up to 500 KV.	130
80%	[redacted] Metals & Plastics S.A.E.	1994	Manufacturing parts, components and accessories for other [redacted] manufacturing companies. The company is also serving non-[redacted] customers.	170
80%	[redacted] Industrial Systems S.A.E.	1995	Marketing, sales, engineering, and after sales of [redacted] Automation Segment products and systems covering the industrial sector in Egypt.	130
100%	[redacted] Turbochargers S.A.E.	1996	Supplying, Servicing and repair for [redacted] Marine equipment & Turbochargers. The Company provides these services in the various Egyptian harbours and shipyards being backed-up by its Suez free zone workshop & storage facility.	10
50%	Egyptian Maintenance Company S.A.E.	1997	Servicing support, modification and upgrading within the Oil & Gas sector for products, systems and complete installations from extraction, refining and petrochemicals production upstream and downstream.	60
65%	[redacted] Arab Contractors for Construction "Abacon" S.A.E.	1998	Electro-mechanical contracting covering engineering, procurement and construction in commercial and Residentia Buildings, Touristic Resorts & Hotels, and Industrial Complexes.	80
100%	[redacted] Petroleum Technology S.A.E.	1998	Offering total Oil and Gas Systems and Products to meet needs throughout the whole production process from extracting, refining, petrochemical production to overall project management.	50
65%	[redacted] Transformers S.A.E.	1998	Manufacturing and marketing of oil immersed distribution transformers up to 1500 KVA, 24 KV.	90
			Total Number of Employees	1841

Source: Company data.

Zeta Transformers employs 100 employees, most of whom are directly involved in the technical operation. The selection of technical employees was mostly from fresh graduates to avoid bad operation habits that might exist with more experienced employees originating from their previous experiences. In the interviewee's view, previous expertise isn't always a positive aspect.

Egypt and other countries in the region fall under Zeta's MEA region (Middle East and Africa) and hence report to the Zurich headquarters. The interviewee has experienced no problems in coordination with the headquarters, especially that management and manufacturing functions are subject to formal headquarters' audit every 2 years, unless otherwise requested. Furthermore, worldwide Zeta standard auditing forms are filled out monthly and sent to Zeta headquarters.

4. The issues of technology and means of its transfer

The interviewee believes that Zeta is transferring more and more state-of-the-art technology to Egypt, through the efforts of the dedicated skilled workers, the highly qualified engineers, technicians and other professionals. Zeta corporate operates worldwide using focus manufacturing plants (specialized plants), rather than mutli-product plants. This was applied to the joint venture in Egypt too, which specialized in oil immersed distribution transformers manufacturing.

Even though the factory equipment was already used prior to being dismantled and exported from Germany and installed at Zeta Transformers in Egypt, yet it could still be considered state of the art. In the opinion of the interviewee, there were no black boxes of technology hidden from the joint venture in Egypt. In fact, the interviewee believes that the joint venture mode was the main route that facilitated technology transferred from Zeta experts. Zeta's business conduct and the eagerness of the local employees (who were seeking a world class qualification for themselves) further maximized the content and the speed of the technology transfer.

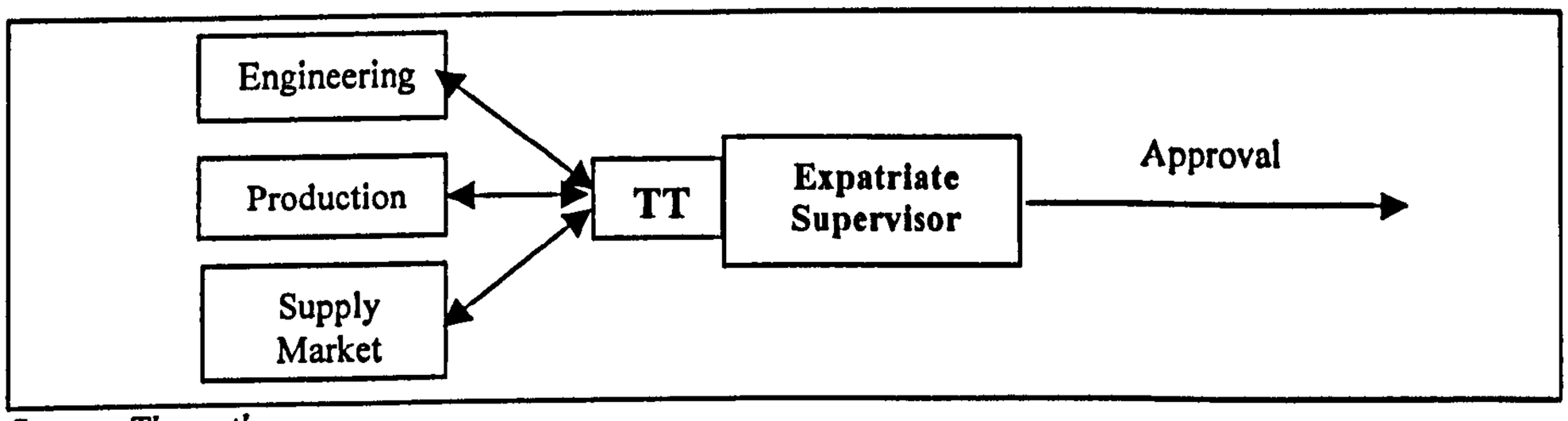
Along with equipment supply, the Zeta headquarters also provided start-up technical assistance through appointing a senior technical manager who had an experience of 35 years in the field. He personally supervised the initial installation then remained resident for 3 years in Egypt. Afterwards the factory has been fully operated by Egyptian staff. The technology transfer process was achieved through two channels, namely: through technical assistance provided locally by the expatriate technical director and through the training conducted abroad at the headquarters.

The interviewee identifies the possibility of separation of technical issues from administrative ones as a major benefit offered by the joint venture mode of entry. This

mode gave the expert the manoeuvring space necessary for technology transfer occurrence. He also highlights that one expert alone managed to train more than ten dedicated engineers, who are now in senior positions at the plant.

The foreign expert was involved as a supervisor overlooking all technical details in various departments as follows:

Figure 8/11: Areas of foreign involvement in the Zeta operations



Source: The author.

The interviewee advised that the know-how transfer from the expert occurred mostly in the design phase, which is core in the transformer manufacturing process. There are two types of design, namely: Basic design (involving understanding of blue prints, implementation, minor modifications to standard products based on periodic update from the headquarter, etc.) and advanced design (involving major changes which occur in average once every two years). As an example, in 1998, an advanced design change was introduced, and needed 3 weeks of training abroad for successful implementation.

Training:

Trainees would be usually sent to the Norway subsidiary for 3 months of technical training. The trainees are usually very eager throughout the training. They usually have a personal agenda of being accredited by the corporate in order to be able to relocate in any higher-pay Zeta facility abroad. On the supplier network front, Zeta is heavily involved in developing local suppliers through implementing its policy "think global and act local".

Quality:

Zeta Transformers is already ISO 9000 accredited and is in the process of receiving the ISO 14000 certification. The company considers the certification as a catalyst to exporting, but does not add to the currently existing quality measures.

From the product perspective, different quality checks are conducted on transformers to ensure conformance to standards. The following quality tests are performed on each transformer: voltage ratio and vector group, power frequency withstand test, induced over voltage withstand test, measurement of no load losses at rated, voltage and rated frequency, measurement of no load current, measurement of load losses, measurement of winding resistance, measurement of short circuit impedance and oil leak test. Furthermore, each transformer will be tested in a noise laboratory to ensure that it meets standard noise levels and environment regulations.

Zeta corporate has a sustainability policy (code of conduct) with triple aspects, namely: workers, community around and community at large. In light of these aspects, Zeta Egypt is steadily implementing this goal.

R&D:

As indicated, transformer design is the core of the manufacturing process, because implementing relatively simple design modifications may often save on efficiency and cost. Zeta provides key training sessions for Zeta Transformer's development engineers on design of transformers at Zeta's world-centralized R&D centre. The trainees would spend one-month sessions at this R&D centre (free of charge) to learn all about design and engineering issues. It is noteworthy that Zeta Transformer pays additional annual royalties to the Zeta headquarter in return for use of brand name. In addition, an R&D fee is also paid in return for any requests of technology assistance.

As result of complete comprehension of the process, Zeta Transformers R&D staff have achieved substantial added value for their locally manufactured transformers, such as modification and implementation of complicated designs for more compact transformers that are better suited for crowded cities like Cairo and Alexandria.

Based on the interviewee, Egyptian staff members are currently fully capable of developing designs of their own and implementing new designs from any MNC if necessary. In fact he foresees that there is no technological gap at all between the Egyptian joint venture compared even to the Zeta headquarters.

The purposes and means of transfer of technology at Zeta Transformers is as follows:

Table 8/13: The purposes and means of technology Transfer

Management Technology Transfer	**Purposes:** Corporate strategy understanding Supplier development Increase general profitability Improve services rendered to customers Increase Environmental consciousness Best practice awareness **Means:** HRD Staff general training and orientation Local training (administrative/technical) Training abroad Employment of Expatriates Conferences and seminars Legal and Administrative interactions
Product Technology Transfer	**Purposes:** Increase quality perception Export of end products **Means:** Product designs Product blue prints Product troubleshooting training
Process Technology Transfer	**Purposes:** Improvement of performance standards Improve materials procurement **Means:** Equipment design Improve supplier linkages Production technology detailing Maintenance training/learning for equipment Installation of equipment Inspection systems implementation Quality systems implementation Plant designs, documentation, drawings & layouts

Source: The author.

5. Egypt: the macro perspective

The interviewee criticized the current commercial law that grants customs duty holidays on semi processed imports but not on raw material imports despite the obvious fact that raw materials will involve local processing (sub-industry) and used to manufacture added value products inside Egypt, promoting the local industry and offering more employment opportunities as opposed to handling semi-processed items.

The custom duty for raw material (essentially operating supplies) is 30%, while the custom duty on added value components is 3% only. Even though this issue was conveyed to various levels of the government, yet no remedy action has been taken, and there was little responsiveness to change the rigid laws.

Zeta-Egypt's biggest challenge in the local market is the lack of market education in regard to price, quality and performance assessment. The local market is a 'price-only' market. This is eroding the profits and hence threatens the continuity of the operation.

The interviewee advises that no governmental assistance was offered to Zeta Transformers, and they have not gained any benefits from Egypt's bilateral agreements. A concern was the employment law, which prohibits laying workers off. This is a key social issue that is carefully guarded by Egyptian government, but harmful to private businesses.

The interviewee indicates that the Egyptian government falls out of its expected neutrality when it favours one of Zeta's competitors (which is government owned) over Zeta Transformers joint venture and the other 3 competitors existing in the market. This is considered by Zeta as negative government harassment in the market.

Other issues hindering Zeta Transformers in Egypt is the instability in exchange rate market and the hidden costs and government bureaucracy associated with exporting.

6. Case observations

The interviewee stressed on the following observations:

- All local issues that involve governmental bureaucracies (such as customs, taxing, permits, exports, etc...) are mostly addressed by the local partner within the joint venture. The interviewee believes that without the presence of a local partner, any foreign company would feel it has no choice but to pull out of the Egyptian market.

- The interviewee believes that even though SMEs are more flexible in regards to joint ventures and technology transfer, yet MNC have the advantage that they can better withstand local operation's financial losses in case of market downfalls. He mentions that Zeta Transformers is unprofitable, yet the operation is continuing because a large portion of the production output is transferred to affiliated Zeta corporate subsidiaries.

Chapter 9: Cross-Case Synthesis and Findings

9.1. Introduction

The analyses of multiple-case study (as a variant within the same methodological framework of the classic case study) often provide the basis for significant generalizations (Allison and Zelikow, 1999), especially when the overall 'correctness' of the data analyses is verified. Consideration should be made to robustness of data, appropriateness of data analyses, the rigour of the research methodology and/or the conceptual detail underpinning the research questions (Miles and Huberman, 1994; IGDS, 2002). For case studies of this thesis, the following measures (Yin, 1989) were carefully considered:

- Construct validity: establishing correct operational measures for concepts studied;
- External validity: establishing domain to which findings can be generalized; and
- Reliability: demonstrating that the operation can be repeated, with the same results.

Without much repetition, it is important in this section to re-affirm the directions taken within this thesis to maintain the above measures, especially after having analysed individual cases and prior to conducting cross case synthesis.

Construct validity relates to the correctness of the conceptual model, which is being used to capture the data. An error in the internal assumptions and selection of issues of the mode can result in errors of gross magnitude in findings (if a causal issue is unidentified, or if the nature of an issue is more sensitive than anticipated). Combinations of internal issues can be invisibly interlinked to create a superficially plausible set of results, when in reality the underlying model could be fatally flawed. Such a fatal flaw may only show up on cross-analyses between data generated from different sets (IGDS, 2002).

Three tactics are available to increase construct validity when doing case studies. The first is the use of multiple sources of evidence, in manner encouraging convergent lines of inquiry, and this tactic is more relevant during data collection. A second tactic is to establish a chain of evidence, also relevant during data collection. The third tactic is to have the draft case study report reviewed by key informants (Yin, 2003). In this thesis, all tactics are applied.

The multiple-case study provided insights to technology transfer associated with several modes of entry (multiple sources). The cases were scrutinized to ensure that they are genuinely representative of modes of entry to Egypt and technology transfer modes. Furthermore the multi-sector nature of the cases allowed for identification of cross sector patterns. A consistent chain of evidence was established within each case. The sources of evidence include: documentation, archive records (web sites) and interviews. The strengths and weaknesses of the used sources of evidence are included in table 9/1:

Table 9/1: Sources of Evidence: Strengths and Weaknesses

Source of Evidence	Strengths	Weaknesses
Documentation	▪ Stable-can be reviewed repeatedly ▪ Unobtrusive-not created as a result of the case study ▪ Exact-contains exact names, references, and details of an event ▪ Broad coverage-long span of time, many events, and many settings	▪ Retrievability-can be low ▪ Biased selectivity, if collection is incomplete ▪ Reporting bias-reflects (unknown) bias of author ▪ Access-may be deliberately blocked
Archive Records	▪ (Same as above for Documentation) ▪ Precise and quantitative	▪ (Same as above) ▪ Accessibility due to privacy reasons
Interviews	▪ Targeted (focuses directly on case study topic) ▪ Insightful (provides perceived casual inferences)	▪ Bias due to poorly constructed questions ▪ Response bias ▪ Inaccuracies due to poor recall ▪ Reflexivity-interviewee gives what interviewer wants to hear

Source: Yin, 2003.

External validity was achieved in this research through continuous comparisons between the findings of this research and issues emanating from existing literature, while the reliability (reduction of errors and biases) in this research was achieved through conformity to the research design. The main purpose of this design was to make sure that the evidence addresses the initial research questions. As noted from chapter 8, all cases were analysed in the same way. Finally, and in line with these measures, several procedural steps were taken at the outset of this research.

Inquiries were made to find out which firms had realistic experience in transferring technology from foreign corporates. Several firms were contacted, and it was discovered that most of them only had very generalized forms of knowledge on actual technology transfer. This eliminated the consideration of a few sectors where tangible technology transfer was very limited.

Then, a short list of sectors and firms that had clear technology transfer experience was reviewed to identify where the researcher can arrange for a reliable and impressive contact for admission. Accordingly, several more firms were eliminated from the list due to lack of influential contacts. Therefore, the selection of sectors and companies was based on the facts: That these had the most evident experience in technology transfer from their foreign companies' modes of entry; That these corporations had established business and market share in Egypt (not new start-ups); and That upon being contacted, senior level of management at these firms were available and interested in the research project and were willing to demonstrate the forms of technology transfer that they experience in association with their modes of foreign entry, in a relaxed time slot.

It is important to highlight that the generalization of the findings of this research discussed in the following sections are not automatic, despite arguments that replicating the findings in three or even a second neighbourhood should sufficiently support, or not, a theory. Once such direct replications have been made, the results might be accepted as providing strong support for the theory, even though further replications had not been performed (Yin, 2003).

Having conducted the analyses in the previous chapter, it should be highlighted that the selected cases offered the following cross-case potential:

- Both Beta and Gamma are in the pharmaceuticals industry. Both started in Egypt through a scientific (liaison office). One established its permanent entry in the seventies, while the other started in the nineties. Both MNCs are among the top 5 worldwide. Locally, one operates as a JV that gradually grew from minority foreign ownership of 10%, to 20%, to 51%, to 90% majority foreign ownership, while the other was a fully owned subsidiary since it started.
- Epsilon, Zeta, Pi and Phi are all manufacturing companies. Phi is the only one operating in food industry while the rest are in industrial manufacturing. These companies experience a large array of modes of foreign entry, ranging from licensing, combination know-how transfer and technical assistance, minority foreign holding in JV, and majority foreign holding in a JV.
- Alpha and Beta are the two fully owned subsidiaries, with one in insurance and the other, as indicated, in pharmaceuticals. Both foreign partners of these two cases have been present in Egypt for more than 25 years.

- Alpha in its current mode is relatively new as a fully owned subsidiary (3 years), but has been present as a majority holder in a JV in the non-life insurance business. Giving the Alpha case report additional depth and overall perspective in relation to government policy, an additional interview with the CEO of MI was included. MI is the biggest insurance company in Africa and the Middle East (Egyptian government owned). MI originally owned the shares that Alpha acquired in the joint venture. MI had to sell out all these shares in AIIC in compliance to new government policy.
- Both Epsilon and Pi share a governmental public sector background and a governmental type of employment structure. Issues such as bureaucracy, social aspects of laying off employees, government subsidies and government policy are more critical to these two cases than others. For Pi licensing is the mode selected by their foreign partner. Epsilon provides additional assessment of know-how transfer contracts accompanied with their selected technical assistance mode.
- Zeta, Phi and Gamma are all JVs and demonstrate the range of shareholdings in a JV from minority, slight majority to almost full foreign ownership (90%).

9.2. Research Phase 5: Synthesis of the Multiple-Case Analyses and Findings

In chapter 8 seven cases involving technology transfer through various modes of entry were extensively explored and analysed, and the issues influencing the content of technology transferred in these cases were assessed. Cases were carefully selected so that they either (a) predict similar results (a literal replication). This includes similar modes or similar industries; or (b) predict contrasting results but for predictable reasons (a theoretical replication). This includes different modes across industries. All case studies were arranged effectively within the multiple-case design of this thesis.

In the current chapter, a cross-case synthesis is conducted. Furthermore, a key individual (Dr. I.F.) who was a former cabinet minister and former chairman of investment authority in Egypt- GAFI and current advisor to the Prime Minister agreed to act as "expert witness" in assessing findings, without seeking to impinge in any way on the independence of the research or on the confidentiality of the individual cases. These discussions provided additional and valuable insights. The expert was interviewed with the same interview guide as were the rest of the cases, to confirm consistency in his assessment and understanding

with that of the interviewees. His opinion in each area is indicated within the synthesis section to provide further external validation. The interview was conducted at Dr. I.F's office, and for a duration that exceeded two hours. The expert interviewee consented to receive follow up phone calls for any extra clarifications or opinions needed. The expert interviewee was first given a brief of the research scope, the main questions and objectives of the research and an idea about the researched sectors of the sample, which were all familiar to him.

In order to achieve consistency of this synthesis and to provide a logical flow in association to the previous analyses, the synthesis will follow the same structure as that of each of the individual cases. Accordingly, the subsections to follow are:

- The foreign companies and entry decision perspectives
- The mode of entry perspectives
- The issues of technology and means of its transfer
- Egypt: the macro perspective
- Followed by: Model Assessment, Issues Assessment and Other Assessments

9.2.1. The Foreign Company and Entry Decision Perspectives

The initiating party was one of the important commonalities among the cases. This is described in the following table, along with the main reasons behind the foreign firm's market entry decision into Egypt. These reasons are important for policy makers in order to assess the effectiveness and focus of national policy.

Table 9/2: Motives of foreign company for market entry

	Gamma	Zeta	Beta	Pi	Alpha	Epsilon	Phi
Initiating party	Local	Local	-------	Local	Local	Local	Local/Arab
Availability of cheap labour	No	No	No	No	No	No	No
Availability of skilled highly technical labour	Useful	Useful	Useful	No	Useful	No	Useful
Large market potential	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Educated consumers	No	No	No	No	No	No	No
Country geographical location	No	Useful	No	No	No	No	Useful
Government incentives/policy	Useful	No	Yes	No	Yes	No	No
Bank credit/financial facilities	No	No	No	No	No	No	No
Competitive situation in Egypt	No	No	No	No	No	No	No
Economic stability	Useful	Useful	Useful	No	Useful	No	Useful
Political stability	Useful	Useful	Useful	No	Useful	No	Useful

Source: The author.

As observed from table 9/2, in all the cases that were interviewed, the local company took the initiative. In the case of Beta, the entry decision was made in the seventies, and the interviewee was unable to clearly specify who was the initiating party, but due to announcement of what is known as 'the open door policy' at that time, it is highly possible that the government invited foreign investors such as Beta into the country.

Egypt suffered prior to that from bad foreign publicity during the rule of the Nasser regime where nationalization of foreign companies occurred and it became a national goal to attract foreign investments. This demonstrates the importance that local companies need to usually take the initiative in order to attract foreign partners.

Examining the reasons for the foreign companies' entry decisions into Egypt, the most important reason (that was common to all), was the large domestic market potential, which represented the main attractiveness of Egypt. Reasons such as political stability and economic stability were seen by joint ventures and fully owned subsidiaries as useful or rather as pre-requisites, not a motivation for entry. Obviously, the reason is that JVs and fully owned subsidiaries carry a certain risk to the foreign company, while on the other hand, such issues were not highlighted as concerns to the licensors of Pi and Epsilon (who selected a less risky mode of involvement).

Government policies were useful to several of the cases, and assisted in the market selection, such as the case of Beta where the 'open door policy' attracted them to enter the market. Similarly, in the case of Alpha, the government's decision to allow foreign ownership in the insurance industry attracted them to increase their holdings (as demonstrated in the detailed case report). Incentives offered under establishment law, and locational incentives were utilized by most of the companies.

On the other side, availability of cheap labour (unskilled) was not of interest to any of the foreign companies. This is an alarming indicator to the government as this type of labour is in fact Egypt's largest resource, yet it is not in as much demand as hoped. Therefore, the need arises to train and re-orient these workers. Banking facilities offered to the companies, the competitive situation in Egypt and the level of education of the local customer were all not highlighted to have any serious impact on the entry decision.

In fact, in the case of Alpha, the lack of customer awareness was considered an opportunity to capitalize on this raw market.

The country's geographic location is mostly important to companies who had initial plans for exports such as the two joint ventures Zeta and Phi. This factor was less important to all the other companies.

The availability of technologically advanced labour came high on the list (after the main reason and prerequisite factors). This issue was more important to the JVs and the subsidiaries, than to licensors. Nevertheless, this matter varied. For instance, neither Alpha nor Zeta were concerned with the technical level of the employees prior to their employment. They trusted their own technical training is sufficient and both attempted to avoid the bad habits of senior employees whenever possible. They only demanded fresh graduates with university degrees and general IT knowledge.

It is interesting that the two companies with public sector background (Epsilon and Pi) selected licensing and both shared excessive employment issues along with several other bureaucracies. This was a proof of the foreign licensors disinterest in the actual level of education and skill of the licencee's employees.

A historical culture synergy arises between the public perception of the 'open door policy' in the seventies and that of the 'privatisation programme' in the nineties, where both were viewed as a form of 'selling out the country'. This concerns foreign investors.

Furthermore, the fact that the political scene in Egypt is stable has proven useful, but the abundance of government policies related to agricultural land, construction and monetary market cause confusion, uncertainty and inherent instability to existing investors and is deterrent to new ones. The government-related bureaucracies are noted in slow and ineffective reactions to both local and foreign investors' calls. This has been noted in several calls in the cases, such as issues of price ceilings (pharmaceuticals), customs authority (manufacturing) and governmental harassment (Alpha and Zeta).

Interestingly, despite their governmental background, Pi's management are very conscious of sending out their royalties payments in a timely fashion or else their production may be interrupted due to their full dependence on the brand name.

As seen in chapter 3, the motives of the interviewed MNCs for assigning a partner fall well within acknowledged motives indicated in literature, namely: resource mobilization, political insurance, cultural guide and competitive advantages. The review of the cases reveals that local partners were perceived to offer various contributions (table 9/3).

Table 9/3: The contribution of the local partners in the cases interviewed

	Local partner contribution
Gamma	Resources
Zeta	Financial stability
Beta	N/a
Pi	Market share and Local technical expertise
Alpha	N/a to AILC. Knowledge in cultural aspects (for AIIC) and Local technical expertise (for AIIC)
Epsilon	Market share and Local technical expertise
Phi	Financial resources, Regional capability and Qualified personnel

Source: The author.

On the other side, from the local partner perspective, the local companies (in cases other than the fully owned subsidiary of Beta and Alpha) foresaw the importance to associate themselves to MNCs for different reasons. For instance, Pi maintains its licence in the field of decorative paints in order to acquire access to the brand names only, while it seeks a licensor in the field of printing inks for the sake of gaining access to technology, intermediates and patented formulae. Epsilon seeked the technical assistance and know-how transfer contracts in association with its new investments and in order to achieve sustainability. Zeta, Phi and Gamma seeked the association to the MNC for motives that are also commonly acknowledged in the literature, such as source of capital, source of technology (Phi, Zeta and Gamma), source of market (e.g. Zeta internally transfers its production to the corporate when local market is slow), increasing national income (through employment opportunities). As observed, the national needs of the developing countries are related to the interests and motives of the host partners. In support of this argument, many Arab countries have recently changed their stance, and they are now allowing that the local partner holds only minority in return for other foreseen benefits.

When a smooth operation exists, staff interactions on all hierarchal levels of the venture occur. These technology-transferring interactions continue over the years (from start-up through to maturity).

In support for the above synthesis, the expert interviewee views that Egypt (as a high population country) is in continuous need for jobs to accommodate new generations, and whenever an investment is assessed from the policy perspective, the need for new jobs is an important factor to be born in mind. From the host's perspective, these jobs should be sustainable ones (i.e. not of a vulnerable nature, such as those jobs geared to the local market only, whereas if the local market falls into recession, these jobs are spared). For example, P&G in Egypt announced major investments and expansions in the Egyptian market, but when the market slowed down, many workers were laid off. "Sustainable jobs are those associated with exporting businesses". Abu Kier Fertilizer Company (a fertilizer-producing company near Alexandria) is an example given by the expert to support the above argument, where this company exists in both the local and exports markets simultaneously and is a clear success with a steady sustainable expansion in business and employment. Therefore, supporting the export potential of foreign entries is the best route to sustainability from the national policy perspective.

Therefore, by means of synthesis, the level of local market attractiveness when weighed against desired factors (such as low cost of establishment, reasonable cost of local operation and availability of other operational needs) guides the MNC in deciding on the mode it will use to set up an operation in Egypt (targeting the local market). On the other hand, it is the geographical location, level of facilitation, existing frameworks, and incentives offered, that represent the criteria that the MNC may review for initial market entry (especially when compared to other investment options or competing host destinations), and subsequent export potential.

9.2.2. The Mode of Entry Perspectives

As indicated, the foreign companies involved in the cases are all among the top 5 worldwide ranks in their respective categories. Synthesizing the cases provides evidence that some of the foreign MNCs have preferences to particular modes. This preference is either related to the industry, general internationalisation preference, the host nation/region, or otherwise. For instance, in the case of Pi, the corporate prefers licensing as a general mode of foreign market entry, probably due to the lower cost and risk involved. This foreign MNC declined on many alternative opportunities to develop its mode of presence in Egypt, sticking to licensing as their only mode of choice. In the case of Epsilon, the option was a know-how

and technical assistance contract. For Alpha, the corporate trend is to expand via acquisitions and their Egyptian business was no exception. For Gamma the JV option allowed the fastest start for the venture and the corporate had no other preference. Early on, Beta decided that the fully owned manufacturing subsidiary is the route they believed best for Egypt, with the employment of Egyptian employees to buffer cultural concerns. For Phi and Zeta, the corporates typically preferred fully owned subsidiaries in Europe and USA, and JVs in the MEA region (Middle East and Africa).

Interestingly, all of the interviewees, without exception, indicated that their initial choice of mode was correct and that they would still agree to it had they reviewed it today. Also, in all applicable cases, the local partner submitted a business proposal to the foreign partner, who reviews this proposal, and often verifies its content through several sources (embassies, chambers of commerce,..). The characteristics of the local partner sought by the MNC varied in the different cases and will be discussed in the context of the mode of entry development.

The mode development:

Some of the modes of entry have developed in a form that demonstrates growing confidence and interest, while others remained at the same pre-determined start-up levels. For instance, the development of the mode in the case of Phi took the form of regular expansion and diversification, along with keeping the shareholding the same (majority ownership to the local partner). Interestingly, Phi did not suffer from any of the many challenges (indicated in the literature) to international joint ventures in Arab countries that both Zeta and Gamma faced. These challenges include: cultural conflict of interests and priorities among the partners (Elhagrasey and Maher, 2000), loss of foreign partner's control over the venture's operations, poor infrastructure in the Arab countries and human resource concerns. Zeta and Gamma suffered from human resource concerns in particular.

The inward-outward activities were not proven to be related in the companies that experienced substantial exports. Phi conducted its exports mostly in the Arab region where its Kuwaiti co-owners had an established network that facilitated the entry of Phi's exports within a stream of other products. No particular Phi exports were made to the home country of its foreign partner. For Zeta, products were only bought by the MNC at transfer prices and were sent to other subsidiaries worldwide within the MNC network.

On another front, the case of Epsilon is interesting due to the extended 5-year period of the contracts of technical assistance and technology transfer. The mere extended length of a technology transfer contract implies either a learning problem that needed management attention (especially when there are no anticipated updates in the technology) or possible corruption. For Beta, Epsilon, Pi and Zeta, the original mode remained unchanged.

Even though Alpha's fully owned subsidiary remained unchanged, it was prudent for this thesis to review beyond that into the 25 years of Alpha operation in the Egyptian market as a minority shareholder in AIIC. This minority holding developed into a majority shareholder in the joint venture AIIC. Expanding (in further confidence in viability of the investment) by the additional fully owned subsidiary was aimed at creating a specialized subsidiary for addressing the scope of life insurance (AILC). Gamma also experienced very similar increase in shareholding and mode development as Alpha. These two companies have transited from a limited foreign control mode to a full foreign control mode of entry. From another perspective, it is notable that foreign partners of Zeta, Pi, Epsilon, Beta, and Alpha have all been present in Egypt for a long time and have demonstrated interest in continuing this presence through increase of shares/formation of new companies (Zeta and Alpha) or maintaining existing stability (Beta, Pi and Epsilon). Interestingly, relatively recent investments of Phi and Gamma, which are 12- 15 years old, have followed identical patterns, whereas Phi maintained stable development while Gamma increased its foreign shares at particular phases.

In the JV cases, the criteria that the foreign company chose for their local partners varied from resource mobilization (such as the case of Gamma, in its original entry via a 10% share in ABI- to gain immediate access to the market through ABI's resources and also in Gamma purchase of Amoun- to gain access to its physical resources), to cultural guide/political insurance (such as the cases of Zeta and Phi- where the local partner is responsible for all local government dealings). Both cases have explicitly indicated that the foreign partner would have long left without the local partner to buffer between them and the local environment bureaucracies.

The employee structures:

The number of employees ranges between 100 at Zeta to 1595 at Gamma (table 9/4). The number of employees in the rest of the cases is in between these two figures. Pi and Epsilon

have kept the number of employees confidential in line with their governmental type of protectionism of what is perceived as critical data. Interestingly, Phi kept their employment figure confidential too. This question was evaded during the interview and is not indicated in any of their documentation or web site.

Table 9/4: The employee structure at interviewed companies

	Gamma	Zeta	Beta	Pi	Alpha	Epsilon	Phi
No. of employees currently	1595	100	280+ 80p/t	Confidential	110	Confidential	Confidential
No. of resident expatriates currently	---	---	---	---	4	---	---
Original No. of resident expatriates	Start-up staff	1	Start-up staff	Start-up staff	4	Start-up staff	Start-up staff
Duration of expatriate Stay	Initial Start-up period	3 Years	Initial Start-up period	Initial Start-up period	3 Years	Initial Start-up period	Initial Start-up period
Local employee turnover	Low	Low	Low	Medium	Low	Medium	Low

Source: The author.

Further observations can be made from table 9/4:

- The only company with current resident foreign staff is Alpha. This could be attributed to the fact that AILC is recently established (3 years). This implies that basic technologies have certainly been transferred in the other cases. Zeta, for instance, demonstrated that only one qualified expert from the corporate was sufficient to 'train the trainers' at Zeta in Egypt, across the entire scope of business (engineering, production and supply market).

- For the rest of the cases and due to the long time since start-up, it was not possible to objectively obtain the exact duration of the start-up phase, which involved foreign employees. In the case of Epsilon, based on their contracts, prolonged durations under the technical assistance were paid for. But there is no indication that foreign engineers were ever fully resident at any time.

- In regards to the local staff, it is notable that highest turnover occurs at the governmental-type Pi and Epsilon. All other companies experience low turnover. The economic status of Egypt may be the drive behind any turnover, motivated by seek of the better pay.
This also explains the interest of staff members such as Zeta's in the foreign training that grants a certificate, because this might be used as a plus on their CVs and may hence qualify them for a better pay job. On the other hand, the declining state of the Egyptian economy is easening the turnover concerns; as employees are clinging to whatever jobs they have,

because qualified workers and management are available in abundance in Egypt (Elhagrasey and Maher, 2000).

Some issues have arised upon dealing with employment of Egyptian local staff, and these vary from one case to another, even though all cases had some sort of concern, as follows:

Table 9/5: The employee issues at interviewed companies

	Key local employment issues
Gamma	The technical expertise of existing employees at time of acquisition was not important to MNC The majority of these employees were not productive Laying off was a big problem at time of acquisition (not permitted) After orientation and filtration, employees are working to satisfying standards
Zeta	Low turnover. Preference is to employ and train fresh graduate engineers to avoid any bad habits that employees may have developed working elsewhere Employees are eager to learn and develop
Beta	Low turnover due to incentives, profit sharing, high pay and stability Excellent overall performance to keep jobs (competitive)
Pi	Suffers from a high turnover Highest technical level in the market due to the many years in business, but suffer from a bad payment structure, hence with the boom of the paints industry, new incomers grab these calibres Training abroad is considered an award rather than a task Language barriers needed addressing Lack of Team spirit, individualism and administrative deficiencies
Alpha	They tend to emphasize issues such as title, office space, etc. New graduates are preferred more than experienced ones (easier to teach) New graduates have bad IT skills New graduates believe that they have a right-to-a-job (socialist culture) Education system provides theoretical aspects only. All practical training is achieved on-the-job Satisfied to be working in a MNC environment
Epsilon	Suffers from a high turnover. Training abroad is considered an award Language barriers needed addressing at a high cost due to the extended durations
Phi	They tend to accept the training more from their colleagues than from foreign instructors They are well motivated and loyal and have a very low turnover rate Suffer from individualism that is often monitored and avoided by management

Source: The author.

These employee issues fall in line with the writings of Elhagrasey and Maher (2000), contending that Arab workers tend to resent orders and close supervision, especially from (usually young) expatriates who may symbolize a threat to prestige or even national sovereignty. The governmental-type of workers prefer to be treated according to their age status and generally have low productivity (Henley and Ereisha, 1987), while the joint venture and subsidiary employees find motivation in higher pay.

Contractual issues:

The interviews demonstrated that written contractual formalisations govern many of the aspects of the mode's operations. These contracts are usually highly confidential areas, but some enlightenment was gained as follows:

Table 9/6: The contractual issues at interviewed companies

	Key Contractual issues
Gamma	Undisclosed
Zeta	Undisclosed, but interviewee indicated that contractual issues took a relatively long time, with local partner often seeking concession.
Beta	N/a
Pi	Limited specification of know-how is included. Upper hand is to the corporate, and a royalty of 1.5% calculated on accumulated net annual sales of the products, with a guaranteed minimum annual amount to be paid to the foreign corporate On the other side, corporate will make available 5% of the previous year's net royalty payments for the development, implementation and execution of agreed marketing programmes. The details were related to overall durations and logistics, rather than the actual training, or TT Long term confidence and re-investment in Pi was not demonstrated Durations of local visits are too short to implement major updates All monies were transferred abroad
Alpha	N/a
Epsilon	Loose, and foreign liability will not exceed 50%. Upper hand to the licensor. The details were related to overall durations and logistics only, rather than the actual training Long term confidence and re-investment in Epsilon was not demonstrated Durations of local visits were not clear at all All monies were transferred abroad
Phi	Even though the foreign corporate owns a share of 35% in Phi, it still contractually receives an additional 1.5% royalty on gross sales, in return for use of technology and brand name. Phi-corporate is also represented in the board of directors and the corporate interests are observed by regular monthly audits, and are coordinated with a dedicated liaison officer at HQ. All dividends were to be re-invested in the company

Source: The author.

Several observations can be made from table 9/6 above:

- In the cases of Epsilon and Pi, their contractual learning appeared clearly upon comparing their older contracts to the more recent ones, which include added issues such as arbitration, scope of works, etc. Nevertheless, in both cases, the upper hand in all contract issues was that of the foreign corporates. This was clear in issues such as liabilities and technology transfer commitments, which were over simplified, while issues related to corporate's interests were fully detailed.
- The contract was emphasized by Pi and Epsilon. One to guarantee brand name access and simultaneously block competitors from snatching the strategic licence and the other to guarantee the long-term continuity of the extended contracts.
- The issue of exchange rate was addressed in the Pi contract, but failed to buffer volatility in this area. This issue is further addressed under section 9.2.4.

- R&D issues received clear emphasis in the contracts of Gamma and Pi. In Gamma, the new products are owned locally (because it is still a joint venture), while in case of Pi, they committed to handover detailed info on all developments. This further demonstrates the upper corporate hand and a disinterest of Pi in all but the brand name.
- Foreign corporates notably emphasized quality measures and listed corrective actions (in modes where it had less control). This was the case with Epsilon, Pi and Phi. As seen, these are the modes with minority foreign shares or a licence. In fact, Phi experienced very tight, contractually detailed, audits.

The relationship with the corporate HQ:

The relationship of the local operations with their foreign headquarters (partners) has possible impacts on the frequency of interaction, the sustainability of local operation on its own and demonstrates the level of foreign confidence in the local operation. All of these have their own individual impacts on technology transfer. Audits (technical and financial) were the most obvious form of interaction. On the overall, financial audits observed the overall performance and book keeping, while the technical audits focussed on consistency and quality. The various forms of relationships are indicated in table 9/7.

Table 9/7: The relationships of interviewed companies with their corporates

	Technical audit/assistance (Management and manufacturing)	Financial audit	Other HQ Issues
Gamma	Quarterly	Semi-annual	None
Zeta	Every 2 years Standard corporate reporting forms are used regularly on monthly basis		None
Beta	Annually Against compliance to quality and GMP	Every 2 years	None
Pi	Annually HQ reviews production, planning processes and procedures and assortment of production recipes and raw materials (Senior corporate production planning /logistics and R&D managers will liase with the Pi's technical, production and R&D personnel, and visit the Pi's place of business during one-week stays for each. On a sales front, an area manager comes two times per year)		Low rate of utilization of agreements
Alpha	Annually Against compliance to standards, quality and financial aspects		None
Epsilon	None. But technical assistance is for 5 years upon request		Loose
Phi	Monthly audits (3-4 days long)		None

Source: The author.

As indicated in the cases' analyses reports, each interviewee perceived his choice of mode of entry as the optimal choice for his company. The corporate employees were even more cautious in this regard. Hence, no explicit disadvantages were highlighted in any of the cases. On the other hand, the advantages included:

Table 9/8: The advantages of modes of entry of interviewed companies

	Mode employed	Advantages
Gamma	JV (90% absolute Foreign Majority)	Access to patents, brand names and Fast entry
Zeta	JV (65% Foreign Majority)	Access to technology, brand name, improved portfolio for local partner (hence better financial facilities from banks and prestige)
Beta	Fully owned subsidiary	Full control. No residual problems
Pi	2 Licences	Access to brand names Access to intermediates and colour compositions
Alpha	JV/Fully owned subsidiary	Control
Epsilon	Two (Technical assistance + Technology transfer) contracts	Continuity
Phi	Multiple JVs+Licence	Technology, quality accreditation and access to brand names

Source: The author.

Based on the expert interviewee's experience, joint ventures are easier to promote and faster to implement. Also joint ventures are more acceptable to a large base of MNCs and most of internationalising SMEs. This provides a larger base for promoting of targeted-mode programmes. In addition, local partners of joint ventures buffer bureaucracies that are knowingly existent in Egypt. In addition to this, the advantages of the local partner in joint ventures of the interviewed cases also include provision of initial market feasibility and speeding the venture, provision of the necessary contact base (whom you know, rather than what you offer) and offer local resources and finance.

In further support (with the exception of the fully owned subsidiaries that were opened during the open door policy in the seventies), most of the new investments tend to prefer joint ventures in one way or another. For example, in case of Alpha, the fully owned subsidiary AILC was spinned off the joint venture AIIC, not instead of it and they notably carry the same name. So in effect, Alpha enjoys the benefits of both modes. Another example is Gamma, where 90% of the shares are owned by the corporate that could have simply completed its ownership to 100%, but had decided that their best interest is to keep the local partner with a 10% share.

These conclusions fall in line with known advantages of joint ventures, namely that they provide shared profits, managerial control and tend to protect the participants from opportunism and information imbalance. Technology transfer may also be controlled or regulated more efficiently within collaborative ventures. Young (1987) contends the same,

and indicates that smaller innovative firms are adopting strategies (such as licensing and joint ventures) more widely as their initial foreign market entry mode.

9.2.3. The Technology and Means of its Transfer

In all the cases, interviewees have indicated that they are satisfied with their modes of entry and that there are no black boxes of technology hidden from them as a result of these selected modes, even in the case of pharmaceutical companies, where it is a normal industry practice that patents and formulae are kept with the corporate only (i.e. they are not hidden from the Egyptian operations in specific). Nevertheless, the cases demonstrate various levels of technological dependencies on the corporates after many years of operation, and with no apparent relation to the existing technological gap (table 9/9):

Table 9/9: Technology gap and corresponding corporate dependencies

	Current Technology Gap	Technological dependencies on corporate after completion of initial transfer
Gamma	None	Yes, for active materials and patents
Zeta	None	Yes, for updates and new designs
Beta	3 years (only in area of hardware, and none otherwise)	Yes as a fully owned subsidiary and for active materials and patents too
Pi	None	Not for technology. Yes for brand name and economies of scale
Alpha	4-5 years (mostly in areas of administration and IT and none otherwise)	Yes as a fully owned subsidiary, but not for technology
Epsilon	10-15 years	No.
Phi	None	Yes, for quality, technology and brand name

Source: The author.

As noted, the technology gap between the technology used at the local Egyptian operation and that used at their relevant corporate, falls in all the cases between no gap to 5 years (except Epsilon that increases the overall average). This, assuringly, implies that the technology used in Egypt (product, process and management technologies) is relatively up-to-date.

The expert interviewee indicates that the technologies used by MNCs in Egypt, in general are considered appropriate and fit for Egypt. Even in the case of Zeta, where the equipment was used in Germany prior to shipping it to Egypt, it still proved sufficient for the local market and is very much comparable to the other equipment at the HQ. He indicates that the same applies to the MNC P&G in Egypt who started their operation with used

equipment, and later upgraded to state-of-art equipment after the market proved ready. This revelation contradicts with arguments against the importation of used equipment.

Particularly in medical and pharmaceutical industries, fears of used equipment being contaminated are high. In the manufacturing sector, used equipment implies to many that these are inferior pieces of equipment that will produce faulty products and result in financial burdens for maintenance, in addition to unavailability of spare parts. The expert perceives that these costs are less than savings made in both the original purchase, and the subsequent technological gains achieved.

Demonstrating this, the corporate of Zeta is purchasing the products of the Egyptian operation, and providing them to its own subsidiaries worldwide (through transfer pricing) in a vote of confidence in the Egyptian product, which is produced by the used equipment.

Proof of sufficiency of existing technology at Pi is demonstrated when it expanded into the new tax-exempted facility. They did not buy any new equipment, but only new conveyors and filling equipment, because the existing equipment was perceived sufficient by Pi and by the licensor. For both the pharmaceutical companies, the current equipment is sufficient to accommodate formulae of medicines, for now and in the foreseen future. Therefore, arguments in literature that MNCs provide only obsolete technologies or that the technologies usually lag severely behind state of art technology, are unfounded in this thesis.

The products:

Product updates in the cases of Gamma and Beta mostly take the form of new products (table 9/10). These new products are very similar in their production methods to old ones (the formula and active materials are received from the corporate, and the main local process to mix the ingredients to the specification).

In this context, there are no special training needs or obstacles foreseen for implementing new updates. In the case of Zeta for example, minor developments are implemented immediately, while major design changes (released every 2 years in average) necessitate that engineers receive 3 weeks training abroad (on average).

Table 9/10: Product updates and ability to accommodate them

	Events of Substantial HQ product updates	Ability to locally accommodate updates
Gamma	New medicines	Yes
Zeta	New designs	Yes + three weeks training abroad
Beta	New medicines	Yes
Pi	New formula	Yes
Alpha	New offerings	Yes
Epsilon	None	N/a
Phi	New spin-off venture	Yes + start-up training

Source: The author.

The product specialization is an aspect that Zeta considered a great strength and a gateway to associate with MNCs. This argument is supported by empirical evidence from Tunisia for instance, where specialization in printers' auto feeders has created a vast market for the nation. The supply chain industry specialization is an area that needs tapping by the policy makers to review the industries without impinging on the actual technology utilized.

Training:

Training is perceived as one of the most important routes of technology transfer and sustainability in the cases interviewed. The types of annual training experienced are:

Table 9/11: Annual training at cases interviewed

	On-the-job	Abroad	Local
Gamma	No	Yes (20% of overall training)	Yes (local instructors- 80% of total training)
Zeta	No	Yes (3 months)	Yes (local instructors)
Beta	No	Yes (35% of overall training)	Yes (local instructors- 65% of total training)
Pi	Yes	Yes (2 weeks-4 people, considered reward)	Yes (local instructors)
Alpha	Yes	No	Yes (local + foreign instructors)
Epsilon	Yes	Yes (considered reward, 175 man month)	Yes (local instructors)
Phi	No	Yes (2 weeks)	Yes (local instructors)

Source: The author.

The training in most of the cases involved multiple forms. Start-up phases experienced a flurry of benefits in information gain. All cases involved local instructors for the local training, except in the case of Alpha who bring a foreign instructor. Many employees consider training abroad as a reward, and the benefits of this costly form of training are attained through returning trainees giving training to their own colleagues on what they have learnt abroad.

Quality:

The management in each independent case inflict internal audits and carefully assure quality perceptions, as follows:

Table 9/12: Quality certifications at cases interviewed

	Main Certifications
Gamma	MRPII + ISO 9002 + ISO 9001 + ISO 14001
Zeta	ISO 9000 + ISO 14001
Beta	ISO 9002
Pi	ISO 9002
Alpha	-
Epsilon	ISO 9002
Phi	ISO 9002 + ISO 14001

Source: The author.

None of the interviewed case perceived a need for quality development assistance backed by the government (aiming at exports). They perceived that they had the quality of the product, the certifications and the corporate mentality necessary to engage in exports. The code of conduct was one of the main routes for transfer of the quality mentality with all its constituents. Interestingly, due to their substantial sizes, most of the MNCs involved in the cases had a code of conduct of their own, but implementation mostly rotated around the product, the quality, the sustainability and the employees.

Table 9/13: Impacts of corporate code of conduct on local operations

	Impacts of the Code of conduct of the MNC on the local operation
Gamma	Yes
Zeta	Yes (sustainability policy)
Beta	Yes (business charter for sustainable development)
Pi	None (passive MNC)
Alpha	Yes
Epsilon	None (passive MNC)
Phi	Yes

Source: The author.

It is noteworthy that the MNCs were passive in both the licensing cases of Epsilon and Pi, which implies that corporate focus is not on developing the local partner.

R&D:

In the case of Gamma, products developed through local R&D are owned by the local operation (because it is still a joint venture). In the case of Pi, the mode contract indicates that details of any new products must be handed over to corporate (the assumption here is

that they were built on the corporates patent and hence they have all rights to this development information).

The expert interviewee notes that clustering of R&D activities is one aspect that is missing upon review of the R&D efforts in Egypt. This is confirmed at the cases interviewed. It seems that these efforts focussed on internal activities and corporate integration. With the exception of Phi, which has started to commercialise its development laboratories, none of the cases interviewed have extended into the transfer of gained know-how to peers or back to corporate

Table 9/14: R&D perspectives at cases interviewed

	Localization	Ability to develop new products	Understanding of current technology	HQ support
Gamma	Yes (e.g. local storage conditions)	Yes	Yes	Yes
Zeta	Yes (compact transformers for crowded areas)	Yes	Yes	Yes + 1 month free R&D training abroad
Beta	Yes (e.g. local storage conditions)	N/a to mode	Yes	Yes
Pi	Yes (e.g. new formulations for bright white, raw materials)	Yes	Yes	Yes
Alpha	Yes (e.g. cultural aspects)	N/a to mode	Yes	Yes
Epsilon	No	No	Yes	Yes
Phi	Yes (e.g. process engineering, farming applications)	N/a to industry	Yes	Yes

Source: The author.

Supplier networks:

Synthesis of the development of the supplier networks in all cases, indicates that they all had supplier network arrangements in order to secure procurement, protect against supply shortages and confirm quality aspects. With the exception of Epsilon and Alpha, all the cases had formal procedures for qualifying the sub-suppliers of raw materials based on their corporate's standards.

No long-term contractual relationships with sub suppliers were demonstrated in any of the cases sounding a concern of sustained consistency. The MNCs did not assist in linking the local sub suppliers to international manufacturers.

Regarding equipment technology, the case of Beta revealed that the corporate's technology recommendation system may often specify a particular manufacture. In this case, it is the original strength of that manufacturer's local representation that will identify whether Beta

will utilize him or not, and hence foreign investment will initiate limited supplier development in field of equipment technology.

Table 9/15: Impacts on supplier networks at cases interviewed (supplier linkages)

	Supplier network development areas
Gamma	Technically for consistent qualities of raw materials and packaging materials
Zeta	Technically (through qualification and orientation) and socially (through joint social events)
Beta	Technically for consistent qualities of raw materials and packaging materials
Pi	Technically for consistent qualities of raw materials and packaging materials
Alpha	N/a to industry
Epsilon	No
Phi	Technically for quality aspects, sorting equipment and packaging materials

Source: The author.

As noted in the case of R&D, there is no cross industry coordination of the supplier networks. So, in fact each company attempts to develop its own supplier network, in an effort that is duplicated among many companies of the same industries.

Means and purposes:

Details of the collective purposes and means of technology transfer incidents at all the respective cases is indicated in table 9/16.

Table 9/16: Collective review of purposes and means of technology transfer

		Zeta	Phi	Gamma	Beta	Alpha	Epsilon	Pi	
Management Technology Transfer	**Purposes:**								
	Corporate strategy understanding	*	*		*	*			** **
	Supplier development	*	*		*				** *
	Increase general profitability	*	*	*	*	*			** * **
	Improve services rendered to customers	*	*	*	*	*	*	*	** * ** **
	Increase entrepreneurial skills		*	*					**
	Increase creativity and drive		*			*			**
	Increase Environmental consciousness	*	*		*				** *
	Raising national Reputation						*	*	**
	Best practice awareness	*	*	*	*	*			** * **
	Means:								
	HRD	*	*	*	*	*	*	*	** * ** **
	Staff general training and orientation	*	*	*	*	*	*	*	** * ** **
	Local training (administrative and technical)	*	*	*	*	*	*	*	** * ** **
	Foreign training	*	*	*	*	*	*	*	** * ** **
	On-the-job-training					*	*	*	* **
	Employment of Expatriates	*				*			* *
	Conferences and seminars	*	*	*	*				** * *
	Legal and Administrative interactions	*	*			*			** *
	Code of conduct obligations	*		*	*	*			** **
	Technology Transfer clauses in mode contracts					*	*	*	* **
Product Technology Transfer	**Purposes:**								
	Increase product range		*	*		*	*	*	* * * **
	Ownership of new modifications/localized rights			*	*			*	* * *
	Increase quality perception	*	*	*	*		*	*	** * * **
	Enhance speed to market			*	*	*			* **
	Export of end products	*	*	*			*	*	** * **

		Zeta	Phi	Gamma	Beta	Alpha	Epsilon	Pi	
	Means:								
	Product designs	*						*	* *
	Product blue prints	*						*	* *
	Product training	*	*	*		*	*		* * * *
	R&D	*	*	*	*		*		* * * *
Process Technology Transfer	**Purposes:**								
	Cost reduction		*	*			*	*	* * *
	Improvement of performance standards	*	*		*	*	*	*	* * * * *
	Lowering of labour costs and idle time		*	*				*	* * *
	Developing technology recommendation systems			*	*				* *
	Improve materials procurement	*	*		*		*	*	* * * *
	Means:								
	Equipment design	*					*		* *
	Improve supplier linkages	*	*	*	*			*	* * * *
	Production technology detailing	*	*		*			*	* * *
	Maintenance training/learning for equipment	*	*	*	*		*		* * * *
	Installation of equipment	*	*				*		* *
	Alterations and additions to equipment		*				*		* *
	Plant designs, documentation, drawings, layouts,..	*	*	*	*	*	*	*	* * * * *
	Inspection systems implementation	*	*		*				* *
	Control systems implementation		*	*	*				* * *
	Quality systems implementation	*	*	*	*	*	*	*	* * * * *
	Evaluation systems implementation		*	*	*	*			* * *

Source: The author.

- It is important to highlight that the findings in table 9/16 summarize the empirical evidence regarding the various components of technology transferred and the purposes and means of this transfer, whereas these findings provide "analytic generalization," as the means and purposes indicated in the table have previously emerged from the literature, and then supported by empirical evidence. Furthermore, in most of the situations, two or more cases show support to the same issue, hence replication maybe claimed. Only with such replications would the original finding be considered robust and worthy of continued investigation or interpretation (Yin, 2003). The following observations could also be made from table 9/16:

- The interview guide included additional purposes and means to the ones indicated in table 9/16 for each component. The ones that are not included were not perceived as important by any interviewee, and hence rendered irrelevant to the context of Egypt. For example, none of the cases perceived re-export of equipment or lowering transport costs as purposes for technology transfer, (even though some of the cases expanded into their own distribution fleets), nor was mobility of HR considered as a means. On the other hand, mobility of HR was a personal motive of employees who wished to develop their careers in order to be considered corporate employees (at a better pay). In order to better themselves, they were eager in learning and performing (i.e. transferring technology).

- The purposes of the management technology transfer occurrences in the cases varied, but: improve services rendered to customers and increase general profitability ranked high as the main purposes for management technology transfer incidents.

- Raising national reputation was a purpose indicated only by the two public sector governmental cases, Pi and Epsilon, for image purposes. No evidence of national or society development (sustainability) was revealed in either of these cases.

- On the other hand, best practice awareness was a purpose in itself for all cases experiencing direct involvement of foreign partner (either fully or jointly). It is a purpose of the foreign partner in the local company, whereas he attempts to orient the local staff to his way of doing the business, and hence get the quality and standardization that he desires.

Epsilon and Pi did not indicate best practice awareness as a factor, which implies that the foreign partners did not either. This demonstrates the lack of long-term interest in the local partner. Had this interest been there, the foreign company would be certainly keen to educate the local partner more, as this would impact on the ROI on the long run (especially that both Epsilon and Pi have already experienced confirmed, expected to sustain, long term cooperation with their foreign partners). As noted, in contracts of both firms, the technology transfer commitments were not detailed, while in the other cases there were either contracts or other relevant formalization (code of conduct, etc)

The above arguments fall in line with views that developed countries use technology transfer to avoid the risks of investing in developing countries resulting from the economic and political issues (Baranson, 1978) and that different entry modes have different performance outcomes, based upon their resource and organizational control demands (Woodcock, Beamish and Makino, 1994).

o For management technology transfer, HRD and various forms of training were the absolute main means of transfer. This includes local, foreign and on-the-job training. As indicated earlier, all of the cases emphasized local training that is mostly conducted by local instructors due to the cost savings, increased numbers that could attend and cultural preference (a respected colleague or university professor conducting the training). In regards to the foreign training, all the cases used this except Alpha, due to the presence of four expatriates on a long term basis, and as a result that the technology to be received by training is highly administrative and on-the-job related (due to the nature of the business of insurance). The on-job training tended to be the least utilized, as many of the cases do not allow any semi-trained employees to start the jobs, especially in sensitive products. On the other hand, Alpha utilizes on-the-job training extensively.

o The code of conduct was also a main mean to management technology transfer especially through quality emphasis, consistency emphasis, and sustainability emphasis and through its availability over the Internet (Gamma, Beta) or in printed form (Zeta, Alpha). Even though Phi did not indicate an explicit code of conduct for its foreign partner, but it also shares many of the values of these codes, such as quality and community relations within the company.

o In regards to product technology transfer, the main purposes of technology transfer were to increase the quality perception and the product range. The means were also through training, and R&D activities. Interestingly, a high achiever in regards to product technology was Gamma. The interpretation for this is that all the locally developed products are owned by the local venture, and the local staff has developed skills to regularly introduce products. Upon comparing Gamma (90% foreign ownership) to Beta (as a competitor pharmaceutical MNC, operating in the same setting of Egypt, by a fully owned subsidiary as mode of entry), the level of product development at Gamma is higher. Regarding the mode development of Gamma (from a minority foreign share of 10% to a majority foreign share of 90%), the interviewee, who had first hand experience in this as the CEO since establishment, attributed it to satisfaction with maturity of employee learning and good relationship with the corporate.

o In regards to process technology transfer, the improvement of performance standards and the improvement of materials procurement were the most important purposes of the transfer. These were mainly achieved by developing quality systems and supplier linkages, in line with the previous argumentation in this regard.

o The two governmental-type companies Epsilon and Pi have demonstrated emphasis on the process technology and the product technology, more than the management technology. This conforms to the earlier synthesis. Interestingly, due to the nature of the cultures at these companies, the means that were used for transfer of technology are limited and do not extend beyond traditional blue prints, documentation and training. The ISO certification contributed to the overall technology transfer content and core competence at the time of its implementation.

o The process and product technology transfer was minimal for Alpha due to the nature of the industry, and because the insurance business is well established in Egypt through operations of many companies and many universities. On the other hand management transfer is of highest emphasis and involves most of the means needed for transfer to be successful.

o Based on a collective technology transfer content analyses, and in order to assess preferred modes of entry into Egypt, the collective tables of technology components may be further synthesized for replication (not sampling) logic, demonstrating modes with highest technology transfer content.

Table 9/17: Modes with highest content of technology transferred

Technology Component Transferred	Mode with highest content
Total Process Technology Transfer Purposes	JV and LIC
Total Process Technology Transfer Means	3 JVs
Total Management Technology Transfer Purposes	3 JVs
Total Management Technology Transfer Means	FOS then 2 JVs
Total Product Technology Transfer Purposes	JV
Total Product Technology Transfer Means	3 JVs

Source: The author.

As seen, table 9/17 accommodates the case of Gamma in two perspectives. One is that it is a more balanced joint venture (especially that it was strengthened by multiple JV stages) and the other is that it is very close to a fully owned subsidiary. This explains, for example, that Gamma was high in logic of total product transfer purposes.

From the synthesis, it is found that JVs demonstrated the highest assessment of technology transfer events. In addition and quite interestingly, in the technology components where JVs were not the highest, JVs still turned out to be the second highest (such as case of management technology transfer means). Therefore, it can be concluded from the above table 9/17 that on the overall, joint ventures are the most active in the means and purposes of transfer of technology components, adding to this the advantages possibly offered by local partners makes the joint venture quite suitable as the mode of foreign entry to Egypt. Furthermore, utilizing the Gamma pattern of minority foreign shares growing into a majority foreign share increases the potential for technology transfer, strengthens the internal relations between partners, and is safe for the foreign firm.

Synthesis of empirical evidence demonstrates the finding that formal training, conferences, code of conduct obligations, R&D and quality aspects are the most common means of transfer for the various technology components, and across all modes and sectors. The main components of technology transferred by these means across the cases are:

Table 9/18: Technology components transferred at cases interviewed

	Process technology	Product technology	Management technology
Gamma	Yes (production)	Yes (localization)	Yes (MNC standards)
Zeta	Yes (manufacturing)	Yes (design)	Yes (MNC standards)
Beta	Yes (production)	Yes (localization)	Yes (MNC standards)
Pi	Yes (manufacturing)	Yes (localization, supply)	No
Alpha	Yes (planning)	Yes (new product design)	Yes (MNC standards)
Epsilon	Yes (manufacturing)	Yes (maintenance)	No
Phi	Yes (production)	Yes (quality)	Yes (MNC standards)

Source: The author.

As noted from table 9/18 above, all the cases experienced various types of technology transfer. In the cases of Pi and Epsilon, no particular evidence of management technology transfer was noted. For instance they did not have documentation on regular management training, orientation, or conferences. Neither did the interviewees indicate any direct learning. Most of the transfer occurred at particular technical events. Quite importantly, the main triggers for technology transfer events (i.e. timing of the main events of technology transfer) are:

Table 9/19: Triggers (timing) of technology transfer events at cases interviewed

	Timing of the key events of technology transfer
Gamma	o Upon Quality certification o Regular training
Zeta	o Major designs (and these occur in average every two years) o Regular training
Beta	o Upon Quality certification o Regular training
Pi	o During contractually obligated interactions with MNC o Regular training
Alpha	o Upon introduction of new products o Regular training
Epsilon	o During contractually obligated interactions with MNC o Regular training
Phi	o Regular Training o Upon Quality implementations for production o Upon prequalification for sourcing to supermarket chains in agricultural venture o On the job in the cases of supporting activities such as warehousing

Source: The author.

The extent of the technology transfer beyond the start-up is the essence of the above table 9/19 hence it excludes the obvious primary cases of start-up technology transfer.

9.2.4. Egypt: The Host Macro Perspective

Pi and Epsilon companies had a governmental historical culture. Interestingly, both companies believed that the Egyptian government needed to step up its protectionism, in

one way or another. In the case of Epsilon, they were pleased with regulations that all government agencies must buy the local produce, because they are the local monopoly and the government is almost their sole customer. In case of Pi, although there are many companies already competing locally in the paints industry, yet foreign competition is obstructed by high custom duties. They believe that removing such custom duties may harm their business. Another concern of Pi management is the obstacles that they face every time they renew their licence. The paints licensor is concerned that Pi gets sold under the privatisation programme, and that his interests be harmed in one way or another.

This recently re-emerged upon drafting the contract with the new printing ink manufacturer, who despite receiving half of the profits in return for 10% of the equity, the licensor demanded clear indication of 'first refusal rights' in case of neutral sale, and 'Veto right' in case of sale to a competitor.

Pi wishes that the government makes a swift and bold decision to either keep it (i.e. not sell under privatisation), and hence face no problems with the licensors and achieve stability, or alternatively, to approve a non exaggerated price and conclude the selling situation with any non-competitor investor. Pi believes that the government has yet to make this decision.

Both Epsilon and Pi are pro government intervention. They believe that the government needs to emphasize particular modes of entry of foreign companies, and actually specific technologies too. It is the opinion of the Epsilon interviewee that when the government began to pull out entirely after launch of privatisation policies, chaos occurred and people started importing obsolete technologies that resulted in inferior products. He believes that the interest of the foreign corporates became of an opportunistic nature. The load of finance became on the local banking infra structure, which in turn resulted in fraud, bankruptcies and foreign exchange crisis. As indicated in the case report, the interviewee mentioned the automotive industry as an example of success. He described how the high tariffs, the obstacles posed on importation of cars (only 'last-year make' are allowed into the country) and the incentives granted to the local manufacturers have allowed this industry to thrive. Confronting this view, the expert argues that to the contrary, protectionism has resulted in a fragile industry that contributes only 30% of the finished car in local content (tyres, interiors, etc...). The rest is imported.

Pi viewed the governmental tax exemption of 10 years for companies established in new industrial zones as a major incentive. Interestingly, all of the companies interviewed (except Beta which was established in a down town area) benefited from these incentives (either new industrial city exemptions such as Zeta and Phi, capital raise exemptions such as case of Gamma, or tax free zones such as Alpha) but none indicated this as a significant factor, neither in mode choice, nor in technology used, except in cases when relocation involved new equipment purchase.

In this particular point, the expert interviewee emphasized the impact of these tax exemptions. He believes that all the interviewed companies of this research have benefited in various forms from tax exemptions granted to them 'even if they do not admit it'. Actually it happens that when the exemption period ends (10-years according to investment law), many companies attempt to work around that and establish new companies with slightly modified names, to start new periods of exemption. He contends that besides financial benefits of tax exemptions, exemption in itself relieves investors from government harassment and bureaucracy related to tax collection and accounting.

In regards to the bilateral agreements between Egypt and the home nations to the interviewed foreign corporates, these are synthesized as follows:

Table 9/20: Utilization of BITs in cases interviewed

	Existing BIT	Utilization of BIT
Gamma	Yes	No
Zeta	Yes	No
Beta	Yes	No
Pi	Yes	Yes (tax duplication)
Alpha	Yes	No
Epsilon	Yes	Yes (cost waivering)
Phi	Yes	No

Source: The author.

From the above table 9/20 it could be noted that the joint ventures and the fully owned subsidiaries did not make any use of the BITs. Local licencees did. Pi indicated that BITs might pose threats that outweigh the benefits, especially to relatively weak local companies. Interestingly, none of the interviewed companies perceived BITs as an opportunity for exports. Also, IPR implementations provide assurance but not protection.

The companies that did not utilize the BITs indicated that the procedural hastles of applying for financial assistance under a BIT far exceed the benefits. Therefore, the importance of BITs to investment and technology lies mainly in the area of financing private sector investments. Adding a further complication to implementation of financial components of BITs, is that often the government requests that part of financial programmes be directed back to the government itself, rather than given all to the private sector. This lessens the number of projects benefiting from these programmes, and hence of the entire BIT. Furthermore, the preferred access granted by the BITs, when associated with the soon to be lifted custom duties (under WTO agreements) complicate the situation.

On the economical framework front, all interviewed companies, without exception, perceived exchange rate fluctuations as absolute and major hindrance to new investment, existing operations, technology transfer, exports, overall stability and national attractiveness. In the previous years, the exchange rate in Egypt suffered from sudden decreases in the value of the Egyptian pound, which is usually followed by some sort of government intervention to moderate its effects. Such intervention results in a temporary increase in the value of the Egyptian currency (hence the fluctuation). In both cases, foreign currency is unavailable at banks. Then the public announcement of the full floatation was made.

For the fully owned subsidiaries, the fluctuations resulted in problems in the budget assessments, which are submitted annually to the corporates. These budgets often have to be reviewed and adjusted for exchange rate, creating an ill image regarding their accuracies and reliability upon submission. For the joint ventures Zeta and Phi, they both pay royalties to their corporates (embedded licence to use brand names), which is very similar to the royalties paid by Pi (for the explicit licence). All these royalties are paid in foreign currency and are fully repatriated abroad. The companies often face serious problems sourcing these amounts in foreign currency and are obliged to turn to black market in many occasions especially when the local banks decline to source the necessary foreign currency.

For Alpha, they are occasionally obliged to submit quotations in foreign currencies. These quotations may be accepted after many months during which the exchange rate fluctuated.

Alpha management often have to buffer large amounts themselves, or alternatively adjust their quotations with a safety margin, rendering themselves safe but uncompetitive.

In the case of Phi, the company has an export component. This component of the business generates foreign currency. Nevertheless, the government has recently released a new law in its struggle to stabilize the monetary market in Egypt. This law forces the local exporting companies to deposit 75% of their export earnings in local banks and convert it immediately to the local currency, at the bank's current rates. This has caused the companies many problems, and resulted in massive evasions, and companies began declaring untruthful amounts on their books (i.e. tampering with the export documents). To other companies in the exporting business, the low value of the pound (which is supposed to improve the export potential of Egyptian goods) is in fact harming the Egyptian products, due to the fact that most of the industries involve semi-finished components and raw materials that are fully imported, and hence subject to exchange rate issues. Many factories in industrial cities have laid off personnel (fixed costs) as a result of difficulties in sourcing the foreign currency needed to import vital row materials. Therefore, another compounded effect has resulted from the government policy in monetary market, impacting on technological and social employment aspects.

The expert interviewee argues that the government policy may cause confusion when it intervenes in the exchange rate (in order to lower the descent of the Egyptian pound against other currencies) by injecting several hundred million of US dollars and Euros into the market. Unfortunately, such policies result in further massive exchanges. Policies do not stop the descent of the Egyptian pound for more than a few weeks, after which the descent resumes. Needless to say, the injections are eroding the national reserve, and hence the international perception of the national and economic stability.

The government resources are themselves being eroded by the exchange rate issues, especially upon making the annual foreign purchases of subsidized foods such as sugar, wheat and cooking oil. The concern over the social aspects is too high and is not allowing the government to mark up any of the prices of these goods, which are in clear detachment from their actual cost. This has resulted in a jump in the overall government subsidy share on goods from 4.93 billion pounds in year 2000, to 7 billion pounds in 2003.

In a related situation, interviewed pharmaceutical companies, Gamma and Beta, have clearly noted that they object to the government-ceiling price on all medicines. Although the aim of this law, as others, is to protect the social aspect, but it is now being subjected to loud objections because of the increase of cost of supply of the raw materials and active materials imported in foreign currency. The prices indicated by law have not been changed for many years, while in the mean time the local currency has lost 50% of its value in less than 5years. In fact many of the pharmaceutical MNCs in Egypt are threatening the government to pull out of Egypt because of this law, which is inconsistent with the market dynamics and is causing them losses.

Government intervention is resulting in major turbulences to technology as well, simply because from the product perspective, policies such as price ceilings, result in the inclination of the MNCs to only introduce proven and profitable products, and avoid being market leaders. This is a clear hindrance to new product technology transfer.

The flotation of the currency has further impacted on issues that were originally considered normal obstacles, but have turned into very damaging issues after the currency flotation. For example, as detailed in the cases, Zeta and Phi have presented the customs authority procedures as obstacles to imports (Zeta) and exports (Phi). The expert supports that the basis for the new complaint is that the customs' dollar value has been floated as well.

Accordingly, the customs duties of goods have become a matter of speculation on a daily basis, allowing companies no room for constructive planning. In fact, often in cases of low exchange rates, the customs clearance procedures are informally halted until some sort of directive is received. The duties are calculated based on price lists that are not updated regularly. These price lists are unified across importers, irrespective of their sourcing capabilities or economies of scale. Furthermore, these prices are subject to a personally judged improvement on invoice value. All these obstacles have caused the companies to slow down their operations, negatively affecting both the image of external attractiveness of the overall market and new technology introductions of existing investments.

The stability and suitability of the political environment was a pre-requisite to entry, but had no impact on any of the modes of entry or technology transfer. Many MNCs prefer to

establish fully owned subsidiaries in Europe and USA, while possibly utilize less risky modes in areas such as the Middle East. The expert interviewee supports this and contends that the market itself defines the nature of the modes, and there should be both long term and short term national planning for the attraction of foreign investments.

The Egyptian employment laws presented restrictions on the number of expatriates affecting Alpha, while the hindrances to laying off employees, was a problem area in cases of Alpha, Zeta, Gamma, Epsilon and Pi. Neither Phi nor Beta did employ excess employees from the beginning, so they did not face this problem. Even though Epsilon and Pi do not consider excess employment as a daily problem, but it has damaged a lot of their prospectus of being sold at a premium under the privatisation programme.

A new concern that did not emanate from literature emerged as a true problem in the cases of Zeta and Alpha (more than the rest), namely that the government favours governmental companies over other private companies operating in Egypt. For Zeta, and due to the nature of the electromechanical business, the government wishes to have a direct presence in the industry to support its infrastructure, and accordingly grants projects by direct award to governmental companies. In case of Alpha, it was indicated that the government-owned insurance companies bully new comers.

Therefore, it seems appropriate that the government of Egypt should depend on a more comprehensive mechanism for implementing integrated policies and incentives for attracting investments (with associated technology transfer). Furthermore, MNCs offering to enter Egypt with multi million dollar investments and employment opportunities for thousands may perhaps be treated differently from smaller investors. This has been a proven practice in many countries. The problem seems to be that the government prefers to offer a "one suit suitable for all" type of investment framework.

The expert interviewee attributed this to the reason that government ministers are not completely free to set the policies and the socialist background of Egypt still drives policy makers to avoid such preferential status type of investment categorisation. In addition, an extreme penal system is in place, applied especially against public officials who attempt to provide flexibility that is beyond the norm. This often deters such officials from putting

themselves in a questionable position and hence they would not act all together. For instance, a former minister of finance was recently jailed because he offered out-of-ordinary facilities to an investor during his post as the GAFI chairman.

Another given example occurred in relation to a major foreign investor, namely a MNC called "Leoni" operating in the field of manufacturing high quality automobile spare parts for exports. They wished to purchase and establish their facility in the free zone area in Egypt. Investment law (number 8 of year 1997) prohibits foreign ownership of land in these free zones. At that stage the company intended to pull out. In attempt to encourage the MNC to stay, the chairman of GAFI Dr. I.F. granted them an approval to establish a private free zone facility (outside the free zone area). This approval has encouraged the MNC investor to stay and is still operational to date. Legal investigations are undergoing regarding this decision and the former minister is being questioned about it, even though it was clearly made in attempt to attract investments.

The expert interviewee further supports his argument on government rigidity mentioning a recent case of the MNC "Intel" (the microprocessor giant) who wished to establish a presence in Egypt. Intel's management wanted an expression of good will from the government of Egypt in the form of providing the building for Intel's operation in Egypt. This seems to be a low price to pay in return for the publicity, technology transfer and employment opportunities that Egypt would gain of Intel's presence. However, that Intel request was refused, because applicable laws in Egypt do not accommodate such type of incentives (there is no clear budget item that could be used for that purpose in the national budget).

It seems necessary that investment negotiations should be conducted with flexibility, and relative confidentiality. Issues of bureaucracy and "straight jacketing" of investment laws to suit all investors should be easened.

In regards to technology transfer policies, the Egyptian government issued the new commercial law number 17 for year 1999, whereas this law includes, for the first time in Egyptian policies, specific items governing technology transfer, whether as separate contracts or embedded within other contracts (such as mode of entry contracts). These

inclusions were implemented to govern actual entries and simplify legislation. The effectiveness of these to promote or deter technology transfer is still under observation by the Egyptian lawmakers and related authorities.

On the technology transfer front, technology-related laws, especially in standardization, environment and quality areas will have a direct impact on the technologies transferred into Egypt. When policies are designed and implemented with flexibility, as indicated above, this will in turn impact on technology transfer content. The above argument is in line with Cantwell (1989; 1993) who states that technology is the key to location of foreign investments, the behaviour of companies towards rivals and to the development and growth of countries.

Performance requirements such as standardization and environmental and quality related regulations may result in more appropriate technology transferred to the companies in Egypt. This is in line with many previous argumentations (Sen, 1962; Wolf and Surfin, 1965). On the other hand, some argue against such appropriate technologies (Hirschman, 1958; Stewart and Nihei, 1987). They believe that less developed countries are short of the resources required to adapt technology, the size of the domestic market is a major constraint, managerial and technical skills are also lacking; and finally many developed and developing countries compete for the more advanced technologies.

In the case of Zeta, the factory installed was a used one that was dismantled from Germany. Nevertheless, the technology is still state of the art and sufficient for the local and export markets. Therefore, there should also exist a distinction between used and obsolete technologies. Highly clear descriptions indicated in the contracts between the partners, would minimize relevance of such problems, achieve compliance to regulations and hence achieve appropriateness of technology.

On the social front, it is noted that both Zeta and Alpha expressed the need for consumer education on the importance of general quality aspects upon making purchase decisions, as opposed to mere cutthroat price.

Concerns over governmental corruption were raised in the case studies. For the pharmaceuticals, the main concern was of the patent files being stolen from the Ministry of Health and reverse engineered at local companies. In the case of Alpha, the concern was the need to payout people to get services done (government corruption). During the course of write up of this thesis, a sad situation occurred, yet it confirms the assessment made above. The management of one of the cases was prosecuted for mal practice and was sentenced to a long term in jail. One of the core areas of prosecution was the extended periods of training abroad of the staff and for the amounts paid for technical assistance.

On investment promotion, the policies aiming at new investments should not be separated from those related to current operations. The importance of existing companies was noted to extend beyond their own investments into the ability to draw new ones too. Gamma, for instance, acted as a lead informer for both Jaguar and Sainsbury in regards to the Egyptian market. Both companies had entered into Egypt based on the Gamma advice.

Nevertheless, after a year of success, Sainsbury pulled out of the country, selling investments in excess of 200 million L.E. The company faced fierce opposition during its operation from small sized grocers who were threatened by the MNC muscle of Sainsbury. The stores were also subject to public demonstrations (during the Afghanistan war), which unfortunately turned into aggressions towards foreign entities as a whole. Stores of McDonalds were also attacked in the process. Even though the government, represented in the Prime Minister personally, tried very hardly to persuade Sainsbury to stay, but no incentive was sufficient and they pulled out. In a separate incident, the local partner of Sainsbury was later accused of abusing the banking facility system and he fled the country.

This entire perspective will, almost certainly, be conveyed to new investors who might be interested in investing in Egypt. The ad hoc nature of the policies, cultural sensitivities and the accumulated issues need to be addressed clearly, consistently, and collectively by the Egyptian government.

Finally, it is evident that the government cannot affect the technology transfer content of an established company, but it can affect technology transfer content through control of certain aspects such as quality, standardisation and environment by implementing codes

and setting governing laws. The government can also encourage new investments that tend to have a higher technology transfer content.

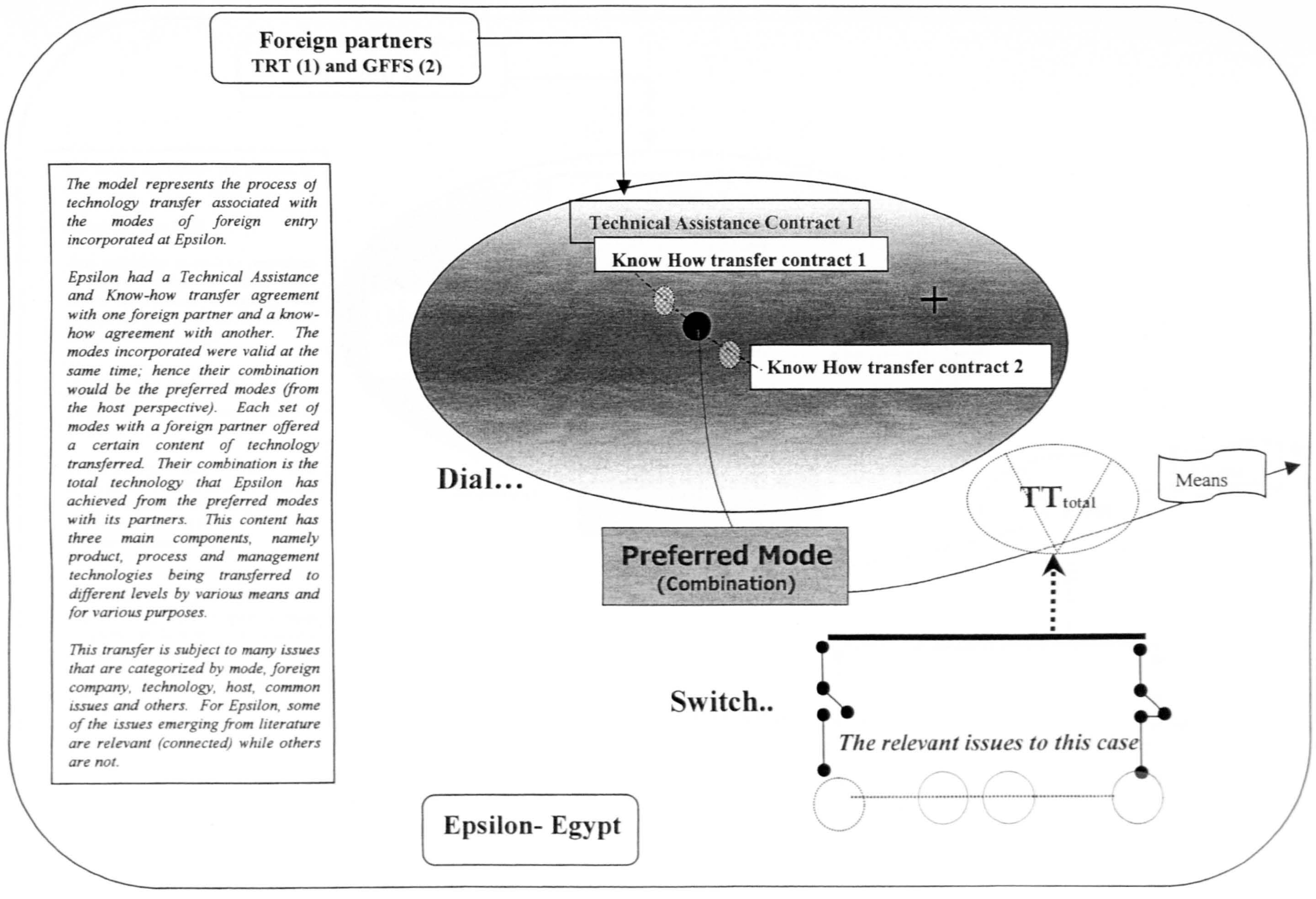
9.2.5. Conceptual Model Assessment

The contribution of the conceptual model was that it provided an overall context of the technology transfer process and the factors that affect its content from a mode of foreign entry perspective, including stages of mode development. The fact that the cases were context specific was compounded by the fact that they were from different sectors, at different stages of development and involved different modes. Nevertheless, the model succeeded in capturing the essence of the situation, including a time dimension as well.

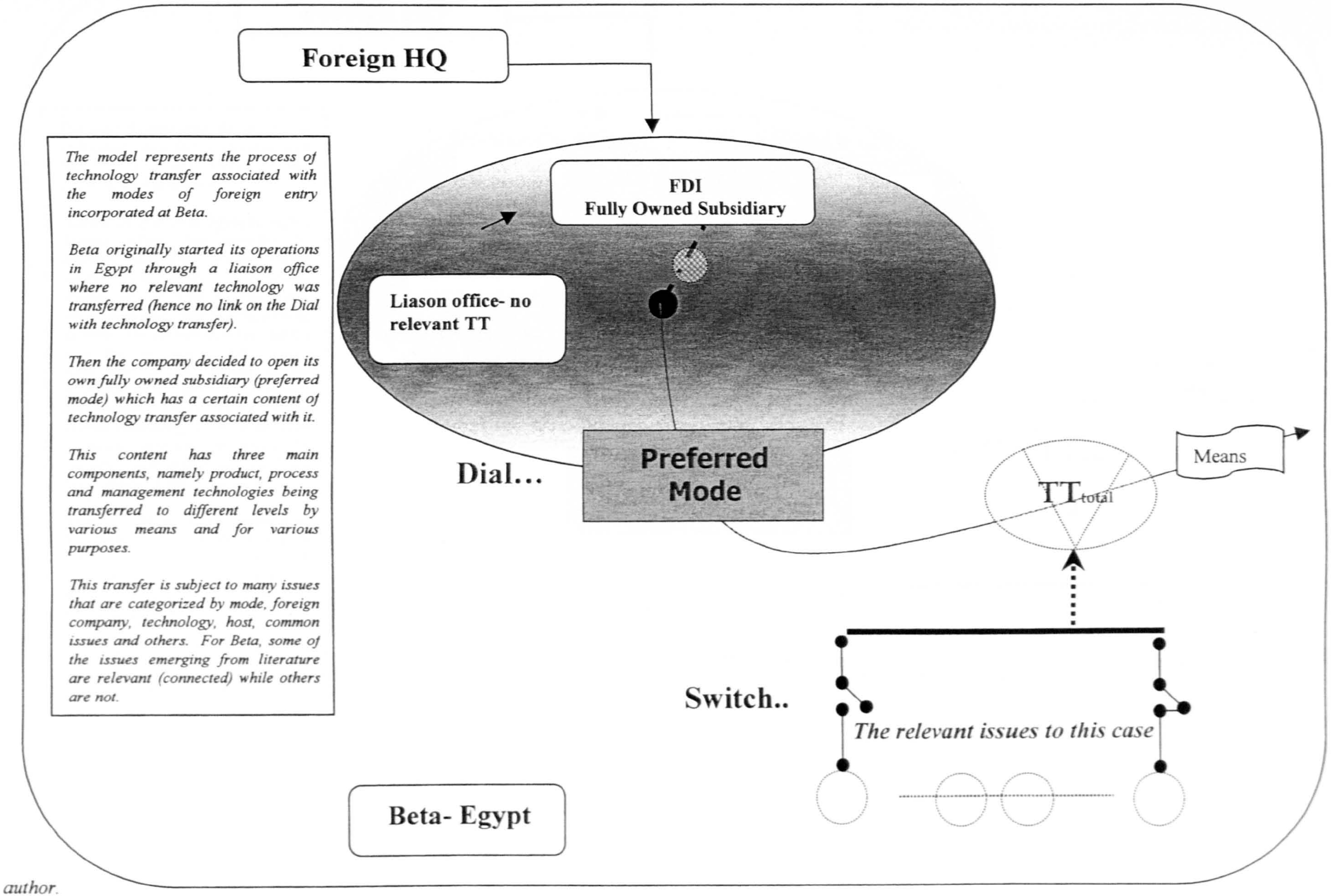
This accredited the model, as it has been perceived in previous literature that it is difficult to conceive technology transfer flows, particularly at a single point in time. The focus of the model has been on the mechanisms that impacted on the technology transfer content. The issues and contexts that were identified at earlier stages, from contended efforts were incorporated.

The following figures (under figure 9/1) demonstrate the conceptual model adapted to each individual case of the research sample:

Figure 9/1: Assessment of the conceptual model for sample cases



Source: The author.



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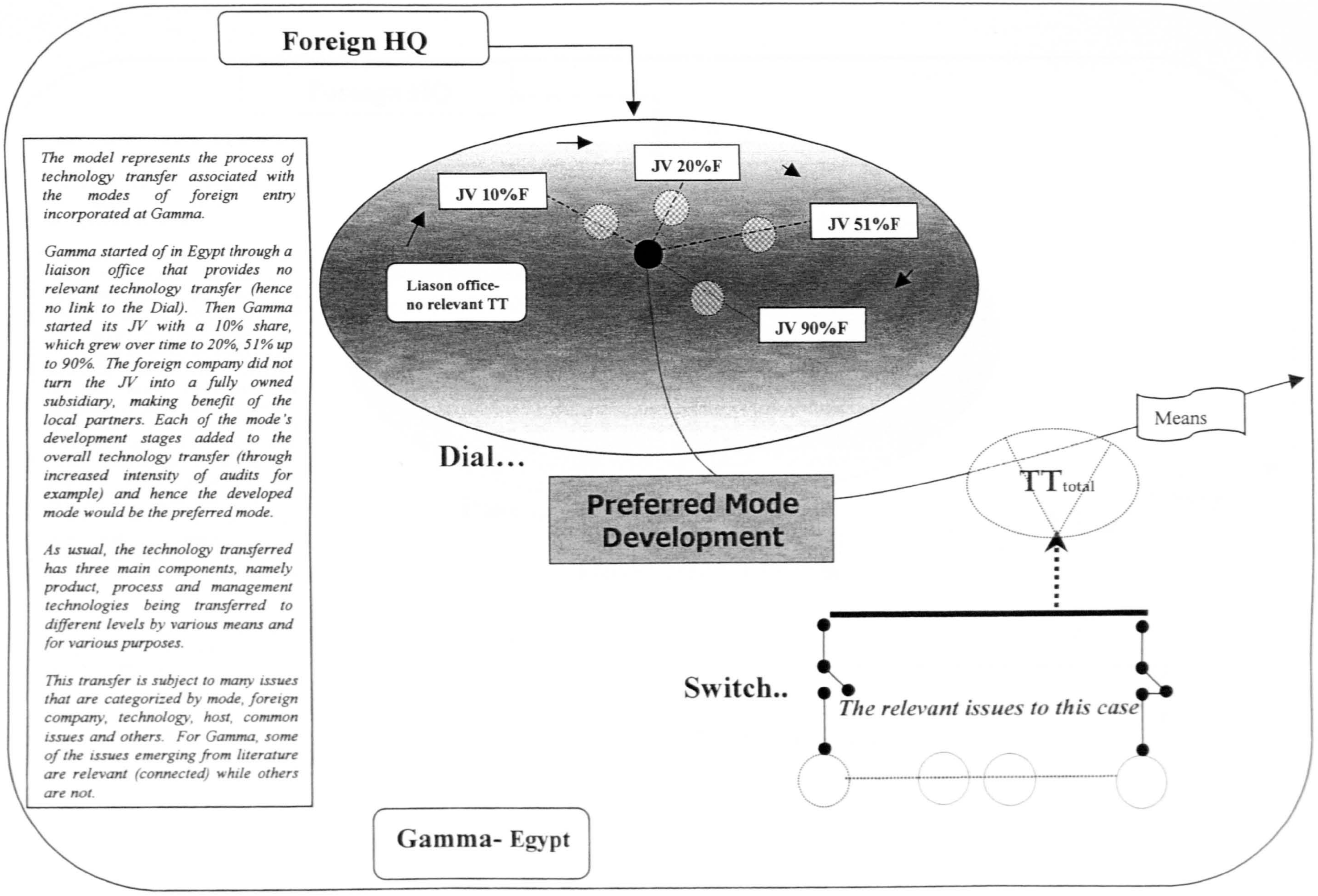

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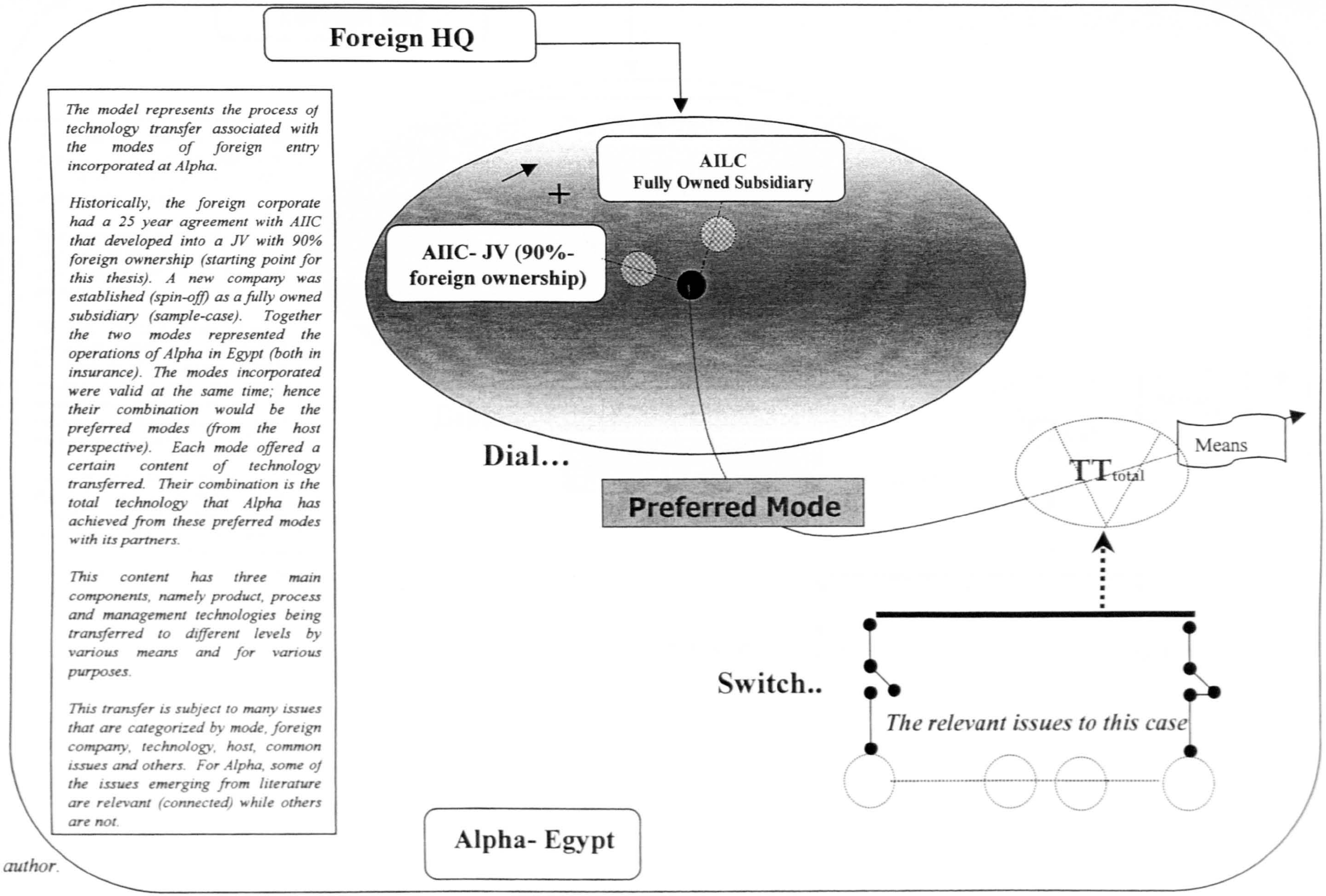

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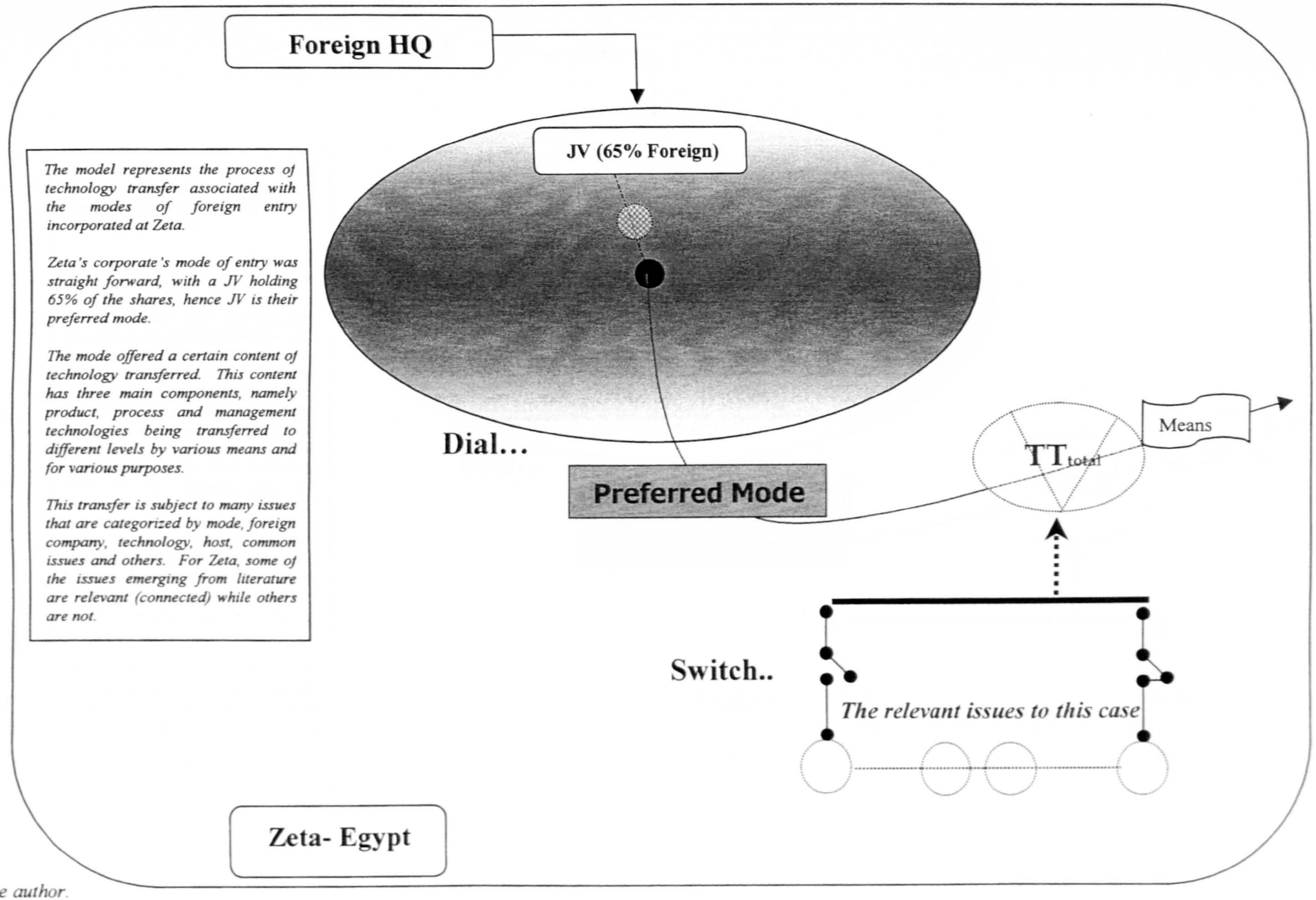


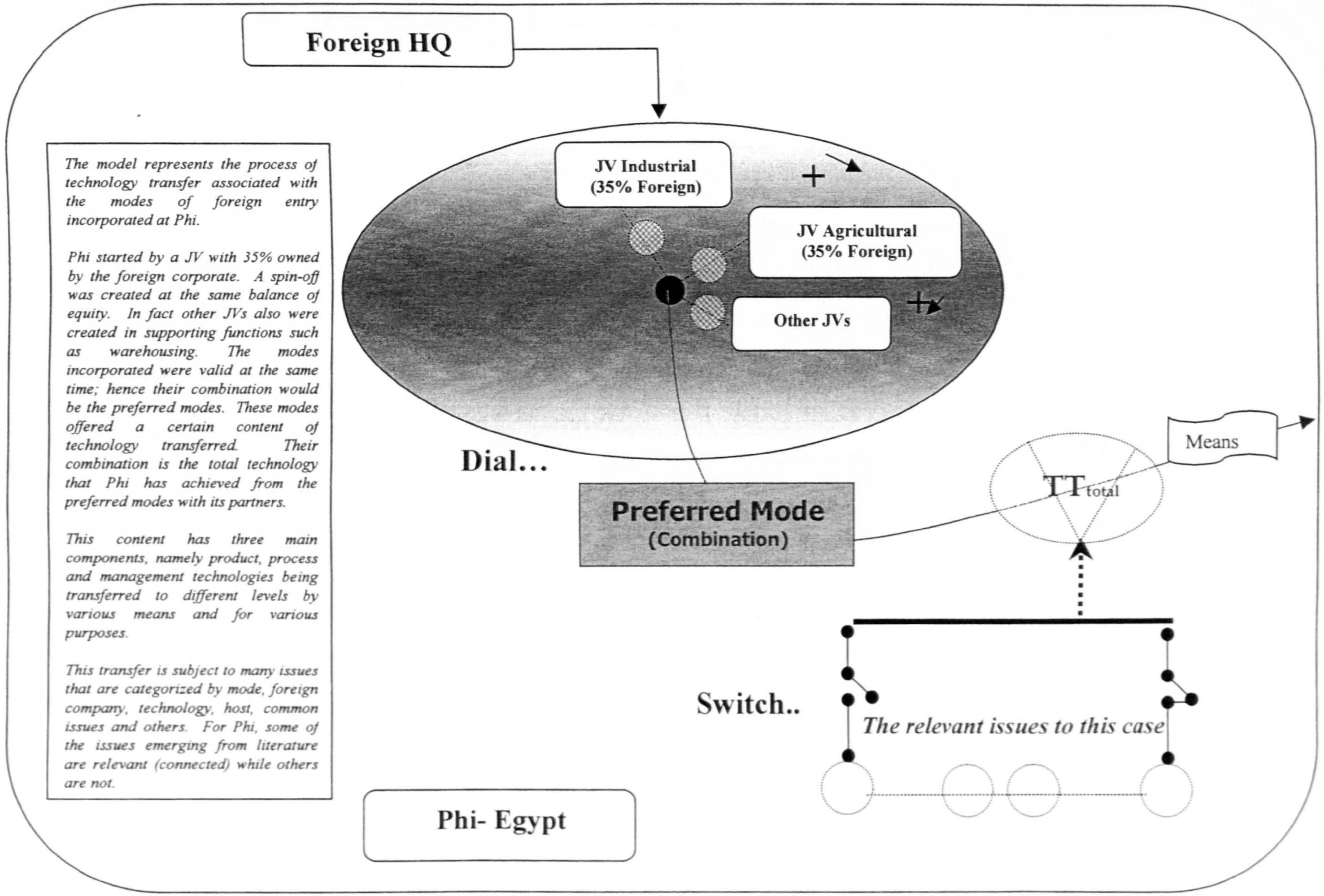
The model represents the process of technology transfer associated with the modes of foreign entry incorporated at Zeta.

Zeta's corporate's mode of entry was straight forward, with a JV holding 65% of the shares, hence JV is their preferred mode.

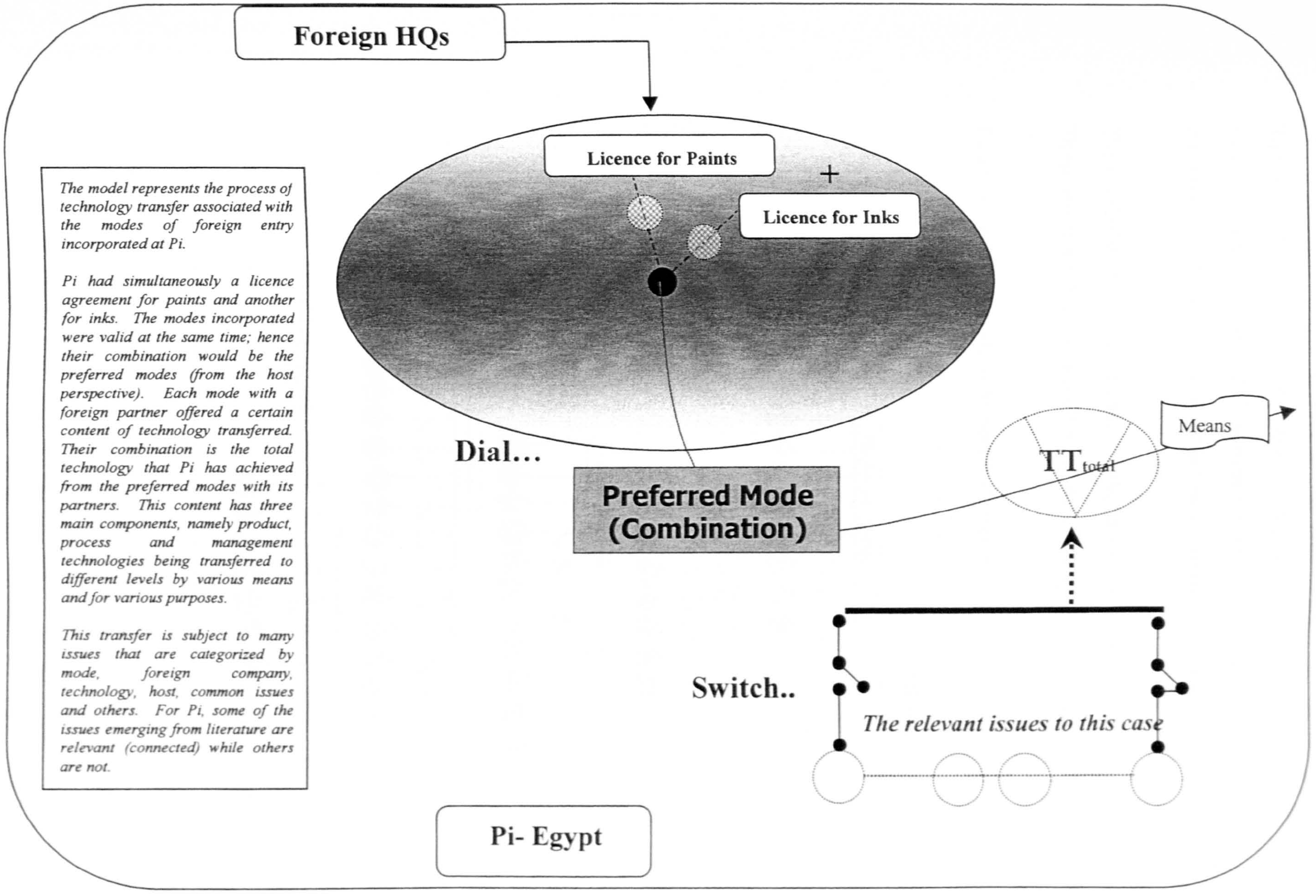
The mode offered a certain content of technology transferred. This content has three main components, namely product, process and management technologies being transferred to different levels by various means and for various purposes.

This transfer is subject to many issues that are categorized by mode, foreign company, technology, host, common issues and others. For Zeta, some of the issues emerging from literature are relevant (connected) while others are not.

Source: The author.



Source: The author.



The model represents the process of technology transfer associated with the modes of foreign entry incorporated at Pi.

Pi had simultaneously a licence agreement for paints and another for inks. The modes incorporated were valid at the same time; hence their combination would be the preferred modes (from the host perspective). Each mode with a foreign partner offered a certain content of technology transferred. Their combination is the total technology that Pi has achieved from the preferred modes with its partners. This content has three main components, namely product, process and management technologies being transferred to different levels by various means and for various purposes.

This transfer is subject to many issues that are categorized by mode, foreign company, technology, host, common issues and others. For Pi, some of the issues emerging from literature are relevant (connected) while others are not.

Source: The author.

9.2.6. Overall Assessment of Main Issues

The issue switch of the conceptual model may be expanded to visually represent the various categories of issues, following the systematic logic of case analyses. A sample schematic representation of the issues involved in one case is indicated in figure 9/2.

Then, tabulation for cross-case synthesis of the issues is represented in table 9/21. These issues are homogenized for applicability across modes and sectors.

Figure 9/2: Sample schematic representation of issues involved in cases

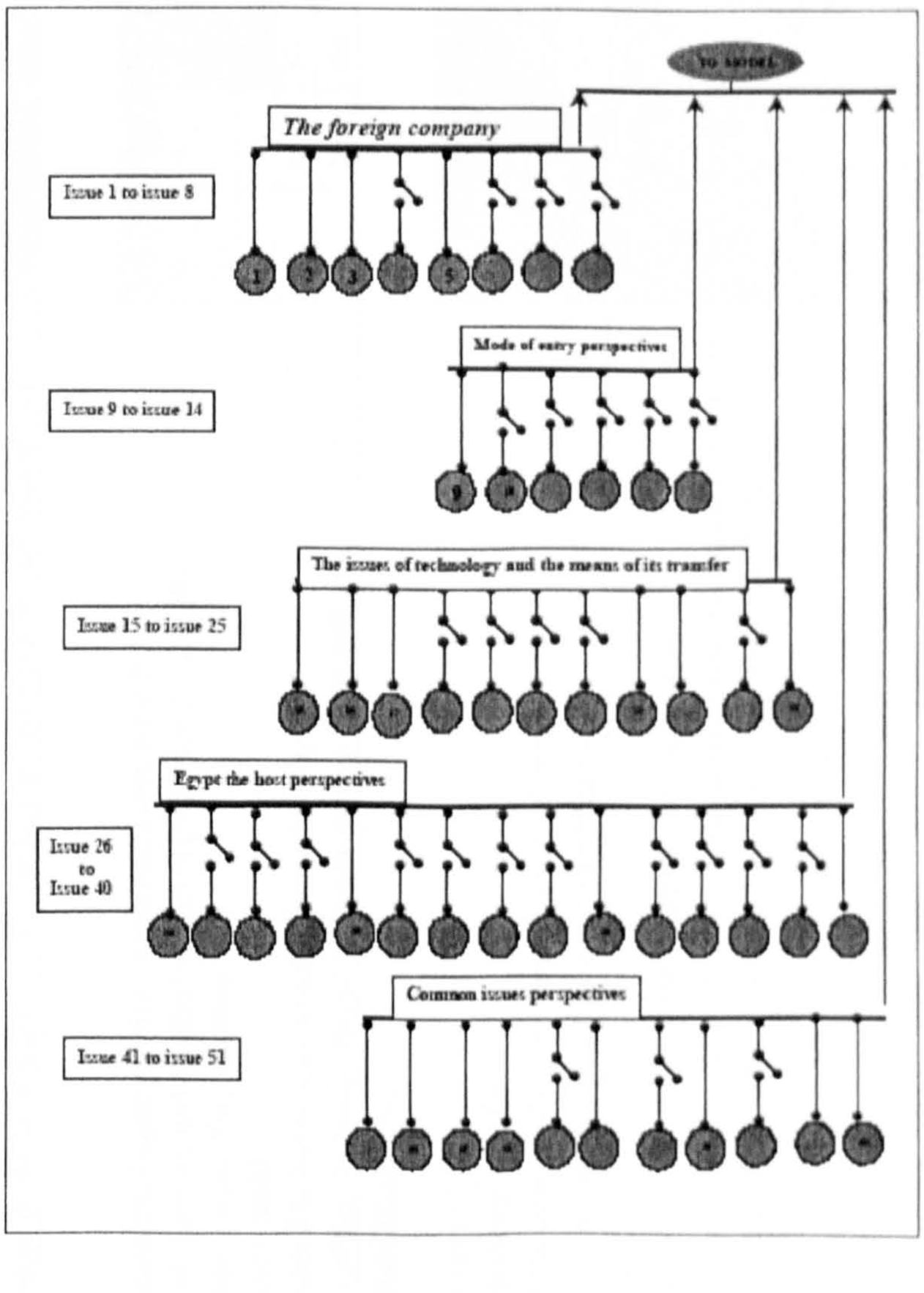


Table 9/21: Synthesized issues that affect technology transfer content

Issues That May Affect Technology Transfer Content	Zeta	Phi	Gamma	Beta	Alpha	Pi	Epsilon	
The foreign company (home to technology) perspective								
Issue.$_{1.}$ The experience of foreign company in internationalisation (mode and technology transfer related)	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue.$_{2.}$ The objectives and host-market entry decision process of the foreign firm	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue.$_{3.}$ The characteristics and preferences of the foreign firm.	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue.$_{4.}$ The initiation of cooperation (foreign or host. Possible foreign upper hand)	Yes	No	Yes	N/a	No	Yes	Yes	4/7
Issue.$_{5.}$ The foreign company's interest/involvement in local operation (auditing/benchmarking)	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue.$_{6.}$ The problems in interaction with foreign Headquarters (culture, brain drain, loyalty)	No	No	No	No	No	No	No	0/7
Issue.$_{7.}$ The existence of a too-wide technology gap between local and foreign operations (see issue 48)	No	No	No	No	No	No	Yes	1/7
Issue.$_{8.}$ Certain characteristics seeked in the local partner from the foreign perspective (see issue 47, 21, 31)	Yes	Yes	Yes	N/a	No	No	No	3/7
Modes of entry perspectives								
Issue.$_{9.}$ Host nation governing frameworks (legal, political, economic) (see issue 26)	Yes	Yes	Yes	Yes	Yes	No	No	5/7
Issue.$_{10.}$ Host nation mode preference, policies and related incentives (see issue 27, 28, 29)	No	No	Yes	No	No	No	No	1/7
Issue.$_{11.}$ Mode development over time (ownership, structure, etc)	No	No	Yes	No	Yes	No	No	2/7
Issue.$_{12.}$ Mode evolution (change) and transition	No	No	Yes	No	No	No	No	1/7
Issue.$_{13.}$ Mode Contractual issues related to technology transfer (see issue 45)	No	No	No	No	No	Yes	Yes	2/7
Issue.$_{14.}$ Impacts of the level of technology on mode selection (hi-Tec hard to learn, IPR, cost)	No	No	No	No	No	No	No	0/7
The issues of technology and means of its transfer								
Issue.$_{15.}$ Technological appropriateness and fit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{16.}$ Means and purposes of technology transfer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{17.}$ Unique learning patterns of the local staff on the various levels of company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{18.}$ Implications of the local learning patterns on staff mix (expatriates/local)	Yes	Yes	No	No	Yes	No	No	3/7
Issue.$_{19.}$ Various training perspectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{20.}$ The relevance of foreign technology specifics to the continuity of cooperation	Yes	Yes	Yes	Yes	Yes	No	Yes	6/7
Issue.$_{21.}$ The impact of local partner characteristics & his staff's original determinants on technology transfer	Yes	Yes	Yes	N/a	No	Yes	Yes	5/7
Issue.$_{22.}$ The chronology of technology transfer events (triggering factors, timing, relation to mode, formalizations and other requirements)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{23.}$ The R&D efforts (level of integration in local operation, level of R&D integration with HQ)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue.$_{24.}$ Internal factors hindering Technology Transfer	Yes	No	No	No	No	Yes	Yes	3/7
Issue.$_{25.}$ Implementation of tech. Recommendation systems, quality, standardization and environmental issues	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7

Issues That May Affect Technology Transfer Content	Zeta	Phi	Gamma	Beta	Alpha	Pi	Epsilon	
Egypt: The host perspectives (micro and macro)								
Issue.$_{26}$ The criteria of attractiveness that Egypt presented to the foreign company (generally and politically)	No	No	No	Yes	Yes	No	No	2/7
Issue.$_{27}$. Egyptian gov. policy effectiveness regarding mode selection incentives and needed improvements	No	No	No	No	No	No	No	0/7
Issue.$_{28}$. Egyptian government policy effectiveness regarding TT incentives and needed improvements	No	No	No	No	No	No	No	0/7
Issue.$_{29}$. Egyptian government policy effectiveness regarding investment incentives & needed improvements								
Issue.$_{30}$. The transfer of technology to the Egyptian supplier networks	Yes	Yes	Yes	Yes	No	Yes	No	5/7
Issue.$_{31}$. The Egyptian host company characteristics for partnering/continuous operation (industry, experience, size)	Yes	Yes	Yes	No	Yes	Yes	Yes	6/7
Issue.$_{32}$. The relevance of technology to continuity of foreign presence at company in Egypt	No	Yes	No	No	Yes	No	Yes	3/7
Issue.$_{33}$. The government general policy and its impacts on confidence hence continued or renewed interest	Yes	Yes	No	No	Yes	Yes	Yes	5/7
Issue.$_{34}$. Suitability of existing investment framework of Egypt to daily operation of local company	No	No	No	No	No	No	No	0/7
Issue.$_{35}$. Suitability of the existing economical framework of Egypt to operation of local company	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue.$_{36}$. Improvement in Egyptian policy in relation to technology transfer (see issue 28)	No	No	No	No	No	No	No	0/7
Issue.$_{37}$. Improvements in Egyptian policy in relation to foreign investment attraction (see issue 29)	No	No	No	No	No	No	No	0/7
Issue.$_{38}$. Improvements in policy targeting specific mode promotion (see issue 27)	No	No	No	No	No	No	No	0/7
Issue.$_{39}$. BITs through their effects on mode of entry choice, operations or technology transfer in Egypt	No	No	No	No	No	Yes	Yes	2/7
Issue.$_{40}$. Future prospects of Egypt and Egyptian domestic market	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Common issue perspectives								
Issue $_{41}$. Human resource motivation	Yes	Yes	Yes	Yes	Yes	Yes	No	6/7
Issue $_{42}$. Learning patterns	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue $_{43}$. Time elapsing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue $_{44}$. Industry type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue $_{45}$. Contractual arrangements (mode and TT clauses, royalties, training, expat. Contracts,..)	Yes	No	No	No	Yes	Yes	Yes	4/7
Issue $_{46}$. IT infrastructure	Yes	Yes	Yes	Yes	Yes	No	No	5/7
Issue $_{47}$. Partner relationship (dynamics, confidence in cooperation)	Yes	Yes	Yes	N/a	Yes	Yes	Yes	6/7
Issue $_{48}$. Appropriability of Type of technology from a host perspective and technology gap aspects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue $_{49}$. Expectations and outcomes of technology transfer performance	No	No	No	No	Yes	No	Yes	2/7
Issue $_{50}$. Egyptian government prioritisations (social versus commercial)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7
Issue $_{51}$. New issues arising from research sample cases	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7/7

Source: The author.

The following main observations could be made on the above table, namely:

- The table represents a summary of responses of interviewees. These responses should only be viewed within the overall context of the depth qualitative assessment of each case study, and hence are not conclusive by themselves.
- Some of the issues were perceived by all the cases as unimportant to the technology transfer content associated with their respective modes of entry. For example, no one found that interaction with the corporates resulted in a problem. Very interestingly, none of the cases perceived that the level of technology had anything to do with their choice of mode.
- In a surprise finding, not one single case indicated that government incentives were important to their mode choices or to technology transfer, implying ineffectiveness of existing incentives especially technology related ones.
- All the companies perceived no problem in the suitability of the existing investment framework, economical framework and policy framework to accommodate occurrence of technology transfer during the daily operations of the company, but not catalyse that transfer as indicated earlier.
- All companies, without exception, believed in the effects of learning patterns, experience by time, mode development (maturity) and industry type on technology transfer content.
- All companies (except Epsilon) believed in the importance of human resource motivation to transfer the technology. Some referred to motivation of their local staff and the expatriates as well.
- Prioritisation of the government and the appropriateness of the technology from a host perspective also received unanimous support from the cases. This would explain why all the interviewees were happy people. None expressed that they were unsatisfied with their current level of technology. All of these companies had confirmed that the technology they possess is fit for the local market, even though they had also expressed that it might be slightly lagging behind current technologies.
- Many issues ranked very high with all the cases but Epsilon (which seemed to diverge away from the norm of all other companies), such as experience of foreign company, market entry decision process and characteristics of foreign firm. The level of involvement in local operations, especially auditing and quality was a key factor.

- Both Epsilon and Pi were noted to have the exact views related to unimportance of mode perspectives, with the exception that they both confirmed the absolute importance of the contracting issues. They also shared similar views in regards to technology issues.
- In the case of Gamma and Beta, they shared almost identical views in all categories except those of mode of entry, due to the recent developments of Gamma. Otherwise, sharing the same industry was clearly noted in the aspects of Egypt, the foreign pharmaceutical MNC perspectives and the perception of technology issues.

9.3. Summary

Due to the complexity and wide spectrum of many of the findings, this section highlights some of the most pertinent findings emanating from the empirical research. These will be presented against the backdrop of the thesis aim, objectives, sub-objectives and research questions (figure 9/22). Following this section, the broader conclusions and recommendations of this thesis will be presented in chapter 10.

Table 9/22: Summary of Key research findings

Research Aim (Section 1.4.)	Research objectives (Section 6.2.)	Highlights of key Research findings (Section 9.3.)
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 1: To develop a dynamic conceptual framework that allows for systematic representation and exploration of the process of technology transfer associated with different modes of foreign entry into a host developing country (Egypt).	The empirical findings showed that the conceptual model accurately represented all the investigated cases of the sample. This includes the actual process of technology transfer and the dynamics of the individual mode development of each case, and issues and parties affecting them.

Research Aim (Section 1.4.)	Research objectives (Section 6.2.)	Sub-objectives	Research Questions (See section 6.2.)	Highlights of key Research findings (Section 9.3.)
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 2: To explore the dynamic process of technology transfer associated with foreign market modes of entry into Egypt.	2-a: To assess the defining characteristics of technology transferred from foreign modes of entry in Egypt	1. What are the main technology components being transferred, and what are the means and purposes of that transfer (content) from various foreign market modes of entry into Egypt?	All the companies experienced the three components of technology being transferred (product, process and management), with the management technologies relatively less in the cases involving licensing modes. The main means of technology transfer was formal training (in its various forms), HRD, followed by quality aspects and code of conduct obligations. The main purposes were increase general profitability, improve services rendered to customers, followed by best practice awareness, and cost efficiencies.

Research Aim	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 2 … contd.	2-a … contd.	2. What are the dynamics of the technology transfer process in association with post entry operations of the mode in Egypt?	Technology transfer was highest at the early stages of mode operations, and was conducted on what could be described as 'need-to-know-for-smooth-operation basis'. Formal training and expatriate employees were arranged for, until cost effective local employees could confidently take over. The issues that affect the process of technology transfer itself are discussed later against the following research question #3. Regarding the mode of entry, JVs and FDIs, are found to be more permissive of easier, faster and more collaborative introduction of products, which impacts on the learning spectrum of the staff members on the longer run. Entry decision will be highlighted within the context of the next group of findings, but in regard to the mode choice, technology has been found to be irrelevant to mode choice. This finding must be seen itself in the context that all the sample companies are larger MNCs, so this finding might change from the SME perspective. Mode operations (and associated technology transfer) are governed by the local management (host and expatriate management working locally), and are subjected to continuous audits. Post entry mode developments occur for several reasons that are corporate driven and are not technology-related, but these may have technological implications such as the corporate's desire for increased control over quality aspects resulting from new interest in the market.

Research Aim	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 2 … contd.	2-a … contd.	2. …contd	Mode development may occur in the form of increase in shares of the original mode, adding a new spin-off, or integrating multiple modes. Foreign company experience and support is important, as introduction of new products, for instance, is based on both market demand and corporate decision (not only demand). The extent of the role of R&D activities in technology transfer in Egypt was limited, whereas R&D activities have mainly focussed on the localization and tailoring of the foreign offerings to the local conditions, which after the basic product training becomes a local matter. Very minimal integration with the corporate R&D has been noted. Very little transfer of local R&D experience occurs to neighbouring branches of MNCs, nevertheless, the importance of R&D to technological stance of firms is supported. The findings indicate that formal contractual relationships between technology transfer and modes of foreign entry in Egypt have proven to be of high importance. This applies to mode contract for joint ventures' and to the expatriate contracts of MNC employees (succession plans). This thesis contends that technological learning in Egypt is noted to be efficient and of high standards as none of the companies interviewed indicated that they had unsolvable learning problems (no apparent effect to the current technological gap). Cooperation with expatriates is good and improves by time. Limited cultural concerns exist (e.g. prestige of local partner, resistance to expatriates, etc.).

Research Aim (Section 1.4.)	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 2: To explore the dynamic process of technology transfer associated with foreign market modes of entry into Egypt.	2.b.: To explore and identify the most relevant issues that affect technology transfer and modes of foreign entry in Egypt.	3. What are the main categories of issues that affect technology transfer associated with foreign entry in Egypt?	The relevance of several issues emerging from literature has been substantiated in this research. The overwhelming relevance was to impacts of government policy prioritisation, followed by technology fit, partner relationships, motivations and characteristics; and learning patterns, time elapsing, industry type, quality and standardization aspects. Other issues that have emerged from literature, and have not been found important in the context of Egypt, include: communication with headquarters problems and importance of technology in mode selection (which was not substantiated at all). Finally, an important finding was the ineffectiveness of current policies in Egypt on mode choice and technology transfer activities. This relates to the findings on the last objective #3, concerned with Egyptian government policy.

Research Aim (Section 1.4.)	Research objectives (Section 6.2.)	Sub-objectives	Research Questions (See section 6.2.)	Highlights of key Research findings (Section 9.3.)
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 3: To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer.	3.a.: To assess the attractiveness criteria of Egypt as a host nation.	4. What are the main pre-entry motives behind foreign entry decisions into Egypt, and did government policy have an influence?	The main attractiveness of Egypt as a host nation was the domestic market, with no exception. The main motive of the foreign company for deciding on the entry was to address the local demand. Other factors arised as useful, such as convenient geographical location, and access to regional markets through multilateral and bilateral agreements. No government policy or incentive persuaded the foreign companies into altering their decision from another market to Egypt. No government policy affected the entry mode decision either. And as indicated earlier, technology and its transfer were not a factor in the first place, neither for entry decision or for mode choice, and no government policy affected the technological aspects of that mode. The relatively volatile and changing economy affected the mode choice, in the sense that all companies entered with lesser-risk forms of entry, and expanded from there. Despite the above, Government incentives were utilized by local operations to their fullest.

Research Aim (Section 1.4.)	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 3: To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer.	3.a.: To assess the attractiveness criteria of Egypt as a host nation.	5. What are the perceived technological contributions of foreign mode operations in Egypt?	On the overall, both the fully owned subsidiary and the joint ventures offered substantial potential for national development, through integration into supply chains, development of supplier networks, and learning potential, quality aspects and managerial skills. A point of caution here is that the cases investigated were all successful cases. Inefficient modes were not investigated. Licensing modes gained access to international brand names and may often be the only possible route to technology in cases where the foreign company does not want to enter through an investment mode.

Research Aim (Section 1.4.)	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 3: To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer.	3.b.: To assess the Egyptian government frameworks and policies affecting the process of technology transfer and modes of foreign entry.	6. What is the perception of effectiveness of existing Egyptian national policies and frameworks on mode choice, subsequent mode operations, and technology transfer?	As indicated in findings on the attractiveness of the Egyptian market, the foreign conception of government efforts to affect the entry decision or entry mode was that they are ineffective. The impacts of government policy on mode post-entry operations were overwhelming. Policy rigidity leads foreign companies to avoid fully owned subsidiaries and prefer to associate a local partner to buffer bureaucracies and red tape (this factor will only be removed when a transparent and flexible policy and business environment is in place). Policy inconsistencies confuse investors where industrial policies, privatisation polices, monetary polices and other policies all overlap with no clear borders resulting in an abundance of governmental bodies that the operation will have to deal with throughout its life cycle. Changes in foreign exchange policy have proven be one of the most rippling policies that the government of Egypt has taken in the past decade, affecting foreign entry and local operations, and even ability to transfer technology on micro level through expensive means of foreign training or new investments. No current Egyptian policy addresses technology transfer directly; rather it is addressed in a scattered manner in new commercial, investment, industrial and S&T laws.

Research Aim (Section 1.4.)	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	**Objective 3…contd.**	3.b … contd.	7. What are the impacts of Egypt's international policy (bilateral and multilateral cooperation) on technology, its transfer and mode of foreign entry into Egypt?	Egyptian government has given strong focus on emphasizing its international policy, but benefits of it are not substantiated. Usefulness of bilateral agreements in regards to modes of entry and technology transfer is minimal, except in cases where financial grants are utilized. It is considered a useful addition to the host in regards to export potential, but this is after the entry decision to Egypt has been taken already (it does not affect the entry decision). On the other hand, they represent possible threat, especially when associated with Egypt's WTO compliance.

Research Aim (Section 1.4.)	Research objectives	Sub-objectives	Research Questions	Highlights of key Research findings
Contending that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt, and that technology transfer from foreign modes of entry is one definite route to foreign technology; and acknowledging that there is near absence of literature on this subject for Egypt- the aim of this thesis is to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.	Objective 3: To assess and critique Egypt's current policy environment impacting on foreign modes of entry into Egypt, technology and its transfer.	3.c.: To recommend policy perspectives that could improve competitiveness through affecting technology transfer potential from modes of foreign entry to Egypt.	8. What are the types of targeted policies that can improve technology transfer from modes of foreign entry in Egypt?	It is noted that there is little the government should or can do in regards to technological aspects of the entry mode (including technology transfer), but up-to-date policies regarding quality, environmental and standardization impact favourably on technological issues. These will, in themselves, govern many of the technology aspects without imposing on the foreign entry. In addition, these lie at the core strength areas of the MNCs so they will be easier in transfer. Incremental performance requirements in regards to technology transfer and exports need to be assessed in order to orient the new entrants towards certain modes of higher content of transfer, but have not been implemented clearly in Egypt. Target industries (front runners) may be selected to encourage new investments and modes in particular targeted areas, such as information technology for instance. Policies aiming at improving technology transfer may lead to support of creation of clusters of companies, where experiences could be disseminated. An obstacle to such a policy would be the general confidentiality that surrounds the local operations, arising from the closed cultural background. Nevertheless, such clusters can emphasize, coordinate and subsidize training, exchanges & linkages with S&T. Improving technology transfer may come through lessening negative impacts of issues affecting it. This will have to come within an overall national policy context, due to the diversity of such issues.

Chapter 10: Summary and Conclusions

10.1. Summary

The aim of this thesis was to explore empirically the relationships between technology transfer and modes of foreign entry within the specific context of Egypt, and hence assess the viability of taking policy measures to improve these relationships.

This aim was based on the contention that technology (local and foreign) is a milestone needed for development and competitiveness in Egypt; that technology transfer from foreign modes of entry is one definite route to foreign technology; and that there is a near absence of literature on this subject for Egypt.

Reflecting this aim, the thesis followed a very carefully designed structure, to guarantee systematic reading and a gradual narrowing down on the specific objectives.

First, the literature was reviewed in chapters 2 to 4. The foundation for a robust research had to be laid through conceptualising the various issues related to technology transfer associated with modes of foreign entry.

In chapter 2, technology and its transfer was thoroughly assessed, including the definitions, the components, the characteristics of technology on the micro and macro levels, the role of technology in economic development and its significance to competitiveness, the conceptualisation issues of technology transfer and the associated analytical frameworks. In addition, aspects and channels of technology transfer, the overview of technology transfer issues from perspective of developing countries and finally the overall rationale for technology policy were also discussed.

In chapter 3, foreign market modes of entry were thoroughly assessed, including entry mode classifications, underlying internationalization theories, the determinants of foreign market entry strategies including the frameworks for assessing markets and entry modes, and finally the policy rationale for modes of entry.

In chapter 4, the linkages that became apparent from the previous chapters were synthesized and supporting empirical evidence presented. These linkages are important because of their potential impacts on the process of technology transfer associated with foreign market modes of entry. Such linkages include technology gaps, mode development, contractual perspectives, R&D linkages and several other commonality linkages. Chapter 4 concluded with an approach towards integrated policy for technology transfer through modes of foreign entry and the rationale behind it, building on separate policy discussions in the previous two chapters.

At this stage, the uniqueness of the Egyptian context was not yet addressed (except through synergies with other developing countries discussed in earlier chapters). Therefore, chapter 5 focussed on providing an overall assessment of Egypt. The economic, investment, technological and policy perspectives were comprehensively discussed, and then chapter 5 ended with a sectoral overview.

It was important to establish the particular gaps in the body of literature that this research was going to fill. First, a clear gap was soon identified concerning the lack of literature focussing on issues of technology transfer associations with modes of foreign entry in particular. This thesis attempted to bridge islands of diverse and fragmented literature on technology transfer, foreign market modes of entry, and effectiveness of policy addressing them in developing countries.

Then, the absence of a systematic approach that could dynamically capture the process of technology transfer in light of changing circumstances, operational experiences and global factors was also noted.

Furthermore, an associated gap in the literature was identified, concerning the impacts of interlinkages and overlapping issues emerging upon assessing technology transfer associated with foreign market entry (into Egypt). Previous efforts directed towards these interlinkages are far from satisfactory, especially on the empirical front. Furthermore, the issues that do emerge from literature are not necessarily applicable to many developing countries, which are individually unique host countries.

This led to yet another original contribution of this thesis; namely the integration of unique issues of Egypt within the discussed interlinked issues. Moreover, the limited and non-conclusive empirical evidence on integrated policy implementations at host developing countries was furthered by evidence from the current case of Egypt.

The empirical work on Egypt, like many developing countries, was expected to be problematic due to lack and often-contradiction in data emanating from various data sources. Furthermore, turbulences in the Egyptian economy that occurred during the course of this research required special attention and effort. The changes that took place in the monetary policies impacted heavily on many aspects related to this research. For instance, the perception of Egypt as an attractive investment environment between 1998 and 2000 flipped into a negative and declining one as result of the government's decision to float the Egyptian currency, despite the fact that this move was supposed to promote exporting from Egypt and complied with long standing demands of the IMF and World Bank. Interested new investors became discouraged and existing ones became more cautious, and still suffer from the trauma created by the sudden, previously denied, flotation of the currency, especially with investors' over-reliance on local banking systems.

A couple of years prior to the official announcement, the government of Egypt had apparently decided on the eventuality of full flotation of the Egyptian Pound, and hence engaged in a deliberate unannounced strategy of "treatment-by-shocks" by which the Egyptian Pound was gradually devalued over the course of these years (from original rate of 3.4 L.E./$ suddenly dropping to 4.2 L.E./$ to 4.7 L.E./$). As indicated, this was done in preparation for the actually announced flotation, which took the official exchange rate right down to 6.2 L.E./$. Coincidently, such policy turned out to be quite useful for this research. It allowed the interviewees to include their reactions to a truly changing policy climate.

Moreover, due to several years lag in available data, matters for this thesis were compounded by the fact that most of the already-inconsistent governmental data on various aspects and policies (related to foreign investment) indicated favourable trends, while many of the findings indicated otherwise.

On the policy front, policy formulation in Egypt, on both micro and macro levels, is hampered itself by scarcity of aggregate data in most areas but especially in the area of technology transfer content associated with foreign markets modes of entry into Egypt. Furthermore, existing macro, sectoral and case studies generated very limited amounts of data, were focussed on investment policy only, were outpaced by the major economic changes that took place in the recent years, and were almost completely researched via quantitative methods (using mail questionnaires) resulting in serious methodological limitations (especially when addressing technology and confidential mode issues).

Technology transfer in Egypt was treated as a black box and all attempts to apply international experience directly to the Egyptian setting was often rendered initially inappropriate due to the country's unique history, circumstances and prioritisations. There was urgent necessity to strengthen the database at both the aggregate and macro levels.

Having established the literature and the national Egyptian need for this research and the literature gaps, the research specific objectives and conceptual model (later utilized to guide the fieldwork) were developed in chapter 6. The framework model of this thesis has notably set the basis for a systematic and dynamic understanding of the complex process of technology transfer alone, and in association with foreign modes of entry as well, accommodating different definitions of technology, the development of foreign modes of entry and the issues that impact on them (classified by the various perspectives), in addition to critical Egyptian perspectives.

Chapter 7 presented an overview of various alternative research methodologies, data needs and instruments, followed by the justification for adopting the current approach. The research design, comprehensive interview guide, sample selection and operationalisation were discussed in this chapter, followed by chapter 8 where the multiple case analyses conducted for the sample companies were presented.

Using the conceptual framework, the research objectives were empirically investigated through in-depth work at seven foreign market entries into Egypt. The research sample included companies from key sectors in Egypt. These companies utilized a variety of modes of foreign entry.

All companies were well established, and all the interviewees had first hand experience in the areas under investigation. The cases selection also involved diverging cases from the perspective of foreign ownership and host government ownership, which provided richness to the findings. With its multi-sector, multi-mode focus, the present thesis adds considerably to existing knowledge as well.

The unit of analysis being the firm, added fundamental strength to the level of aggregation, permitting the uncovering of firm specific attributes, and the sample selection illuminated variation across firms within the same industry, and variation across industries and variation across modes of entry. The idiosyncratic (firm-related) issues were carefully noted and showed the expected uniqueness of each case (and sector).

As indicated, the multiple-cases of this thesis were individually analysed in chapter 8. Then a cross case synthesis was conducted (chapter 9). It is noted that the data emerging from the cases were related to the concepts developed in earlier chapters. This was managed through utilizing the same conceptual model developed in this thesis to each unique case. The issues that have been included in each of the cases were selected in the same systematic way (using the guidance of the comprehensive and well structured interview guide), whereas each issue emerging from the literature was assessed in relation to each of the perspectives at which it arised, and then in the context of each individual case and hence relevance, if any, was noted. As indicated, each one of the interviewees was well placed to appropriately shed light on the phenomenon, where careful attention was always given to navigate the interview away from whatever the interviewee thought that the research was aiming to find.

The synthesis in chapter 9, extending to provide the cross-case perspectives, provided valid theoretical replication. The separate addressing of the many often overlapping issues emanating from the literature and permittance of new issues has provided the assurance that data was interpreted correctly and that no hidden factors are at play. The research model and these issues were subsequently assessed by the empirical findings

Again, the systematic approach pursued, starting from the exact routes that each firm pursued in its mode development (the dial) and the issues that were considered important (the switch), makes it possible to retrace and reconstruct the entire process by which

findings were reached, especially that no easy answers or shortcuts were involved in that process. This provided the base and audit trail that confirmed that the same routes were pursued in all the case analysis and that no misleading information be considered (case analysis pouring into a standard set of issues), and in the same time that all the data is accounted for.

Within the synthesis, counter evidence has been sought to refute interpretations to reach to further validation. An example would be the conducted comparisons between governmental cases (Epsilon and Pi) versus foreign dominated cases (Gamma and Alpha), where one group represents profit seekers versus the other reputation seekers.

Reliability of the replication in the synthesis, the actual analysis and subsequent findings were all further confirmed by a detailed and comprehensive expert opinion, provided by the highly reputed and qualified expert who is a former Investment Authority Director, and Minister of Industry and a current investment advisor to the Prime Minister.

As described earlier in this section, the results emerging from the empirical work demonstrate heterogeneity and stability across the sample at company level and could hence be used for policy recommendations at country level (Egypt), especially that the underlying conceptual model remained the same, on both micro and macro levels.

The following sections will present those broader conclusions that have been reached from the original work in this thesis. A set of policy and practitioner recommendations will then be proposed, followed by a detailed discussion on limitations of this research. Finally suggestions for future research will end this chapter and the thesis.

At the end, it is concluded that the topic of technology transfer content associated with modes of foreign entry is a true blend of related disciplines and hopefully this thesis managed to push the boundaries of related literature on developing countries in general and on Egypt, in specific.

10.2. Conclusions and Recommendations

Egypt is currently in a development phase that would certainly benefit from research in the area of technology transfer, especially if the conclusions of this research may be replicated onto various industries or sectors, and onto the policy making process.

The conclusions and recommendations that are drawn from the empirical findings of this thesis are presented in this section. First starting with the main aspects of technology transfer and modes of foreign entry, and the benefits of proposed integrated policy involving FDI and technology transfer for Egypt; then, the broader conclusions and recommendations regarding globalisation, developing countries, Egyptian government policy (national, bilateral, regional and multilateral) and industry levels are presented. Last, but certainly not less important, the micro company level conclusions and recommendations are presented.

Technology transfer and modes of foreign entry

All investigated modes of foreign entry were found to provide for initial technology transfer. The content of technology transfer highly depended, among other things, on the stage of development of the mode of entry. Technology transfer (of various components of technology) has been empirically proven to be highest at the earlier stages of entry, (particularly at start-up) or upon new product introduction, mostly due to the extensive interactions between local staff and expatriates associated with these events. In addition, new learning of process and product skills is often associated with new spin-off modes, and introduction of new (significantly different) product ranges.

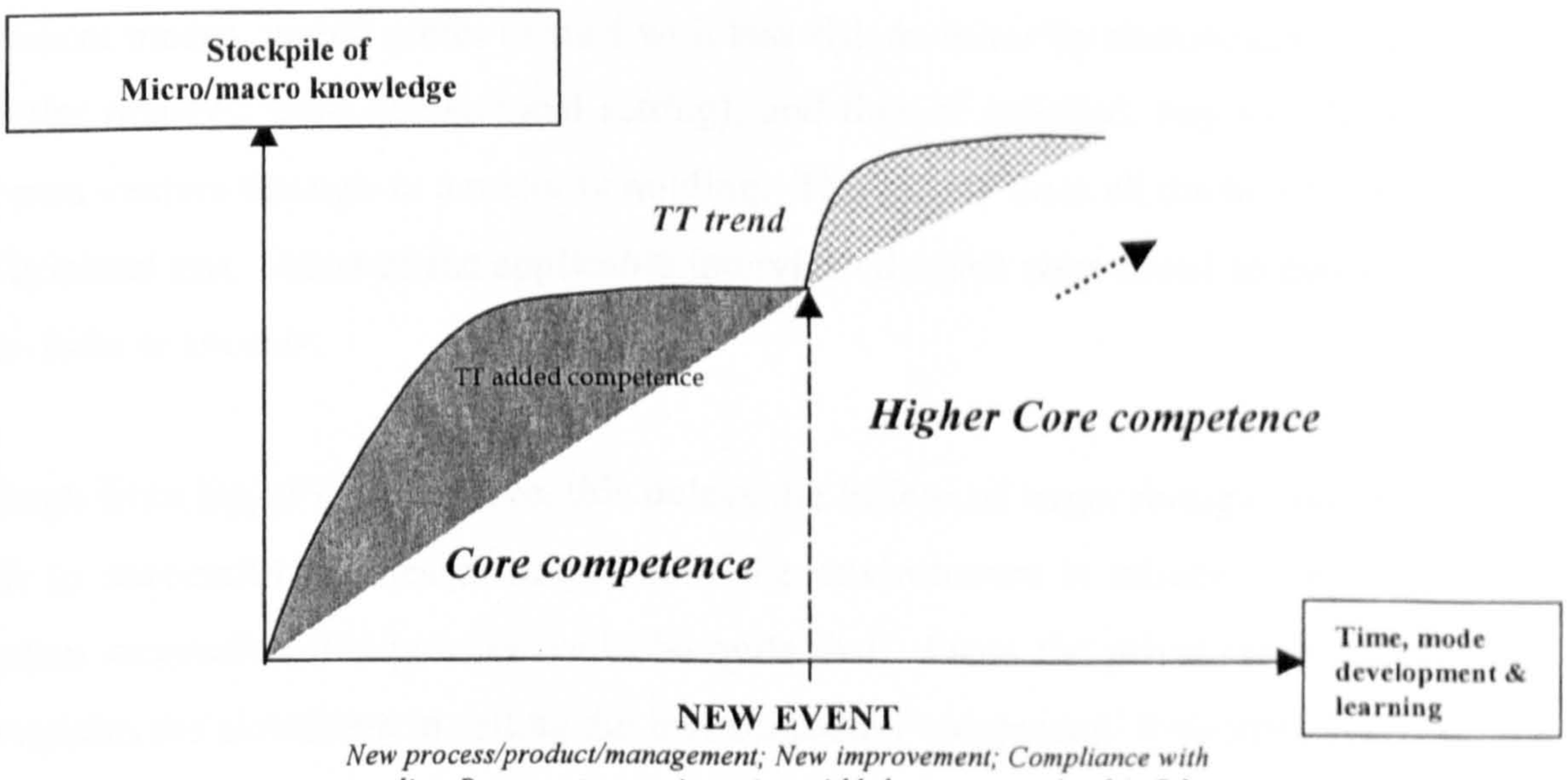
Licensing modes in Egypt were concluded to be often limited in scope to a single product (or range), hence miss out on technological gains associated with new product learning, while cases of FDIs (including JVs and wholly owned subsidiaries) seemed more permissive of easier, faster, sustained and more collaborative introduction of new products and achieve first hand cooperation with partners, having positive impacts on the learning spectrum of the staff members over the longer term.

It may be concluded that learning accumulates over time as post entry operations develop and dependency on expatriates diminishes and ability to implement new traditional developments is established. At that stage, the pace of transfer of technology from the

foreign corporate slows down, especially on the process and product levels, and shifts more towards management technologies (such as marketing and customer support). Reponses to new events such as the introduction of new products, etc. meant added transfer. This is represented in figure 10/1, which may serve as basis for future understanding and planning.

Core competences accumulate over time, whereas employees carry along their newfound competencies from time/place to another.

Figure 10/1: Technology transfer planning for the future



Source: The author.

The fears of undermining the indigenous technology through foreign technology transfer have not been substantiated in this thesis. R&D activities in Egypt are not focussed on new product development, and there is a wide gap between the S&T institutes and industry, where the relationship lies mostly in shared training activities and conferences. Therefore, the debate of endangering the indigenous technology in Egypt, as a result of welcoming foreign investments and associated technology transfer should stop. It only distracts from planning for the potential benefits of technology transfer.

Among the large number of probing, often overlapping, issues that had emerged from literature and were introduced to the conceptual model, several were found to have low significance on technology transfer. For example, the existing technological gap in Egypt has neither obstructed the entry mode nor the associated technology transfer, and even at its

current level (5 years in average), the existing gap still permitted efficient absorption of technologies to a level sufficient for addressing the local market. The extent of the effect of the technological gap on technological potential for exports is out of the scope of this thesis and hence needs to be further researched. In addition, no obvious relationship between country of MNC origin and the country to where the local company starts its exporting emerged from the findings.

Acknowledging the potential of the local market, the pattern that emerged in this thesis regarding foreign modes of entry to Egypt, is that foreign companies, upon deciding between investment modes, would prefer to start with less risk as minority shareholders in a JV, test the water (market, local demand and setting), and then if satisfied, buy into the shares of their own venture through-to a majority holding. This grants them all the benefits and safety with minimal risk. Most of the applicable interviewed cases were found to evolve as such, in one form or another.

Although from Egypt's perspective, this delays the inflow of larger foreign investment, and ties it to successful businesses only, yet if the environment is attractive, and the local operation successful, this process could be quite fast. From the privatisation perspective, this explains the slowdown in selling the less successful companies. Retrospectively, from a technology transfer perspective alone this situation is quite useful. It drives the local businesses to better themselves, in hope of being sold later to their minority foreign partners at a profit. Interestingly, the contractual modes investigated did not develop beyond the initially selected mode.

In post entry stages (operations), all modes were overwhelmingly affected by government policy. Far less importance and impact was given to Egyptian policies during screening and mode decision phases, where emphasis was more on the assessment of attractiveness of local market (screening), and decision on best mode of entry to service this local demand.

The current level of attractiveness of Egypt has mostly attracted entries of MNCs that are only interested in the local market. This is also validated by the fact that most of the sampled modes gave exports and outward servicing investment a second place, and there was no special linkage between inward-outward activities of the firms.

Results indicate that the foreign firms, already operational in Egypt under various modes of entry, postpone investments of today to tomorrow. No company sampled in this thesis indicated that its technology is in advance of the market or that it aims at educating the customer of new products, or conducting extensive R&D. In fact, these MNCs do not exchange their foreign earnings (from limited exports for instance) into local currency in fear of new exchange rate regulation. Size of their investment and operations are limited to that of the local market consumption.

The key reason for foreign joint venturing has emerged to be the local partner buffering the bureaucracies and protect the foreign partner against local market vulnerability, rather than local value added. Local partners in JVs have been found to also present a gateway to the local banking system. Interestingly, growth in investment size of joint ventures is faster than other modes.

This thesis shows that there is a direct correlation between technology transfer and the type of mode of foreign entry into Egypt. This applies across all components of technology. It has also been found that the content of total technology transfer largely depends on reactions to the set of macro policy issues. This applies very much across sectors and modes.

There is also a positive correlation between modes of entry and technology transfer on one side, and host policies and national growth and development (on both micro and macro levels) on the other.

Although policy conclusions will be addressed later in this section, in the context of technology transfer and foreign market modes of entry, there are exceptional benefits supporting the implementation of an integrated policy approach towards FDI and associated technology transfer. These are concluded to include:

- Economic benefits
- Upgrading of the technology
- Achieving cost-effectiveness and efficiency
- Increasing export potential
- Improving the quality of life

- Improving the nation's international attractiveness
- Coping with globalization

Having presented the focussed conclusions, the broader conclusions and recommendations of this thesis are now presented:

Globalisation

Regarding globalisation and within the context of this thesis, Egypt needs to replace its passive and reactive attitude towards globalisation by a proactive one. This implies giving more emphasis to exports and integration into global supply chains. It has been found in this thesis that applying macro-level regulations and micro-level measures of standardization, quality and environmentally sound technologies is a means to that integration end, if not a pre-requisite. Searching for means to implement environmental, standardization and quality policies in the Egyptian sectors will, inherently, encourage companies to search for better technologies. This will not only be beneficial to the industrial sector, but also to supplier networks and even the research organizations. This may also create a dynamic Egyptian space for focused, targeted, research in technology transfer and FDI.

Egypt has made significant progress on the path of reform, but improving the overall business climate is a continuous process that has a lot to do with coping with new, also continuous, developments, both internally and externally.

All firms on the micro level in Egypt must have an understanding and strategy regarding globalisation (not only firms planning to go global themselves) because, whether they like it or not, they will eventually face globalising competition in their home turf and hence should prepare for that.

Developing countries

The several challenges, discussed earlier, facing developing countries should be addressed in order to limit any damaging effects that they represent on utilization and benefiting from technology transfer associated with modes of foreign entry. These challenges are broadly classified into financial, technical, informational, attitudinal, social and policy challenges.

Lack of financial resources on both the micro and macro levels is a challenge to benefiting from an integrated approach to technology transfer and FDI in developing countries (including Egypt). On the micro level, this directly prevents the initiation of technology transfer activities. Both public sector enterprises (who are already losing money and have substantial debts), and smaller firms (who cannot afford the expensive communication and training costs) are missing on technology transfer benefits due to lack of financial resources.

The short-term profit calculations resulting in low tolerance for longer payback periods of equipment investment and lack of economies of scale to justify the transfer are leading any available finances to other activities. On the macro level, financial challenges limit the ability to develop, implement and maintain expensive integrated policy plans.

Technically, developing countries such as Egypt are challenged by the weakness of its S&T institutes and the lack of basic technical know-how on company level to primarily assess the shortcomings of their existing facilities and recommend foreign technological possibilities of improvement.

Common to many developing countries, there is an identified informational challenge evident in the lack of public awareness to the importance of technology transfer, and the lack of informational integration with academic research in the field. In Egypt, the results of academic research are often branded as 'non-practical theoretical academia' and any benefits or insights of such research are missed.

Finally, the inconsistency of data in many developing countries has rendered many quantitative research based on secondary resources faulty if not simply wrong.

Attitudinal and social challenges exist for many developing countries. There is an inherent resistance to changing the status quo, and willing policy makers have failed to articulate clear goals upon implementing policies for the achievement of an integrated approach to foreign investment. As a result, there is no useful frame of reference for industry, policy or even research.

Due to their many similarities, and in light of the previous conclusions, it is therefore recommended that developing countries pool their informational databases and share their experiences in the field of technology transfer and foreign entry modes. The utilization of the generic framework of this thesis may assist homogenizing the approach to technology transfer (at the end, the target foreign party is the same, namely the globalising MNCs and internationalizing SMEs). Clusters of designated authorities within developing countries that possible share regional commonalities should be created, and these clusters should be equipped with high IT infrastructure facilitating the cooperation.

In regards to policies of developing countries, many of the findings confirm the literature conclusions but there are some remarkable differences to be discussed in the context of Egypt as a host nation.

Egyptian government Macro level

The main conclusion concerning Egypt's current macro policies is that they are highly rigid, and oriented towards foreign inflows, rather than towards selective type of quality investments. Existing policies are far from integrated and policies are implemented 'to the beats of different drums' and are not currently geared towards any particular mode of foreign entry (especially non-investment modes) or any technology transfer aspect. There is hence a clear, prime case for implementing a newly tailored, targeted, integrated, balanced and flexible policy programme in Egypt that address and integrates technology transfer and modes of foreign entry with other aspects.

As indicated, the weight of evidence clearly points to a modest response by internationalising firms to Egypt's current policies aiming at attracting new investments. Due to broad factors such as non-coordinated policies, unclear border lines between policies and inflexibility of policy implementation in Egypt, several government approaches have lost their internationally contended importance for stimulating investment and its associated technology transfer (such as the current incentives offerings). Meanwhile, factors such as exchange rate policies have had an overwhelming impact. In fact, such impact should emerge far more importantly than it currently does in literature. This is in confirmation with previous insightful literature of Young et al (1989) indicating that foreign exchange should be considered as a major determinant of market servicing strategies.

Therefore, it is the contention of this thesis that, in broad terms, the stability of economic variables (directly related to overall environment) has the prominent impact on the market entry decision, mode choice, while government policy impacts more on sustainability of operations and associated transfer of technology. Technology transfer is positively correlated with sustained operations, in a stable environment.

This thesis provided empirical support to the importance in Egypt to carefully balance often-contradicting issues, such as: social aspects of laying labour off versus legitimate interest of foreign investment in efficiency, increase in exchange rate versus better competitiveness of Egyptian exports, and offering incentives versus lowering taxes. For example, the incentives that are offered by the government are utilized by all eligible companies, but interestingly are not recognized as substantial in regards to entry decision, development or technology transfer by any of the companies in the research. It is concluded that easing the taxation levels and related regulation while gradually lifting the incentives will be better for foreign investors. This would render the environment more attractive, stable, less problematic and will minimize evasions, increase the national revenue from tax, and decrease the burden of financial incentives.

A review of all stages of the standard policymaking process in Egypt is recommended. These stages include establishing a vision, the review of existing policies, the alignment of impacting issues, the implementation of new policies, and the follow up and monitoring stages. The process of formulating an integrated policy will be expensive and far from static and necessitates availability of continuously updated information on domestic and international parameters.

Policies in Egypt have often been inconsistent and thus far from being effective. In fact, some times they even cause negative impacts where they were supposed to have positive ones. For example the emphasized issue of currency flotation was supposed to encourage exports, but it did not, and negatively affected many other aspects on the side. Similarly, the present quality of the educational system (outcome of the government's current S&T policy) cannot adequately support governmental efforts to encourage innovation, R&D or technological improvement.

It is important for the Egyptian policy makers to realize that foreign investment has no instant "magical" effect on the performance of the economy, growth or even technological aspects. This thesis concludes that only with a coordinated effort under an integrated national vision, a shift in social attitude towards hard work for this vision and an increase in local market competition should the wheel of development start rolling.

Egyptian industry stakeholders including government bodies, private enterprises and other industrial institutions often know many of the problems facing industrial development in particular as well as their solutions. However, what has always been lacking is the institutional framework in general and the policy implementation know-how in specific. Moreover, there is a whole number of institutions responsible for setting and implementing industrial policies, and that leads to contradictions, inconsistencies and wasted parallel efforts by different institutions.

With such an inadequate institutional framework, Egypt has always ended up with "occasion policies" as opposed to a set of consistent and integrated policies. Looking at things from the angle of producers and investors, the inadequacy of the institutional framework is being manifested in a totally inadequate business environment.

It is an important recommendation of this thesis that one single empowered governmental body with authority to negotiate the regulatory and policy system be put in place, governing and orchestrating all aspects related to foreign investments and technology transfer. This body should have higher authorities than the ones that GAFI has at the moment. This will limit diversification between government authorities, and govern integration aspects. Functions such as those currently of GAFI, supervision over stock markets, technological planning and privatisation programmes should all fall under this body.

There is certain need for a central point of policy leadership and coordination to guide technological and economical development activities towards the national vision. A number of steps are also recommended on the level of macro policy:

- Proclaim technology transfer from foreign modes of entry as an issue of high priority in the Egyptian industry, and as an integral part in the movement towards modernization of the industry.

- Establish the proposed single authorized body that will coordinate, organize and evaluate existing policies and identify means of introducing new initiatives into the complex Egyptian policy framework.
- Identify all ministries and agencies, which are currently involved with foreign investment and technology transfer and coordinate their activities.
- Utilize legislative-based instruments (aiming at stipulating and enforcing laws and regulations that would encourage the uptake and implementation of technology transfer activities).
- Identify means of introducing technology transfer activities associated with foreign investment into the 21st century vision for Egypt.
- Identify means of strengthening the enforcement of the environmental, standardization and quality-related aspects within existing laws.
- Phase out some historic approaches related to the local setting, in a controlled way, without harsh economical impact on the industry.
- Utilize economic-based instruments (aiming at removing the inefficiencies of the market that may act as disincentives to technology transfer and foreign investments) and introduce financial policies, which are attractive to FDI.
- Issue guidelines to the Egyptian industries on ways to incorporate and reap benefits of technology transfer.

On the multilateral level, it is concluded that the level of Egypt's active involvement and compliance with WTO is quite satisfactory (especially after the flotation of the currency). On the regional and bilateral level, the many RIFs and BITs that Egypt has in place have not been found particularly useful from the foreign investment and technology transfer perspectives. It is recommended that the Egyptian government makes far better use of these integration frameworks and treaties, through development of a database on the strong areas of each of the members and tap the resources granted by them. Utilization of the opportunities made available by these treaties may include establishing special funds and financial arrangements to support technological development initiatives, conduct pilot projects, provide technical assistance in areas of strength, and offer financial incentives (in the form of soft loans and/or grants) and target import/export coordination.

Information, Attractiveness and Promotion

Many of the earlier discussions point to the fact that Egypt lacks key skills needed for promoting its attractive aspects. Part of this may be attributed to the lack of information that Egypt makes publicly available, and the inconsistencies in that information. This confuses foreign investors. It is therefore concluded that it is important to align and link the databases emerging from different institutions in Egypt, and unify definitions of basic industrial, technological and sectoral concepts in compliance with international standards and constantly monitoring the consistency of this data.

It is recommended that information-based instruments be utilized in order to facilitate access to information by creating informal or formal industry networks, within individual sectors. The government should pool the information at the proposed single body; disseminate information to the industry; ensure easy access to information; coordinate with S&T resources such as universities and offer a variety of training tools, including formal training, study tours, diagnostic workshops, on-the-job training, self-managed learning, and in-house learning centers. In short, activating information instruments across the spectrum and provide compliance-incentives.

In addition, the government should require public disclosure of information on technology and foreign investment and stimulate greater voluntary corporate reporting.

Finally, on the macro level of Egypt, the Egyptian public need to see and feel a national vision, which boosts their self-esteem and gives genuine hopes in a better future. There is a need to create a country promotional image, maybe by creating a "National Brand" for Egypt as a nation (or on a sectoral level) to be used with all international activities, such as accredited exports, investments and tourism activities. The objective is to have a memorable and coherent image of the country in all its dealings with the rest of the world.

Company Micro level

It is concluded that it is very important for Egyptian national growth that Egypt hosts fully owned subsidiaries and that Egyptian companies associate themselves with MNCs and advanced SMEs through creating joint ventures, licensing and technical assistance agreements. It is greatly beneficial that Egyptian employees gain exposure to the

international business practices through working alongside foreign experts. Egyptian top management are often board members in more than one company, and in the case of joint ventures they often become fully responsible for implementing the various state-of-art practices and hence gain valuable experience that they usually carry along to other companies. The association of an Egyptian company and Egyptian employees with competitive and established international counterparts offers the potential of technology transfer of many product, process and management technologies, including design, installation, maintenance of equipment for product manufacturing, operation, control, calibration, improving efficiency, quality, standardization of processes, and organizational skills such as marketing, sales and accounting practices, and others. Furthermore, foreign companies know the export markets better and hence will provide this knowledge in order to increase sales. This is perceived as more sustainable for employment purposes as well, because it is based on local market and exports.

Looking at the findings of this thesis, some specific functions seem to be quite important to businesses in Egypt, and need to be more emphasized upon planning technology transfer activities in Egypt, namely: accurate job description setting; marketing and selling techniques; market study techniques; succession planning; tying local and export markets together; inventory planning; global procurement; standardization, quality and technology recommendation systems; R&D integration; and staff selection.

The findings of this thesis led to additional conclusions on technology transfer from foreign modes of entry at the micro level, as follows:

- The importance of the micro-level contractual formalisation (across various modes) detailing the technology transfer activities cannot be over emphasized. In comparisons conducted in this thesis it was noted that very strong pro-foreign contracts governed all licensing mode aspects, even including the right to local modifications and improvements. Joint venture contracts were notably more carefully balanced, and managed to regulate the business operations and governed the audits and may even be used for arbitration purposes.

- It is concluded that each party (local and foreign) seeks a complementary and compatible partner, based on the understanding of the importance of such complementarity and

compatibility for ongoing sustainability of mode, and internal ease of technology transfer and for plain and simple efficiency. Foreign partners have been found to seek financially capable, language literate, politically connected and reputable local partners. The local partner seeks a prestigious affiliation, a leader in the international market, an internationally experienced partner who understands the unique aspects of the region (politics, culture, ..), and a partner with a long term perspective. The commitment of both partners is necessary for creation of a technology transfer inductive environment within the local operation.

- The sustained development of the skills of local employees (or national work force) is important because this impacts on learning from their interactions and development of core competence that they can utilize in different aspects. Competence of foreign employees is by no means less important. Foreign competence impacts on the overall experience of the foreign partner in internationalisation, accurate selection of local partners, ability to handle cultural differences, and ability to transfer technology smoothly. All these result in success of technology transfer and cost saving on the long run.

- The previous conclusion, leads to highlighting of the conclusion that subsidiary employees tend to aspire to excel for promotion onto the corporate level, while the employees at the JVs (having a large stake in the success of business as a result of the downturn of the local market and the high levels of unemployment and bankruptcy cases) exert large efforts to comply with required standards to maintain their jobs. Preparing and motivating the human component is crucial from the host perspective when it comes to technology transfer (training, incentives, etc.).

The framework offered by this thesis may provide components to assemble a road map to harnessing the Egyptian potential to promote technological capabilities and economic competitiveness. Key recommendations of this thesis for success at host company level include the following:

- Clearly understand the strategic and technological objectives of the foreign firm and your own;
- Negotiate a suitable contract that clearly lists the technological aspects of the cooperation, and the implementation mechanisms. Create clear provisions for

the framework of technology use in the partnership; and view the contract as a dynamic document that might be used in arbitration if necessary;

- Maintain your comparative advantages at the outset of the agreement, because this may change over time (technological appropriateness, and importance of complementarity of partners);
- Be aware that technology transfer is a most sensitive and contentious issue;
- Monitor and review operations over the modes development stages;
- Always ensure the training and motivation of all employees.

- One final conclusion of this thesis is the importance and large potential benefit expected from quality certifying and creating specialization in supplier network clusters to serve various industries, creating synergies across the nation. The main obstacle to the implementation of such recommendation will be cultural, where the customers will be sceptical on the level of confidentiality of their operations. These supplier linkages could succeed if they operate with complete transparency to MNC standards.

Having discussed the overall conclusions and recommendations of this thesis, including the crucial levels of policy, the following section will address the main methodological and theoretical contributions of this research.

10.3. Contributions of this Research

The conceptualisation and findings of this thesis are hoped to have contributed to the stock of human knowledge. Along with the direct use of the thesis findings, several key methodological, theoretical and interdisciplinary contributions could be distinguished.

Methodological contributions

As indicated, Egypt in general represented a challenging research environment, whereas the use of qualitative techniques was successful in assessing the areas that touched upon company critical and confidential operations, such as technologies, royalties, quality, etc.

The rich and positive outcome of the qualitative in-depth case interviews is an important contribution to future methodological considerations of researchers facing similarly challenging research environments. This conforms to findings of Ibeh and

Brock (2003) and Yin (2003). However, it needs to be noted that the value of this contribution is also highly correlated with the importance of personal contact and rapport developed with the interviewee in Egypt. This supports findings of Mahdy et al (2003) that data quality and depth is negatively affected by the attitudes and mood of interviewees in Egypt.

The holistic exploratory approach was successful in capturing the effects of both macro and micro issues (such as macro economic issues of exchange rate), time (mode development and learning), subsequent types of technology transfers and others, within the context of Egypt. This supports literature by Patton (1990) on the importance of holistic use of qualitative data in similar cases.

The strength and rigour of this research resulting from application of a multi-staged multi-sector research design with cross-case synthesis and supporting expert opinion gave strong support to similar approaches by Yin (2003), particularly from the case study perspective. This has achieved and strengthened the overall correctness of the thesis findings; and further supported Miles and Huberman (1994) in demonstrating usefulness and richness in exploratory research in topics where strong theoretical frameworks do not particularly emerge.

Finally, the expanded conceptualisation developed in this thesis accommodated aspects of the globalising international environment, which has given exploratory support by obviating the shortcomings of previous studies with too narrow a focus (see section 10.4. for limitations of this research).

Theoretical contributions

This thesis is marked by a particular distinction from previous studies in that it offers a wide scope of contributions, filling many of the gaps in literature, related to technology transfer associated with foreign market modes of entry. Having discussed the findings of this thesis against the backdrop of the research objectives, sub-objectives and questions (section 9.3.), it has become evident that some of the empirical findings of this thesis are theory confirmatory, while other findings (within the context of Egypt) do not support

earlier work. Finally, parts of the empirical findings of this thesis have contributed new and original theoretical insights. These are all discussed in the following contexts.

- *Contributions to literature on technology and its transfer*

  This thesis redresses imbalances in the literature on technology transfer, through introducing new *insights* involving sharp and up-to-date definitions for technology, technology transfer and technological appropriateness. Furthermore, new *insights* included findings that technology transfer is highest at introduction phases increasing upon occurrence of new events, and that training and HRD are means to the profitability, efficiency and quality end. The limited extent of R&D in Egypt was also identified, along with other newly identified issues that affect the technology transfer process.

  Confirmatory support was given to the contributions of technology to the economy and the importance of local capabilities and supply networks (Lall, 2001) and the development of such capabilities (Kim, 2002). This thesis also supports the works of Obaidi (1999) and Nahar et al (2001) on the process of technology transfer and usefulness of decomposing technology into its various components. *Contradicting* evidence emerged in regards to literature on the importance of technology gaps on technology transfer content (Lall, 1998), but in the same time supported the importance of appropriateness of technology transferred to the existing context at the host.

- *Contributions to literature internationalisation of the firm and modes of foreign entry*

  This thesis gave *confirmatory* support to several of the internationalisation theories, such as the OLI paradigm of Dunning (1977, 1980, 1991) by conceptually expanding its theoretical framework, through allowing for multiple issues to be assessed in the same time against the ownership, location and internalisation factors, all from a host perspective.

  The empirical results gave exploratory support for the validity of an expanded, multi-concept holistic framework for the internationalisation of the firm and the market entry decision and mode choice. Hence, a new holistic model was proposed giving *Confirmatory* support both to the works of Ibeh, Young and Lin (2003) on the network theory through the importance of personal contacts and connections, and to calls for a

link between network perspectives and resource based perspectives of Tavares and Young (2002). Also, confirmatory support was given to the transaction cost rationale of Hennart (1991) supporting joint ventures as more efficient modes when dealing with environments with uncertainty.

The findings of this thesis contributed a *contradicting* perspective to literature on inward-outward linkages, particularly works of Luostarinen and Welch (1990). Hence, this provided support to findings of Forsman et al (2002). Furthermore, new *insights* of this thesis offered categorizations for modes of entry (from a technological perspective), along with identification of various issues affecting foreign market entry.

- *Contributions to literature on synthesized interlinkages between technological development and foreign market entry*

  Support was given to relevance of several of the *new* interlinkages issues that were synthesized in this thesis, such as complementarity and compatibility of partners (Luo, 1998b), HRD (Ghoshal and Moran, 1996) and learning patterns over time (Bresman et al, 1999). In addition, full *confirmatory* support to importance of flexible market-friendly (Blomstrom et al, 2000) integrated policies (WIR, 2003) and incentives (Charlton, 2003) aiming at technology transfer (Kumar, 2002) and modes of foreign entry (Chang, 2002) were achieved.

- *Contributions to literature on Egypt*

  This thesis is a unique contribution to the literature on Egypt. It provides empirical data and conclusions on aspects in Egypt such as macro policies, micro policies, sectoral characteristics and other aspects, all which have suffered a large void in data for a long time. *Confirmatory* support was given to the difficulty of conducting research in a challenging environment such as Egypt, due to the lack of consistent data on company, sectoral and macro levels (Mahdy et al, 2003). This also confirms the consensus view regarding ineffectiveness of policies in attracting foreign investment with their associated technology transfer. The importance of the policy implementation process has been widely confirmed (IMC, 2003).

New insights regarding the detrimental impacts of Egyptian government policies on many of the contended aspects and issues of mode post-entry operations and associated technology transfer was established, particularly the foreign currency exchange policy. Finally, the *insights* that the local market is the only motivation for foreign investment, and that Egypt's other assets (such as unskilled labour and many BITs) are not considered important present cause for concern.

- *Contributions to limited literature on technology transfer associated with foreign market modes of entry*

Confirmatory support was also given to Ibeh, Young and Lin (2003) and Chang (2002) on importance of active role of government; the importance of inter firm contractual relations; and personal, ethnic and network relationships; the relevance of various interlinkages issues and the previously proven importance of market friendly policies.

By providing a *new insight* contribution with a dynamic framework on technology transfer associated with foreign market entry processes, the conceptualisation of this thesis may serve as a 'launch pad' for future research in these areas. This was only made possible by interdisciplinary contributions. The thesis offered new insights regarding the relationships between the modes of entry and the associated content of the technology transfer, whereas technology was not a decisive factor in market choice, mode choice or mode post-entry development. Nevertheless, joint ventures and fully owned subsidiaries tended to be more conducive to technology transfer, in light of the foreign firm's resource base and existing complementarities with the local partner (Yasuda, 2004).

Interdisciplinary Contributions

Another main contribution of this thesis relates to its interdisciplinary approach. Technology perspectives were integrated with foreign market entry considerations, and were explored in the Egyptian context. As such, this study addressed calls from Dunning (1991) and others for more interdisciplinary approaches among international business research. Indeed, the conceptual model and overall context of this thesis exposed an obvious engineering approach of the researcher reflecting on interdisciplinary calls.

The result of this thesis showed the fruitfulness of this approach. It helped developing the research model, framework and objectives, allowing for empirical assessment. Also the interviewees were comfortable speaking with a researcher who understands the technicalities of the interviewed topic. This clearly implies a need for embracing more theoretical interlinkages to fully understand new realities of dynamic processes with similar complexity to technology transfer.

In its current form, there is no *a priori* reason not to apply the logic of the thesis conceptually supported model to other levels in the internationalisation process of the firm, or technology learning of the host. In fact, the model can also incorporate insights provided by other theoretical contributions in other related domains.

10.4. Research Limitations

This thesis, just like any scientific inquiry, has its limitations. Despite of the multi-phased approach, which reduced some of the inherent limitations of the research, methodological limitations still apply. Being aware of these limitations is important, because not only do they open up the field for future research (see section 10.5) but they also help in assessing the applicability of the findings. This thesis has applied methodology limitations, contextual limitations and empirical base limitations.

It is important to highlight, before discussing the methodological limitations, that the findings of this research are based on the assumption that no personal agendas or perceived political correctness will impair the demonstration of the actual constructed reality of the interviewee. This thesis has relied on truthful expressions of the interviewees, and intentions regarding to future planning (rather than observed behaviour), it is noted that previous research in consumer behaviour and exporting research (for example) have noted that intentions may not always be good indicators of actual behaviour (Ibeh et al, 2003).

Besides limitations arising from the above assumptions, the first methodological limitation is the rather exploratory status of this research. Due to the absence of an integrated framework for technology transfer associated with foreign market entry and absence of research on issues critical to this process in Egypt, this research drew on potentially applicable theories and reasoned by analogy from concepts and highly redundant and

overlapping issues (arising from multiple disciplines) to develop and explore a framework that might have missed out additional valuable concepts, theories or issues.

Although time related dimensions were addressed in different areas of this research and were carefully traced throughout the interviews from market entry to present day, yet the cross-sectional nature of the research emerged as another possible limitation. This may be remedied by adopting longitudinal studies on the same topic, over a number of years.

A number of other contextual limitations, related to the Egyptian environment should be highlighted, in order to present the context of which the thesis conclusions are viewed:

- Egypt has been facing serious instability in the exchange market, which might have dominated the government policy behaviour, and timing.
- Lack of aggregate data in Egypt and Inconsistencies of data of different sources
- Conservatism of interviewees

Furthermore, this thesis focussed on certain companies, and whilst these companies are highly representative of their respective sectors and modes, yet the sample did not include all types of modes, or all sizes of the foreign firms, or newly established foreign and home partners. The focus was on mature foreign and local entities (to better provide for the development of technology transfer activities and in the same time buffer issues of the time elapsing and mode development).

The chosen level of analyses constitutes another limitation. The interviews of the sample were the most senior managers in each case. The reason for this was that they alone were knowledgeable and authorized to give the information that would be related to technology transfer through modes of foreign entry.

Nevertheless, this selection has missed the chronology of daily events at the shop-floor level (such as technology transferring meetings, exchanged correspondence, etc.) and the magnitude, interrelationships and importance of such events, beyond the aspects that arised from the empirical analyses.

Future directions or research are included in the following section.

10.5. Directions for Future Research

This thesis answered several questions related to technology transfer associated with modes of foreign entry. It has also uncovered many more.

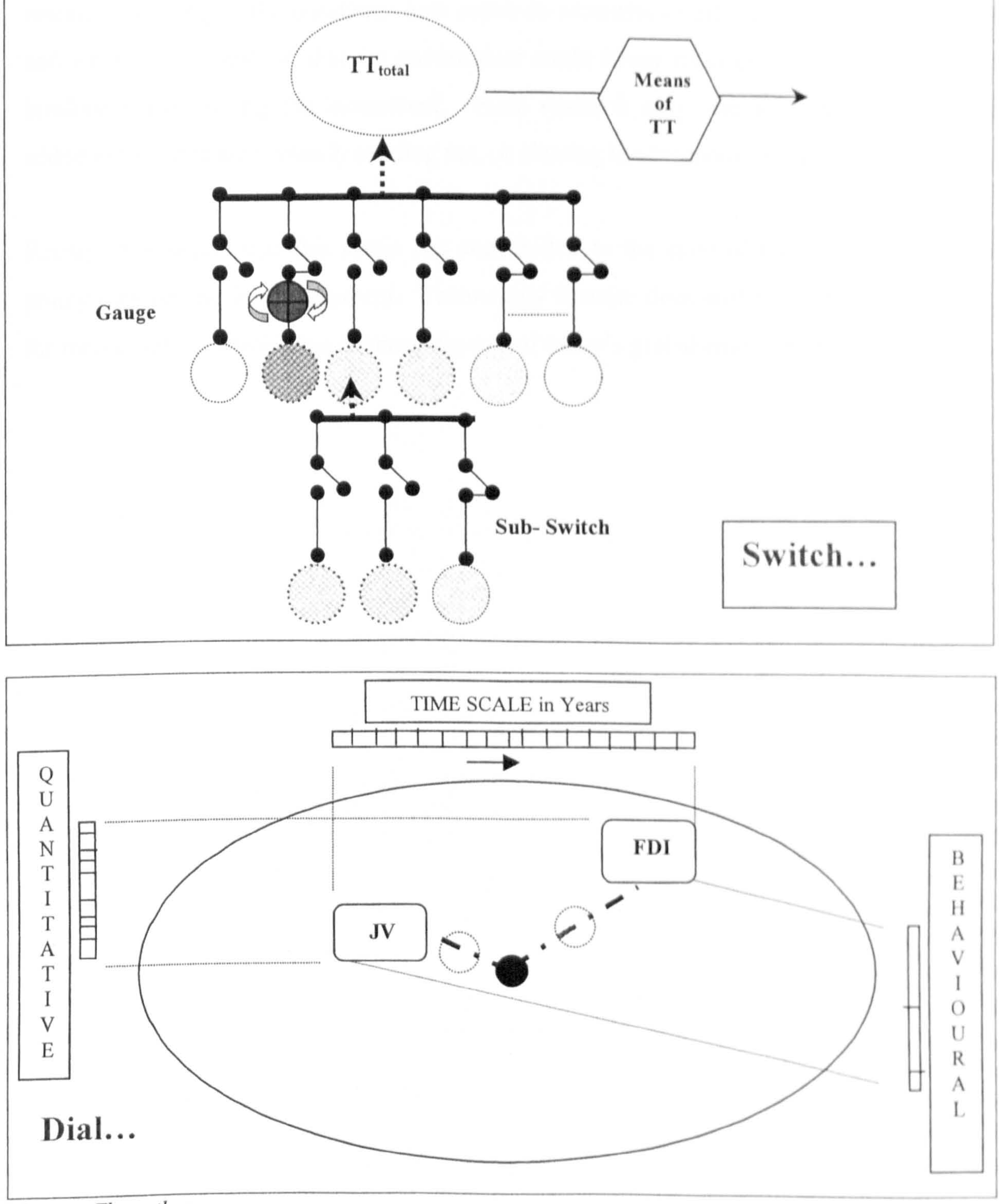
Primarily, a set of suggestions for future research may arise based on the limitations discussed in the previous section. This would hence include replication studies, longitudinal studies, confirmatory studies and further exploratory studies.

In addition, future research on implementing technology recommendation systems and developing supply chain networks and their management in association with technology transfer and international cooperation is much needed.

The conceptual model opens up new directions for future research. For instance, it could be mirrored, hence providing a reversal of perspectives, to be seen from the perspective of the foreign companies (naturally other issues will arise to be incorporated in the Switch). This opens a new agenda of research in itself.

An important direction for future research may draw on the logic of the conceptual model to synthesize multiple dimensions. In this case the directions for future research are unlimited. Performance gauges maybe added to each issue on the issue switch, whereas quantitative research maybe conducted on the effect of altering a single aspect, positively or negatively. Sub-switches may be added as well. Time rulers may be applied to the dial for longitudinal research, while assessing the rest of the model as usual. Some examples are presented in the following figures:

Figure 10/2: Examples of future potential for the thesis model



Source: The author.

Given the potential usefulness of adopting a regional perspective, researchers are also urged to explore the single industry perspectives, the multiple country possibilities, the reverse technology transfer issues (from host back to foreign home and the inward-outward connections), the longitudinal angle of a single firm throughout its development from establishment to maturity, etc…

For Egyptian policy, an area that is important for future efforts is related to need for a research focusing on the questions: how much do incentives cost the Egyptian government? and what is the threshold that the government could lower its corporate tax to, in order to breakeven after lifting the incentives?. Such research may also account for anticipated added entries that are currently evading tax, or abusing the incentives framework.

Finally, it is hoped that this thesis has contributed to the state of knowledge in research, policy making and in management. Technology transfer does still provide a fertile ground for increasing our knowledge of many aspects of today's global environment.

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Appendices

Appendix 1: Necessary Host Nation Data and Information

1. **National Account Statistics**
   - National income, gross domestic product, and net material product.
   - Expenditure on gross domestic product, and net material product by use.
   - National income and national disposable income.
   - Gross domestic product and net material product by kind of economic activity.
   - Gross domestic product and net material product at constant prices.
2. **Population and Manpower**
   - Population by sex, rate of increase, surface area, and density.
   - Employment/hours of work in manufacturing.
   - Unemployment.
   - Scientific and technical manpower and expenditure for research and development
3. **Production**
   - Agriculture/forestry/fishing/mining.
   - Index numbers of industrial production.
   - Manufacturing production (food, textiles, paper, rubber products, chemicals, building materials metals, transportation equipment).
   - Construction (output and employment, activity).
   - Energy (output and employment in electricity, gas, and water supply).
4. **International Trade**
   - Imports by end use.
   - Exports by industrial origin.
   - Source/destination of imports.
5. **National Trade**
   - Transportation (railways, international sea borne shipping, civil aviation traffic, motor vehicles in use, international tourist travel).
   - Wages and prices (earning on manufacturing, index numbers of wholesale, consumer price index numbers).
   - Consumption (total and per-capita consumption of steel, fertilizers, newsprint, and other commodities).
   - Finance (BOP, exchange rates, money supply, international reserves).
6. **Social Statistics**
   - Health (hospitals establishments and health personal).
   - Education (# of teachers and school enrolment, public expenditures on education)
   - Culture

Appendix 2: Technology Transfer Provisions- WTO Council for TRIPS (2003)

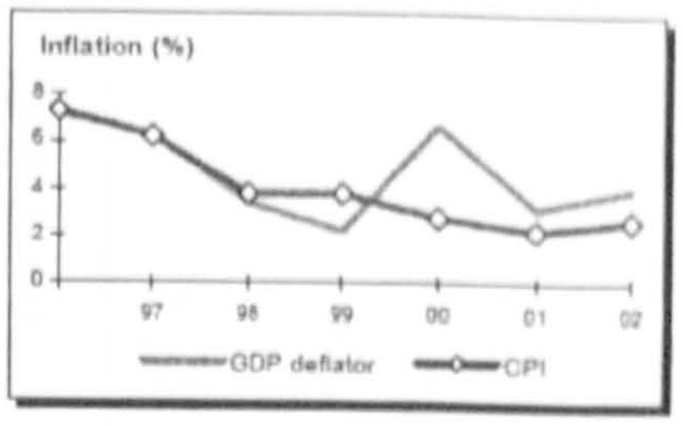
• "Developed country Members shall submit annually reports on actions taken or planned in pursuance of their commitments under Article 66.2. To this end, they shall provide new detailed reports every third year and, in the intervening years, provide updates to their most recent reports. These reports shall be submitted prior to the last Council meeting scheduled for the year in question
• The submissions shall be reviewed by the Council at its end of year meeting each year. The review meetings shall provide Members an opportunity to pose questions in relation to the information submitted and request additional information, *discuss the effectiveness of the incentives provided in promoting and encouraging technology transfer to least developed country Members* in order to enable them to create a sound and viable technological base and consider any points relating to the operation of the reporting procedure established by the Decision.
• The reports on the implementation of Article 66.2 shall, subject to the protection of business confidential information, provide, *inter alia*, the following information: ▪ An overview of the incentives regime put in place to fulfil the obligations of Article 66.2, including any specific legislative, policy and regulatory framework; (b) Identification of the type of incentive and the government agency or other entity making it available; (c) Eligible enterprises and other institutions in the territory of the Member providing the incentives; (d) Any information available on the functioning in practice of these incentives, such as: ▪ Statistical and/or other information on the use of the incentives in question by the eligible enterprises and institutions; - the type of technology that has been transferred by these enterprises and institutions and the terms on which it has been transferred; - *the mode of technology transfer*; - least-developed countries to which these enterprises and institutions have transferred technology and the extent to which the incentives are specific to least-developed countries; and – any additional information available that would help assess the effects of the measures in promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base.
• These arrangements shall be subject to review, with a view to improving them, after three years by the Council in the light of the experience."

Source: WTO, 2003a.

Appendix 3: Egypt Data Profile and Macroeconomic Performance Indicators

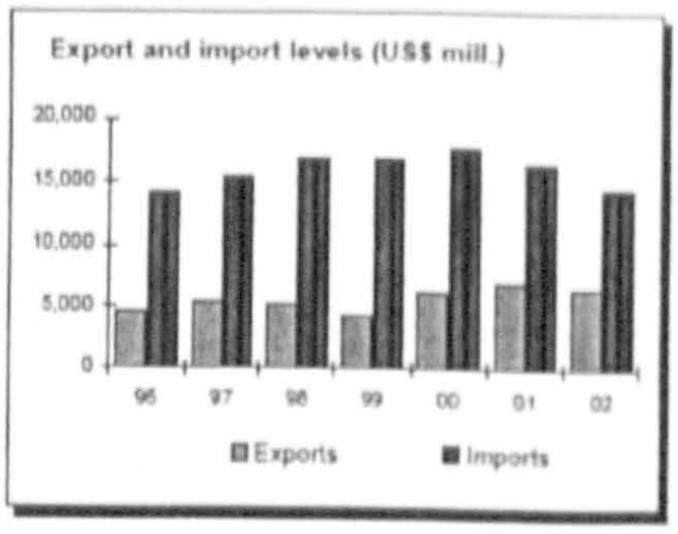
PRICES and GOVERNMENT FINANCE

	1982	1992	2001	2002
Domestic prices				
(% change)				
Consumer prices	..	21.1	2.3	2.7
Implicit GDP deflator	9.2	19.7	3.2	4.0
Government finance				
(% of GDP, includes current grants)				
Current revenue	..	27.2	20.5	20.1
Current budget balance	..	1.2	-1.8	-1.7
Overall surplus/deficit	..	-5.5	-5.5	-5.8



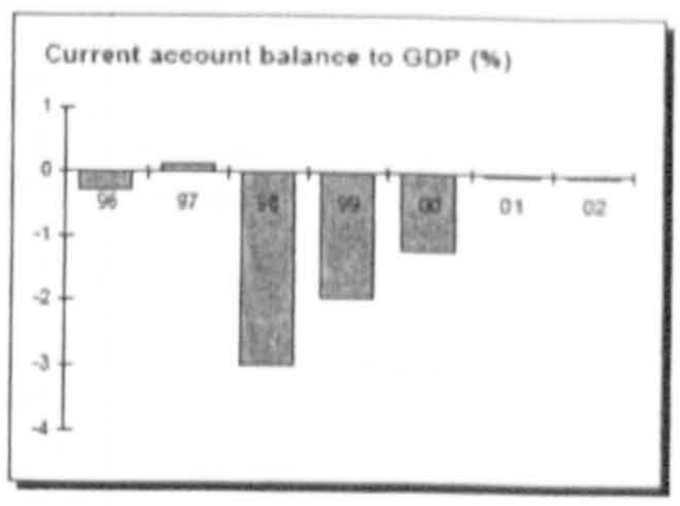
TRADE

	1982	1992	2001	2002
(US$ millions)				
Total exports (fob)	..	3,880	7,078	6,643
Cotton	..	1,898	145	83
Other agriculture	..	35	163	185
Manufactures	..	1,461	2,710	2,877
Total imports (cif)	..	10,054	16,441	14,644
Food	..	1,979	1,128	1,035
Fuel and energy	..	959	3,233	2,961
Capital goods	..	2,610	3,696	3,211
Export price index *(1995=100)*	..	99	..	..
Import price index *(1995=100)*	..	92	..	..
Terms of trade *(1995=100)*	..	108	..	..



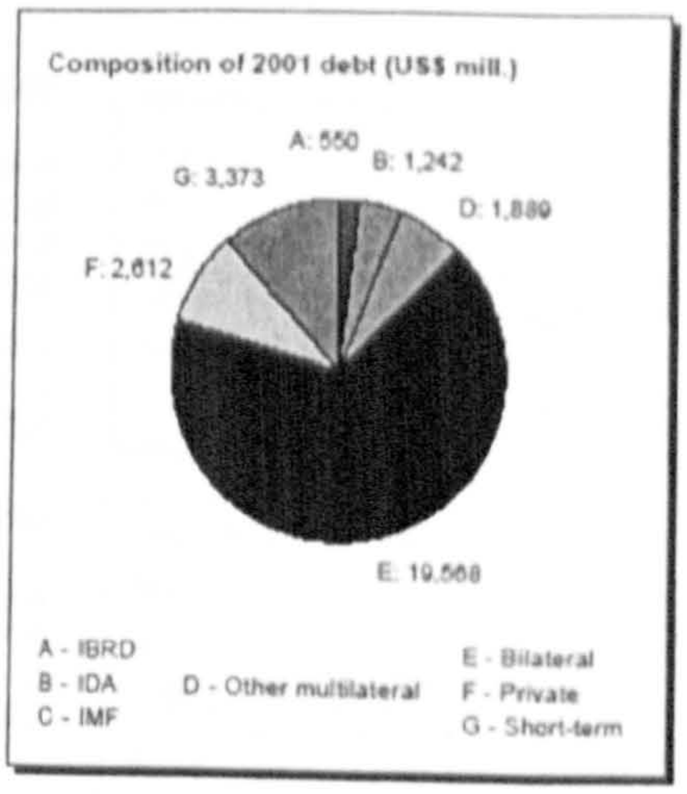
BALANCE of PAYMENTS

	1982	1992	2001	2002
(US$ millions)				
Exports of goods and services	6,338	11,074	16,925	15,323
Imports of goods and services	10,332	12,460	21,772	19,500
Resource balance	-3,994	-1,385	-4,847	-4,177
Net income	-671	-325	1,072	95
Net current transfers	2,133	4,380	3,742	4,073
Current account balance	-2,532	2,670	-33	-8
Financing items (net)	1,264	1,329	-838	-132
Changes in net reserves	1,268	-3,999	871	140
Memo:				
Reserves including gold *(US$ millions)*	..	..	12,926	13,242
Conversion rate *(DEC, local/US$)*	0.8	3.3	4.0	4.6

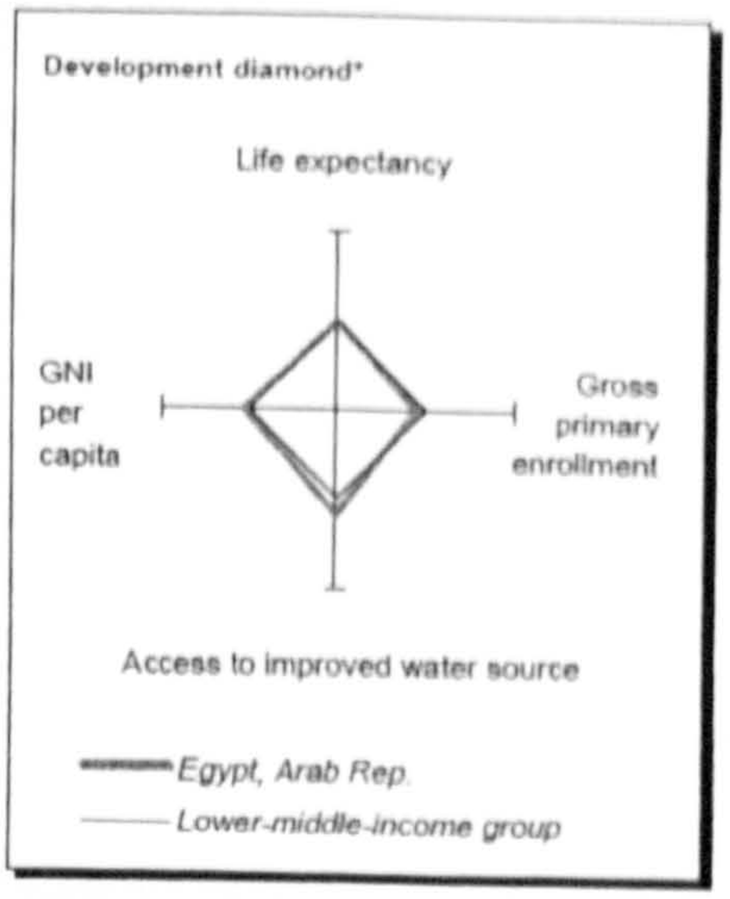


EXTERNAL DEBT and RESOURCE FLOWS

	1982	1992	2001	2002
(US$ millions)				
Total debt outstanding and disbursed	27,332	31,129	29,234	..
IBRD	616	1,381	550	..
IDA	509	904	1,242	..
Total debt service	1,714	2,680	1,932	..
IBRD	66	302	108	..
IDA	4	18	39	..
Composition of net resource flows				
Official grants	303	2,428	651	..
Official creditors	2,200	442	-647	..
Private creditors	1,313	-547	1,519	..
Foreign direct investment	294	459	510	..
Portfolio equity	0	0	39	..
World Bank program				
Commitments	333	376	0	..
Disbursements	217	245	49	..
Principal repayments	25	198	102	..
Net flows	192	47	-53	..
Interest payments	45	122	43	..
Net transfers	147	-75	-95	..



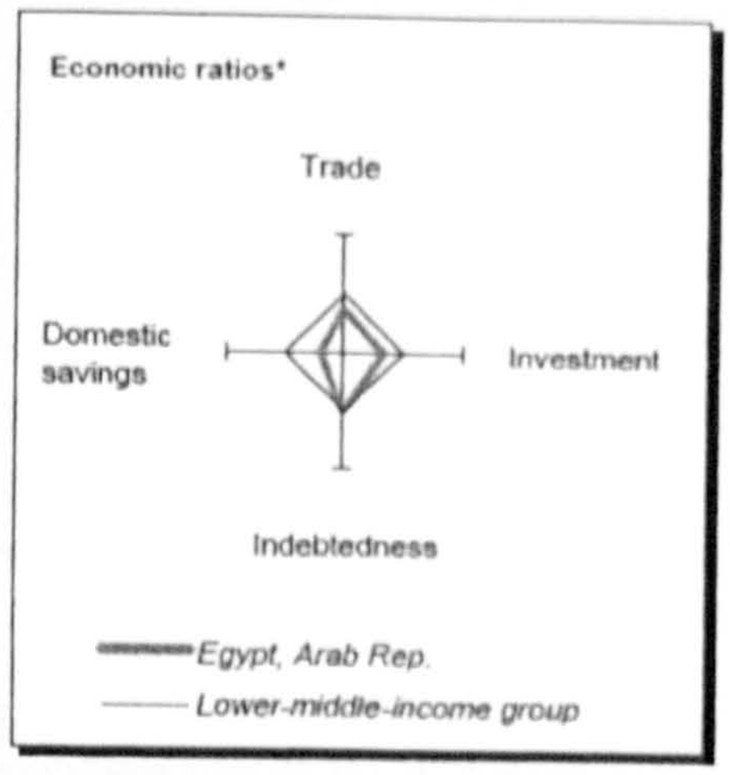
POVERTY and SOCIAL	Egypt	M. East & North Africa	Lower-middle-income
2002			
Population, mid-year *(millions)*	66.4	306	2,411
GNI per capita *(Atlas method, US$)*	1,470	2,070	1,390
GNI *(Atlas method, US$ billions)*	97.6	670	3,352
Average annual growth, 1996-02			
Population *(%)*	1.9	1.9	1.0
Labor force *(%)*	2.9	2.9	1.2
Most recent estimate (latest year available, 1996-02)			
Poverty *(% of population below national poverty line)*	17	..	..
Urban population *(% of total population)*	43	58	49
Life expectancy at birth *(years)*	69	69	69
Infant mortality *(per 1,000 live births)*	35	37	30
Child malnutrition *(% of children under 5)*	4	..	11
Access to an improved water source *(% of population)*	97	88	81
Illiteracy *(% of population age 15+)*	43	35	13
Gross primary enrollment *(% of school-age population)*	100	95	111
Male	103	98	111
Female	96	90	110



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

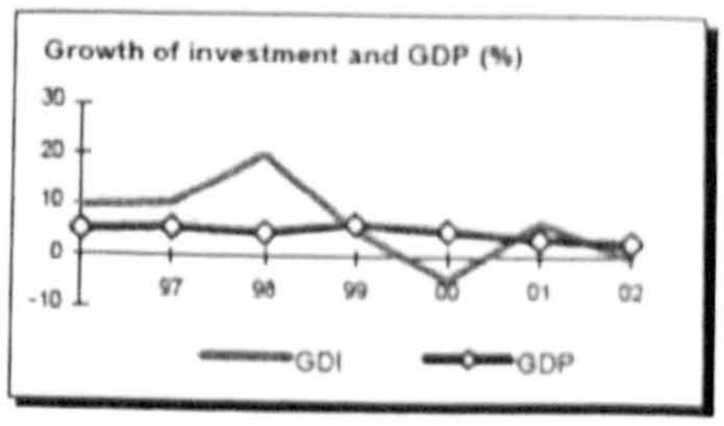
	1982	1992	2001	2002
GDP *(US$ billions)*	25.6	41.9	91.1	83.7
Gross domestic investment/GDP	..	18.2	16.9	16.9
Exports of goods and services/GDP	27.0	29.0	17.4	16.2
Gross domestic savings/GDP	15.2	15.4	12.2	10.4
Gross national savings/GDP	..	25.1	17.5	15.4
Current account balance/GDP	-9.9	6.4	0.0	0.0
Interest payments/GDP	2.3	2.5	0.8	0.9
Total debt/GDP	106.8	74.4	32.1	..
Total debt service/exports	19.3	17.8	8.9	..
Present value of debt/GDP	..	..	27.5	..
Present value of debt/exports	..	..	115.3	..

	1982-92	1992-02	2001	2002	2002-06
(average annual growth)					
GDP	4.5	4.7	3.5	3.0	..
GDP per capita	2.0	2.8	1.6	1.1	..
Exports of goods and services	7.5	2.1	3.3	-10.4	..

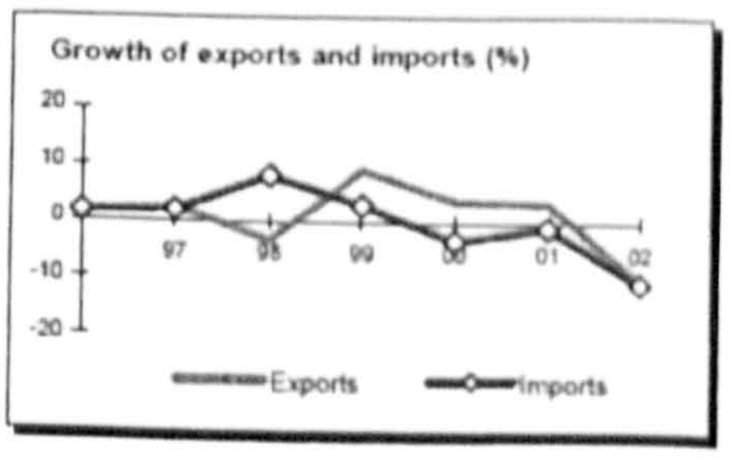


STRUCTURE of the ECONOMY

	1982	1992	2001	2002
(% of GDP)				
Agriculture	19.6	16.5	16.8	16.8
Industry	32.4	33.3	33.1	33.0
Manufacturing	13.3	16.6	19.2	19.2
Services	48.0	50.1	50.1	50.2
Private consumption	67.0	74.2	77.7	79.3
General government consumption	17.8	10.4	10.1	10.3
Imports of goods and services	41.9	31.8	22.1	22.7



	1982-92	1992-02	2001	2002
(average annual growth)				
Agriculture	2.7	3.3	3.3	3.4
Industry	8.6	4.6	0.7	3.6
Manufacturing	5.9	7.1	4.5	4.2
Services	5.1	5.2	5.0	2.7
Private consumption	4.1	4.1	1.3	2.4
General government consumption	0.6	3.1	3.8	6.3
Gross domestic investment	-4.1	7.6	6.7	-0.2
Imports of goods and services	-1.6	2.0	-1.1	-10.8



Appendix 4: A Framework Assessing Foreign Market Entry Issues

Micro (firm-level) distinguishing characteristics

- Extent of product/service diversity
- Extent of geographic coverage
- Number of market segments served
- Distribution channels used
- Extent (number) of branding
- Marketing efforts (e.g. size of sales force)
- Extent of vertical integration
- Product adaptability
- Product/service quality
- Technological leadership
- R&D capability
- Cost position (investments for cost reduction)
- Utilization of capacity
- Pricing policy and flexibility
- Level of gearing
- Ownership structure
- Relationship to influence groups
- Size of organization

External environment influences

- **Economic factors**

Business cycles
GNP trends
Interest rates
Exchange rates
Money supply
Inflation
Unemployment
Disposable income
Energy availability and cost

- **Technological factors**

Government spending on research
Government/industry focus on technology
Invention and Innovation
Speed of technology transfer
Rates of obsolescence

- **Socio-cultural factors**

Population demographics
Income distribution
Lifestyle changes
Attitude to work
Consumerism
Commitment

- **Political/legal factors**

Monopolistic regulation
Environmental protection law
Taxation policy
Foreign trade regulations
Employment law
Government subsidy

The elements of an international market entry strategy **1.Assessing products and foreign markets: choosing the target product/market**	*And home market, in case of any restrictions on certain modes abroad* *Type of product: service intensive, technology intensive SWOT* *Adaptability of product* *Commitment*	**Evaluation of target Market** **1. General political stability** Past political behaviour Form of government Strength and ideology of government Strength and ideology of rival political groups Political, social, ethnic, other conflicts **2. Government policies toward foreign investment (for investment types)** Past experiences and issues of other foreign investors Attitude towards foreign investment Foreign investment treaties and agreements Restrictions on foreign ownership Local content requirements Restrictions on foreign staff Other restrictions on foreign investment Incentives for foreign investments Investment entry regulations **3. Other government policies and legal factors** Enforceability of contracts Fairness of courts Corporate/business law Labour laws Taxation Import duties and restrictions Patent/trademark protection Antitrust and restrictive practices laws Honesty of public officials **4. Macroeconomic factors** Role of government in the economy Government development programmes Size/growth rate of GNP Size/growth rate of population Size/growth rate of per-capita income Distribution of personal income Sectorial distribution Infra structure (communication, transportation,..) Rate of inflation Government policies Price controls Availability and cost of local capital Management-labour relations Free trade areas **5. International payments** Balance of payments Foreign exchange behaviour, position and external indebtness Repatriation restrictions
2. Setting objectives and goals	**Objectives for foreign market entry:** Internal: economies of scale Internal: technology development External-company related: risk reduction External-company related: shaping competition External- market related: new market opportunities External- market related: neo-protectionism	

3.choosing the entry mode (selection of mode after comparisons of modes) Investment mode : JV Investment mode : FDI Contractual mode: Licensing Contractual mode: Management contracts	**Sequence** Screening of all available modes Evaluate external factors Evaluate internal factors Reject inapplicable modes Compare feasible modes- profit analyses Compare feasible modes- risk analyses Compare feasible modes- non-profit analyses Ranking and selection	**Comparative Criteria, favouring one mode, based on:** - Investments needed - Resources needed (limited/substantial) - Commitment (low/high) - Sales (low/high potentials) - Costs (low/high production costs,..) - Profit contribution - Market share prospectus - Reversibility - Desired Control level achievability - Risk - Competition (atomistic/oligopolistic/..) - Marketing infrastructure (poor/good/..) - Attitude towards host government policies (if they are restrictive/liberal to imports or investment,..) - Geographic distance from home (small/great) - Economy nature (dynamic/stagnant) - Exchange controls/rates (appreciating/depr) - Cultural differences Other	**<u>Financial components for entry mode:</u>** **New venture related:** G+ Assets needed to sustain new entry B+ Liabilities incurred as result of new entry B+ Variable costs for new entry B+ Fixed costs for new entry G+ Sales of new entry **Effects on old venture** B- Assets no longer needed or liquidated G+/B- Liabilities change due to shift in operation B+ Variable costs increases due to diseconomies of scale due to volume loss to new operation G+ Fixed costs reduction due to shift of operation B- sales loss in this SBU **Incremental net value** • Net Assets acquired • Net Liabilities incurred • Overall net Variable costs change • Overall Fixed costs burden • Net additional sales (increase)
4. Designing the marketing plan	**Main issues o f concern include:** Extensive marketing research is necessary, Language, Culture Perceptions, Price structure, Approval of standards Staffing, Technological lead, Niche, Established partner Aggressiveness of competitors, Ethics		

Source: developed by researcher

Appendix 5: Complete interview guide

A complete thesis outline and an overall desired outcome of the interview shall be communicated to the interviewee prior to the interview. Necessary definitions of technology and its components, Technology Transfer, foreign market modes of entry, etc. that this study uses, will be presented to interviewee prior to the interview. Permission to record acquired.

I. BACKGROUND DETAILS

Date of interview :_____

1. Location of interview :_____
2. Company name :_____
3. Company address :_____
4. Name of respondent :_____
5. Title of respondent :_____
6. Function of respondent :_____
7. Date respondent joined the company :_____
8. Date of company establishment in Egypt :_____
10. Total number of employees :_____
11. Type: Public/Private enterprise :_____

12. Name of foreign organization:_____
13. Nationality of foreign organization: _____

14. **Main activity of organization (industry):**
    - ( ) Manufacturing of.....
    - ( ) Financial and banking
    - ( ) Pharmaceuticals
    - ( ) Engineering and civil
    - ( ) Oil and Gas
    - ( ) Automotive
    - ( ) Consumer electronics and Appliances
    - ( ) Consumer Products
    - ( ) Raw Materials supplies
    - ( ) IT
    - ( ) Others, *please specify*.....

15. May I get a copy of your **company general publications?**

II Entry and Operation in Egypt

II.1. **Why** did your foreign company choose/accept **Egypt** as host to their activities?

Prompt [Afterwards]:

- *Would you prefer to see a list of the most common reasons of coming to Egypt? Yes-hand-out the following list: Please also indicate the top two important reasons in order*

1. Availability of cheap unskilled labour
2. Availability of skilled highly technical labour
3. Large market potential
4. Educated consumers
5. Country geographical location
6. Government incentives
7. Bank credit and financial facilities
8. Competitive situation in Egypt
9. Economic stability
10. Political stability

Other (Please specify)

II.2. Were there other **alternative internationalisation countries** available to your foreign firm at the time of the decision? Where (regional/worldwide hosts)? Why finally select Egypt versus/with those?

II.3. What are your **foreign corporate objectives in Egypt?**
Prompt [afterwards] for:
- *Short term/Long term objectives*
- *Other than profit, are there any social/developmental targets?*

II.4. What is the legal type of operation of your company in Egypt (mode of operation in Egypt
Prompt [afterwards] for:
- *Joint venture, licensing, etc...*
- *What are the percentages of local/foreign ownership?*

II.5. Has this mode, that you have just indicated, been the initial mode of entry into Egypt, or has this current **mode evolved** from another? In this case, what was the initial mode? Why did the evolution occur? After how long after establishment did this evolution occur?
Prompt [afterwards] for:
- *Please describe the development history of your company*
- *Any major expansions/contractions since investing in Egypt? And why?*
- *Any major product changes? And why?*

II.6. Is your current mode of operation the **foreign company's preferred mode worldwide?** If not, which?
Prompt [afterwards] for:
- *More specifically, does your foreign company have a preferred mode of entry to developing countries?*
- *Would you consider your current mode of operation your optimal preference, or was it imposed by circumstances, government regulations, etc.? if yes, What are they? How do you plan to act?*

II.7. On the positive side, upon making the entry decision, did you sense that **Egypt promoted one mode of entry over another?** Which and How? Do you agree with this promoted mode?
Prompt [afterwards] for:
- *Do you agree with this promotion /or not? Which promotion actually affected your decision?*

II.8. In which other developing countries has your foreign firm employed the same mode of entry? how many years?
Prompt [afterwards] for:
- *What is your assessment of the experience of your foreign company in internationalisation?*
- *What is your assessment of the experience of the foreign company in the mode used in Egypt?*
- *In your opinion, can you compare your foreign company's same mode, but in different countries?*

II.9. How do you describe the **advantages of one mode of entry over another?**
Prompt [afterwards] for:
- *What are the bases of assessment? Control, equity, risk, profitability, ...*
- *Emphasize JVs Vs other modes*

III. Technology And Related-issues

III.1. Using the definition of technology that we discussed at the beginning, how do you **evaluate your company's current technological level** (staff know-how, equipment age, ...) especially in addressing the local market needs and Export demands? (internal perspective)
Prompt [afterwards] for:
- *How would you classify the end product that you have today (for example hi-tec, medium tech, low tech.)?*
- *Do you think that the technology you use fits (i.e. appropriate) the current needs of Egypt, or is it higher/lower?*
- *Do you think that the technology you use fits (i.e. appropriate) the future needs of Egypt, or is it higher/lower?*

III.2. How many years, if applicable, do you estimate the **technological gap** between technology used in your company and that used by your foreign firm HQ?

Prompt [afterwards] for:

- *Where it exists, what in your opinion is the reason for the gap?*
- *Mainly in the following particular focus areas:*

Technology component	*Gap measured in years*
Software: *Staff know-how* *Staff independence* *Other large gap component, please specify……*	
Hardware: *Equipment and machinery (date, usage, maintenance,...)* *Contribution to overall capacity* *Other large gap component, please specify……*	
Process: *Efficiency* *Economies of scale* *Quality* *Other large gap component, please specify……*	

III.3. Is technology of **relative importance to your existence in Egypt? And what are your views on technology utilization in Egypt?**
Prompt [afterwards] for:

- *What is the trend for technology valuation? Overvalue/undervalue/Ignorance?*
- *New laws on technology obsolescence*
- *Competitors/competitive advantage*
- *Receptiveness of Egypt to technology*
- *What is Egypt's added value to the technologies used today? Localization of equipment/service?*

III.4. In your terms, how do you **define Technology Transfer?**

III.5. Please, skim through the following ***...HAND-OVER...*** **list of means and purposes involving technology transfer** and mark them if you feel that they have occurred in your company through this means or/and for this purpose.

Means and purposes involving Technology Transfer

Examples of Management' Technology Transfer situations	Applicable ▪	Not important X	Moderate -	Important ✓
Purposes:	O	☐	☐	☐
- *Specify……*	O	☐	☐	☐
+ Increase general profitability	O	☐	☐	☐
+ Improve services rendered to customers	O	☐	☐	☐
+ Corporate strategy understanding	O	☐	☐	☐
+ Supplier development	O	☐	☐	☐
+ Increase entrepreneurial skills	O	☐	☐	☐
+ Increase creativity and drive	O	☐	☐	☐
+ Increase Environmental consciousness	O	☐	☐	☐
+ Raising national Reputation	O	☐	☐	☐
+ Best practice awareness	O	☐	☐	☐

	Applicable	Not Important	Moderate	Important
Means:	O	□	□	□
- *Specify*……	O	□	□	□
- Human Resource Development	O	□	□	□
--Staff general training and orientation	O	□	□	□
-- Local training (administrative and technical)	O	□	□	□
--Foreign training	O	□	□	□
--Onsite-training	O	□	□	□
- Mobility of HR	O	□	□	□
- Employment of Expatriates	O	□	□	□
- Conferences and seminars	O	□	□	□
- Legal and Administrative interactions	O	□	□	□
- Code of conduct obligations	O	□	□	□
- Technology Transfer clauses in contracts	O	□	□	□
Examples of Product' Technology Transfer situations	▪	X	-	✓
Purposes:	O	□	□	□
- *Specify*……	O	□	□	□
+ Increase product range	O	□	□	□
+ Ownership of new modifications/localized rights	O	□	□	□
+ Increase quality perception	O	□	□	□
+ Enhance speed to market	O	□	□	□
+ Export of end products	O	□	□	□
Means:	O	□	□	□
- *Specify*……	O	□	□	□
- Product designs	O	□	□	□
- Product blue prints	O	□	□	□
- Product troubleshooting training	O	□	□	□
Examples of Process' Technology Transfer situations	▪	X	-	✓
Purposes:				
- *Specify*……	O	□	□	□
+ Re-export of machinery	O	□	□	□
+ Cost reduction	O	□	□	□
+ Improvement of performance standards	O	□	□	□
+ Lowering of transport costs	O	□	□	□
+ Lowering of labour costs	O	□	□	□
+ Developing technology recommendation systems	O	□	□	□
+ Improve materials procurement	O	□	□	□
Means:	O	□	□	□
- *Specify*……	O	□	□	□
- Equipment design	O	□	□	□
- Improve supplier linkages	O	□	□	□
- Production technology detailing	O	□	□	□
- Maintenance training/learning for equipment	O	□	□	□
- Installation of equipment	O	□	□	□
- Alterations and additions to equipment	O	□	□	□
- Plant designs, documents, drawings, layouts	O	□	□	□
-/+ Inspection systems implementation	O	□	□	□
-/+ Control systems implementation	O	□	□	□
-/+ Quality systems implementation	O	□	□	□
-/+ Evaluation systems implementation	O	□	□	□

III.6. Has your company locally experienced clear **Technology Transfer occurrences? Pls elaborate.**
Prompt [afterwards] for each occurrence:
- *Which areas of the company?*
- *Which stage on the time span of your company?*
- *Was it mode related?*
- *Who were people involved? May I Meet them..?*

III.7. Are you and other managers **pleased with the a/m occurrence? Was it rewarded?**
What were the benefits/drawbacks of this occurrence in the way it occurred?
Prompt [afterwards] for
- *Was this technology transfer occurrence formal/informal?*
- *Do you expect it to repeat?*
- *Have you taken any repeat related actions?*

IV. Technology-specific' mode developments

Prompt that now this section relates to the mode of entry aspects....

IV.1. Has **technology played a role in the selection of Egypt** versus other prospect countries? How?

IV.2. Has **technology played a role in the selection of your current mode of entry** versus alternative modes? And in your opinion, Do you believe that one mode of entry can transfer technology more than another? Which and how?

IV.3. What **factors triggered the Technology Transfer** occurrences that you have previously mentioned? How often do you encounter these triggers in particular? Which were mode specific?
Prompt [afterwards] for:
Are there any other triggers that you might suspect?

IV.4. From a mode-only perspective, would you say that your current **mode of entry promotes/hinders Technology Transfer?** Please specify.
Prompt [afterwards] for:
- *Comparison to the original mode of entry if any*

IV.5. If applicable to your company, when your **mode transition** occurred, how do you describe the Technology Transfer gains/losses?
Prompt [afterwards] for:
- *Incremental transfer/ Decremental transfer*

IV.6. Do you think that the **size of your investment** in Egypt has positive/negative/no **correlation** with Technology Transferred?
Prompt [afterwards] for:
For example, did the high/low learning pattern of your staff encourage you to invest more/less in Egypt?

IV.7. Do you think that technology transferred within your mode, has positive/negative/no **correlation with the balance of your staff mix** (that is local: foreign)?
Prompt [afterwards] for:
For example, which is the case: the more the foreigners the more the transfer, 50:50, or the more the locals the bigger the gain?

IV.8. What **effect**, in your opinion, does **technology transferred** from your investment in Egypt have on **national development?**
Prompt [afterwards] for:
- *Policy effects*
- *Economical effects*
- *Human resource effects*
- *Cultural effects*
- *Other...pls specify.....*

V.A. POLICY [Macro- Related]

V.A.1. In your opinion, what global **factors hinder Technology Transfer occurrence?** Do you encounter these?
Prompt [afterwards] for:
Anti-culture, political conflicts, BIT/RIFS/..,

V.A.2. In your opinion, what global **factors hinder mode development?** Do you encounter these?
Prompt [afterwards] for: ...same as above....

V.A.3. In your opinion what are **requirements of Technology Transfer** had Egypt wanted to promote it on a national level? What are the costs of each of these requirements?

V.A.4. What are your views on the **policy framework that Egypt offers** to investors? And what are your views on the effects of this framework on the technology transfer issues of your company?
Prompt [afterwards] for:
- *For example, were there any policies clearly dictating technology transfer?*
- *How? At what stage of development of your operation (beginning, after a few years)?*
- *Restrictive policy framework? Prohibitive? Redundant? How?*
- *What are effects of Sub-frameworks, such as:*
  Entry-law.....Operation law.....Incentive law

V.A.5. What are your views on the **economic framework that Egypt offers** to investors? And what are your views on the effects of this framework on the technology transfer issues of your company?
Prompt [afterwards] for:
- *Economical stability (exchange rate, interest rate, transfer of funds,..)*
- *Tax law*

V.A.6. What are your views on the **political situation that Egypt offers to investors?** How does this situation affect both investments and technology transfer in your opinion?
Prompt [afterwards] for:
- *Political stability*
- *Political backing for new ventures versus old ventures?*
- *Arbitration*

V.A.7. Are there any **bilateral agreements** or treaties between your foreign country and Egypt? Has this helped your overall situation in Egypt? Do you feel that such arrangements can facilitate Technology Transfer?
Prompt [afterwards] for:

↗ *IPR*	↗ *Finance*	↗ *Long term interests*

V.A.8. Has your investment been involved or active in **attracting new investments** into Egypt, Directly or Indirectly?

V.A.9. What are your **future views on Technology Transfer?** What promotional actions by Egyptian government do you recommend?
Prompt [afterwards] for:
- *Importance of Technology Transfer as opposed to giant leaps in Technology hard to catch up with?*
- *Importance of Technology Transfer as opposed to low price competition, hard to achieve anyway?*

V.A.10. In light of the current situation in Egypt and your overall assessment of it, how do you foresee the **Future outlook of investments?** What government policy/action do you recommend?
Prompt [afterwards] for:

Promising	*Investment facilitating*	*Would you prefer to pull out had your capital investment been returned?*	*Main problems that hurt business?*

V.B. POLICY [Micro- Related]

V.B.1. What has been the **strategic role of your investment in Egypt?** Is this role likely to change in near

future?how?
Prompt [afterwards] for:
Marketing, Services, Sales and distribution, Manufacturing, ...areas

V.B.2. Describe the **original characteristics of local partner** prior to cooperation? And what were the criteria when he was screened?
Prompt [afterwards] for:
- *Industry*
- *Size*
- *Years in business*
- *Who made the initiative for cooperation*
- *Staff capabilities*

V.B.3. Do your local staff conduct **successful interaction with foreign Head Quarters?**
Prompt [afterwards] for:
- *Do you feel that the local staff compete or complement Head Quarters functions/interests?*
- *Do you feel that the local staff have transferred technology back to HQ?*
- *Cultural differences*
- *Insecurity in some positions*
- *After technology transfer drain and leave Egypt*
- *Loyalty issues*

V.B.4. For the various components of technology, How do you describe the **learning patterns** of the local staff on the various levels of company hierarchy:
Prompt [afterwards] for:
- *Top management, Technical staff, Labour, Finance, Administrative, Marketing*
- *What is the most effective means of learning? Costs, Durations, Pre-Requisites,...*

Further Prompt [afterwards] for:
- *Foreign HQ training*
- *Local in-house training*
- *Printed material*
- *Diffusion and interaction*
- *Other*

V.B.5. How many **local employees** do you have? And how many **expatriates?**
Prompt [afterwards] for:
- *In which areas of the business do the expatriates work? Why, aren't Egyptians' salaries more economical?*
- *How mobile are your HR?*
- *Are your employees capable of installing and operating any new equipment?*

V.B.6. Who guarantees your end product? Do you implement an international warranty policy?

V.B.7. Do you have any **R&D** functions? Who decides on the R&D criteria?
Prompt [afterwards] for:
- *New product development/product customisation/product localization/new process development/process improvement?*
- *Are R&D activities integrated globally? And if so, how?*
- *What is the role of the company's R&D, now and in the future?*

V.B.8. What do you think have been the technological development and **R&D impacts of your company** on Egypt?
Prompt [afterwards] for:
New Product portfolio, New product/service quality, Price, Export competitiveness, Import substitution, International reputation

V.B.9. Compared to your subsidiaries in Europe, do they experience **formalized Technology Transfer** and can these formalizations be implemented in Egypt?
Prompt [afterwards] for:

- *R&D reasons?*
- *Intellectual property rights (IPR) technology transfer protected?*
- *Faster learning curve?*

V.B.10. In your opinion, what are your **internal factors hindering Technology Transfer occurrence?**
Prompt [afterwards] for:

- *Do you consider the Technology Transfer occurrences that you experience in your company One-off? Or an ongoing process?*
- *What actions are you taking to overcome these barrier factors?*
- *What are the costs and requirements for promoting Technology Transfer on the micro level?*

V.B.11. How do you describe the **involvement of the foreign company in operations of your company?** Which departments in particular? How often? For what purpose?
Prompt [afterwards] for:

- *Control, quality assurance, financial, etc.*
- *Can you operate with no Head Quarter's involvement at all*
- *Who determines your investment in, and what are your procurement rules for: New product technology, new process technology, new information technology*

V.B.12. Are there any **Technology Transfer related clauses in your contract** between local and foreign partners? Who prepared this contract? Were these clauses disputed during negotiations? *Prompt [afterwards] for:*

- *Future use of technology*
- *Patents*
- *New developments*
- *In your opinion what are costs and requirements of Technology Transfer had your local partner wanted to promote it?*
- *Other...may I get a blank-non-confidential copy...*

V.B.13. Does your company have a **formal technology recommendation system? If not,** would you consider implementing one?
Prompt [afterwards] for:

- *Do you need HQ approval for implementing such a system?*

V.B.14. What are/would be the most **important considerations of your technology recommendation system?**
V.B.15. Who set your company's performance standards? On what basis? Did you make any local inputs to these standards? Are you ISO certified? Why?
Prompt [afterwards] for:

- *Exports*
- *Image*
- *Other...pls specify*

V.B.16. Describe your company's **relationships with local supplier networks, government and financial institutions.**
Prompt [afterwards] for:

- *Cooperative, Sceptical, Hesitant, Non-existent or Delays*

V.B.17. Has your investment been involved or active in **attracting new investments into Egypt?** Directly or indirectly?

V.B.18. What **other company venturing** have been undertaken from your company?
Prompt [afterwards] for:

- *Purchase of local private sector companies?*
- *Purchase of local privatised public sector companies?*
- *Spin out by employees*
- *Investments in suppliers (financial/ technical /staff...?)*
- *Supplier referrals to new customers (local/ international?)*
- *Investments in local funds*

- *Other corporate ventures*

General conclusion

Would you like to make any comments or suggestions regarding our discussions or the nature of the research? *Prompt [afterwards] for:*

- Openness of respondents
- Validity of data
- Return for expert opinion
- Do you recommend a particular company for this research
- Would you like a copy of the results of this survey
- May I get a copy of the technology related clauses of your contract, or a non-confidential blank version?

THANK YOU.....Prompt for return ....

Interview guide annex: Technology Recommendation system' considerations

Technical considerations	Economic considerations	Legal considerations	Marketing considerations
Product quality	Initial cost	Scope of grant,.	Quality perception of product range
Product range	Running cost	Right of use	Market size
Commercial viability	Cost of licence/services (including expansion cost)	Right to sell,	Area limitations,
Maturity	Sub-licence fees, plant cost, production cost.,..	Right to expand,	Technical services back up,
Reliability	Other economic factors	Scope of indemnity	R&D improvements
Turn-down ratio		Licensor standing,	Technical co-operation,
Flexibility		Title to technology,	Market presence: product distribution in the targeted market areas,
Environmental impact		Scope of process guarantees,	Share in world-wide sales,
Improvements		Applicable law	Captive use
Commissioning		Other.... Specify	Others...specify
Training			
Basic engineering			
Complexity Vs ease of use			
R&D cooperation			
Future back up			
Safety and health			
Other technological factors			

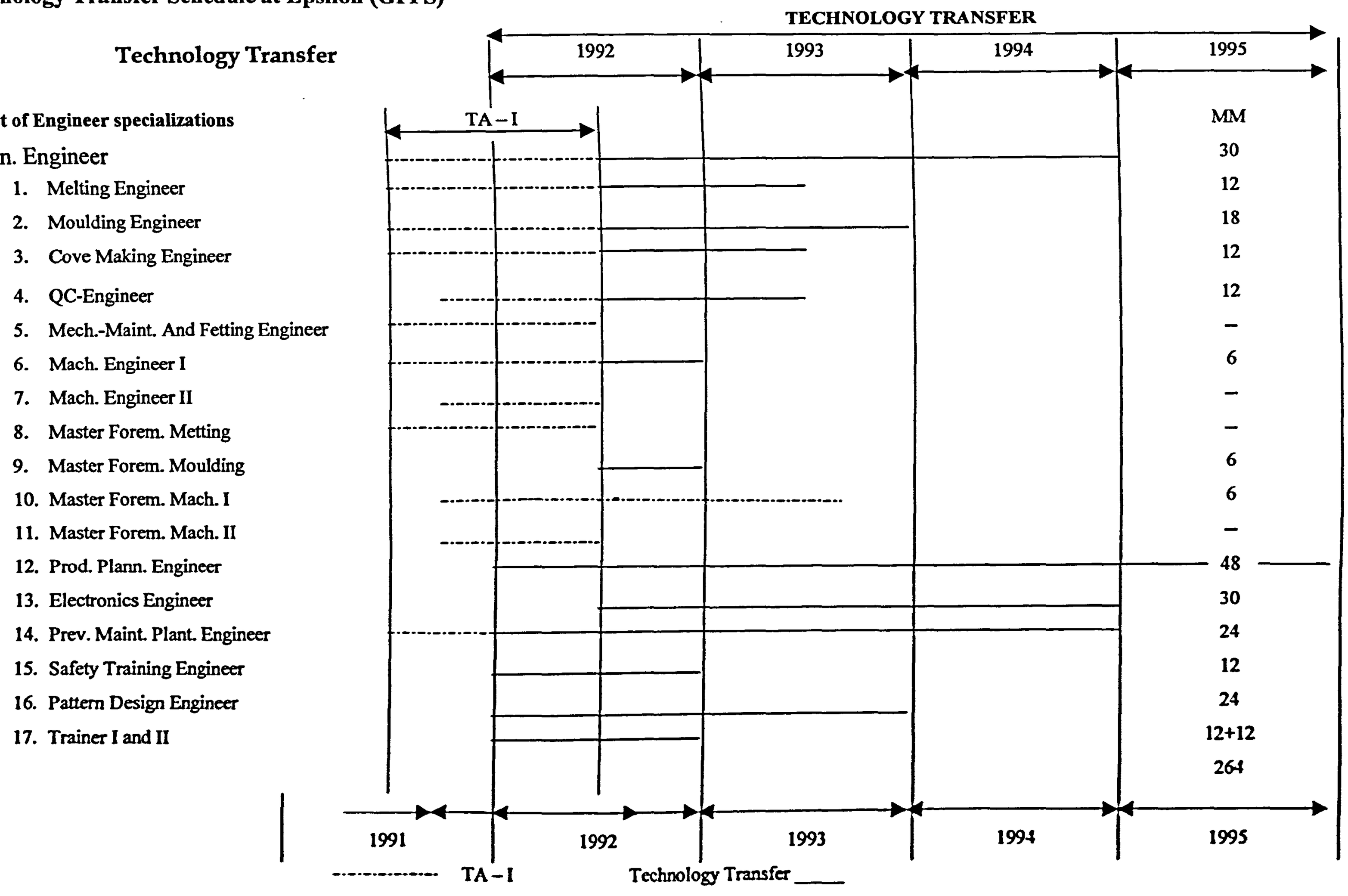
Appendix 6: Core Know-how Documentation of Epsilon's Partners TRT and GFFS

- Specification and characteristics of raw and auxiliary materials
- Recommendations for analyses and mixtures
- Inspection and quality control and test specifications (quality parameters) of the products in various stages of production
- Methods of production process including manuals referring to the different steps of production, e.g. melting, pouring, core-making, annealing, ..
- Method of maintenance
- Safety requirements
- Trouble shooting
- An administrative and technical structure for the plant
- A staffing plan for the plant to include its staffing requirements, job descriptions and the minimum qualifications required for each job
- Operating instructions, including start-up operation and shut-down for normal running, process description for each operation and process
- A pay compensation system to ensure for the project well educated staff and skilled workers and to promote a pay scheme to reward efficiency and provide bonuses for accomplished targets
- Production plans including a start-up plan and inventories
- An production accounting system, a scheme of financial reporting and detailed produces for the preparation of financial statements including, without limitation, profit and loss statement, balance sheet, cash flow budgeting in operation and capital investment
- Audit and assets control system
- Cost analyses and control systems
- Production control systems including inventory control and material, supply system
- Internal and external transportation systems

Appendix 7: Objectives of Technical Assistance at Epsilon (Know-how Transfer Areas)

- Implementing and continuous improvement of all systems, procedures, plans, structures and schemes referred to in the know-how documents. Developing and implementing of whatever management and control systems and techniques as may be necessary to ensure that the plant can be operated efficiently and profitably on a continuing basis.
- Maximizing production of the work with due regard to well-established management and operating practices.
- Maintaining the works and equipments in good operating condition adhering to the operating and maintenance requirements specified in the maintenance manuals.
- Establishing and implementing an efficient system of preventive and routine maintenance for the works based on adequate equipment records and operating histories.
- Developing and implementing appropriate production and quality control procedures including the utilization of accurate measurement procedures and devices, the maintenance of log sheets and the recording of raw materials and utilities consumption, so as to maintain high production efficiency, minimize losses and identify sources, if any, of operating inefficiencies.
- Taking all steps necessary to minimize at all times production costs with due regard to prudent operating practices. Implementing a production cost control system for issuance of variance and cost analyses on a monthly basis, and instituting a safety and accident prevention system aimed at protecting the plant's employees and assets, and develop disaster control procedures providing adequate staff instruction and training.
- Establishing a technical department within the plant, this department shall undertake appropriate studies of the plant's processes, operations, raw materials, and products so as to continuously improve the plant's technical and operational standards – develop economic plans as justified by technical, economic and market conditions – carry out as far as possible, studies, designs and implementation programmes to manufacture, modify or repair in Egypt, either directly or through outside existing Egyptian facilities, certain spare parts, components and equipment required for the maintenance of the works to secure smooth continuous operation thereof. Within the technical department a special engineering sub-department shall be built up in which the personnel will assisted in the planning of complete pipe systems.
- Taking the necessary actions to attain full production capacity as soon as possible and establishing technical and operating practices based on Know-How Documentation.
- Implementing efficient production planning and scheduling in accordance with actual market needs in order to minimize running stock of products and to produce the most profitable items.
- Improving and implementing systems to control labour cost.
- Developing further training programmes for staff and workers to achieve, maintain and upgrade the technical level and managerial skills of Epsilon's Egyptian employees.

Appendix 8: Technology Transfer Schedule at Epsilon (GFFS)



Appendix 9: The Code of Conduct of Beta

A brief of issues addressed in Beta's Codes of conduct, are:

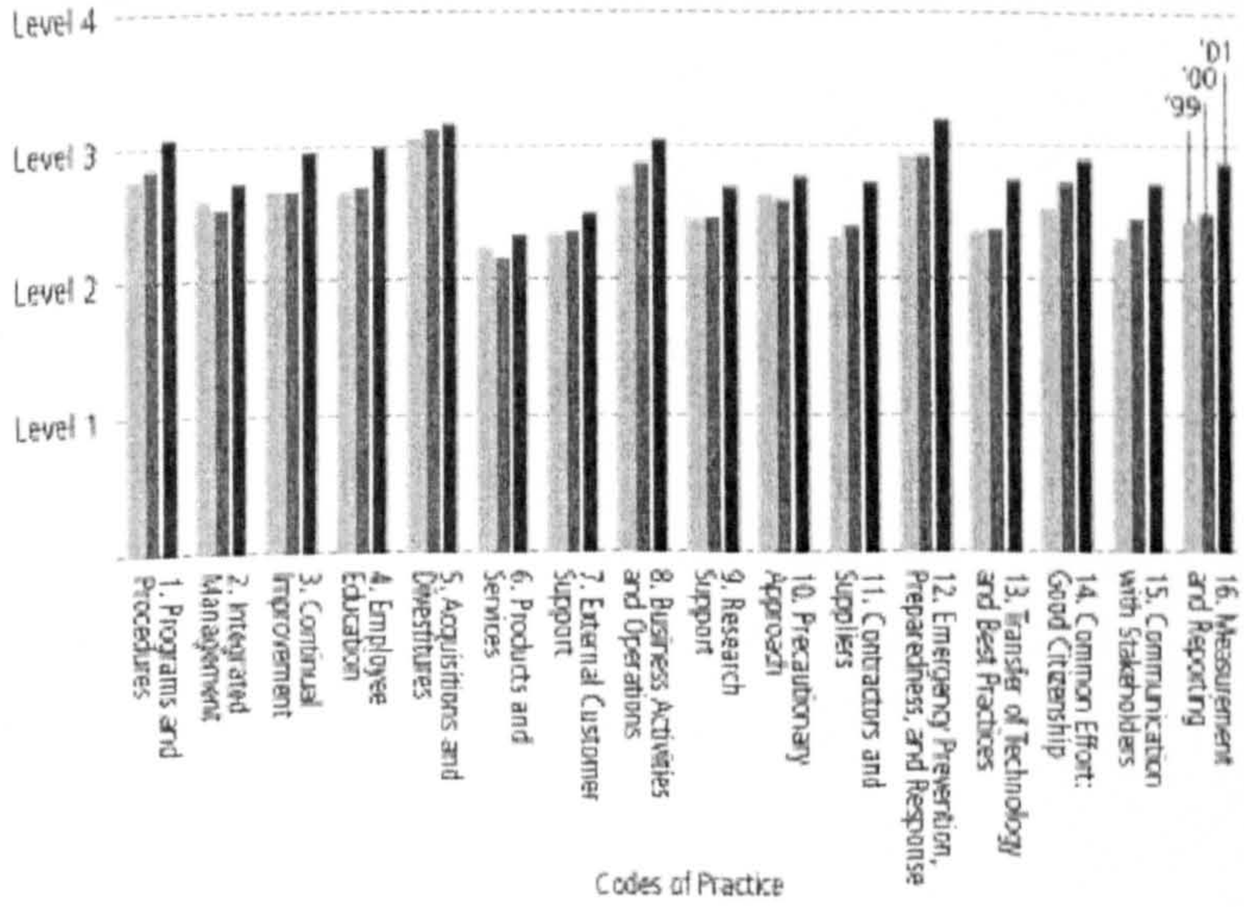
1. ***Programmes and Procedures.*** *Each business function and facility shall establish and implement goals, programmes and procedures in order to: conduct operations safely and in an environmentally-responsible manner; ensure conformance with all applicable and relevant laws, Company policies and requirements and tie the function's and facility's performance to corporate and division goals and objectives.*
2. ***Integrated Management.*** *Each business function and facility shall integrate the code's programmes and procedures into its business activities, as appropriate.*
3. ***Continual Improvement.*** *Each business function and facility shall ensure that Company requirements are periodically evaluated, and continuously improved to enhance worker health, safety, and environmental protection. Evaluations shall take into consideration technical developments, recognized best practices, scientific understanding, and customer, community and other stakeholder expectations.*
4. ***Employee Education.*** *Each business function and facility shall educate, train and motivate employees to conduct their activities safely and in an environmentally responsible manner. Employee training will be sufficient to fulfil employees' responsibilities and comply with applicable code requirements. An Arabic language health and safety guidance manual is used at the facility to train those employees who have limited English language skills.*
5. ***Acquisitions and Divestitures.*** *Each business shall identify impacts and evaluate potential risks and liabilities for all acquisitions, divestitures and joint ventures.*
6. ***Products and Services.*** *Each business function and facility shall identify, evaluate and minimize the function and facility's direct and indirect impacts for every major product line and service provided.*
7. ***External Customer Support.*** *Each business function and facility shall ensure that the known hazards or negative impacts of its products are appropriately communicated to potentially affected customers, distributors and the public.*
8. ***Business Activities and Operations.*** *Each business function and facility shall identify, evaluate and minimize the function and facility's code impacts.*
9. ***Research Support.*** *Each business function and facility shall conduct or support research to develop solutions to significant challenges associated with the function and facility.*
10. ***Precautionary Approach.*** *Each business function and facility shall take the necessary precautions to prevent negative effects as a result of its activities. Modifications to the function's and facility's activities shall comply with code requirements.*
11. ***Contractors and Suppliers.*** *Each business function and facility will encourage suppliers and contractors to adopt policies and practices consistent with Beta own and to demonstrate a commitment to environmentally responsible products, services and management. Suppliers and contractors shall provide product/services that comply with applicable code requirements.*
12. ***Emergency Prevention, Preparedness and Response.*** *Each facility shall develop, implement and maintain emergency prevention, preparedness and response plans to address unexpected incidents. If a plan is needed, it shall be coordinated with emergency services, relevant authorities and the local community. Each business function shall assess its potential for incidents and participate, if appropriate,*

in the emergency planning process. Plant personnel review the emergency response plans with civil defence organizations. Moreover, external emergency responders participate in fire drills at the facility to simulate possible actions in case of an emergency. In 2000, the facility did not have any recordable accidents and has not had a lost-time injury in more than 4.5 years.

13. ***Transfer of Technology and Best Practices. Each business function and facility shall participate in the transfer of technology and best practices related to performance and management systems. Information transfer shall occur both internally and externally.***
14. ***Common Effort: Good Citizenship.*** *Each business function and facility shall contribute, as appropriate, to public policy and to business, governmental and educational initiatives that will enhance code awareness and protection in the community. Facility personnel hold meetings with neighbours to answer questions about plant operations and promote a positive relationship in the community.*
15. ***Communication with Stakeholders.*** *Each business function and facility shall foster openness and dialogue with Company and external stakeholders, anticipating and responding to their concerns about the potential hazards and impacts of products and operations.*
16. ***Measurement and Reporting.*** *Each business function and facility shall measure its performance through audits and self-assessments.*

17.

Management System Self-Assessment Results
Level of performance for each Code of Practice weighted by number of employees per division



18.

Appendix 10: A Chronological List of Developments in Operations of Alpha Group

1958: Introduction of advertising slogan ("...hopefully covered by Alpha")
1959: Resumption of foreign business activities with opening of an office in Paris
1966: Opening of a management office in Italy
1974: Foreign expansion stepped up: including Great Britain, the Netherlands, Spain, and Brazil
1976: Establishment of the property and casualty insurance business in the U.S.
1984: **Purchase** of a stake in Riunione Adriatica di Sicurtà (RAS), Milan
1986: **Takeover** of Cornhill Insurance PLC, London
1989: **Purchase** of a stake in the French insurance group Via/Rhin et Moselle
1990: **Takeover** of the state insurance company of the former East Germany
1990: Beginning of activities in Eastern Europe, e.g. **purchase** of Hungária Biztosító,
1991: **Acquisition** of the US insurer Fireman's Fund Insurance Company, California
1995: **Acquisition** of the ELVIA Group, Zurich, Lloyd Adriatico, Trieste, etc.
1995: **Purchase** of a stake in the Australian insurance provider Manufacturers' Mutual Insurance Group, Sydney(today Alpha Australia Limited)
1997: Development of the health insurance provider of Alpha
1997 : **Acquisition** of Assurances Générales de France (AGF), Paris
1998: Strengthening of portfolio management as a core business through establishment of Alpha Asset Management GmbH, Munich
1999: Beginning of expansion in Asia: e.g. founding of a **joint venture** in China, Alpha Dazhong Life, and **acquisition** of First Life Insurance Co., Ltd, South Korea
1999: Introduction of the new Group logo for all Group companies
2000: **Purchase** of the U.S. asset management company Pimco Advisors L.P., California
2000: First listing of Alpha stock on the New York Stock Exchange
2000: **Purchase** of the US asset manager Nicholas-Applegate, San Diego, California
2001: **Takeover** of Dresdner Bank