

ANGLIA RUSKIN UNIVERSITY

**INNOVATION POLICY TRANSFER IN DEVELOPING COUNTRIES: A COMPARATIVE
ANALYSIS OF ORGANISATIONAL SCHEMES IN THE NATIONAL INNOVATION
SYSTEMS OF EGYPT AND MOROCCO**

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requirements of Anglia Ruskin University
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This work is original except where stated otherwise, and is not the result of collaboration. It has not been submitted for a degree at any other university.

Sandra Selmanovic

March 2015

ANGLIA RUSKIN UNIVERSITY

ABSTRACT

LORD ASHCROFT INTERNATIONAL BUSINESS SCHOOL

DOCTOR OF PHILOSOPHY

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By SANDRA SELMANOVIC

March 2015

Abstract

The practice of forcing onto developing countries policies developed in other contexts assumes standardised paths to social and economic growth. These policies should enable rapid economic development by “correcting” local market inefficiencies, without considering the role these may have in preserving stability and preventing violence. Moreover, this approach does not address the compatibility of such policies with the culture, values and norms of the receiving country.

The thesis aims at extending our understanding of success factors for policy transfer, focusing on organisational schemes for innovation support. It follows the pragmatic research paradigm and adopts a deductive approach using mixed methods to study the link between administrative efficiency and innovation performance in developing countries, an under-researched area. This thesis argues that policies successfully implemented in culturally proximal contexts are more likely to lead to similar results in the receiving context.

The results of the quantitative analysis indicate a strong relationship between administrative efficiency and innovation performance in low-middle income countries in the Middle East and North Africa. The performance of organisational schemes supporting innovation in the national innovation systems of Egypt and Morocco is qualitatively assessed on the basis of 72 face-to-face interviews with entrepreneurs, policy makers and academics. The research finds that similar organisational schemes have produced similar results in the two case studies,

confirming the working hypothesis and supporting an approach to policy transfer based on “relevant” good practice.

KEY WORDS: *Innovation Support, Administrative Efficiency, Organisational Schemes, National Innovation System, Policy Transfer, Cultural Proximity, Developing Countries, Socio-Economic Development*

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Table of acronyms

AE	Administrative Efficiency
ANAPEC	Agence Nationale de Promotion de l'Emploi et des Compétences (Morocco)
ANPME	Agence Nationale de la Petite et Moyenne Entreprise (Morocco)
ASRT	Academy of Scientific Research and Technology (Egypt)
ASTEC	Association des Sociétés du Technopark (Morocco)
AUC	American University in Cairo
BER	Business Environment Ranking
CEDO	Career and Entrepreneurship Development Office (CEDO)
CEO	Chief Executive Officer
CGEM	Confédération Générale d'Entreprises du Maroc
CII	Composite Innovation Index
CIS	European Community Innovation Survey
CMI	Centre Marocain d'Innovation
CNEA	Commission Nationale de l'Environnement des Affaires (Morocco)
CNRST	Centre National de la Recherche Scientifique et Technique (Morocco)
CPIRSDT	Comité Permanent Interministériel pour la Recherche Scientifique et le Développement Technologique (Morocco)
DBR	Doing Business Report (World Bank)
EBN	European Business and Innovation Centre Network
EC	European Commission
ECIPIT	Egyptian Centre for Intellectual Property and Information Technology
ECOSOC	United Nations Economic and Social Council
EDP	Entrepreneurship Development Programme (Egypt)
EFSA	Egyptian Financial Supervisory Authority
EGP	Egyptian Pounds
EGYPO	Egyptian Patent Office
EIC	Embedded Systems and Integrated Circuit Competence Centre (Egypt)
EIPC	Entrepreneurship and IP Commercialisation Centre (Egypt)
EIS	European Innovation Scoreboard
EIU	Economist Intelligence Unit
ELLC	E-learning Competence Centre (Egypt)

EPO	European Patent Office
ERP	Enterprise-Resource-Planning
ETTIC	Egyptian Technology Transfer and Innovation Centre
EU	European Union
FDI	Foreign Direct Investment
FTTC	Foreign Trade Training Centre
GAFI	General Authority for Investment (Egypt)
GCR	Global Competitiveness Report
GDP	Gross Domestic Product
GERD	Gross Expenditure on R&D
GIS	Global Innovation Scoreboard
GNP	Gross National Product
HCST	Higher Council for Science and Technology (Egypt)
IASP	International Association of Science Parks
IC	Integrated Circuits
ICT	Information and Communications Technology
IDA	Industrial Development Agency (Egypt)
IDS	Industrial Development Strategy
IDSC	Information and Decision Support Centre (Egypt)
IDV	Individualism Index
IEN	International Enterprise Network
IFC	International Finance Corporation
ILO	International Labour Organisation
IMC	Industrial Modernisation Centre (Egypt)
IMF	International Monetary Fund
IP	Intellectual Property
IPR	Intellectual Property Rights
ISO	International Organization for Standardization
IT	Information Technology
ITIDA	Information Technology Industry Development Agency (Egypt)
IUS	Innovation Union Scoreboard
JPO	Japanese Patent Office

KPI	Key Performance Indicator
LTO	Long versus short term orientation
MAD	Moroccan Dirham
MAS	Masculinity Index
MASciR	Moroccan Foundation for Advanced Science, Innovation and Research
MCIT	Ministry of Communications and Information Technology (Egypt)
MDG	Millennium Development Goal
MEK	Misr El Kheir (Egypt)
MENA	Middle East and North Africa
MHESR	Ministry of Higher Education and Scientific Research (Egypt)
MHESRPT	Ministry of Higher Education, Scientific Research and Professional Training (Morocco)
MITC	Moroccan Information Technology Company (Morocco)
MTINT	Ministry of Trade, Industry and New Technologies (Morocco)
MMPS	Ministry of the Modernisation of Public Sectors (Morocco)
MNF	Maroc Numeric Fund (Morocco)
MOEF	Ministry of Economy and Finance (Morocco)
MOF	Ministry of Finance (Egypt)
MOHE	Ministry of Higher Education (Egypt)
MOSR	Ministry of Scientific Research (Egypt)
MSAD	Ministry of State for Administrative Development (Egypt)
MSCC	Mobile Social and Cloud Computing Competence Centre (Egypt)
MTI	Ministry of Trade and Industry (Egypt)
MUSCAT	Mubarak City for Scientific Research & Technology Applications (Egypt)
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne (Statistical Classification of Economic Activities in the European Community)
NGO	Non-governmental organisation
NIE	New Institutional Economics
NIS	National Innovation System
NM	Nahdet El Mahrousa (Egypt)
NPIE	National Pact for Industrial Emergence (Morocco)
NPL	New Public Leadership

NPM	New Public Management
NTRA	National Telecommunication Regulatory Agency (Egypt)
OECD	Organisation for Economic Co-operation and Development
OMPIC	Office Marocain de la Propriété Intellectuelle et Commerciale (Morocco)
PA	Public Administration
PCT	Patent Cooperation Treaty
PDI	Power Distance Index
PhD	Doctor of Philosophy
PM	Public Management
PTR	Prestation Technologique Réseau (Morocco)
R&D	Research and Development
RDI	Research Development and Innovation Programme (Egypt)
RDT	Réseau de Diffusion Technologique (Morocco)
RME	Réseau Maroc Entreprendre (Morocco)
RMIE	Réseau Marocain d'Incubation et d'Essaimage (Morocco)
SCM	Standard Cost Model
SFD	Social Fund for Development (Egypt)
SII	Summary Innovation Index
SMEs	Small and medium size enterprises
STDF	Science Technology Development Fund (Egypt)
SVC	Smart Village Company (Egypt)
TDF	Technology Development Fund (Egypt)
TDP	Technology Development Programme (Egypt)
TIEC	Technology Innovation and Entrepreneurship Centre
TIP	Technology Incubation Programme (Egypt)
TISC	Technology Innovation Support Centres (Morocco)
TTO	Technology Transfer Office
UAI	Uncertainty Avoidance Index
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference for Trade and Development
UNDP	United Nations Development Programme

UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
USPTO	United States Patent and Trademark Office
WEF	World Economic Forum
WGI	World Governance Indicators
WIPO	World Intellectual Property Organisation
YIA	Young Innovators Awards (Egypt)

1 Introduction

There is empirical evidence of the difficulty of enforcing policies in developing countries when defined on the basis of policies implemented successfully in countries economically more advanced (Rodrik, 2004; Brynard, 2005; Makinde, 2005); Olapido, 2008). It is however tempting for policy makers to "copy and paste" policies as a shortcut for achieving rapid progress in their countries' economic development, a behaviour endorsed, when not promoted, by many international cooperation programmes (Mishrif and Selmanovic, 2010).

This thesis aims at increasing the understanding of the success factors for policy transfer in developing countries, with a particular focus on innovation support policy. It provides evidence on a positive relationship between good governance in the public sector and innovation performance in the private sector and evaluates the effectiveness and impact of similar organisational schemes set up in Egypt and Morocco to support innovation.

The practice of attempting to force policies developed in other contexts is based on a paradigm that assumes standardised paths to social and economic growth (North, 1993; Rodrik, 2004), whereby the recommended measures "correct" local market inefficiencies. This approach, according to the conceptual framework proposed by North, Wallis and Weingast (2009), does not recognise that these apparent inefficiencies may be the price paid in such societies "as a means of solving the problem of violence" (Weingast, 2009, p.37).

The containment of violence is an issue common to all societies. However, in a very limited number of open access societies¹ "all citizens have the ability to form contractual organizations and to access the state enforcement apparatus" (Weingast, 2009, p.31) and, ultimately, compete both economically and politically without fearing consequences. These societies have evolved in the past two

¹ These countries include Australia, Canada, Japan, New Zealand and the United States of America (Weingast, 2009).

centuries from existing natural states, hierarchical organisations similar to the vast majority of currently existing countries, where such freedom of action was not generally granted (North, Wallis and Weingast, 2009).

In North, Wallis and Weingast (2009), the authors' focus was on the transition from natural states to open access orders. Four years later, in their preface to the paperback edition, they underline a second development problem, how to improve natural states so that they can work more effectively, recognising that "the analysis of developed economies [...] fails to explain how developing economies can be improved in a sustainable way" (North, Wallis and Weingast, 2013, p.274).

This thesis aims at offering a contribution towards its solution, arguing that the paradigm underlying policy transfers needs to be reversed: every country (whether open access orders or natural states) has systemic characteristics that translate in a set of capabilities at any given time and this should be the endogenous starting point for policy definition. If policy lessons are to be drawn from other contexts, the likelihood of a successful transfer will be higher the more similar the capability levels are. Hence, the working hypothesis of this thesis is that policies implemented in homogenous contexts should lead to homogenous results.

Furthermore, it is argued that particularly important for developing countries are policies meant to increase the efficiency and the effectiveness of Public Administration (PA) (UNCTAD, 2011) in its interaction with all economic actors and, between them, those aiming at business facilitation. In this context, Administrative Efficiency (AE) is defined as the ability of PA to facilitate the interaction with entrepreneurs when starting, running and closing a business through organisational schemes, laws and regulations and E-Tools (UNCTAD, 2010; UNCTAD, 2011)².

These policies, in general, aim at fostering entrepreneurship and promoting the creation and development of micro and small and medium-sized enterprises (SMEs), fundamental drivers of economic and social progress in developing countries, where

² This definition of AE is based on work conducted by the researcher at the United Nations Conference for Trade and Development (UNCTAD) in 2010.

young and expanding populations require more (and more "attractive") jobs (OECD, 2004). These countries need to manage their evolution towards knowledge-based societies to fully exploit the potential of their human capital, promoting entrepreneurship and innovation while nourishing (the evolution of) local and specific cultural values.

Within the scope of business facilitation are policies meant to support innovation. The link between PA efficiency and innovative performance in developing countries has not yet been sufficiently addressed by scholars or policy makers (Celikel-Esser, 2007; Fagerberg and Srholec, 2008). The logic behind focusing on innovation support appears straightforward: innovative countries generally experience significant economic growth (Hollanders and Arundel, 2007), which for many developing countries is a necessary precondition to promote social and human development (Aubert, 2005; Kraemer-Mbula and Wamae, 2010).

There is, however, a more stringent reason for developing countries to focus on innovation support policies, particularly those aiming at capability building. The State can act as a Schumpeterian innovator, fostering the process of creative destruction in highly capital intensive or high-risk areas (Mazzucato, 2013), compensating for the risk adversity of the private sector, provided it has the necessary capabilities.

Rethinking the processes that are meant to ignite the innovation process requires the stakeholders in PA to "walk the talk" and lead by example the evolution of the industry-academia-government relationships. This awareness is crucial and their action demands "finger tips feeling" to understand to what extent existing habits can be questioned: "Encouraging innovation and creativity in public sector institutions requires thinking about organisational dynamics" (Mazzucato, 2013, p.197).

Once the status quo is challenged, it would be naive to assume that institutions (informal and formal) in natural states will evolve in any expected direction without having made the effort to identify "the incentives for dysfunctional government or [understand] why different groups might not support or willingly implement policies that promote greater political or economic access" (Nye, 2011, p.4).

Whilst these themes will be fully addressed in the thesis, they are briefly introduced here as they explain the focus on lessons to be learned from innovation support policies implemented in similar contexts: if their introduction has proven not to be disruptive but, on the contrary, beneficial, these policies represent a feasible opportunity for progress.

Consequently, according to the working hypothesis adopted, the question "to promote social and economic development through innovation, can policy makers in developing countries learn from organisational schemes implemented elsewhere?" should be answered a priori positively if the context of reference is considered homogenous (i.e. "relevant").

To verify or falsify this assertion, it is necessary to establish whether, and to what extent, policy makers in developing countries can make use of organisational schemes developed elsewhere to promote innovation and, ultimately, to achieve social and economic development. Accordingly, this research aims at answering the following research questions:

- What relevance does AE in general, and organisational schemes of the PA in particular, have for supporting innovation in developing countries?
- How should policy makers in developing countries assess the relevance of organisational schemes for innovation support designed elsewhere?
- How can the impact of such organisational schemes on local innovation and entrepreneurship in developing countries be evaluated?

Consequently, the research objectives are:

- study the relationship between AE and innovative performance in the context of developing countries;
- identify comparable contexts (case studies);
- evaluate the relevance and impact of organisational schemes for supporting innovation in the countries chosen as case studies (Egypt and Morocco) by reviewing their NIS, the main obstacles to innovation and the underlying causes, and the effectiveness of similar organisational schemes.

The innovative performance of countries has been studied extensively and the literature on innovation has struggled with its measurement (Kleinknecht, Van Montfort and Brouwer, 2002; Hagedoorn and Cloudt, 2003; Fagerberg, Mowery and Nelson, 2005), with a progressive shift in focus from inputs to outputs and, later, to innovation process indicators (Milbergs, 2004). The selection of appropriate innovation and governance indicators for the quantitative correlation is methodologically of particular importance as it facilitates the identification of innovative local enterprises and of relevant PA bodies. These are analysed within a qualitative study on the impact of organisational schemes on the innovativeness of local companies.

Finally, the findings of this research indicate that socio-economic and cultural proximity should be carefully assessed before attempting to implement practices developed elsewhere. As analysing causal relationships in socio-economic contexts is extremely complex, this requires the definition of a method for assessing the relevance of policies by means of a number of variables, defining a composite measure of the proximity of countries that takes into account social, economic and cultural elements.

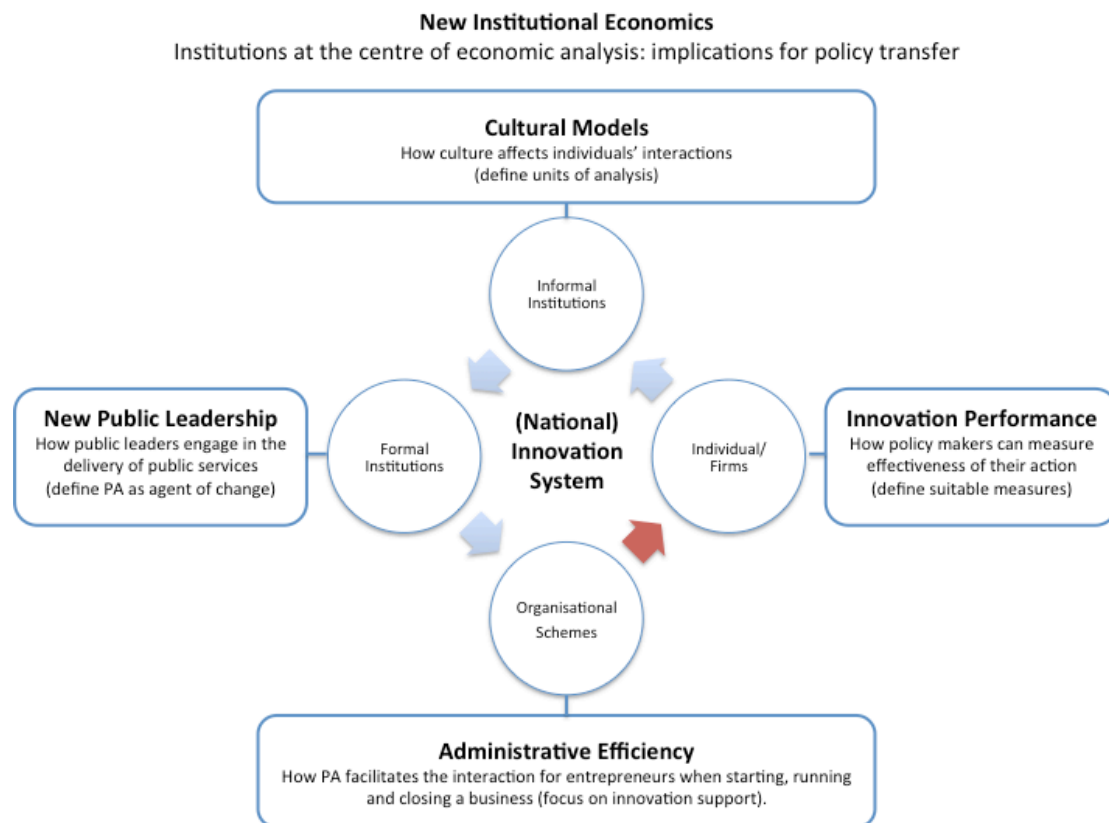
The advantage of such an approach is that, instead of assuming the validity of a policy on the basis of positive experiences in another context, it provides policy makers with an instrument, a decision-support framework, to facilitate their own policy definition. This research does not imply that an approach based on relevance provides, *per se*, superior policy definitions, but rather that it mitigates the risk of falling into the "capability trap" (Pritchett, Woolcock and Andrews, 2010).

The conceptual framework underlying this research is presented in Figure 1. A real understanding in a given context of the role and impact of organisational schemes on innovation, in the figure represented by the red arrow, requires an holistic approach taking into consideration the context in which the interaction happens.

The existing literature on the represented concepts is reviewed in Chapters 2 and 3. The second chapter begins with an overview of the literature on the role and scope

of PA according to different schools of economic thought, its evolution in developed countries and the existing definitions of AE.

Figure 1: Conceptual framework



Source: Author

In his prize lecture at the Nobel ceremony in 1993, Douglas North argues that “neo-classical theory is simply an inappropriate tool to analyze and prescribe policies that will induce development” (North, 1993) as, in his view, it is based on the “rationality assumption” and assumes an ergodic world where markets operate frictionless.

New Institutional Economics offers a shift of paradigm by focusing on the role of institutions as incentive systems that “define the structure of human interaction” (North, 1999, p.7). Measuring the costs of transacting and producing allows for comparing (the quality of) institutions underlying those costs (North, 1992). However, in the attempt to escape the “Nirvana fallacy” (Demsetz, 1969), the choice of the best of the non-perfect institutional arrangements could be based on an overstatement of efficiency as the main criteria.

Enforcing policies on the basis of (supposedly successful) experiences in Western societies in contexts that do not allow for an open competition in economy and politics is likely to generate violence as consequence of the struggle for (retaining) power (North, Wallis and Weingast, 2009). This is because such reforms would normally not lead to outcomes that are Pareto efficient. On the contrary, they may well undermine dominant positions of existing elites.

Therefore, the preliminary assessments of the impact of a change, of the concerns of those affected by it and of the conditions for its acceptance are fundamental steps to ensure the sustainability of the measure introduced. Accordingly, endeavors that represent “small steps” and have been already profitably implemented in relevant contexts are more likely to be successful.

Policy changes that result, whether by design or by chance, in an albeit minimal change of the existing distribution of power in a society cannot be seen simply as technical means for improving the efficiency of a (PA) process. They represent an opportunity for non-violent social change, which in itself may eventually modify the institutional framework. This research shares the view that the New Public Management (NPM) approach, which advocates the adoption of private-sector management methods, has failed to fully capture the potential societal impact of PA, in particular in terms of participation and accountability.

The New Public Leadership Challenge offers, in the researcher’s view and in light of evidence presented in this thesis, a much richer range of opportunities for PA to create “Public Value”, whereby the efficiency of the PA action is not a goal per se: rather, the quality of the process remains intrinsically bound with its purpose, with the achievements of its goals and with the alignment of the declared values with the daily experience of the users of its services.

The last two sections of Chapter 2 address how policy making in developing countries has been largely influenced by the experiences made in Western countries, particularly in those embracing the NPM paradigm (e.g. the United States of America (USA) and the United Kingdom (UK)). The policy agenda known as the Washington Consensus, where applied, has not delivered the expected economic growth while poverty and inequality levels have actually increased (Gray, 2009). As anticipated

above, a cause of this underperformance is that the introduction of “best-practice solutions” from developed countries has not taken into consideration the availability of the necessary capabilities nor the compatibility with local culture (see for example Rodrik, 2004; Jooste, 2008).

The third chapter outlines in depth the role of National Innovation Systems (NIS) as institutional contexts where interactions between economic actors take place. Alternative models, such as Triple and N-tuple Helix models, are evaluated. In consideration of the scope of this research, an inclusive definition of NIS is adopted that reflects all factors that “influence the development, diffusion and use of innovations” (Edquist, 1997 in Fagerberg, Mowery and Nelson, 2006, p.183).

This definition is complemented by a representation of NIS as an interconnected system of institutions (Groenewegen and van der Steen, 2006) to take into account the role of informal institutions (i.e. culture, values and norms) rather than attempting to focus on spatial references (e.g. local or regional innovation systems), which could not be analysed on the basis of the available data.

The adopted definition of NIS allows for a dynamic, holistic view of the interactions between formal and informal institutions, how these reciprocally shape each other and the potentially disruptive role of technology in their evolution. The relationship between innovation and culture, the last concept fundamental to the logical construct of this thesis, has not been thoroughly addressed by the existing literature (Sun, 2009).

The way culture affects individuals’ interaction is presented for three cultural models (see Hofstede, 1984; Hall and Hall, 1990; Hofstede, 1993; Trompenaars and Hampden-Turner, 1997). Three dimensions used in Hofstede’s model (i.e. longer power distance, collectivism and high uncertainty avoidance) correlate negatively with innovation performance (Sun, 2009). These results are highly relevant for innovation policy makers in developing countries, particularly in the Middle East and North Africa (MENA) region, as their explicit goals may be at odds with societal imprinting.

An overview of the relevant organisational schemes supporting innovation concludes the chapter (i.e. operational institutions, national agencies, technology parks, business incubators and technology transfer offices). In general, organisational schemes supporting innovation can be grouped in four categories according to their purpose (namely Governance, Funding, Capacity Building and Infrastructure), building on the functional approach toward NIS as suggested by Edquist (2004) and confirmed in the thematic analysis of the transcripts of interviews with participants in this research.

Having reviewed the literature underlying the conceptual framework of this research, the methodology used to answer the three research questions is presented in Chapter 4. Given its purpose, the original contribution of this research is twofold: first it confirms the link between good governance and innovation performance in developing countries once cultural proximity is considered; and, second, it tests for the adopted case studies whether similar organisational schemes for innovation support implemented in homogenous contexts lead to similar results.

This research applies a method for the assessment of the similarity of contexts in which AE policies are (meant to be) implemented, which disentangles the concept of "good practice" in AE from the concepts of efficiency and effectiveness by focusing on preconditions to assess the relevance. Accordingly, this research addresses the comparison of the impact of the PA's organisational schemes on local innovativeness only after having verified the proximity of the reciprocal social, economic and cultural environments.

The last two sections of the chapter introduce the analytical framework developed on the basis of the concepts presented so far and address the researcher's position and ethical considerations, acknowledging the risks inherent to the author's stance and the strategy adopted to minimise their consequences on the validity of the conclusions of this study.

The effectiveness of a government's action is anticipated to positively correlate with the innovation performance of a country, however the impact of a single organisational scheme for innovation support implemented is particularly difficult to assess in developing countries. Such initiatives are rarely launched with a clear

identification of performance indicators and corresponding targets to measure their success. Furthermore, for these countries accessible quantitative data is normally limited, both in terms of scope and availability of historical data.

Nevertheless, the analysis of the evolution of governance indicators and of inputs (or enablers) and outputs (patents, patent citations, citations of scientific papers in journals) of innovation confirms the positive correlation of good governance and innovation capabilities of a country. The innovation scoring models introduced in the first part of Chapter 5 have been designed to compare the performance of developed countries, assuming the availability of the underlying data. This represents an obstacle for their utilisation in other contexts: their adaptations for the purpose of this study are presented in the section on methods and data collection, where methodological issues are addressed.

The chapter reviews alternative approaches to assess innovative performance: inconsistency in definitions and the variety of measurements and samples (Fagerberg, Mowery and Nelson, 2006) recommend prudence when comparing the innovative performance of countries, confirming that the "import" of policies should be handled with extreme care. A broader definition of innovation performance comprises all activities from the initial stages of R&D until the introduction of a new product, possibly supported by the submission of relevant patents (Hagedoorn and Cloudt, 2003).

This research, therefore, evaluates in more detail the major indicators of innovation performance, namely R&D expenditure, patents and new product announcements, and their relationship. Alternative innovation scoring models are introduced. These models represent a powerful tool for comparing the performance of countries over time, therefore supporting the assessment of the respective policies.

Building on the results of a work commissioned by the European Commission (EC) (Celikel-Esser, 2007), the last section of Chapter 5 explores the link between AE and innovation performance by means of a linear regression for countries belonging to the low-middle income group and for countries where the absolute or relative majority of the population is Muslim.

While a casual or reciprocal relationship is not confirmed in the first case (i.e. countries selected on the basis of GDP per capita), a significant correlation is found for the latter (i.e. countries selected on the basis of cultural proximity). This empirical evidence of the relevance of cultural proximity represents a major finding of this research.

The following two chapters outline the NIS of Egypt and Morocco, the two major non-oil producing countries in the MENA region selected as case studies for this research. The choice of countries with similar socio-economic and cultural backgrounds reflects the working hypothesis of this research as it mitigates the risk that, in addition to policies implemented, other variables may explain variation in innovation performance. In this regard, it is important to mention that during the period of this research, the MENA region was theatre of major turmoil and these historic events have dramatically affected Egypt.

The information presented is the result of extensive desk research enriched with the findings of 72 interviews with local entrepreneurs, academics and high-level representatives of PA. For both countries, the respective chapter first outlines the making of the NIS to provide an historical perspective of the events that have led to the current situation. Thereafter, the strategic background of the innovation policies is presented before describing the major components of the two NIS, grouped according to the adopted NIS definition. The contributions of interviewees allow for a first reflection on the role of the PA bodies considered and the impact of policies in place. A closing section summarises the major findings from the review of the respective NIS.

Chapter 8 is structured in three parts. First, it compares how the two countries have approached the definition of their innovation strategy and of the corresponding objectives. This provides a first assessment of how the respective NIS are performing in achieving them. The assessment can only take place at country level because of the general lack of clearly defined and measurable objectives for the initiatives implemented (with significant exceptions).

The second part reviews the obstacles to innovation identified during the fieldwork. The qualitative analysis, building on the information collected in the interviews,

identifies the challenges innovators in Egypt and Morocco face, focusing on the operational interactions between the individual actors of the respective NIS and the formal institutions and institutional arrangements. The comparison aims at assessing whether the challenges innovators face in the two countries are similar and it is structured according to the four themes mentioned above: Governance, Funding, Infrastructure and Capacity Building.

In the third part of the chapter, the effectiveness of selected organisational schemes supporting innovation is compared to verify whether similar schemes in homogeneous contexts have produced similar results. The same structure of the previous section is adopted and one institutional arrangement/organisational scheme for each country is selected for the four thematic areas. Chapter 9 highlights how the key findings can support theory development and policy making in the area of organisational schemes dealing with innovation, summarises the conclusions drawn, states the limitations of this study and recommends further directions for research.

2 From the administration of the "Res Publica" to Administrative Efficiency

There is an extensive body of literature on PA that, by reviewing the systems and processes put in place by governments to implement their policies, defines its scope as being on administering justice, maintaining law and order, and providing sufficient means to the population. The following sections outline the role of PA according to major schools of economic thought before reviewing the evolution of its scope and nature in open access societies and in natural states.

2.1 *Scope of PA in major schools of economic thought*

The following sections introduce three major schools of economic thought, namely Classical, Neo-classical and (New) Institutional economics, which have considerably influenced economic theory and the debate on economic development. The aim here is to review the role of PA in each of them to support the analysis of AE in later chapters and to verify Aubert's (2005) statement that any policies concerning innovation in developing countries have to be regarded within the framework of New Institutional Economics (NIE).

Economic growth and the generation of wealth lie at the heart of **classical economic theory**, as these are believed to be necessary preconditions for the well being of any society. In the centre of the classical school of thought stands the analysis of the functioning of markets and how their mechanisms can be used to achieve sustainable economic growth and accumulate wealth. Self-regulated competition and laissez-faire are key aspects of classical economics (Griffiths and Wall, 2012). The major focus of classical economic theory, as advocated by Adam Smith in his work, *The Wealth of Nations*, is on resource allocation in the context of economic growth:

"Every man, as long as he does not violate the laws of justice, is left perfectly free to pursue his own interest his own way, and to bring both his industry and capital into competition with those of any other man or order of men" (Smith, 1778, p.914).

Economic growth, despite its relevance for development, is not univocally considered the ultimate goal (see for example Sumner and Tiwari, 2009, p.17). While

Lewis (1955) asserts that growth is the main subject of economic analysis and inequality does not matter, other analysts hold the opposite view: Kuznets (1955) argues that the relationships between growth and inequality should be of primary importance for economists and Kanbur and Squire (2001, p.183) maintain that the reduction of poverty “lies at the heart” of development economics.

Focus on economic growth is supported by Dollar and Kraay (2002, p.27), who stress that “growth on average does benefit the poor as much as anyone else in society, and so standard growth-enhancing policies should be at the center of any effective poverty reduction strategy”. Moreover, Collier (2007, p.11) is convinced that growth is the most important aspect of development and argues that “growth usually does benefit ordinary people”.

In the approach of the classical school of thought keeping PA as small as possible allows for the most efficient allocation of resources. In Smith’s view, the major tasks of the government are to ensure that contracts are protected as defined by the law, to support innovation by granting intellectual property rights such as patents and copyrights and to provide basic public goods and infrastructure, such as roads (Smith, 1778). Smith, however, does not assume that markets are perfectly competitive once left to operate on their own. Rather, he advocates for markets to be less regulated instead of being regulated by the government for an efficient allocation of resources (O’Brien, 2004).

Other classical economists oppose government interventions like the so-called ‘Corn Laws’ imposed to subsidise corn farmers through limiting corn imports and encouraging exports between 1815 and 1846 (Woodward, 1962). For example, even if less confident in free markets than Smith, Ricardo views government intervention as inferior to the ‘invisible hand’ within free markets (Ricardo, 1817).

On the other hand, potential disadvantages may occur when letting the market determine the way economic activities are conducted, whereby private property rights in particular can potentially generate inequalities among economic actors. In general, while market mechanisms and laissez-faire are believed to be the most efficient ways to organise economic activity, “the market was certainly not regarded as a ‘perfect’ entity by classical economists!” (Griffiths and Wall, 2012, p.167).

Building on these findings, the **Neoclassical school of thought** presumes that human beings always act rationally and attempt to maximize utility (the so-called *homo economicus*)³ and does not acknowledge the existence of “unconscious decision-making” including traditions and customs (Griffiths and Wall, 2012, p.168). “Neoclassical theory implies that economic behaviour is essentially non-habitual and non-routinised, involving rational calculation and marginal adjustments towards an optimum” (Hodgson, 1988 in Griffiths and Wall, 2012, p.168).

Furthermore, neoclassical economics relies on market-mechanisms as the main tool to coordinate economic activity and hence advocates a small public sector and little government intervention in markets, as is the case in classical economics: “Many people want the government to protect the consumer. A much more urgent problem is to protect the consumer from the government” (Friedman, 1962 in Skousen, 2008, p.538).

One of the main advocates of conservative neoclassical economic theory, the Nobel laureate Milton Friedman agreed on the government providing basic public goods, however not with a monopolistic character. In his view, public goods provision should be subjected to competition from the private sector, which has a higher potential for achieving Pareto-efficiency⁴, that is allocative efficiency (Friedman, 1962).

Liberal neoclassical economic theory as advocated by Paul Samuelson considers government intervention necessary in four particular cases (Samuelson, 1954):

- use of fiscal and monetary policy to mitigate the inherent instability of capitalism
- to regulate imperfect competition, especially monopolies
- to provide sufficient public goods, and

³ The three main assumptions of the Neoclassical school of thought are: “People have rational preferences among outcomes that can be identified and associated with a value. Individuals maximize utility and firms maximize profits. People act independently on the basis of full and relevant information.” (Weintraub and Forget, 2007, p.79)

⁴ A more detailed discussion on Pareto-Efficiency is presented in section 2.2

- to control negative externalities, such as pollution.

Hence, neoclassical economics does recognise the necessity of state intervention, but still leaves a very limited role to the public sector.

The neglecting of the 'soft' factors of human behaviour, such as routines and habits, led to considerable debate among economists in the first part of the twentieth century, whereby some argued that irrational factors play a significant role in terms of human behaviour and, consequently, of economic behaviour (see for example Hamilton, 1919 in Hodgson, 2000).

According to the school of thought, which formalised such considerations, **Institutional economics**, economic actors do not always behave rationally as they do not constantly pursue utility maximisation when making economic decisions. Moreover, economic actions and changes take place within an evolving institutional context, which incorporates many more aspects than just rationality. Consequently, markets cannot be considered self-efficient and institutions should be the focus of economic analysis (Monnet, 1976; Hodgson, 1998).

New Institutional Economics (NIE) attempts to build a bridge between IE and neoclassical economics:

"Institutions are the rules of the game of a society or more formally are the humanly-devised constraints that structure human interaction. They are composed of formal rules (statute law, common law, regulations), informal constraints (conventions, norms of behavior, and self imposed codes of conduct), and the enforcement characteristics of both" (North, 1992, pp. 5-6).

As such, they are distinct from organisations, which are "groups of individuals bound by a common purpose to achieve objectives", examples being "political bodies", "economic bodies", "social bodies", and "educational bodies" (North, 1992, p.6).

The historical evolution of formal and informal institutions shapes economic development and performance (North, 1993). They define the role of markets, which are "means for transmitting information and knowledge" with "a transformational role, shaping individual behaviour, beliefs, preferences or cognitive processes" and are "specific, cultural institutions, reflecting historical and locational contexts" (Hodgson, 1998 in Griffiths and Wall, 2012, p.173). This definition implies that the

notion of market as an abstract concept to describe human interaction is very limited and neglects the transformational potential of “real” markets (see in this regard Chapter 3 on the interactions between the components of NIS).

In “real” markets, in line with Simon’s concept of “bounded rationality”, economic actors may well stop looking for alternatives once they find a solution that is satisfying, despite the possible existence of more utility maximizing alternatives (Simon, 1972). Williamson (1985) argues that ‘bounded rationality’ is caused by the fact that individuals can never gain perfect information on economic transactions, impeding planning, as their predictability of future events is very low. Similarly, Eisenhardt (1989a) asserts that information asymmetries restrict decision-making.

According to Williamson (1975) in Dollery (2001), these information asymmetries in markets cannot be avoided: “the complexities of actual economic exchange” make it difficult to establish “complete contracts between principals and agents”, as contracting parties are easily able to hide information from each other, leading to “opportunistic behaviour by economic agents” (Williamson, 1975 in Dollery, 2001, p.188). That opportunism arises from the combination of bounded rationality with the self-interest pursued by human beings: when there is no accordance between what people want and what they are asked to do, they will usually attempt to find ways to pursue their self-interest, as long as this information is costly or not easily accessible to the other party involved (Williamson, 1985).

Alchian and Woodward (1988) criticise Williamson’s (1985) definition of opportunism for not explicitly pointing to the two different types of opportunism, i.e. “moral hazard and holdup” (Alchian and Woodward, 1988, p.67). While not discrediting Williamson’s conclusions, the distinction between the two types of opportunism adds clarity: a “holdup” situation happens when two contracting partners engage in an economic relationship, whereby some aspects (e.g. exact costs or the willingness to pay) are not a priori determined and information emerges ex post so that the initial agreement is not respected; on the other hand, “moral hazard arises in agreements in which at least one party relies on the behavior of another

and information about that behavior is costly”⁵ (Alchian and Woodward, 1988, p.68). Finally, information asymmetries can also lead to “adverse selection”, whereby economic actors usually choose the option that is not utility maximizing, because information is not perfect⁶.

These imperfections of “real” markets are crucial to understand the relevance of the rule of law or, in its absence, of personal relationships in the (economic) interaction of individuals. Within a proper framework, which in North’s view characterises “Open Access Orders” (North, Wallis and Weingast, 2009), the impossibility of choosing impersonal exchanges results in higher transaction costs, one of the three dimensions of economic behaviour together with agency theory and property rights economics (Dollery, 2001). While agency theory attempts to explain the actions of individuals within a hierarchy (i.e. Principal-agent problem as in Jensen and Meckling (1976)), transaction costs and property rights help determining the relative efficiency of institutions.

Transaction costs have been initially defined by Ronald Coase as “the cost of using the price mechanism” (Coase, 1937, p.390). Despite several examples, this definition is strikingly imprecise. Greatly influenced by Coase, Williamson (1979; 1985) attempts to establish specific characteristics and identifies five major determinants of transaction costs, namely “frequency, specificity, uncertainty, limited rationality, and opportunistic behaviour”, which however do not allow for empirical measuring. The OECD defines transaction costs as “the costs involved in market exchange. These

⁵ The authors go on to describe moral hazard as follows: “*The owner of a firm hires a manager and wants the manager to maximize profits. The manager hires employees and want them to follow directions. An investor lends money to a firm and wants the firm to act in that debt holder’s interest. Because it is costly for the principal to know exactly what the agent did or will do, the agent has an opportunity to bias his actions more in his own interest, to some degree inconsistent with the interest of the principal*” (Alchian and Woodward, 1988, p.68).

⁶ A good example of adverse selection is provided by Akerlof (1970) in his article “The Market for Lemons: Quality Uncertainty and the Market Mechanism”, where he explains this problem by using second hand cars purchases for demonstration: the seller usually has perfect information about the car, but the buyer does not and therefore must assume that the reason for the seller to sell his car is related to the vehicle’s poor quality standards.

include the costs of discovering market prices and the costs of writing and enforcing contracts” (OECD, 1993, p.84).

Wallis and North (1986) attempt to measure transaction costs in the USA economy between 1870 and 1970. Providing a simple example of a transaction between a buyer and a seller of a good, the authors find that transaction costs are characterised by a “time dimension [...] where costs occur pre, during or post exchange” and include respectively (I) “coordinating”, (II) “enacting” and (III) “monitoring.” The examples provided for these three categories comprise (I) “gathering information about prices and alternatives, ascertaining the quality of the goods and the buyer’s or seller’s credibility, and so on”; (II) “waiting in lines, paying notaries, purchasing title insurance, etc.”; (III) “the cost of ensuring that the contract is enforced, monitoring performance, inspecting quality, obtaining payment, and so on” (Wallis and North, 1986, p. 98).

This “workable definition”, on the basis of empirical data, is used to capture the evolution of transaction costs in the USA over the selected period: their results show that public and private sector transaction costs account for almost half of the country Gross National Product (GNP). Their study inspired Dollery and Leong (1998), who analyse the transaction costs of the Australian economy, producing very similar results.

Looking at the public sector, Dollery and Wallis (2001) review the contributions of several analysts (e.g. Arrow, 1970; Barzel, 1982; Williamson, 1985; Eggertsson, 1990; Allen, 1991). The authors decide to adopt the definition of Furubotn and Richter (1992): transaction costs “... are most easily understood as embracing all those costs that are connected with (i) the creation or change of an institution or organisation, and (ii) the use of the institution or organisation” (Furubotn and Richter, 1992 in Dollery and Wallis, 2001, p. 119). On this basis and considering the above examples provided by Wallis and North (1986), the authors conclude that “both market and

hierarchical modes of governance may be incomplete or subject to high transactions costs” (Dollery and Wallis, 2001, p. 128).⁷

The discussion above points to three major implications of NIE for the public sector and efficiency in line with Jooste (2008). First, according to the principal-agent model, citizens (public) are principals and public servants are their agents. “Opportunistic behaviour” due to “information asymmetries” leads to a focus on “performance measurement (in response to information asymmetries) and incentive structures (in response to conflicts of interest)” in the conduct of PA reform, with public sector managers being “incentivised to perform by sharing in residual firm revenues” (Jooste, 2008, p. 6).

Second, when looking at transaction costs, these “are higher when delivered by the market as opposed to a hierarchy (delivering the service in-house)” and they can help “determine the most efficient structure of service delivery [...] by aggregating transaction costs with production costs”. Finally, NIE explicitly emphasises “markets and competition” as means to promote participation in PA issues while “increasing efficiency of service delivery” (Williamson, 1996; Lane, 2000; Bately and Larbi, 2004 in Jooste, 2008, p.6).

These findings have complemented the assumptions of (Neo-) classical economics and progressively influenced policy makers in Western countries, which is reflected in the evolution of the public sector in developed countries as well as in developing ones, outlined in the following sections.

2.2 PA in open access societies: from bureaucracy to New Public Leadership

Bureaucratic structures were already present in ancient civilisations. Turner and Hulme (1997) in their work on governance, administration and development cite

⁷ Several analysts, inter alia Lane (1995) and Dollery and Leong (1998), criticise transaction cost economics for the difficulties related to their measurement. Others note that transaction cost economics is not broad enough in scope, as it does not sufficiently address cultural or social aspects of human behaviour, neglecting power relations (Perrow, 1986) or trust and social “embeddedness” (Granovetter, 1985; 2008).

Heady's (1984) comment on the "impressive" bureaucratic features of the old kingdom of Egypt, where "before 2180 BC complex patterns of delegation, specialisation and institutional longevity were evident" (Turner and Hulme, 1997, p.85) or the Chinese army around 478 BC, when Confucius died, "already had the character of a disciplined bureaucracy" (Gerth and Mills, 1948 in Turner and Hulme, 1997, p. 85).

The development of PA as an academic field of study began in the late nineteenth century and early twentieth century in the developed world (Osborne, 2010). A vast number of academics, practitioners and national and international bodies have since provided possible definitions of PA, with considerable differences in their scope (e.g. Jacques, 1976; Beetham, 1987; Brown, 1989; Hood, 1991; Osborne, 2010). In the 1980s minimalist definitions gained popularity among policy makers, as reflected for example in the definition of Beetham (1987, p.3), who states that the main characteristics of PA are "its compulsory character, its particular relation to the law [and] the public accountability of its operations". In the same period Brown (1989) cited the definition of Jacques (1976) as the prime example for advocating a "minimalist genre": "a hierarchically stratified managerial employment system in which people are employed to work for a wage or salary" (Brown, 1989, p.372).

Interestingly, most authors in the area, including Jacques (1976), Beetham (1987) and Brown (1989), use the term bureaucracy as a synonym for PA. This pattern can equally be observed in more recent definitions of PA, as for example in Osborne (2010). Citing Hood (1991), he defines several key elements of PA: first of all, he emphasizes the "dominance of the rule of law" and suggests that the bureaucracy's main tasks include "administering set rules and guidelines" and "making and implementing policy" as well as the responsible distribution of resources, i.e. "budgeting". Furthermore, key characteristics of PA include "the 'politics-administration' split within public organisations", and "the hegemony of the professional in public service delivery" (Osborne, 2010, pp. 2-3).

While the definition of the main elements of PA in Osborne (2010) compensates for some weaknesses of the minimalist definitions presented above by including a broader view of the role of PA, they all do not seem to capture the whole picture by

taking into account the complex relationships between political and legal actors, the private sector and citizens.

Recognising these weaknesses, Bovaird and Loeffler (2003, p. 6) define PA as “the study of the work of civil servants and other public officials (including their interface with politicians who were involved in legislation and setting public policy)”. Furthermore, they acknowledge that a transformation of PA in the end of the 1970s and early 1980s to a more managerial discipline – Public Management (PM) – had taken place. The main difference, according to the authors, is that “[PM] was thought to be about budget management and not just budget holding, a contract culture including contracts with private sector providers of services and employment contracts for staff, which were for fixed periods and might well not be renewed, entrepreneurship and risk taking, and accountability and performance” (Bovaird and Loeffler, 2003, p.6).

Meanwhile, New Public Management (NPM) started to spread, explicitly advocating the superiority of private-sector management methods over those of the public sector. Initiated in Australia, New Zealand and the United Kingdom (UK), NPM aims at redefining the relationship between government and society (UN Economic and Social Council, 2006). The fall of the Soviet Union and other socialist and communist economies in Eastern Europe was taken as a demonstration of the superiority of market economies and NPM gained acceptance with policy makers who advocated market-like mechanisms for increasing the efficiency and efficacy of the PA.

The main characteristics of the then new paradigm (or set of paradigms) have been summarised by Osborne (2010, p. 3-4):

- *“An attention to lessons from private-sector management*
- *The growth both of hands-on ‘management’ – in its own right and not as an offshoot of professionalism – and of ‘arm’s length’ organisation where policy implementation was organisationally distanced from the policy-makers (as opposed to the ‘interpersonal’ distancing of the policy administration split within PA)*
- *A focus upon entrepreneurial leadership within public service organisations*
- *An emphasis on inputs and output control and evaluation, and upon performance management and audit*

- *The disaggregation of public services to their most basic units and a focus on their cost management and*
- *Within the Anglo-American and Australia/New Zealand regions at least, the growth of use of markets, competition and contracts for resource allocation and service delivery within public services”.*

Hood labels NPM as a “marriage of opposites” between “NIE” and “managerialism”: in his view, the major characteristics of NIE are an inherent part of NPM as reflected in “transaction cost theory and principal agent theory”. Furthermore, there is an emphasis on “professional management expertise”, reflected in the notion of public management as opposed to public administration (Hood, 1991, pp.5-6)⁸.

Over the past two decades a range of negative criticism⁹ of NPM emerged. Christensen and Laegreid (2001, p. 67) mostly criticize NPM for its one-sidedness, i.e. “the constant economic rationalisation of all activities”; according to Frederickson and Smith (2003) as explained in Osborne (2010, p. 4) “in reality, the NPM is simply a sub school of PA that has been limited in its impact by the lack of a real theoretical base and conceptual rigor”; Hood and Jackson (1992, p. 122) label NPM as a “disaster waiting to happen” or as Farnham and Horton (1996, p. 59) put it: “NPM is a failed paradigm”, while Denhardt and Denhardt (2003, p.133) argue that “this perspective of the public administrator is narrow and is poorly suited to achieve democratic principles such as fairness, justice, participation and the articulation of shared interest”.

Accordingly, NPM is perceived as having failed to fully capture the potential societal impact of PA, in particular in terms of participation and accountability. This research fully supports this view and, consequently, adopts the definition provided by the United Nations (UN) Economic and Social Council (2006), which captures both the managerial and the societal aspects of PA by defining it as:

⁸ See Appendix I for a more comprehensive overview of the “doctrinal components” of NPM as outlined by Hood (1991).

⁹ For a more extensive overview of NPM critics, see McLaughlin et al. (2002).

“The aggregate machinery (policies, rules, procedures, systems, organisational structures, personnel and so forth) funded by the State budget and in charge of the management and direction of the affairs of the executive government and its interaction with other stakeholders in the State, society and external environment” and

“The management and implementation of the whole set of government activities dealing with the implementation of laws, regulations and decisions of the Government and the management related to the provision of public services” (UN Economic and Social Council, 2006, p.5).

Several researchers (e.g. Dunleavy et al., 2006a and 2006b or Brookes and Grint, 2010), noting the obsolescence of NPM, identify the need to replace it with a more powerful theory that focuses on the collective nature of public leadership, rather than on management or administration. In this context, the UK Economic and Social Research Council has initiated five series of seminars that address the “Public Leadership Challenge”, which defined public leadership as:

“A form of collective leadership in which public bodies and agencies collaborate in achieving a shared vision based on shared aims and values and distribute this through each organisation in a collegiate way which seeks to promote, influence and deliver improved public value as evidenced through sustained social, environmental and economic well-being within a complex and changing context” (Brookes, 2008, p.1).

Brookes (2008) proposes a change of paradigm towards **New Public Leadership** (NPL), identifying “three suggested areas of significant difference” with NPM¹⁰:

- “the role of public leadership in the context of reform
- the importance of relationships through networked management
- the overall goal of public leadership vis-à-vis the overall goal of public management” (p.4).

The NPL Challenge (Table 1) aims accordingly at answering the question: “*How and why do public leaders engage collectively through partnership activity in the delivery of public services?*” (Brookes and Grint, 2010 p.2). The authors suggest that the NPL

¹⁰ A comprehensive outline of the major differences is provided in Appendix II.

Challenge should focus on the “Purpose, Process, Praxis and Public Value of Public leadership” (Brookes, 2008; Brookes and Grint, 2010, p.343). Thereby “Purpose” refers to the detailed provision of envisaged objectives of leaders in the public sector as well as why these are pursued. Furthermore, there is a need to include “internal and external stakeholders [...] in the development of a shared vision based on an agreed mandate and identifying the desired public good” (Brookes, 2008, p. 13).

Table 1: Summary of the NPL Challenge

The How	Leader relationships will either be shared across public services or distributed within individual services; collective public leadership is likely to represent a combination of both.
	Leader relationships are likely to take place within four contextual conditions with varying accountability mechanisms; these are ‘organisational’, ‘individual’, ‘community’ and ‘political’ leadership.
	Leader relationships will differ dependent on the type and scale of the problem; Using Grint’s (2000) typology three types of problems will be evident; wicked, tame and critical problems.
The Why	Leaders will engage collectively if there is ‘mutual benefit’ to each and where the whole is considered to be greater than the sum of its parts.
	Leaders will engage collectively because of a climate which favours either the drive provided by central government performance regimes or publically valued outcomes, or a combination.
	Leaders will engage collectively because of the strength of networks within a climate that is conducive to ‘trust’.

Source: Brookes and Grint (2010, p.2)

“Process” is considered as the order of activities performed by public leaders and how these are managed and it is “based on the purpose and the principles to be adopted in the implementation of the purpose through problem oriented approaches” (Brookes, 2008, p.13).

“Praxis” is related to the “actual practice of public leadership at all levels”, whereby it underpins the “stated purpose in the achievement of shared objectives and in a way that it is accepted as habitual practice through shared learning and insight” (Brookes and Grint, 2010, p.343). On a similar line, Brookes (2008, pp.13-14) states that “it is about bridging the gap between theory and practice through the emphasis on personal impact supported by effective profiling of problems and challenges,

sharing resources and intelligence sources through effective networks and where credence is provided to evidence based arguments and intended outcomes”.

Finally, “Public Value” represents the result of successful “public leadership” and “requires an alignment between the social goals identified by stakeholders, the trust and legitimacy which leaders secure in the delivery of these goals and the extent to which organisational capability matches the stated purpose to practice through the process of public leadership” (Moore, 1995; Kelly et al., 2002 in Brookes and Grint, 2010, pp. 343-344).

In this context, the efficiency of the PA action does not constitute a value per se: rather, the quality of the process remains intrinsically bound with its openly declared purpose, with the achievement of the goals set and, last but not least, with the correspondence of the values underlying the “purpose” with the daily experience of the users of the service.

Before addressing how PA can facilitate entrepreneurship and innovation, it is important to emphasise here that the above-presented theoretical debate on NPM and NPL assumes a society with the necessary capabilities to “live” the underlying values (e.g. in terms of willingness of public leaders to seek for their legitimacy and of the citizens to challenge it). This is not a mere question of the development stage a society has reached (as this would imply a linear, “natural” path, to a higher level of management of the “*res publica*”), but rather a matter of the cultural context in which the stakeholders operate, an aspect that will be thoroughly addressed in Chapter 3.

The concept of **Administrative Efficiency** is rather new and not yet systematically addressed in the literature. In the locution “Administrative Efficiency”, the adjective “Administrative” defines the scope by referring to the act of administering. The term ‘efficiency’ has specific connotations according to the context (e.g. medicine, engineering or economics). For the purpose of this study, it is relevant in relation to the production process of goods and services, in line with the OECD definition: “Efficiency refers to the degree to which a production process reflects ‘best practice’, either in an engineering sense (‘technical efficiency’) or in an economic sense (‘allocative efficiency’)” (OECD, 2001a).

The OECD definition is adopted as a starting point for the analysis, despite the controversial concept of 'best practice', which will be discussed in more detail at a later stage in this study. The term 'technical efficiency' is straightforward, i.e. "[...] achieving maximum output from a given level of resources used to carry out an activity" (OECD, 2001a). Pareto efficiency, referred to as allocative efficiency, "occurs when resources are so allocated that it is not possible to make anyone better off without making someone else worse off" (OECD, 1993).

Todaro and Smith (2006) point to the potential conflict that could arise from the attempt to determine what it is exactly that makes individuals in different contexts better or worse off (e.g. different levels of socio-economic development). An example should help to illustrate the issue: when looking at child labour, a common practice in many developing countries, it seems obvious that a ban of child labour and the introduction of compulsory schooling would make everybody better off and consequently lead towards a more Pareto efficient situation. However, the affected employers will be worse off, having to pay higher wages (and may thus create "political pressure" to prevent laws against child labour from entering into force) (Todaro and Smith, 2006, p.375)¹¹.

In general, Pareto-efficiency does not consider social implications, e.g. equality among individuals¹². Looking at the allocative efficiency of a given process in terms of cost per item produced over a period of time (unit cost), without a clear statement of the overall objectives to be achieved or supported by the process in question, it does not properly support the assessment of its quality. This is particularly relevant for PA processes as the majority of resources stems from taxes of individuals and businesses: political goals may prioritize long-term versus short-term economic growth, but also equity among citizens versus overall economic

¹¹ Other theoretical models (e.g. Baland and Robison, 2000) have demonstrated that in general equilibrium, a ban of child labour could be potentially Pareto-improving (with imperfect capital markets in many developing countries being the main reason for the existence of child labour) (Todaro and Smith, 2006).

¹² The Kaldor-Hicks criterion, which considers also acceptable outcomes whereby gainers and losers agree on compensations either to proceed or to prevent the change and accept its consequences, despite being less demanding still does not address such issues.

growth. Measuring the efficiency of a process in terms of output per worker over a certain amount of time (productivity) is only apparently less controversial: while it may be very appropriate to analysing the historical evolution, it can easily lead to wrong conclusions when chosen as major criteria for benchmarking purposes.

In the existing literature, only few contributions attempt to precisely define AE (see for example Woolhandler and Himmelstein (1991), Heyneman and Pelczar (2004), Mildenstein (2009) or Nicolle and Mathauer (2010) for the use of the term AE, without referring to any specific definition). Lewin, Morey and Cook (1982) undertook an analysis of the AE of courts in the USA, whereby they focused on the “technical efficiency” (as opposed to the allocative efficiency explained above) of handling cases in 100 criminal superior courts of North Carolina. Hence, AE is used as a synonym to “technical efficiency” (see OECD definition above).

In other cases, an apparently pragmatic approach has emphasised the need to increase the efficiency of PA. In this sense, The USA National Library of Medicine Medical Conditions Dictionary provides an explicit definition of AE as “the capacity of an organization, institution, or business to produce desired results with a minimum expenditure of energy, time, money, personnel, materiel, etc.” (Medical Conditions Dictionary, 2011).

It has become apparent, however, that increasing AE contributes to business facilitation and has a direct, positive impact on the effectiveness of PA and, ultimately, on government action. Accordingly, UNCTAD defines AE as “ the ability of the public sector administration to make it easy for enterprises to comply with national rules applying to entering into business [...]; to business operations [...]; and to exiting from business” (UNCTAD, 2010, pp.3-4).

Quoting the Better Regulation Programme¹³, UNCTAD (2010) argues that a decrease of 25 per cent in “administrative costs for companies” would cause GDP to rise by 1.5 per cent. This figure is likely to be much higher in developing countries, where prevailing red tape is a major impediment to business facilitation and ultimately

¹³ A project launched by the EU in 2006 to reduce red tape among member states.

development. SMEs would particularly profit from investments in AE, as they are confronted with “administrative burdens” estimated to be “six to thirty times higher than for larger businesses” (UNCTAD, 2010, p.16).

Furthermore, UNCTAD has provided evidence that increasing AE contributes to the reduction of public deficits, a crucial economic aspect, particularly in times of crises. Public investment in AE could also aid socio-economic inclusion by reducing the informal sector as simple and transparent rules and procedures would provide an incentive for (potential) entrepreneurs to operate in the formal economy (UNCTAD, 2010). The link with the pursuit of the Millennium Development Goals (MDGs)¹⁴ is evident: by enabling a supporting environment for entrepreneurship, AE is an enabler of economic growth and social transformation (e.g. Goal 8 "Develop a global partnership for development").

In UNCTAD’s view, any policies aiming at increasing AE need to address one or more of the following areas (and are categorised accordingly): “laws and regulations”, “E-tools, i.e. electronic systems functioning between the Government and businesses (G2B) and among Government offices (G2G)” and “organisational schemes, i.e. physical working structures or operational arrangements set up to improve/speed up administrative procedures”. These three areas are sub-divided into 11 fields, i.e. “starting a business, property registration, construction permits, employing workers, visas and residence permits, trading across borders, paying taxes, closing a business, transparency, simplification and eGovernment” (UNCTAD, 2010, p.16).

Good practices within the three categories (and eleven fields) have been collected and a database of 85 such practices, called ‘BusinessFacilitation.org’, has been created by the author of this thesis as part of the consultancy work at UNCTAD (UNCTAD, 2011). Laws, E-tools and organisational schemes from a variety of developed and developing countries are made available by policy makers who wish to share policies that have proven to be beneficial in their respective national context. This information is accessible to policy makers who may wish to introduce

¹⁴ see Appendix III for an overview of MDGs.

these practices in their own countries as well as to donor organisations who wish to invest in AE projects.

However, there are three major drawbacks of the database or, more specifically, of the registered practices. First, when looking at the list of fields considered vital for starting, operating and closing a business, it is striking that *innovation* or the closely related field of *intellectual property* are not included, despite their high relevance for entrepreneurship. Second, there are no formal, standardised criteria to determine whether the law, E-tool or organisational scheme is actually a “good” practice. Rather, the practices are selected on the basis of other publications, such as the World Bank’s Doing Business Report, which inter alia details new procedures that have led to the improvement of the delivery of business-related public services and should consequently lead to increases in the competitiveness of the respective country.

Some initial steps have been made towards a definition of what constitutes a good practice and these are based on the Standard Cost Model (SCM), a method to quantify administrative burdens, which was developed by the SCM network, formed by some EU countries in 2003 to jointly tackle administrative burdens. The main measures to be used by UNCTAD in order to determine how good the registered practices are would be those that “make administrative procedures easier for entrepreneurs and enterprises when starting, operating or closing a business” resulting in:

- “Less interactions imposed on the user of administrative services
- Less time required to complete procedures
- A lower volume of information to be provided” (UNCTAD, 2011).

While these criteria represent a fair starting point for AE analyses, they reveal the third drawback of the Business Facilitation database/website: no effort has yet been made towards determining the suitability of a “good practice” in a different context. Can we really easily transfer a law, E-tool or organisational scheme that proved successful (i.e. reduced time, interactions and the volume of necessary information

on the part of the user) in the UK to, for instance, Rwanda? And would this transfer really produce equally “good” results in Rwanda?

The answer to these questions is not obvious. As a great share of policies transferred between very different contexts did not yield the expected results, several analysts have criticised international organisations for the “copy-and-paste” attitude towards policy transfer between countries. Nevertheless, the web portal has the potential of becoming a very useful tool for policy makers wishing to reform and increase the AE of their PA. However, and to stress this point again, as policies addressing AE ultimately affect the very nature of the interactions between citizens, businesses and public administration, their definition cannot deviate from the social and cultural contexts in which they have to be implemented.

North (1993) confirms these findings on the basis of substantial experience with policy development and advice in developing countries. He argues that policies or institutional arrangements transferred from one context to another will lead to different results, potentially disruptive, like in the case of large-scale privatisation in Eastern Europe in the 1990s, which in some cases had devastating socio-economic effects. He therefore asserts that “adaptive efficiency”, which involves dynamic and flexible institutions, is more important than allocative efficiency despite being very time-consuming.

In later work, he points to the fast-paced change of markets and the ever-greater need for flexible institutional structures necessary to cope with them: adaptive efficiency has enabled the USA to grow over the past 200 years (North, 1999)¹⁵. In “Violence and social orders: a conceptual framework for interpreting recorded human history”, North, Wallis and Weingast (2009) address the transition from ‘natural states’ to ‘open access societies’. The former, called ‘limited access societies’, total about 80 per cent of the world population, with elites retaining economic power and societal gains, while the rest of the society is excluded. The

¹⁵ Thereby, he seems to neglect the devastating consequences of possibly too much flexibility of institutions in the USA, which led to the global financial crisis in 2007 with major implications for the world economy.

latter, characterised by equal participation based on merit rather than origin, represent only approximately 25 countries in the world.

The title is explicit about the ambitions of the authors: it is about offering the conceptual instruments to understand how political, economic and cultural developments are managed within a society to contain violence rather than “deterministic predictions about social changes” (North, Wallis and Weingast, 2013, p.xviii). The first edition’s focus is on the transition from ‘natural states’ to ‘open access societies’, whereby the authors identify three “doorstep conditions” for the transition from limited to open access societies: “rule of law for elites”, “perpetually lived organisations in the public and private spheres” and “consolidated control of the military” (North, Wallis and Weingast, 2009, pp. 151-154).

Four years later, in their preface to the paperback edition, their attention is on how to improve natural states so that they can function more effectively. Their conclusions are provocative:

“[...] important characteristics of [...] open access societies are inconsistent with the internal logic of natural states, where the political system manipulates economic privilege to maintain political stability. Economic and political theories built on assumption of open entry, impersonal exchange, and the stability of property rights fail to explain the problem of economic and political development that occurs within natural states” (North, Wallis and Weingast, 2013, p.xiii).

The corollary to this statement is that policies inspired by economical and political theories, which are built on such assumptions, are likely to fail in addressing the obstacles to the economic and political development in natural states. However, the authors identify an even greater risk in forcing policies, which do not take into account the local balance of powers. In the afterword to the paperback edition, the authors explicitly put the “problem of violence” at the centre of their argumentation:

“... political systems in natural states manipulate the economy to create rents. To contain – but not to eliminate – the problem of violence, the political system allocates rents in rough proportion to violence potential. Allocating rents in other ways risks violence because those gaining too little relative to their power may choose to fight for their share” (North, Wallis and Weingast, 2013, p.274).

Looking at how such risks have materialised in the recent past in the MENA region raises the fundamental question of whether focusing on the transition from natural states to open access societies is always desirable, sensible and, indeed, beneficial. The next section presents the evolution of the role of PA in developing countries, all “limited access societies” in North’s definition.

2.3 Evolution of the public sector in developing countries

The previous sections have presented an overview of the debate on the nature and role of PA in the developed world. The reason for first presenting this perspective is that policy making and the evolution of PA in developing countries have been greatly influenced by the experiences made in Western countries. In particular, international agencies and donor institutions have long pushed for the adoption of so-called best practices and, once this method has been questioned on the basis of the disappointing outcomes, have maintained the underlying principle of the Western superiority, by extending it to the institutional level. These processes and their impacts are illustrated in the following.

Public sectors in developing countries experienced a major expansion between 1945 and 1980, independently from their economic systems (and ideologies behind them) or from their different levels of socio-economic development, as governments across the world as well as multi-lateral agencies recognised that an effective PA can yield major benefits in terms of service delivery, poverty reduction and social inclusion (Bangura and Larbi, 2006).

During the Cold War, development and military aid was mainly provided by the USA and the Soviet Union within their respective spheres of influence. Both sides directed their aid-flows towards countries that were of strategic importance in terms of foreign relations and trade, not necessarily those that were most in need of support. For example, most of the aid from the USA was channelled to middle income countries, such as Israel, Turkey and Egypt (Turner and Hulme, 1997).

This trend continued beyond the Cold War, as pointed out by Randel and German (1993), only 17 per cent of aid budgets of the two largest donors (USA and Japan) were directed towards least developed countries in 1991 and all but two OECD

countries assigned less than 40 per cent of the aid budgets to least developed countries (Randel and German, 1993, p.65).

Until 1980, aid was mainly distributed via projects, leading to a phenomenon later described as “institutional destruction” (Morss, 1984 in Turner and Hulme, 1997): the “diversion of policy-makers and senior-bureaucrats from overall policy formulation to simply responding to demands of consultancy missions about individual projects”, with devastating consequences particularly in Sub-Saharan Africa (Turner and Hulme, 1997, p.223).

Furthermore, aid-flows promoted projects that turned out to be unsuitable to developing countries’ needs. For example, significant investments were made in the education of doctors in “sophisticated, curative medicine” in the 1960s, where investment in “primary health care and preventive medicine” would have been more useful (Turner and Hulme, 1997, p.223). Moreover, the technical assistance for PA has created greater dependence on external consultants instead of advancing organisational performance (Berg, 1993).

After the Cold War, according to Bangura and Larbi (2006, pp.4-7), “financial globalisation and fiscal deficits” as well as “structural adjustment” became the major reasons for public sector reform in developing countries and such goals started to appear on a wide range of governments' and international agencies' agendas. Many countries underwent a considerable “process of integration of different financial institutions, investment, deposit, and retail banks, insurance companies, estate agencies and pension funds”. Additionally, the global liberalisation of financial markets and “credit controls” in the 1980s made financial transactions and the composition of financial assets (in particular the large-scale transformation of “financial assets into bonds”) more complex. Information asymmetries between borrowers and savers (often very far from each other) allowed “fraud, default or poor management” to emerge across financial institutions, to the disadvantage of savers (Bangura and Larbi, 2006, pp.3-9).

Considerable pressure was exerted on governments to reform PAs: cutting the public sector and introducing market-like mechanisms in the delivery of public services became accepted means to control the (vast) fiscal deficits experienced globally in

the 1970s and 1980s. Average deficits in OECD countries were “-4.5 per cent in 1975, -4.2 in 1976, -3.4 in 1977 and -3.4 in 1978”. During the 1980s, the average deficit was three to four per cent and five to six per cent of GDP from 1983 to 1986 (Bangura and Larbi 2006, pp.4-5). Table 2 illustrates the fiscal deficits in developing countries for the same period.

Table 2: Average deficits in developing countries (% of GDP)

Region/Time period	1975 - 1980	1980s	1980 – 1986
Africa ¹⁶	6.5	4.0	4.0
Latin America and Caribbean ¹⁷	2.7	5.8	8.0
Asia ¹⁸	4.0	4.0	4.0

Source: Adapted from Bangura and Larbi (2006, pp.4-5)

In the 1980s, structural adjustment reforms, characterised by market-like adaptations, were introduced in many developing countries under the supervision of the World Bank and the International Monetary Fund (IMF). However, the necessary institutional reforms were not considered, as efforts of the multilateral agencies mainly focused on the promotion of market efficiency. These reforms (replicating those implemented in developed countries, particularly Australia, UK and USA) were characterised by the three major policy prescriptions labelled by Rodrik (2004, p.1) as: “stabilize, liberalize and privatize”.

Extensive “trade liberalization” reforms led to major reductions of trade barriers in most developing countries (Rodrik, 2004). They were undertaken within a broader policy agenda for developing countries, the so-called “Washington Consensus”¹⁹ of 1989 and later the “Augmented Washington Consensus”, lists of respectively 10 and 20 “policy reforms” that aim at increasing economic growth (Williamson, 1990;

¹⁶ Liberia, Mauritius, Malawi, Togo, Ghana, Zaire and Zambia experienced fiscal deficits of over 10 per cent during the 1980s.

¹⁷ Brazil, Belize, Bolivia, Jamaica, Mexico, Nicaragua, Surinam experienced fiscal deficits of over 10 and 20 per cent between 1980 and 1986.

¹⁸ Bangladesh, Burma, Indonesia, Korea, Malaysia and Singapore experienced fiscal deficits of less than three per cent between 1975 and 1989.

¹⁹ An overview of the (augmented) Washington Consensus is presented in Appendix IV.

Rodrik, 2004). In many cases, structural adjustments were initially opposed, as governments felt that these would diminish their power (Hirschmann, 1993). Furthermore, vast delays in implementation caused higher than expected borrowing to meet public sector spending (Sandbrook, 1993).

Reforms did not lead to the anticipated economic growth and increases in productivity. This was particularly visible in Latin America, the major follower of Washington Consensus policies at the time, where the economic situation became much worse than it had been before under import substitutions (Rodrik, 2004). The early effect of structural adjustment policies focusing on market efficiency and economic growth was that poverty levels actually increased (Cornia, Jolly and Stewart, 1987; Moser, Herbert and Makonnen, 1993 in Batley and Larbi, 2004). Public sector policies focusing on the enhancement of its capacities produced a contrary effect, as the cuts in staff within the PAs of developing countries did not lead to the desired budget savings due to compensation and loss of qualified staff (Sandbrook, 1993).

This changed progressively in the late 1980s and early 1990s, when the concepts of 'governance' and 'good governance' gained considerable prominence among development agencies and PAs worldwide. It became apparent that market-driven structural adjustments not accompanied by state reforms did not result in the expected economic growth and caused the 'social costs of adjustment' to rise (Bangura and Larbi, 2006, p.5). This change of focus is apparent in the list of the major support-activities of the World Bank and the IMF towards PA reform in developing countries in the 1990s (Table 3).

Table 3: World Bank and IMF support toward developing countries in the 1990s

World Bank Support Activities	IMF Support Activities
Civil service reform Capacity building Privatisation Decentralisation Introduction of market mechanisms in public services (e.g. user fees)	Aggregate fiscal balances Transparent budgetary practices Expenditure control Tax administration

Source: Adapted from Bangura and Larbi (2006)

The compelling case behind these reforms was the lack of accountability among public officials, believed to pursue their self-interest rather than the broader public interest (see principal-agent problem in section 2.1). This was reinforced by the monopolistic character of public services, by the existing information asymmetries about skills and intentions of public servants and by the high transaction costs associated with “writing and monitoring complete contracts”. It was assumed that by exposing the government to greater competitiveness the problem of public accountability could be solved (Bangura and Larbi, 2006, p.6).

Simultaneously, large-scale democratisation took place across the globe as part of the good governance movement. Supported by multilateral organisations, in particular the World Bank, this ideological shift was meant “to curb corruption, change non-performing governments, and advance liberalisation and pro-property rights policies”. However, as developing countries were (and still are) in the process of repaying vast amounts of public debt, they were often forced to adopt “market-driven” policies imposed by “creditors and donors” (Bangura and Larbi, 2006, pp.6-7).

It is important to underline that the debate on the evolution of the public sector in developing countries has been strongly influenced by the belief that a number of preconditions have to be met before countries can progress. Grindle and Hildebrand (1995) as quoted in Jooste (2008, p.18) assert that “until basic conditions of economic development, political commitment, and social stability are put in place, little can be done along other dimensions that would contribute to improving public sector performance”. However, Chang (2003) underlines that many aspects, considered preconditions for the development of developing countries, were not in place in developed countries prior to their own development. Therefore, what is currently considered prerequisite for socio-economic progress in developing countries, were rather its consequence for developed countries (Chang, 2003).

Chang’s insight delegitimises the vast amounts of “preconditions” (see, for example, the Washington Consensus) that have been set by policy makers from developed countries and particularly by international organisations. These represented a great burden on decision and policy makers in developing countries, who struggled with

determining priorities among the vast amount of policy recommendations, let alone execute the 'necessary' reforms in an efficient way, while coping with weak human and institutional capacities.

The 'copy and paste' of 'best-practice solutions' from developed countries, without much reflection on the relevance and appropriateness became frequent (Rodrik, 2004), further revealing the capacity challenges in the developing world. This is confirmed by Jooste's (2008) analysis, which identifies capacity building as a major aspect for successful reform in developing countries within three major levels: "human level, organization level and institutional level". He then reverses the argument, stating that reform supports capacity building and the two should therefore be pursued simultaneously (Jooste, 2008, p.19). However, this can prove challenging as the policy implementation process in developing countries has specific characteristics, elucidated in the following section.

2.4 Capability trap: issues with policy implementation in developing countries

Policy implementation projects in developing countries, particularly within the realm of international cooperation, have often failed to achieve the planned objectives (Brynard, 2005; Makinde, 2005; Oladipo, 2008). While these difficulties have been widely recognised, it is enlightening to see what the results of the subsequent analysis have been: management of policy implementation (and corresponding programmes and projects) was considered to be too "operational", e.g. focusing on what had to be done, rather than "strategic", e.g. anticipating and dealing "with obstacles and opposition to change" (see, for example, the results of the USAID Implementing Policy Change Project as reported in Brinkerhoff (1996a, p.3; 1996b)).

A strategic approach clearly facilitates policy implementation. However, it is argued here that the successful implementation of policies depends in the first place on their correct definition, reflecting in the choice of goals the local culture and accompanying its evolution in the process. Accordingly, there is little scope for attempting to define "best practice": much more important is the assessment of the

relevance, in terms of achievability of underlying goals, in the local context of others' good practices (Mishrif and Selmanovic, 2010).

In a similar vein, Pritchett, Woolcock and Andrews (2010) note that high-speed modernisation, as envisaged for example by the MDGs, is not feasible, as it would imply rates of change never witnessed before in developing countries (Clemens, 2004 in Pritchett, Woolcock and Andrews, 2010). They argue that so-called "capability traps" are the main reason for "persistent failure" in policy implementation: states fail to implement policies effectively, however offer the illusion of a successful implementation (p.20).

Two major patterns emerge in this context: "isomorphic mimicry", which refers to "the ability of organisations to sustain legitimacy through the imitation of the forms of modern institutions without functionality" (Pritchett, Woolcock and Andrews, 2010, p.18), and "pre-mature load bearing", whereby high expectations or, as the authors frame it, "wishful thinking" induce high stress levels into organisations, causing them to "collapse" and fail continuously (Pritchett, Woolcock and Andrews, 2010, p.33).

Meanwhile, most scholars and practitioners have recognised that the policy prescriptions under the (Augmented) Washington Consensus are inappropriate and not feasible. Empirical evidence shows that the fastest growing developing economies of the 21st century have not followed identical policies, but, on the contrary, pursued very different ways towards economic growth and development (Rodrik, 2004). This further demonstrates the need for defining and implementing policies and priorities on a "country-by-country" basis, i.e. "grounding action in the contextual realities of each country" (Grindle, 2004, p.526 and p.530).

A deeper analysis of the economic performance and policies of emerging economies, despite major differences, reveals some general principles that all of them have followed, even though some to a lesser extent than others. According to Rodrik (2004) these include: "macroeconomic stability" reflected in low inflation rates and sustainable debt levels, "integration in the world economy", "protection of property rights and contract enforcement" as well as "a certain degree of social cohesion, solidarity and political stability" (Rodrik, 2004, p.3). He then asserts that these

principles took the form of “objectives” and were pursued with different specific “policy proposals”, as in the case of China and India, whose economic policies, particularly in terms of trade barriers, have differed considerably and nevertheless have both managed to establish themselves as global economic players. In Rodrik’s words: “Integration into the world economy can be achieved with low tariffs and high tariffs” (Rodrik, 2004, p.4).

An important factor for a country’s development is an environment that enables or even promotes entrepreneurship and innovation. According to Aubert (2010, p.8), such an environment is mainly characterised by “the macroeconomic situation, the level of infrastructure development, and the quality of governance”. The latter is particularly important since, at least for developed countries, it has been empirically demonstrated that there is a positive correlation between indicators of good governance and indicators of innovativeness (Celikel-Esser, 2007): an efficient PA has the potential to create an environment that supports innovation and entrepreneurship and enables socio-economic development.

However, the link between an efficient PA and innovative performance in developing countries has not yet been sufficiently addressed by scholars or policy makers. In particular, organisational schemes meant to support innovation in developing countries have not been addressed at all. This gap has to be filled in order to assess the relevance of organisational schemes developed elsewhere for policy makers in developing countries (Mishrif and Selmanovic, 2010).

This chapter has presented the role of PA according to different schools of economic thought. It established that NIE is the most appropriate overarching framework to address the role and evolution of PA in developing countries for its focus on institutions and the recognition that inefficiencies may be functional to control societal violence.

Second, the overview of the evolution of the public sector in developed countries has shown that PA went through a considerable transformation in the 1980s, evolving into a managerial discipline with emphasis on reducing size and role of the public sector and focusing on performance measurement. These initiatives were

replicated in developing countries under the pressure of development programmes and international organisations.

The prescription of policies based on Western experiences to developing countries has often led to institutional destruction and capability traps, providing evidence of the failure of policy transfers between heterogeneous contexts. Still, it is common practice for international organisations to recommend to “copy and paste” policies from open access orders to natural states.

This thesis argues that the trend needs to be reversed and proposes a new approach towards policy transfer, based on relevance and grounded in the reality of a specific context. The next chapter provides the necessary theoretical instruments, outlining in depth the role of NIS, highlighting the relevance of informal institutions (i.e. culture, values and norms) and addressing the relationship between innovation and culture, the last concept fundamental to the logical construct of this thesis.

Thereafter, multipurpose organisational schemes supporting innovation are presented in detail, building on the functional approach toward NIS suggested by Edquist (2004) and confirmed in the thematic analysis of the transcripts of interviews with participants in this research. A summary of the implications of the literature review for the research concludes the chapter.

3 NIS, informal institutions and organisational schemes supporting innovation

Joseph Schumpeter defines innovation as “the commercial or industrial application of something new – a new product, process or method of production; a new market or sources of supply; a new form of commercial business or financial organisation” (Schumpeter 1934 in 1983, p.19). Several definitions have been proposed since, the majority implying the implementation (commercialisation) of a new idea, others emphasising the creation of economic and social value (Table 4).

Table 4: Selected definitions of innovation

Innovation is the intersection of invention and insight, leading to the creation of social and economic value (Innovate America, National Initiative Report, Council on Competitiveness, 2004).
Innovation covers a wide range of activities to improve firm performance, including the implementation of a new or significantly improved product, service, distribution process, manufacturing process, marketing method or organizational method (EC, Innobarometer 2004, November 2004).
Innovation – the blend of invention, insight and entrepreneurship that launches growth industries, generates new value and creates high value jobs (Ahead of the Curve, The Business Council of New York State, Inc., 2006).
The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational models for the purpose of creating new value for customers and financial returns for the firm (Measuring innovation in the 21st Century Economy Advisory Committee, Department of Commerce, Federal Register Notice, April 13, 2007).
An Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Innovation activities are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to lead to the implementation of innovations (OECD, Oslo Manual, 3rd Edition, 2005).
Innovation success is the degree to which value is created for customers through enterprises that transform new knowledge and technologies into profitable products and services for national and global markets. [...] innovation in turn contributes to more market creation, economic growth, job creation, wealth and a higher standard of living (21st Century Working Group, National Innovation Initiative, 2004).

Source: Stone et al. (2008, pp.3-4)

The last definition proposed explicitly mentions the impact of innovation and, consequently, supports the choice of the innovation performance indicators and

scoring models (see Chapter 5), which allow the measurement of the impact of AE policies.

3.1 *The role of NIS*

In his work on the Theory of Economic Development (in German), Schumpeter (1911) addresses the importance of innovation for economic development, that is breaking out of the usual way of acting and introducing spontaneous and discontinuous changes. Innovation leads to new products, new production methods or business models as well as to market development and new forms of organisation (Schumpeter, 1911).

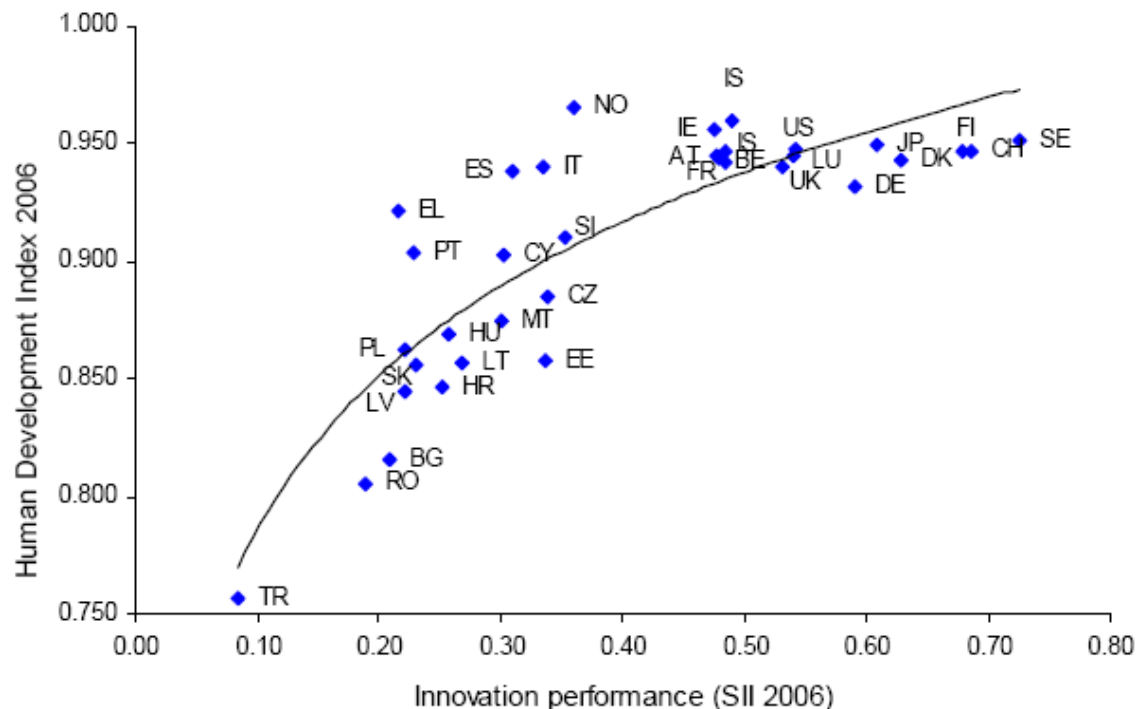
Empirical evidence is provided by Solow (1957), who analyses technical change and the aggregate production function in the USA for the period 1909-1949. More specifically, he aims at assessing the impact of technical change on “gross output per man hour” and his results show that 87.5 per cent of increases in Gross National Product (GNP) for the period were due to technical changes, while only 12.5 per cent could be attributed to the higher use of capital (Solow, 1957).

Similarly, Rosenberg (1982) asserts that the superior “material wealth” of Western civilisations is not a consequence of higher consumption of existing products, but rather of the availability of “entirely new forms of rapid transportation, instant communication, powerful energy sources [...] and a bewildering array of entirely new goods that were undreamed of 150 or 200 years ago” (Rosenberg, 1982, p.4). This view is shared by authors such as Dutrenit and Dodgson (2005), Fagerberg, Mowery and Nelson (2006), Metcalfe and Ramlogan (2008), and by international organisations (e.g. UN bodies, OECD and World Bank).

Innovation is not only a major driver for economic growth, but also facilitates the achievement of developmental goals and supports socio-economic transformation (see for example Kraemer-Mbula and Wamae, 2010). Figure 2 illustrates this relationship for European countries, where innovation performance is strongly

correlated with human development, measured respectively by the Summary Innovation Index (SII)²⁰ and by the Human Development Index (HDI)²¹.

Figure 2: Innovation and human well-being



Source: Hollanders and Arundel (2007, p.4)

According to Aubert (2005), policy makers and international agencies increasingly emphasise the importance of innovation for development as they recognise that policies formulated under the “Washington Consensus”, i.e. “privatisation, liberalisation and deregulation” (see section 2.3), have not generated the expected results in terms of “promoting sustainable development” and policies prescribing greater government involvement for establishing enhanced “infrastructure and institutions” have equally failed (Aubert, 2005, p.6).

The World Bank identifies two major drivers of innovation in developing countries, essentially exogenous: the “intensification of the globalisation process” and “the

²⁰ Defined within the Innovation Union Scoreboard, see for more detail section 5.2.

²¹ A composite index employed by the United Nations Development Programme (UNDP) to measure human well being in three dimensions, namely health (“life expectancy at birth”), education (“mean years of schooling” and “expected years of schooling”) and living standards (“gross national income per capita”) (UNDP, 2010).

intensive ongoing technological change” on a global scale (Aubert, 2005, p.7). There are however endogenous factors that prevent developing countries from profiting from them. According to Aubert (2005), three major weaknesses hamper innovation in developing countries: low levels of education; poor quality of the business environment and governance; and underdeveloped infrastructure. They are the major reason for “poorly constructed and very fragmented” innovation systems in developing countries (Aubert, 2005, p.9).

In Aubert's view, any initiative to promote innovation in developing countries needs to consider the particularities of the local institutions (e.g. culture, values and norms). While Classical and Neoclassical schools of thought view the innovation process as a linear input-output model, NIE emphasises the relationships between economic actors and their interactions within the institutional context: "this school of thought tends to take as a basis the existing institutions and to understand the minimal changes which can help generating progress and growth" (Rodrik 2004 in Aubert, 2005, p.9).

The institutional context is an essential component of **National Innovation Systems**, broad innovation systems in the definition of Lundvall (1992) which cover “parts and aspects of the economic structure and the institutional set-up affecting learning as well as searching and adapting” in addition to the “narrow” innovation systems, which refer only to “organizations and institutions involved in searching and exploring – such as R&D departments, technological institutes and universities” (Lundvall, 1992, p.12).

The concept of NIS can be traced back to Friedrich List (1841), while a more explicit reference and analysis can be found in inter alia Freeman (1982; 1995), Dosi et al. (1988), Nelson (1993), Lundvall (1985; 1997), Edquist (1993; 1997), Niosi (2002) and Fagerberg, Mowery and Nelson (2006) (see Table 5 for a list of definitions).

Martin (2012) as well as Fagerberg, Fosaas and Sapprasert (2012) analyse the core literature on innovation by studying citations. Both contributions note that the field of innovation and science studies has gone through a substantial transformation focusing initially on innovation in firms as well as innovation and R&D in wider socio-economic contexts. The innovation systems approach then emerged as a third

component of the field, making an important contribution towards linking the studies within the other two streams and eventually an integration of the three into an inter-disciplinary field in the 1980s (Fagerberg, Fosaas and Sapprasert, 2012).

Table 5: Definitions of NIS

<p>“... The network of institutions in the public- and private-sectors whose activities and interactions initiate, import, modify and diffuse new technologies” (Freeman, 1987).</p> <p>“... The elements and relationships which interact in the production, diffusion and use of new, and economically useful knowledge... and are either located within or rooted inside the borders of a nation state”(Lundvall, 1992).</p> <p>“... The set of institutions whose interactions determine the innovative performance of national firms” (Nelson and Rosenberg, 1993).</p> <p>“... The national system of innovation is constituted by the institutions and economic structures affecting the rate and direction of technological change in the society” (Edquist and Lundvall, 1993).</p> <p>“... A national system of innovation is the system of interacting private and public firms (either large or small), universities, and government agencies aiming at the production of science and technology within national borders. Interaction among these units may be technical, commercial, legal, social, and financial, in as much as the goal of the interaction is the development, protection, financing or regulation of new science and technology” (Niosi et al., 1993).</p> <p>“... The national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country” (Patel and Pavitt, 1994).</p> <p>“... That set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artifacts which define new technologies” (Metcalf, 1995).</p>
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Source: Niosi (2002, p. 292)

On the basis of interviews with the most influential authors in the field, Sharif (2006) explains the ambiguities in the definition of the NIS with its simultaneous origin in academia and policy-making institutions, with the main proponents often working in both. He quotes Bengt-Ake Lundvall on the inadequacy of neoclassical economics to study innovation-related phenomena: “One important motivation for my interest in innovation and innovation systems is actually that when you focus on innovation it becomes absolutely clear that the neoclassical assumption about agents making

choices between well-defined alternatives cannot apply” (Lundvall, 2003 in Sharif, 2006, p.754).

In his work, Sharif (2006) reports on the existing broad disagreement among major innovation systems scholars regarding the level of theoretical saturation in the field: while some note that it is the theoretical fuzziness and flexibility which increase the concept’s usefulness (e.g. Smith, Nelson and McKelvey), others advocate for more theoretical development (e.g. Edquist, Metcalfe and Fagerberg) (Sharif, 2006). The author of the present study shares the opinion of the first group summarised in the following statement of Metcalfe:

“I think we do need to spend a hell of a lot more on theorizing. That’s why other perspectives are important in this, I think; by taking broader insights from evolutionary thinking, from social constructivism, from institutionalism and so on, and actually applying them to concrete case studies” (Metcalfe, 2003 in Sharif, 2006, p.758).

In their epilogue to “The Handbook of Innovation Systems and Developing Countries”, Lundvall et al. (2009) emphasise the importance of case study research in innovation systems with particular focus on comparative analysis:

“Most research on systems of innovation is based on the analysis of one national innovation system, sectoral or regional. While individual analysis is useful to understand the evolution of an innovation system over time, the systematic comparative analysis of different systems across similar dimensions might help to identify similarities as well as differences across innovation systems” (p.384).

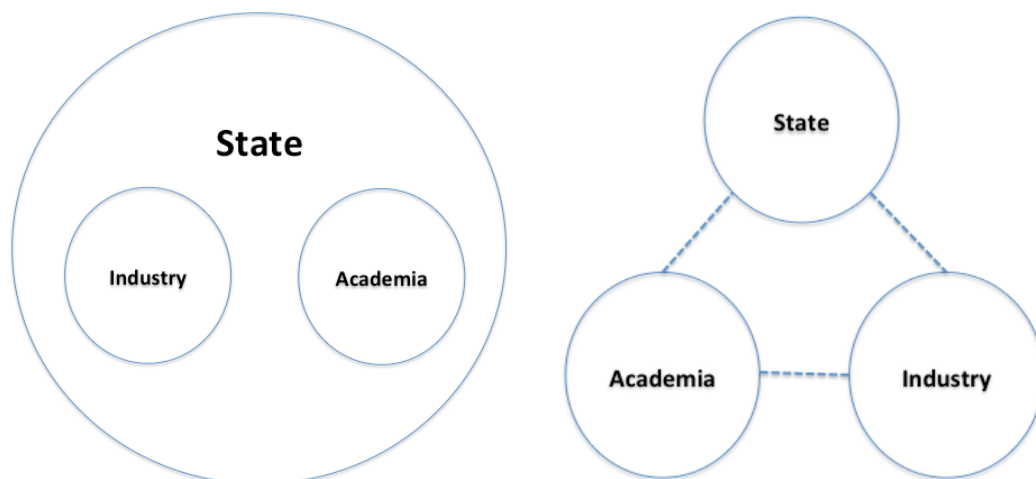
Several contributions in the handbook emphasise the unsuitability of innovation policies designed in the West for developing countries. To determine the right policies, Lundvall et al. (2009) suggest conducting comparative analysis within a group of innovation systems, which could be organised into “families” according to “certain commonalities” (p.19). Apart from geographical ‘commonalities’, the authors, however, do not propose any criteria according to which countries could be grouped into families.

Etzkowitz and Leydesdorff (2000) reject the NIS model for the analysis of complex innovation systems, claiming that it is too firm-centric: “the NIS approach considers the firm as having the leading role in innovation” (Etzkowitz and Leydesdorff, 2000,

p.109). Instead, they propose a different representation of “university-industry-government relations”, whereby these entities interact in three possible ways (Etzkowitz and Leydesdorff, 2000, p.109).

In the first model, called “Triple Helix I”, the government assumes the leading role and dictates the nature of industry-academia relationships, an example being the “institutional arrangement” prevailing in the former Soviet Union. In the second model, called “Triple Helix II” and representing the exact opposite to Triple Helix I, the three entities operate in a “laissez faire model of university–industry–government relations” (Figure 3) (Etzkowitz and Leydesdorff, 1998; 2000, p.111).

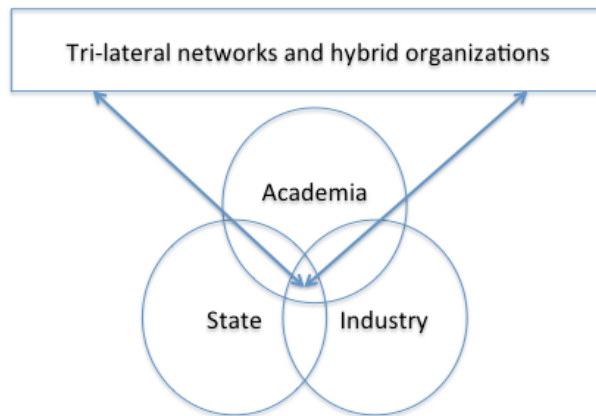
Figure 3: Triple Helix models I and II



Source: Etzkowitz and Leydesdorff (2000)

The authors claim that both forms have failed to adequately support innovation. Therefore, presently most nations are attempting to create an environment conducive to innovation (Figure 4), which entails “university spin-off firms, tri-lateral initiatives for knowledge based economic development, and strategic alliances among firms [...], government laboratories and academic research groups. These arrangements are often encouraged, but not controlled, by government [...]” (Leydesdorff and Etzkowitz, 1996; Etzkowitz and Leydesdorff, 1998 and 2000, p.112).

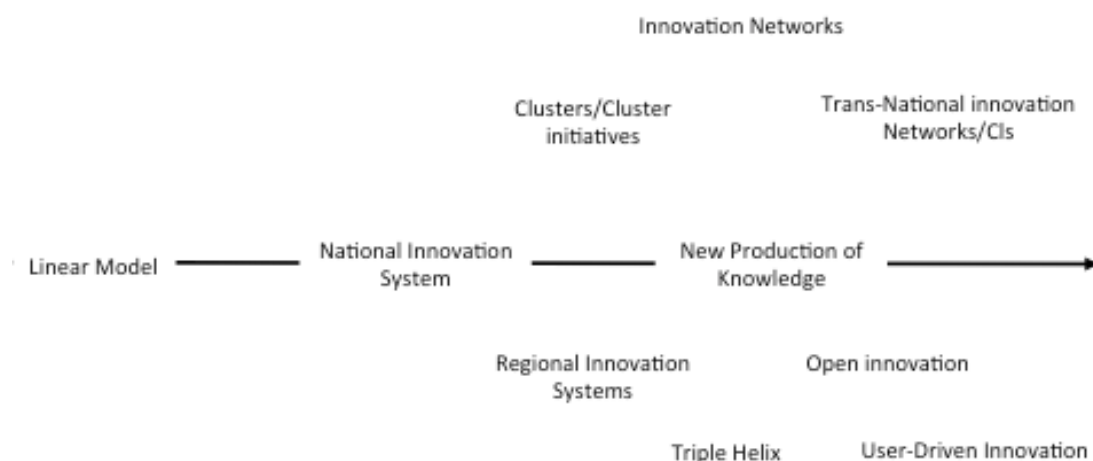
Figure 4: Triple Helix model III



Source: Etzkowitz and Leydesdorff (2000)

Other authors underline the role of further social actors in complex innovation systems. Arnkil et al. (2010) argue that a substantial transition has taken place (Figure 5): the linear model for innovation has been replaced by various systemic models, eventually leading to “innovation theories and approaches [which] emphasize that knowledge is increasingly created in broader, trans-disciplinary and besides economic, also in social contexts, in which the users of innovations have a great role to play. One can name these open and user-oriented models of innovation” (Arnkil et al., 2010, p.10).

Figure 5: Transition from linear to systemic models for innovation



Source: Wise and Høgenhaven (2008) in Arnkil et al. (2010, p.10)

They conclude that Triple Helix models should be extended to include users as the fourth helix and, consequently, name their Quadruple Helix approach “User-Driven Innovation”.

More studies have proposed the addition of a fourth helix, albeit differing in terms of its nature: from “intermediate organizations as innovation-enabler organizations” that “act as brokers and networkers between the TH organisations” (Liljemarm, 2004 in Arnkil et al., 2010, p.14), to the “civil society” (Carayannis and Campbell, 2009; Danilda, Lindberg and Torstensson, 2009; Colapinto and Porlezza, 2012; Lindberg, Danilda and Torstensson, 2012) or to the broader public (Yawson, 2009 in Arnkil et al., 2010).

Leydesdorff (2012, pp.32-33) has recently suggested including even more helices, stating that: “[...] n-tuple or an alphabet of (20+) helices can be envisioned”. Nevertheless, he concludes that:

“One may wish to move beyond three relevant selection environments, but also a fourth (Carayannis and Campbell, 2009) or fifth (Carayannis and Campbell, 2010) dimension would require substantive specification, operationalization in terms of potentially relevant data, and sometimes the further development of relevant indicators. Without such a perspective, parsimony itself may be a methodologically well-advised strategy: so long as one is not able to operationalize and show development in the relatively simple case of three dimensions, one should be cautious in generalizing beyond the TH model to an N-tuple of helices”.

This research acknowledges the criticisms of NIS made by these authors, but equally recognises that more recent definitions of NIS do focus on industry-academia-government relationships, in particular in the framework of NIE. As this research aims at analysing innovation support activities in developing countries, it adopts a broader definition of NIS: “all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion and use of innovations” (Edquist, 1997 in Fagerberg, Mowery and Nelson, 2006, p.183).

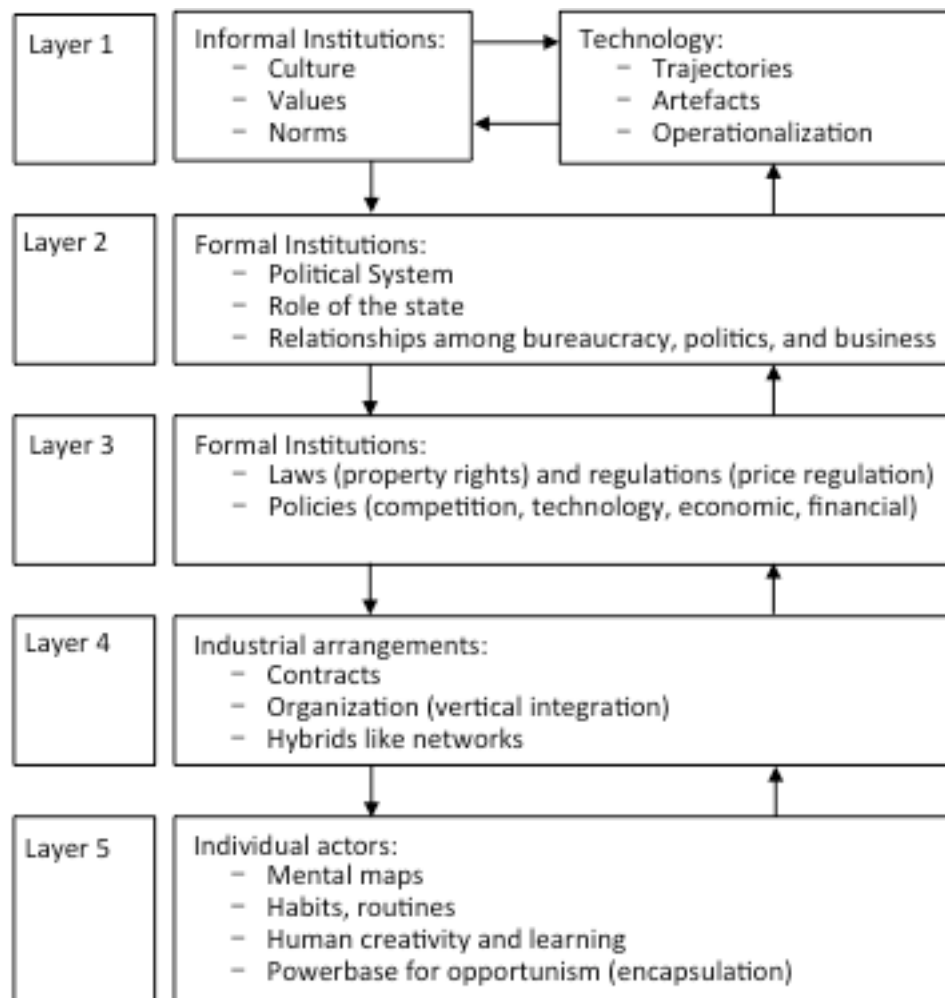
This definition has the advantage of not attempting to describe the nature of the industry-academia-government relationships, allowing for its application in contexts with different levels of institutional maturity. However, it does not provide any insight on how these relationships influence and are influenced by the surrounding context.

In their work on the evolution of NIS, Groenewegen and van der Steen (2006) emphasise the importance of the nature and “speed of change” of interconnections

between the different layers of NIS (Figure 6). Citing North's (1990) work on "shared mental maps" and the hierarchical dependency of formal on informal institutions, whereby the latter permeate and guide the evolution of the former, they establish that the reverse is also true: culture, norms and values of a society are influenced by technological development, which in turn is shaped by formal institutions, their institutional arrangements and, ultimately, the actions and behaviours of all actors of the NIS (Groenewegen and van der Steen, 2006).

This representation complements the definition adopted and is therefore used in the following sections as well as for the description of the NIS of the selected case studies in chapters 6 and 7.

Figure 6: NIS as interconnected systems of institutions



Source: Groenewegen and van der Steen (2006, p.281)

3.2 Innovation and culture

This section covers the last concept fundamental to the logical construct of this thesis, namely how informal institutions influence societies and the formal institutions governing them (layers one to three). To this purpose, it first introduces widely cited cultural models, which support the assessment of the relevance of a given context, and then addresses the relationship between culture and innovation.

Several authors have attempted to categorise cultures by defining their aggregate characteristics according to different variables. Their aim has been to model the collective patterns of thought of different groups of individuals. Originating from subject areas like sociology and anthropology, cross-cultural studies are now widely applied to business studies and economics, recognising the relevance of human behavioural patterns for economic development, as advocated by NIE (see section 2.1).

Edward T. Hall (1914-2009) is considered the founder of intercultural communication as an academic field and his work, Hall (1959; 1966; 1976; 1983) inspired subsequent contributions, in particular Geert Hofstede, Fons Trompenaars and Charles Hampden-Turner, which have considerably influenced business interactions in cross-cultural settings and represent an essential instrument for policy makers seeking inspiration from experiences made in other countries (Mishrif and Selmanovic, 2010).

Hall did not present his work in a single publication, but successively in different works. Based on fieldwork including observations and interviews with individuals in a variety of developing countries, he developed four cultural dimensions to categorise every culture according to certain characteristics.

Hall's first dimension "proxemics" was introduced in 1966 in his book *"The Hidden Dimension"*. It refers to the differences in spatial distances, which are unconsciously accepted by groups of individuals within a society and can vary considerably across different cultures. These spaces, which are larger or smaller depending on the respective culture, are referred to as "distance zones". Thereby Hall (1966) distinguishes between the "intimate", the "private" and the "public distance zones".

For example, a culture from South America would feel much more comfortable with physical contact within a random conversation than someone from say northern Europe. Hence the latter are used to larger distance zones, while the life of people from the South usually takes place within smaller distance zones among individuals.

A second dimension, high context vs. low context, was introduced in 1976 in Hall's book *"Beyond Culture"*. It refers to the concepts of information acquisition and processing as well as the corresponding networking: it is the intensity, i.e. a strong or a weak reference, of the context within communication. In a high-context culture communication is implicit, i.e. not everything has to be spoken out loud (in Hall's words this is called "the silent language") and the engagement with too many details could be considered negative. Hence information is transmitted implicitly via mimics and gestures as well as allusions and specific situational circumstances.

Examples for high-context cultures can be found in Asia (e.g. China, Japan), Southern Europe (e.g. Greece, Italy, Spain) as well as Latin American countries. In cultures with a weak reference to the specific context (i.e. low-context cultures) one does not expect the majority of information to be already known or recognisable without spoken language. Communication is explicit and direct and details are considered an important factor for the accurate transmission of information. Examples of low-context cultures include Germany, the UK and the USA (Hall, 1976).

In *"The dance of life"*, Hall (1983) introduced a third dimension, monochronic versus polychronic time orientation, which refers to the relationship between individuals and time. Monochronic cultures tend to complete the steps of a procedure consecutively, while time lines are strictly followed and the completion of tasks is of higher importance than the cultivation of personal relationships. In poly-chronic cultures, on the contrary, it is more common to perform a range of tasks simultaneously, rather than successively, while time lines are usually not followed strictly. Thus, flexibility is high in poly-chronic cultures and personal relationships have priority over task-completion.

In the 1990s, Hall and Hall (1990) published the results of further research, which lead to the definition of a fourth cultural dimension, i.e. Information Velocity. This dimension refers to the speed at which processible information is preferred by a

specific culture. Hall and Hall (1990) distinguish between “fast and slow messages”, where fast messages include for example “a headline or cartoon” and slow messages are for instance “books or art”. In their view, the velocity in which information is preferred by a society or culture is an “important characteristic of human communication” (Hall and Hall, 1990, p.4).

Geert Hofstede, a Dutch sociologist and expert in cultural studies, proposes a similar representation of cross-cultural dynamics. He undertook a large-scale research on cultural dimensions in 50 countries and three regions, using 116,000 questionnaires on cultural values related to work activities of industrial workers from a large multinational corporation, namely IBM. Two surveys, held respectively in 1968 and in 1972, produced identical results. This led to the identification of “four main dimensions in which country cultures differ”, namely “Power Distance, Uncertainty Avoidance, Individualism and Masculinity” (Hofstede, 1984, p.9). A fifth dimension, “Long-Term Orientation”, was added in the nineties. Indices for each dimension have been developed for all the 50 countries included, as described in the following (Hofstede, 1993).

The Power Distance Index (PDI) seeks to determine to what extent less powerful individuals are willing to accept the authority of the more powerful ones. Hence, countries with a high PDI (for example most Asian and Latin-American countries) tend to accept steeper hierarchies and authoritarian power-relationships, where decisions are made and articulated top down and where those of a lower rank within the hierarchy expect to be told what to do and more or less only execute instructions from the top. The other extreme of the spectrum, i.e. countries with a low PDI, is usually characterised by collaborative team-work independent from positions within a hierarchy, while employees are included in the decision-making process that often manifests itself in a bottom-up approach within a flat hierarchy. Examples of countries with a low PDI include Germany, Great Britain and The Netherlands (Hofstede, 1984, p.79).

The second index, the Uncertainty Avoidance Index (UAI), refers to the willingness of individuals to accept risk and their striving for security and safety. In cultures with high Uncertainty Avoidance, rules, laws and safety standards are crucial, while

individuals tend to be very emotional about these aspects (e.g. Greece, Japan and South Africa). Cultures with low Uncertainty Avoidance are willing to take on high risks and tolerate uncertain situations, usually keeping formal rules to a minimum, with factual rather than emotional relationships (Hofstede, 1984).

The third index, Masculinity Index (MAS), focuses on gender-related values in a society. “Hard” attributes such as “assertive”, “competitive” and “ambitious” fall into the Masculinity category, while “soft” characteristics, such as “life quality” and “relationships” are assigned to the feminine category. Hence, in cultures with a high MAS (e.g. Austria, Japan and Venezuela) individuals from both genders tend to be more materialistic and goal-oriented, whereas cultures with a low MAS (e.g. Norway, Sweden and The Netherlands) tend to be more emotional and “caring” (Hofstede, 1984).

The last index, Individualism Index (IDV), relates to the preference of individuals to express themselves as members of a group or as individuals. Thus, cultures with a high IDV (e.g. Australia, Great Britain and the USA) prefer independence and self-determination, while cultures with a lower IDV (such as Ecuador, Guatemala and Indonesia) rather define themselves via their affiliation to the group and put the interest of the latter before their self-interest.

On the basis of research conducted by Michael Harris Bond with students in 23 countries, in a successive publication Hofstede added a fifth dimension, long versus short term orientation (LTO). Inspired by Confucian philosophy, this dimension addresses the perception of time within a society. In societies whose time orientation is based on a long-term perspective (e.g. China, Hong Kong and Japan), individuals tend to be more future-oriented, which is characterised by “thrift (saving) and persistence”. In societies characterised by a short-term perspective (e.g. USA and West Africa), individuals tend to be “rather oriented towards the past and present” than towards the future (Hofstede, 1993, p.90).

In 2010, on the basis of research conducted by Michael Minkov, two additional dimensions were included in the Hofstede cultural dimensions framework, namely “normative versus pragmatic” and “indulgence versus restraint” (Hofstede, Hofstede and Minkov, 2010, p. 289 and p.358). The former refers to a distinction between

societies that seek for the objective and absolute truth and those that accept their environmental circumstances as given. The latter dimension differentiates between cultures which value having control of their own lives and free expression and those who are more restrained, i.e. accept a certain degree of external control over their lives and do not necessarily expect free expression to be an integral part of society (Hofstede, Hofstede and Minkov, 2010).

Hofstede's model has been criticised because of "the narrowness of the population surveyed" (McSweeney, 2002, p.94). Since his sample population only consists of employees of a single company (IBM), the representativeness of his research is limited and the generalisation of findings to entire nations is potentially biased or misleading. Holden and Soderberg (2002) note that the information gathered in the two survey rounds (1968 and 1972) is relatively out-dated and its validity for representing today's reality is questionable. Furthermore, as argued by for example Triandis (1993) or McSweeney (2002), the IBM data used by Hofstede had originally been collected "for reasons internal to the corporation, not for studying cultural differences" (Hofstede, 1991 in Triandis, 1993, p. 133).

In a reply to McSweeney's (2002) article, Williamson (2002) argues that "to reject totally Hofstede's or similar functionalist models of national culture, before more satisfactory models have been developed, would be to throw away valuable insight. For social scientists [...] quantification of national culture opens up what is otherwise a black box of cultural factors" (Williamson, 2002, p.1391). The author does yet warn about possible "dangers" when using Hofstede's dimensions, such as "assuming [...] that a culture can be uniform", "[...] expecting individuals' values or behaviour to be wholly determined by their cultural background" and "[...] confusing scores for cultural dimensions with cultural constructs for which they are but approximate measures" (Williamson, 2002, p.1391).

In an attempt to compensate for the drawbacks of Hofstede's work, Trompenaars and Hampden-Turner (1997) developed a further model. Addressing managers that operate in a multicultural environment, they provide practical guidelines on how to deal with different cultures when doing business on an international scale. The authors propose seven cultural dimensions to facilitate the recognition of cultural

discrepancies and provide the means to manage them. Their extensive empirical research validates the theoretical foundation provided by the American sociologist Parsons (1951) on which they base their work:

“30 companies, with departments spanning 50 different countries, have contributed to the research. These include AKZO, AMD, AT&T, BSN, Eastman Kodak, Elf Aquitaine, SGS/Thomson, CRA, Glaxo, Heineken, ICI, Lotus, Mars, Motorola, Philips, Royal Dutch Airlines KLM, the Royal Dutch/Shell Group, Sematech, TRW, Van Leer, Volvo and Wellcom, to name a few. [...] a minimum of 100 people with similar backgrounds and occupations were taken in each of the countries in which the companies operated. Approximately 75% of the participants belong to management (managers in operations, marketing, sales and so on), while the remaining 25% were general administrative staff (typists, stenographers, secretaries). The database now numbers 30,000 participants” (Trompenaars and Hampden-Turner, 1997, pp. 1-2).

In their book “Riding the Waves of Culture” (1997), the two authors elaborate in detail on the seven cultural dimensions, the first five directly based on Parsons' (1951) work: “universalism versus particularism (rules versus relationships), communitarianism versus individualism (the group versus the individual), neutral versus emotional (the range of feelings expressed), diffuse versus specific (the range of involvement), achievement versus ascription (how status is accorded)”, “sequential versus synchronic” (time dimension) and “internal versus external control” (environment dimension/relation to nature) (Trompenaars and Hampden-Turner, 1997, pp. 29, 123, 141).

The first dimension, “universalism versus particularism” refers to the way “we judge people’s behaviour” (Trompenaars and Hampden-Turner, 1997, p.31), whereby universalist societies are rule-oriented and judge others’ behaviour according to the rules present in the respective society. Examples of universalist societies include Germany, Switzerland and the USA. At the other end of the spectrum, i.e. particularism, individuals tend to base their judgements of others on their respective relationships. Rules can be neglected or bended when relationships are at stake. Examples of societies that adhere more to the particularist camp include China, India and Russia (Trompenaars and Hampden-Turner, 1997, p.35).

The second dimension, “individualism versus collectivism”, deals with whether we define ourselves as individuals or as members of a group. Accordingly individualist

societies will tend to put their self-interest to the foreground, while collectivist societies will put the well being of the group first. Examples of the former include Canada, Israel and the USA, while collectivist societies are found in, for example, Egypt, Japan and Mexico (Trompenaars and Hampden-Turner, 1997, p.51).

Trompenaars and Hampden-Turner's (1997) third dimension is about the way we deal with our emotions. Labelled "neutral versus emotional", this dimension addresses the extent to which members of a culture show their emotions and whether they are extroverted in the expression of their feelings or rather introverted and silent. Examples of societies that rather hide their emotions include Hong Kong, Indonesia and Japan, while examples of emotional societies can be found in Cuba, Egypt or Spain (Trompenaars and Hampden-Turner, 1997, p.70).

Closely related to the previous dimension, the fourth dimension, "specific versus diffuse", relates to "the degree to which we engage others in specific areas of life and single levels of personality, or diffusely in multiple areas of our lives and at several levels of personality at the same time" (Trompenaars and Hampden-Turner, 1997, p.81). The authors illustrate this dimension with an example: an employee is asked by his/her superior to help him with some building work at his private home. Depending on the respective cultural context of the employee, he will be either willing to help or refuse.

Individuals from 'specific' cultures will tend to clearly distinguish between private and professional life, while diffusely oriented cultures would view the superior's inquiry as related to their entire life and consequently accept. Examples of cultures where engagement of others in one's life is specific can be found in Finland, Sweden or The Netherlands, while examples of diffusely oriented societies include China, Nigeria and Venezuela (Trompenaars and Hampden-Turner, 1997, p.88).

"Achievement versus ascription", the fifth dimension, is about the "status" that is assigned to an individual on the grounds of either past achievements or on the basis of other attributes such as "age, class, gender, education" (Trompenaars and Hampden-Turner, 1997, p.102). Examples of societies that emphasise achievement when granting a status include Australia, Canada or Norway, while examples of

societies where ascription is considered more important are Argentina, Egypt and Nepal (Trompenaars and Hampden-Turner, 1997, p.105).

In their sixth cultural dimension, “sequential versus synchronic”, Trompenaars and Hampden-Turner (1997) analyse how individuals understand the concept of time. In cultures where time is perceived as a sequential series of events, activities are arranged in a specific order that could be depicted with a “straight line”. Activities are performed sequentially rather than simultaneously and individuals hesitatingly change the prescribed order only when exceptional circumstances require it.

Individuals in “synchronic” cultures will tend to perform several activities simultaneously and be more flexible towards changes in planning: if circumstances require it, the order of activities can be easily changed or activities might be entirely skipped. “Doing the right things” is often more effective as when the focus is on “doing the things right” (Trompenaars and Hampden-Turner, 1997, p.123). Examples of sequential cultures can be found in the Brazil, Ireland and Philippines; examples of synchronic cultures include Hong Kong, Pakistan and Portugal (Trompenaars and Hampden-Turner, 1997, p.128).

The last dimension refers to the relationship of individuals to the environment or the nature. The authors distinguish between “internal versus external control”, which is mainly about whether individuals are “acting against” or “with the environment” (Trompenaars and Hampden-Turner, 1997, p.141). Some societies, e.g. Israel, Norway and the USA are much more inclined to control the nature and the external events around them, while others, such as Egypt, Kuwait or Oman will much more readily accept the environment as given and cope rather than trying to control it (Trompenaars and Hampden-Turner, 1997, pp.141-144).

Despite being more methodologically sophisticated than Hofstede’s research, particularly in terms of the population surveyed, there are drawbacks in Trompenaars’ and Hampden-Turner’s work. Keaney (1999) criticises Trompenaars and Hampden-Turner (1997) for not considering sufficiently a variety of external factors in their analysis. In particular, the authors are criticised to have neglected aspects such as “size of the corporation, the nature of the business, the extent of

internationalization, the legal and social environments in which managers must work [...]” (Keaney, 1999, p. 226).

More fundamentally, Tayeb (2001) disapproves the “dimensionalisation of culture” inherent in the contributions of the authors presented above. The author acknowledges that such approaches bear advantages of comparability, but considers them to miss “the big picture”: “National culture cannot really be simplified and reduced to a handful of boxes into which some nations are placed and from which others are excluded” (p.93)²². Instead, Tayeb (2001) advocates for a “multi-paradigm approach”, whereby “non-cultural factors” complement the cultural ones, combining positivist and constructivist worldviews (p.104).

All the three models presented focus on how culture affects individuals’ interaction (Table 6).

Table 6: Overview of dimensions according to selected cultural models

	Hall	Hofstede	Trompenaars and Hampden-Turner
1	Proxemics	Power distance	Universalism / particularism
2	High-context versus low-context	Uncertainty avoidance	Communitarianism / individualism
3	Mono-chronic versus poly-chronic	Individualism	Neutral / emotional
4	Information velocity	Masculinity	Diffuse / specific
5		Long-term orientation	Achievement / ascription
6		Pragmatic / normative orientation	Sequential / synchronic
7		Indulgence / restraint	Internal / external control

Source: Author

²² Having criticised in particular Hofstede’s work, Tayeb explicitly praises the latter for considering “organizational sub-culture” in his analysis (all interviewees in his research did work for the same enterprise in different countries (Tayeb, 1994, p.434)) and for informing the reader on his personal background, which may lead to biased interpretations (Tayeb, 2001).

Hofstede and Trompenaars and Hampden-Turner address more explicitly than Hall the (dis-)enabling effects on business relationships, particularly relevant for this research as the design of business facilitation and innovation policies needs to reflect the underlying cultural environment. Despite Trompenaars' and Hampden-Turner's methodological supremacy, many quantitative studies concerned with cultural differences make use of Hofstede's cultural dimensions. In the words of Walbeek and Vlotman (2003), Trompenaars' and Hampden-Turner's model "has yet to acquire the depth and breadth of social science research usage currently enjoyed by Hofstede's work", possibly as their definitions "are more esoteric rather than practical" (Walbeek and Vlotman, 2003, p.9).

This is particularly true in the context of the (limited) available literature on the relationship between innovation and culture. For example, Sun (2009) correlates the countries' scores assigned by Hofstede (1991) with an indicator developed by Porter and Stern (2001) to assess national innovation capabilities in the Global Competitiveness Report. The results are then used to test the validity of four a priori formulated hypotheses:

- *"Societies with longer power distance will be less innovative than societies with shorter power distance"*
- *Individualistic societies will be more innovative than collectivistic ones*
- *The societies with higher MAS score will be more innovative*
- *The societies with a higher UAI score will be less innovative"* (Sun, 2009, pp. 354-355).

The correlation leads to the rejection of the third hypothesis and the confirmation of the others, a result that is very relevant for the analysis of the case studies selected, as most developing countries (in particular in the MENA region) are characterised by longer power distance, collectivistic societies with a preference for uncertainty avoidance. Therefore, to sustain innovation in these countries, the needs of the individual actors of the NIS must be addressed while taking into consideration local distinctive traits of informal institutions.

Having reviewed how the first three layers of the adopted representation of interactions within an NIS, the next section focuses on the fourth layer, namely the

institutional arrangements which are put in place to support the innovative efforts of the individual actors (layer five, see Figure 6).

3.3 Organisational schemes supporting innovation

Institutional arrangements define how stakeholders interact to achieve their objectives. In the UNDP definition, they are “policies, systems, and processes that organizations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfill their mandate” (UNDP, 2013). This study categorises the organisational schemes (i.e. physical working structures and operational arrangements of PA according to the adopted definition) supporting innovation as follows²³:

- Governance – schemes providing or supporting a regulatory framework (e.g. governance initiatives, one stop shops)
- Funding – schemes offering direct financial support or promoting its availability for innovative projects or product development
- Infrastructure – schemes offering technological infrastructure or means for its development (e.g. technology parks, incubators and technology transfers offices)
- Capacity building – schemes promoting awareness and culture of innovation, knowledge exchange and positioning of R&D outputs.

These categories normally include programmes launched by PA entities to target specific needs according to their mandates (e.g. administrative simplification for SMEs or support to industry-academia collaboration), possibly resulting in the provision of new services or the creation of new physical structures (e.g. e-Government portals or one-stop shops).

Multipurpose schemes offering some or all of the above type of support to innovators, often but not exclusively within a physical arrangement, are considered for the purpose of this research in the infrastructure category. Despite the

²³ This categorisation has been developed on the basis of Edquist (2004) following the thematic analysis of the fieldwork results in Egypt and Morocco.

conceptual differences, often these arrangements coexist in time and space, providing an integrated offer to entrepreneurs and innovators. These are presented in the following sections.

3.3.1 Technology parks

The first **technology park** was created on the premises of Stanford University in the USA in 1951. The region around the University, today known as “Silicon Valley”, was at that time among the poorest in the USA and the establishment of the technology park was one of the major drivers to support the region’s transformation into “a global centre of technology, finance, education and research” (UNESCO, 2012a).

The Technology Park in Silicon Valley was followed by the French Sophia Antipolis (1969) and the Japanese Tsukuba Science City in the 1970s (UNESCO, 2012b). Developing countries began creating Technology Parks during the 1980s (UNESCO, 2012b). By 1990 there were over 1,000 technology parks in the world according to Lindholm Dahlstrand and Lawton Smith (2003), while the United Nations Educational, Scientific and Cultural Organisation (UNESCO) lists 525 science parks on its science and technology online portal (UNESCO, 2012b) – a considerably lower number.

The difficulty in assessing the total number of technology parks is related to the lack of a clear definition in the literature on the topic, with several terms being used as synonyms for Technology Park, such as “Science Park”, “Research Park”, “Business Park”, “Innovation Centre” (Currie, 1985; Eul, 1985; Monck et al., 1988; Loeffsten and Lindeloef, 2002) or “science city”, “cyber park”, “hi tech (industrial) park”, “R&D park”, “university research park”, “research and technology park”, “science city”, “science town”, “technology incubator”, “technopole” and “technology business incubator” (UNESCO, 2012a), “Science and Technology Park”, “Technopark” or “Technopolis” (Dagault, Ziane-Cherif and Menendez, 2012).

The International Association of Science Parks (IASP) defines a Technology Park/Science Park as:

“an organization managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation

and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a science park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities” (IASP 2002 in UNESCO, 2012a).

A similar, more recent definition is provided by Dagault, Ziane-Cherif and Menendez (2012):

“a geographical concentration of companies and research institutions (universities and R&D centres) located in a specific zone (in general spread across a few hectares of land, unlike clusters, which may be spread out over a specific territory or region). Proximity (physical, organisational and cultural) is an advantage and enables joint collaboration and networking. The transfer of knowledge, made easier by strong interaction between the different players, can range from simple sharing of communication tools to joint research projects” (Dagault, Ziane-Cherif and Menendez, 2012, p. 49).

IASP claims that Technology Parks support economic development of their surrounding locations as they

- *“stimulate and manage the flow of knowledge and technology between universities and companies.*
- *facilitate the communication between companies, entrepreneurs and technicians.*
- *provide environments that enhance a culture of innovation, creativity and quality.*
- *focus on companies and research institutions as well as on people: the entrepreneurs and ‘knowledge workers’.*
- *facilitate the creation of new businesses via incubation and spin-off mechanisms, and accelerate the growth of small and medium size companies.*
- *work in a global network that gathers many thousands of innovative companies and research institutions throughout the world, facilitating the internationalisation of their resident companies” (IASP, n.d.).*

Empirical evidence of the socio-economic impact of Technology Parks is provided by Loefsten and Lindeloef (2002), who conducted a study for the period 1996-1998 comprising a sample of 263 new technology-based firms in Sweden, of which 163 were based in Technology Parks and 100 elsewhere in the country. The former had

“a substantially higher rate of job creation” than the latter (Loefsten and Lindeloef, 2002, p.870) and were more likely to have partnerships with universities as compared to enterprises located elsewhere (Loefsten and Lindeloef, 2002).

Further empirical studies have highlighted the positive economic impact of Technology Parks in terms of wages, direct and indirect jobs in the region, tax revenues and scientific output in developed countries (see for example APTE, 2005; Turpin, 2007; Wheeler, Lovell and Weinschrott, 2011; Frerichs, 2011; Lim, 2012) as well as in developing countries (e.g. Xue, 1997; Cabral and Dahab, 1998; Yang, Motohashi and Cheng, 2009).

A particular advantage for firms located in technology parks is represented by the proximities outlined in the definition of Dagault, Ziane-Cherif and Menendez (2012). A technology park is therefore a place where companies and research institutions with a common background (e.g. culture, values and norms) work side by side, creating the conditions for an acceleration of innovation processes.

In contrast to the theoretical and empirical evidence of the positive impacts of technology parks outlined above, a substantial body of research has questioned over the last decades the science park model (Massey, Quintas and Wield, 1992; Massey and Wield, 1992; Quintas, Wield and Massey, 1992; Heydebreck, Klofsten and Maier, 2000; MacDonald and Joseph, 2001; MacDonald and Deng, 2004). Most of these authors base their work on the definitions of science parks developed by the International Association of Science Parks (IASP) and the UK Science Park Association (UKSPA), as summarised by MacDonald and Deng (2004, p.3): “an initiative for the establishment and growth of technology-based expertise formally and operationally linked to at least one centre of technical expertise an organization which provides management support for its tenant companies”.

Massey, Quintas and Wield (1992) provided a seminal contribution to the field and conducted a large survey with over 200 “science park establishments” within 20 UK science parks. The aim was to evaluate the “popular conception” of science parks (p.13), which involves four main elements as presented in Table 7.

Having analysed in detail the activities of the considered UK science parks, the authors conclude that none of the four main expected outcomes was achieved: (1) employment generation was largely due to relocations of existing jobs rather than the creation of new ones; (2) less than one third of surveyed firms were new endeavours; (3) private-public partnerships were significant, however mainly focusing on services and consultancy rather than scientific research; (4) a large share of surveyed firms was applying existing technologies rather than developing new ones (Massey and Wield, 1992, pp.13-14).

Table 7: The popular conception of the science park

1. Proprietary initiative, which is formally linked to a higher education or research institution
2. It is designed to stimulate the establishment and development of knowledge-based enterprises and other organisations on site
3. It has a management function, which is actively engaged in technology transfer
4. According to science park managers, there are four main categories of expected outcomes of science park activity, i.e. employment creation, start-up formation, creation of public-private partnerships and an increase in the number of successful high technology firms

Source: Adapted from Massey and Wield (1992, p.11)

In view of this empirical evidence of the low validity of the science park model, the authors propose a new conceptualisation of the model (Massey and Wield, 1992):

1. Science parks are based on the linear model of innovation (see also Massey and Wield (1995) on the consequences of this view)
2. Science parks have specific “spatial characteristics – located close to academe, away from physical production, as ‘exclusive high status locations’” (p.15)
3. “Science parks are property developments, but with very different results in different places” (p.15).

The proposed conceptualisation has several implications. The isolation within “high status space” and the consequent separation between science and production hamper innovation and nurture social divisions. Furthermore, it implies that the link to academic or research institutions does not seem relevant for enterprises: the

main benefit relates to reputation improvements and no major concrete impact deriving from industry-academia collaboration could be found (Massey and Wield, 1992, p.22).

Finally, while all science parks included in the analysis were property developments, there were considerable differences in terms of their functioning and funding. Three main categories emerged in the analysis: “sunbelt science parks” (follow the increase in employment in a region, usually privately funded and strictly separated from production); “marginal science parks” (hardly profitable and mainly publicly funded for the purpose of economic development and to attract private investment); and “science parks in the North” (50 per cent of science parks included in their research; they are considered to be effective means to attract public funding) (Massey and Wield, 1992, pp.19-20).

Based on the popular conception of science parks developed by Massey, Quintas and Wield (1992), MacDonald and Deng (2004) analyse the development and impact of science parks in China to assess the reasons for their wide acceptance throughout the country. The authors heavily criticise the large-scale replication of the “Silicon Valley model” in China and elsewhere as it is based on false assumptions. Science park developments in practice are based on the stipulations inherent in the popular conceptualisation (Massey, Quintas and Wield, 1992). These do not correspond to the Silicon Valley model, which was not a planned initiative, but rather a coincidence resulting from property tax increases after World War II when Stanford University was forced to sell large parts of its land. Additionally, technology transfer mainly occurred from industry to academia and not the other way around and very few start-up founders had previously studied at Stanford University (MacDonald and Deng, 2004).

Following a detailed analysis of six science parks in Shanghai involving a survey of 219 firms on site and 368 off site, as well as a subsequent evaluation on national scale, MacDonald and Deng (2004) conclude that there were no significant differences between firms located on the premises of the science parks and those located elsewhere in terms of outputs and exports. The only significant difference was the size of firms, whereby firms off-site tended to be considerably larger and

more profitable than those located in science parks. In line with Massey and Wield (1992), the authors suggest that other models could be more effective for supporting innovation and high-potential start-ups and SMEs. These would be based on close integration of science and production, incremental productivity enhancements and skills development and training (MacDonald and Deng, 2004).

Heydebreck, Klofsten and Maier (2000) reach a considerably different conclusion in their evaluation of Swedish technology parks or “Teknopols”. The authors analyse the “Teknopol” concept in order to establish the needs of new technology based firms (NTBFs) as well as the “success factors in meeting these needs” (p.89). On the basis of 259 telephone interviews with managers of NTBFs and 106 researchers from seven Swedish cities, as well as 35 face-to-face interviews with selected NTBFs, the authors find that individual Swedish Teknopols differ in terms of their service offer as well as the degree of proactivity in approaching their tenants.

The innovation support services listed in Table 8 reflect the most relevant needs of Swedish NTBFs based in Teknopols (Heydebreck, Klofsten and Maier, 2000).

Table 8: The needs of NTBFs in Swedish Teknopols

Dimension	Specific innovation support services
Technology-related services	Realisation and management of R&D Technological consultancy Search for cooperation partners
Market-related services	Assistance in the marketing of products and technologies Search for customers and suppliers Assistance with new product launches
Finance-related services	Assistance with topics related to EU funding Mediation of contacts to financiers Assistance with the financing of innovation projects
Soft-services	Seminars and information events Education and training programmes Consulting and mentoring

Source: Adapted from Heydebreck, Klofsten and Maier (2000)

The results of the above research indicate that financial and marketing support services are most relevant for NTBFs, however the majority of firms has at least limited needs in the area of technology-related and soft services. The authors point

out that these services seem to be more effective if offered in a bundle rather than in isolation, which is considerably facilitated if they are “provided out of one hand” (Heydebreck, Klofsten and Maier, 2000, p.95).

In their conclusion, the authors describe the Teknopol scheme as “[...] good practice in satisfying NTBF’s needs for innovation support services. This scheme is both effective and efficient” (Heydebreck, Klofsten and Maier, 2000, p.97). While the network of innovation support actors in Sweden lacks transparency in terms of the concrete service offer, the Teknopol approach has managed to effectively address NTBF’s needs by bundling various support services and effectively serving as a one-stop shop for innovation support services (Heydebreck, Klofsten and Maier, 2000, p.97). These include business incubation within the premises of a technology park, essential to facilitate the creation of innovative enterprises as outlined in the next section.

3.3.2 Business Incubators

According to the European Business and Innovation Centre Network (EBN), **Business incubators** are physical or virtual places meant to support and accelerate the successful development of start-up companies through business support services tailored to the specific needs of entrepreneurial companies in their initial stages so that business ideas can grow to sustainable realities (EBN, 2010). Therefore, incubation is not specific to innovation just like “innovation and entrepreneurship are two separate phenomena, albeit intertwined to a great extent” (EBN, 2010, p.5).

More generally, it is intended to nurture the “would-be entrepreneurs to think over and further develop the business idea and transforming it into a viable and sustainable activity” (EBN, 2010, p.5). Consequently a business incubator aims at enabling successful enterprises to operate autonomously once the incubation process is completed (National Business Incubator Association (NBIA), 2009).

Hackett and Dilts (2004a) have made a substantial contribution to the field of incubator-incubation research. They find that the lack of a common definition of an incubator hampers valid research and consequently propose the following definition:

“a business incubator is a shared office-space facility that seeks to provide its incubatees (i.e. ‘portfolio-’ or ‘client-’ or ‘tenant’-companies) with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance. This system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure” (p.57).

Within a comprehensive review of incubation research, the authors identify five major research streams related to incubation: “incubator development studies”, “incubator configuration studies”, “incubatee development studies”, “incubator-incubation impact studies” and “studies theorizing about incubators-incubation” (p.59). Table 9 provides an overview of these as well as their main characteristics, topics and research questions.

Over the past three decades, the number of business incubators worldwide has significantly grown (7,000 as of October 2012 according to NBIA (2012)²⁴), leading to a considerable increase of impact studies on business incubation (see, for example, Pena (2002; 2004); Lalkaka, 2003; Hackett and Dilts (2004a; 2004b; 2008); Voisey et al., 2006; Al-Mubarak and Busler, 2010). All studies find some positive impact, albeit to varying degrees, and identify corresponding policy responses as to how major deficiencies of business incubators can be addressed.

Impact evaluation studies make use of some type of success criteria to evaluate incubation performance, often pointing to difficulties inherent in measuring success. For example, Voisey et al. (2006), after outlining a range of different possible criteria, adopt five criteria as defined by Wiggins and Gibson (2003) to assess the success of a business incubation project in a higher education institution in Wales:

1. Definition of specific key performance indicators
2. Provision of business-related leadership
3. Provision of “value-adding services to member companies”
4. Implementation of an effective selection process of companies

²⁴ For example, in 1980 there were only 12 business incubators in the United States (NBIA, 2012).

5. Facilitation of “access to necessary human and financial resources” (Voisey et al., 2006, p.459).

The authors find that the analysed Welsh incubation facility meets all the listed success criteria and conclude: “It could be argued that business incubators provide clear advantages for progressive enterprises and a source of reference, knowledge and enabling skills in a ‘safe’ environment, providing an incentive for immediate or future development of new enterprises” (Voisey et al., 2006, p.466). Finally, they provide a conceptual framework for assessing incubation success, which consists of the functions of an incubator as well as measures specific to the client/incubated firm or to the incubator.

Pena (2002, 2004) adopts a critical view of the prioritisation of the needs of young firms, with implications for incubation success criteria: investment into intangible assets and intellectual capital as well as soft skills development, such as management training and related assistance services, is considered much more important for the successful nurturing and growth of young firms than incubation per se.

The author points to the risk of business incubation, especially when funded publicly, to support firms that may be inefficient, while others, e.g. incumbent firms, could be disadvantaged due to a lack of support. Consequently, the main criterion for successful incubation is selectivity when recruiting incubation candidates and a dedicated incubator manager who constantly monitors and consults business owners (Pena, 2004).

Hackett and Dilts (2004b) suggest that business incubator performance can be viewed and assessed as a function of selection performance (admission of high potential candidates for incubation), monitoring and business assistance intensity (involves “time intensity, comprehensiveness and quality of assistance provided”) and resource munificence (“resource availability, quality and utilisation” by the incubator) (p.50).

Table 9: Overview of incubator-incubation literature

Research streams Characteristics	Incubator development studies	Incubator configuration studies	Incubatee development studies	Incubator-incubation impact studies	Studies theorizing about incubators-incubation
Research Period	1984-1987	1987-1990	1987-1988	1990-1999	1996-2000
Main topics	Definitions Taxonomies Policy prescriptions	Conceptual frameworks Incubatee selection	New venture development Impact of planning on development	Levels and units of analysis Outcomes and measures of success	Explicit and implicit use of formal theories (transaction cost economics, network theory, entrepreneurship, economic development through entrepreneurship)
Research Questions	What is an incubator? How do we develop and incubator? What life cycle model can be extracted from analysis of business incubators?	What are the critical success factors of incubators-incubation How does the incubator-incubation process work in practice? How do incubators select incubatees?	What is the process of new venture development in an incubator context? What is the role of planning and the business incubator manager?	Do incubators achieve what their stakeholders assert they do? How can business incubation program outcomes be evaluated? Have business incubators impacted new venture survival rates, job creation rates, industrial innovation rates? What are the economics and fiscal impacts of an incubator?	What is the significance of relationships and how do they influence entrepreneurship? What are the critical connection factors to success, e.g., settings, networks, founder characteristics, group membership, co-production value, and creation process? What constitutes a model for a virtual incubator? Is the network the creation of the incubation process?

Source: Hackett and Dilts (2004a, p.59)

Incubation is successful if any of the following three criteria is satisfied (Hackett and Dilts, 2004b):

1. “The incubatee is surviving and growing profitably
2. The incubatee is surviving and growing and is on a path toward profitability
3. The incubatee operations were terminated while still in the incubator, but losses were minimised” (p.48).

Initially the third success criterion was defined as the survival of an incubatee with no (or marginal) growth and profits. However, terminating incubation rapidly if expected results are not achieved is a more positive outcome than keeping a non-performing firm alive (Hackett and Dilts, 2004b).

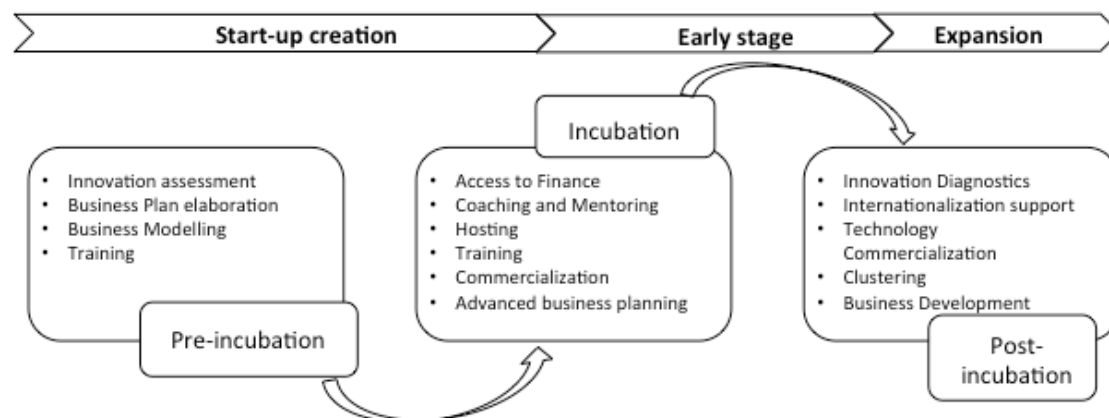
Furthermore, Hackett and Dilts (2004b) point out that institutional theory is useful for research in the area of incubation, particularly when looking at the impact of local, regional, national and international institutions on the incubator and its tenants. Finally, they suggest that research should focus more on the incubation process rather than the incubator facility itself (Hackett and Dilts, 2004a; 2004b; 2008).

The incubation process is structured in three stages (EBN, 2010) (Figure 7):

- pre-incubation or start-up creation, covering all the support activities related to the development of business ideas, models and plans up to the creation of a start-up;
- incubation or early stage, providing support to the entrepreneur in the initial years of activities of the newly established company (normally up to three years) by focusing on facilitating the access to finance, mentoring services and business opportunities (e.g. networking);
- post-incubation or expansion, aiming at the sustainability of the enterprise once it has left the incubator (if physically incubated), for example by improving and innovating its processes and products or by supporting its internationalisation.

Incubators make use of different tools during the three stages and they vary not only in their offer of services but also “in the way they deliver their services, in their organizational structure, and in the types of clients they serve” (NBIA, 2009).

Figure 7: Incubation process and stages involved



Source: EBN (2010, p.6)

Accordingly, it is possible to categorize incubators on the basis of their offer of services (EBN, 2010):

- *Pre-incubators*, offering mentoring to assess the potential of the business idea and to elaborate a business plan and providing the necessary facilities to support potential entrepreneurs
- *Enterprise hotels or small business centres*, providing business services to physically incubated companies, normally located within technology parks
- *Innovation accelerators or Business accelerators*, often managed by financial stakeholders (e.g. venture capitalists), offering similar services to business incubators, however focusing on financing the growth potential of companies entering or growing in the national or global market

or according to their scope:

- *General purpose incubators*, providing all the necessary of services in all stages of the incubation process to all successful applicants independently of their provenance and the economic sector involved.
- *Sector - specific incubators*, providing all the necessary services in all stages of the incubation process to all successful applicants from a specific economic

sector, either linked to the economic history or to the potential of the territory where the incubator is located.

- *Academic, university or research-based incubators*, helping students, graduates and researchers in exploiting the business ideas developed in their projects or R&D activities, often acting in the early pre-incubation phase.

According to Al-Mubarak and Busler (2010), incubators represent an important tool for economic development in less developed countries: in China, for example, the creation of (mainly technology) incubators in the 1990s (reaching a level of 127 incubators by 1999) led to significant economic gains in terms of tax revenues and employment (Lalkaka, 2003 in Al-Mubarak and Busler, 2010).

On the basis of a survey of 105 business incubators worldwide²⁵ and six interviews with incubator managers, the authors find that their “priority goals”²⁶ were employment creation (58 per cent), entrepreneurship promotion in the community (56 per cent), followed by technology commercialisation (42 per cent) and industrial development (38 per cent) (Al-Mubarak and Busler, 2010). Furthermore, according to the inputs of 12 respondents, the authors conclude that most incubators in developing countries are sponsored by academic institutions and focus on technology programs (Table 10).

Incubation facilities are often an integral part of technology parks (Heydebreck, Klofsten and Maier, 2000) as reflected in their overlapping purposes expressed by managers above and in section 3.3.1. The inconsistencies in definitions seem to be a particular problem in developing countries. In a study on the impact of a technology park and incubator scheme in the Philippines, MacDonald and Joseph (2001) found that the major obstacles towards an effective functioning of the scheme were the lack of a common definition among the involved parties as well as the absence of monitoring and evaluation. Furthermore, there was a lack of clarity over the role of technology transfer and incubation, which led to under-utilisation of transferred

²⁵ Some of the 105 participants did not answer all survey questions.

²⁶ 75 incubators responded to this question.

technology by enterprises and decreased interest of incubated companies in novel technology (MacDonald and Joseph, 2001).

Table 10: Characteristics of Developing Country Incubators

Country	Geog. Area	Gross Sq. F.	When Founded	Type of Sponsor	Description of Programme
Jamaica	Urban	23,000	1991-1995	Academic Institution	Tech./Service/ Web
Mexico	Urban	538,195	1991-1995	Academic Institution	Tech./Service
Mongolia	Urban	1,100	1991-1995	Academic Institution	Technology
Pakistan	Urban	12,000	1991-1995	Academic Institution	Technology
South Africa	Urban	21,527	1991-1995	Academic Institution	Mfg
South Africa	Urban	6,135	1991-1995	Acad./Econ. Dev. Org.	Technology
Tunisia	Urban	4,305	1996-1999	Academic Institution	Mixed-use
Cyprus	Multinational	4,305	2001-2006	For-Profit Entity	Technology
Palestine	National	1,000	Before 1981	Econ. Dev. Org.	Technology
Singapore	National/ Multinational	20,000	Before 1981	For-Profit Entity	Mixed-use
South Africa	National	5,382	1991-1995	-	Tech./Mfg.
Oman	National	43,056	-	-	Tech./Web

Source: Al-Mubarak and Busler (2010, p.16)

This is partly in line with the findings of Al-Mubarak and Busler (2010) who identify three major obstacles for the successful operation of incubators, namely a lack of concrete pre-defined goals of incubators, the overall acceptance of the incubator by the surrounding community and “occupancy/ cash flow issues” (p.19). However, rather than cash flow and occupancy issues, MacDonald and Joseph (2001) find that, in the case of the Philippines, those responsible for planning and implementation did not sufficiently consider local specifics such as infrastructure and manpower and that investment in existing industries may often be more effective for increasing

competitiveness than investments in high technology (MacDonald and Joseph, 2001).

The authors provide the following concluding comment in relation to the attempt to transfer a Silicon Valley-type scheme to the Philippines: “Where there has been success overseas, much of it is attributable to adaptation of schemes to local circumstances rather than to the unyielding imposition of a universal model” (p.354). “Local circumstances” are even more relevant in the design of successful schemes to support technology transfer in developing countries, whereby the level of IPR protection is an essential element as highlighted in the following section.

3.3.3 Technology Transfer Offices

Several definitional issues surround the concept of **Technology Transfer Offices** (TTO). Bozeman (2000) provides a comprehensive literature review on technology transfer, asserting that the definition of technology has been controversial and that most scholarly contributions have viewed it as a “tool”, while disagreeing on the concrete nature of which tools exactly can be termed a technology. He then goes on to adopt the definition provided by Sahal (1981) and Sahal (1982), stating that technologies are “configurations” and in the context of technology transfer those “must rely on a subjectively determined but specifiable set of processes and products. Simply focusing on the product is not sufficient to the study of transfer and diffusion of technology; it is not merely the product that is transferred but also knowledge of its use and application” (Bozeman, 2000, p.629). Consequently, technology transfer goes hand in hand with knowledge transfer.

Simply put, technology transfer can be defined as “the movement of know-how, technical knowledge, or technology from one organizational setting to another” (Roessner, 2000 in Bozeman, 2000, p.629). In this context it is worth noting that different disciplines employ distinctive definitions: citing Zhao and Reisman (1992), Bozeman (2000) makes a distinction between the definitions employed by economists (e.g. Arrow, 1969; Johnson, 1970; Dosi, 1988), sociologists (e.g. Rogers, 1962; Rogers and Shoemaker, 1971), anthropologists (e.g. Foster, 1962; Service, 1971; Merrill, 1972) and management researchers (e.g. Teese, 1976; Lake, 1979;

Rabino, 1989; Hagedoorn (1990; 1995); Niosi and Bergeron, 1992; Niosi, 1994; Chiesa and Manzini, 1996; Laamanen and Autio, 1996; Mowery, Oxley and Silverman, 1996; Lambe and Spekman, 1997; Kingsley and Klein, 1998) (Table 11).

Table 11: Schematisation of inter-disciplinary views of technology transfer

Economists	“define technologies on the basis of the properties of generic knowledge, focusing particularly on variables that relate to production and design”.
Sociologists	“link technology transfer to innovation and view technology, including social technology, as a design for instrumental action that reduced the uncertainty of cause-effect relationships involved in achieving a desired outcome”.
Anthropologists	“view technology transfer broadly within the context of cultural change and the ways in which technology affects change”.
Management Scholars	“focus on stages of technology transfer, particularly relating design and production stages, as well as sales, to transfer”. They also emphasise “intrasector transfer”, “the relation of technology transfer to strategy” as well as “alliances among firms and how alliances pertain to the development and transfer of technology”.

Source: Adapted from Zhao and Reisman (1992) in Bozeman (2000, p.630)

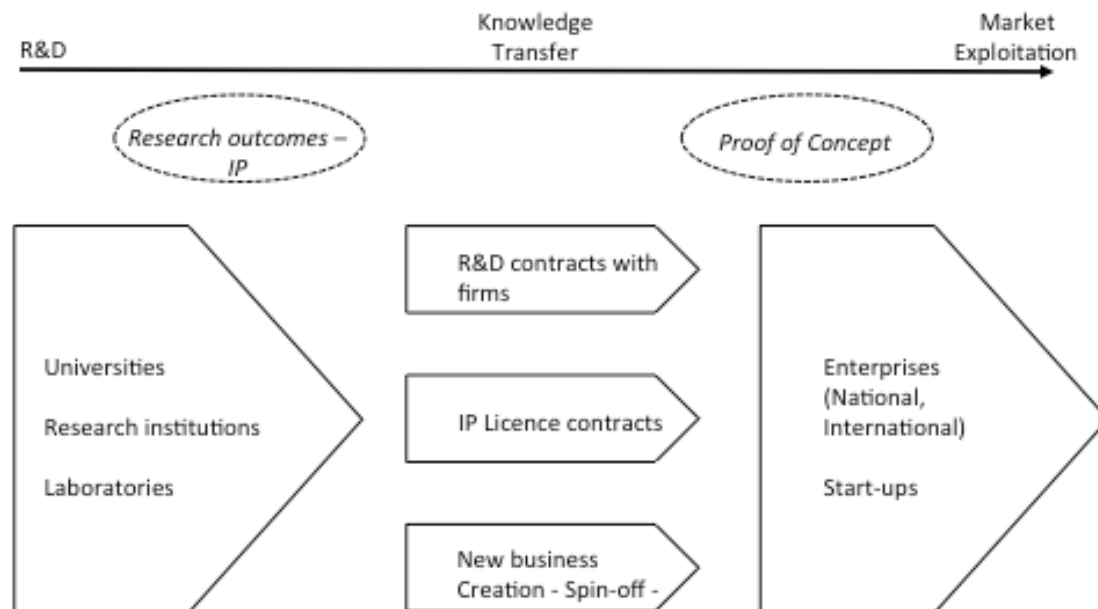
Historically, technology transfer mainly occurred between more and less industrially developed nations, whereby maturing technologies would be made available to countries for which these were relatively new. In the 1980s the attention shifted to technology transfer between academia and industry within national borders, mainly triggered by the Bayh-Dole Act, passed in the USA in 1980 (Bozeman, 2000; Macho-Stadler, Perez-Castrillo and Veugelers, 2007).

Accordingly, Dagault, Ziane-Cherif and Menendez (2012) argue that TTOs have mainly evolved in the context of the commercialisation of (university) research outputs, i.e. inventions or IP. This process is illustrated in Figure 8. The purpose is to create “economic and social value based on knowledge and scientific capabilities”. Possible ways of conducting the process are:

- *“contract or joint research projects;*
- *patent applications and licensing;*
- *new business creations (spin-offs);*

- *dissemination of scientific and technical information (publications, conferences);*
- *advice; technical support; technical studies (engineering or manufacturing);*
- *trials and test” (Dagault, Ziane-Cherif and Menendez, 2012, p.72).*

Figure 8: The process of research commercialisation



Source: Dagault, Ziane-Cherif and Menendez (2012, p.73)

Before the introduction of the Bayh-Dole Act, a range of different IP policies were employed to deal with state-funded academia research outputs in the USA. The new piece of legislation provided a comprehensive legal basis for a uniform treatment of such intellectual property rights (IPR), enabling academic institutions to retain those generated with state-funded research. The subsequent surge in patent applications from academia in the USA (Macho-Stadler, Perez-Castrillo and Veugelers, 2007) and public-private (or academia-industry) R&D activities (Cohen, Florida and Goe, 1993 in Bozeman, 2000) also led to an increase in gains to broader society of publicly funded university research.

However, a trend towards higher patenting and licencing activities in academic institutions could already be observed in the 1970s and therefore the concrete contribution of the Bayh-Dole Act to patenting and technology transfer activities in the USA is questionable (Mowery and Sampat, 2005). Nevertheless, numerous European and other countries, e.g. Canada, Denmark, Germany, Japan and Sweden, subsequently adopted similar pieces of legislation with an aim to encourage research

and development (R&D) activities in academia as well as technology transfer to industry (Mowery and Sampat, 2005).

It is out of the scope of this research to engage in an in-depth discussion of the effectiveness of the Bayh-Dole Act 1980 in the USA and subsequent similar legislation in other developed countries. However, given the unclear IPR arrangements in academic research in developing countries, it is significant insofar that it establishes a rationale for the importance of a strong relevance of IPR protection in academia and on country-level for technology transfer and innovation, which can also be applied to developing countries (Chen and Puttitanun, 2005).

For example, Park and Lippoldt (2008) find a positive relation between IPR protection and technology transfer in developing countries, whereby property rights for technological inventions (patents) are more significant than copyrights or trademarks. Their study suggests that a strong protection of IPRs attracts inward foreign direct investment (FDI), merchandise and service imports and therefore facilitates technology transfer. Furthermore they assert that the strength of IPRs in a developing country significantly impacts on the transfer of “new technologies” from developed nations (Park and Lippoldt, 2008).

In addition to the (often) weak IPR protection and enforcement mechanisms in developing countries, technology transfer to these countries is considerably hindered through “the lack of financial and technological resources, low per capita income and gross national product, and unfair income distribution” (Kahen and Sayers, 1995 in Cohen, 2004, p.22). Additional issues related to technology transfer in developing countries include “[...] specific political conditions and rigid or ineffective bureaucracies, high rates of illiteracy, riots [...] political instability, and frequent labour strikes” (Eres; 1981, Kahen, 1995; Kahen and Sayers, 1995 in Cohen, 2004) as well as “poor research facilities and academic institutions”, which often leads to a loss of talented researchers who leave the country in a quest for better employment and life quality abroad (Cohen, 2004, p.22).

The literature review presented in this chapter bears several implications for this research. Innovation has been found to be a major driver of socio-economic development and the relevance of formal and informal institutions within NIS has

been outlined in detail. Innovation influences informal institutions (i.e. culture, values and norms), which in turn shape the environment where innovation can take place, confirming the link between culture and innovation performance (Sun, 2009).

This needs to be considered when devising AE policies, such as organisational schemes, to support innovation. The literature review confirmed that successful policies cannot easily be transferred into different contexts. The Silicon Valley model, for example, where replicated, did not generate the same results as it did in California. In general, the studies cited above produced mixed results on the impact of such schemes on innovation performance and the growth of firms.

In particular, science parks, in their popular conception, seem to be ineffective and likely to exacerbate social divisions rather than support innovation. However, science or technology parks can be successful in stimulating and enhancing innovation performance (such as the Swedish Teknopol scheme) when offering services addressing the needs of resident firms (i.e. technology, marketing, finance and soft services).

In the area of incubation, most contributions found that a successful outcome depends on a careful selection of tenants, attention to capacity building and training as well as a dedicated incubator manager. In developing countries, policy makers need to reflect on the underlying concepts (i.e. incubation and technology transfer) and clarify accordingly aims and objectives of innovation support programmes.

Finally, TTO implementation in developing countries proceeds at a slow pace, mainly due to inadequate political, legal and educational conditions. A lack of IPR protection, technological and financial resources as well as low incomes and their unfair distribution are the main reasons for limited technology transfer activities.

These findings are coherent with the conceptual framework of this research (Figure 1), which proposes an holistic approach for the definition of innovation support policies taking into consideration the peculiarities of the specific institutional setting. Overall, the literature review presented in Chapters 2 and 3 has confirmed the relevance of the research topic: in unstable contexts, where a rapid improvement of the socio-economic conditions is mostly needed, wasting the limited available

resources in following unrealistic paths is a fatal error with unpredictable consequences. This reflection is central to the definition of the research questions presented in the next chapter together with the methodology used and the analytical framework developed to answer them.

The literature review has also highlighted how the link between an efficient PA and innovative performance in developing countries has not yet been sufficiently addressed, particularly in relation to the contribution of organisational schemes meant to support innovation. These aspects will be addressed in Chapter 5 and, for the relevance and effectiveness of organisational schemes in the NIS of Egypt and Morocco, in Chapters 6 and 7.

4 Methodology

This chapter discusses the research approach taken to answer the research questions of this study. It first clarifies the reasons for the choice of the research topic, outlining research questions and objectives, and thereafter presents the general epistemological stance of the researcher.

Subsequent sections present the research strategy and the choice of mixed methods (as opposed to *either* quantitative *or* qualitative methods) as the most suitable approach to address the underlying research questions and objectives of this study.

Thereafter, this chapter lays out the rationale behind the adopted research design, case study selection and methods for data collection and analysis, highlighting limitations and presenting the overall analytical framework. It ends with the author's reflection on her position in relation to the object of research.

4.1 Choice of research topic

An effective PA that promotes entrepreneurship and innovation facilitates social and economic development (Aubert, 2010), an objective many developing countries struggle to achieve. To accelerate progress, policy makers may "copy and paste" policies developed elsewhere, often within the scope of international cooperation programmes, ignoring local specificities (North, 1993; Mishrif and Selmanovic, 2010). The negative consequences are multiple: waste of (scarce) resources, increased resistance to change fed by the failed implementation and, finally, non-achievement of the objectives (Rodrik, 2004; Brynard, 2005; Makinde, 2005; Olapido, 2008).

On the basis of the literature review, the following hypothesis is formulated: only policies implemented in homogenous contexts should be expected to lead to homogenous results. Therefore, countries can really profit from successful policies implemented in other countries only if they have similar capability levels (i.e. their experience is reciprocally relevant).

Consequently, the specific questions addressed in the study are:

- What relevance does AE in general, and organisational schemes of the PA in particular, have for supporting innovation in developing countries?

- How should policy makers in developing countries assess the relevance of organisational schemes for innovation support designed elsewhere?
- How can the impact of such organisational schemes on local innovation and entrepreneurship in developing countries be evaluated?

The research questions are investigated empirically by looking at AE interventions, more specifically PA organisational schemes supporting innovation, and their impact in two case studies referring to countries whose capabilities level is considered similar on the basis of selected criteria. The corresponding research objectives are:

- study the relationship between AE and innovative performance in the context of developing countries;
- identify comparable contexts (case studies);
- evaluate the relevance and impact of organisational schemes for supporting innovation in the countries chosen as case studies (Egypt and Morocco) by reviewing their NIS, the main obstacles to innovation and the underlying causes, and the effectiveness of similar organisational schemes.

The outcome should facilitate the definition of organisational schemes supporting innovation by assessing the similarity of other contexts. According to the hypothesis, this could bring immediate benefits to developing countries, where policy makers could either choose to introduce what is considered as good practice or, having defined an organisational scheme themselves, analyse the impact of similar solutions already introduced in similar contexts, highlighting the necessary accompanying measures.

The gap addressed in this research was identified during consultancy work the researcher conducted for UNCTAD in the first six months of the PhD (see section 2.2) as well as in a comprehensive literature review on public governance and innovation support during the first year of this research. First, there is still a drive to copy and paste policies from more to less developed contexts for which large amounts of resources are invested by international organisations (see for example Rodrik, 2004; Jooste, 2008; North, Wallis and Weingast, 2009). Second, Celikel-Esser (2007) demonstrates the relevance of good governance for innovation performance in

developed countries, failing to establish the same link for developing countries due to a lack of statistical data on macro level as well as qualitative data on micro level.

The following sections are set out to demonstrate how the present research will fill the identified gaps and contribute to increased understanding of the relevance of AE for innovation support in developing countries in view of policy transfer.

4.2 *Epistemological considerations*

The “worldview considerations” referred to by Teddlie and Tashakkori (2009) above can also be termed “paradigms” (see for example Mertens, 2003, p. 139; Morgan, 2007), fundamental building blocks of research, which guide the researcher through the entire research process including data collection, analysis and interpretation.

The major distinction of paradigms is between the positivist and the constructivist stance, whereby the first makes use of scientific methods stemming from natural sciences to study social phenomena (usually characterised by a quantitative research strategy), while the latter assumes that the nature of such phenomena does not always or rarely allow for a scientific approach toward conducting social research and usually employs qualitative research methods (see for example Bryman, 2008; Creswell, 2009).

Several scholars have advocated a research strategy solely based on *one* of the two contrasting paradigms, thereby rejecting their integration into one plural approach (e.g. Burrell and Morgan, 1979; Jackson and Carter, 1991). In a comprehensive discussion of defenders and opponents of such a view and in relation to interdisciplinary research on management theory, Watson (1997) argues that such an “isolationist” perspective is counterproductive if we aim at broadening our understanding of under researched phenomena, in particular if they involve “[...] thoughts, feelings, values, assumptions, interests, wants and interpretations of [...] subjective actors” as well as the “‘objective’ constraints and opportunities [...] within social, political and economic structures external to them” (p.5).

Hence the pragmatist philosophical perspective allows for co-existence of some sort of objective reality and its subjective interpretation or a perceived reality constructed collectively by social actors. Morgan (2007, p.71) for example argues

that strict separation of objectivism and subjectivism (usually associated with positivism and constructionism respectively) constitutes an “artificial summary of the relationship between the researcher and the research process”, as no such thing as “complete objectivity” or “complete subjectivity” exists.

Morgan (2007) therefore argues that the pragmatic approach towards research in social science is instead concerned with “inter-subjectivity”, i.e. emphasising “processes of communication and shared meaning” as well as solving problems of “incommensurability” of contrasting paradigms (Morgan, 2007, p.71).

For pragmatists, a position is not justified by its congruence with reality, but rather by its adequacy to be functional and contribute to problem solving²⁷. Teddlie and Tashakkori (2009) define pragmatism as:

“a deconstructive paradigm that debunks concepts such as ‘truth’ and ‘reality’ and focuses instead on ‘what works’ as the truth regarding the research questions under investigation. Pragmatism rejects the either/or choices associated with the paradigm wars, advocates for the use of mixed methods in research, and acknowledges that the values of the researcher play a large role in interpretation of results” (Teddlie and Tashakkori, 2009, pp.7-8).

The co-existence of an objective reality and its subjective interpretation by actors does not constitute an issue in philosophical pragmatism (Morgan, 2007), however the latter rejects the existence of a “correspondence theory of truth” (Watson, 1997, p.6) and acknowledges that the concept of reality is a social construct influenced by values, beliefs and attitudes of its actors as well as the researcher himself (Morgan, 2007; Teddlie and Tashakkori, 2009).

A pragmatic stance allows for a deeper understanding of the nature of a NIS, characterised by an institutional environment defined by cultural specifics in which rationally bounded actors interact (North, 1990; Lundvall, 1992). Employing mixed methods increases the likelihood of higher validity (Sieber, 1973) and strengthens confidence in research results (Jick, 1979).

²⁷ On the increasing relevance of pragmatism in social science research, see Creswell (2009).

Denzin (1978), considered the first scholar to have laid down the foundations for inter- and intra-method triangulation, argues that “the bias inherent in any particular data source, investigators, and particularly method will be canceled out when used in conjunction with other data sources, investigators, and methods” (Denzin, 1978 in Johnson, Onwuegbuzie and Turner, 2007, p.115).

Adopting a pragmatic approach, this research employs mixed methods²⁸: quantitative methods are used to verify the robustness of the correlation between good governance and innovation performance before further verifying its validity in the specific case of organisational schemes by interviewing stakeholders, i.e. entrepreneurs, policy makers and academics representing the subjective actors within Egypt’s and Morocco’s NISs. Table 12 summarises the rationales for conducting mixed methods research according to selected authors that have been considered to answer the underlying research questions of this study.

Morgan (2007, pp.68-69) argues that, within a pragmatic approach to research, methodology can be viewed “[...] as an area that connects issues at the abstract level of epistemology and the mechanical level of actual methods” (Figure 9), while epistemological stances, methodological considerations including research design and methods employed to study a specific phenomenon should be justified in an interconnected manner, rather than making a distinction between what knowledge is and the way we derive it.

The above discussion has attempted to provide such an integrated view, complemented by the following discussion on the rationale behind the study’s research design, methods, their limitations and a strategy to overcome bias. To answer the research questions, a case study design has been adopted to assess the impact of policies supporting innovation (in particular PA organisational schemes).

²⁸ “Mixed methods refers to research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry” (Tashakkori and Creswell, 2007, p.4). For a comprehensive overview of definitions of ‘Mixed Methods Research’, see Johnson, Onwuegbuzie and Turner (2007, pp.119-121).

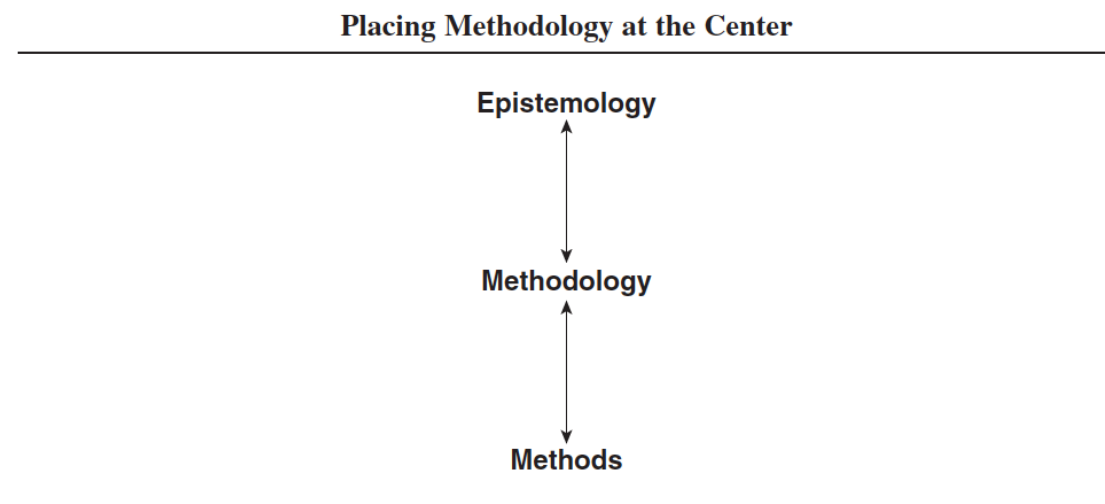
Table 12: Possible rationales for conducting mixed methods research

Author	Rationales for Mixed Methods Research		
Denzin (1978)	Elimination/ Reduction of bias within/from data sources	More and clearer insight into social phenomena	
Jick (1979)	Encourages creativity in data collection techniques and increases confidence over results	Opportunity to collect “thick/rich” data and potential to uncover contradictions	Facilitates the integration of theories and may aid in the evaluation of competing theories
Sieber (1973)	Quantitative data may serve as input for sample selection for qualitative research	Qualitative data may facilitate the interpretation, clarification and validation of quantitative results	
Rossman & Wilson (1985)	Confirmation/corroborations of results from different methodological enquiries	Data ‘enrichment’	May initiate new modes of thinking
Greene at al. (1989)	Triangulation (i.e. seeking convergence and corroboration of results from different methods studying the same phenomenon)	Complementarity (i.e. seeking elaboration, enhancement, illustration, clarification of the results from one method with results from the other method)	Development (i.e. using the results from one method to help inform the other method)
Greene at al. (1989) cont.	Initiation (i.e. discovering paradoxes and contradictions that lead to a reframing of the research question)	Expansion (i.e. seeking to expand the breadth and range of inquiry by using different methods for different inquiry components)	
Sechrest & Sidana (1995)	Verification of results and basis for error estimation	Facilitation of data collection and monitoring	Probing a data set to determine its meaning
Dzuresc & Abraham (1993)	Pursuit of mastery over self and the world; pursuit of understanding through recomposition	Pursuit of complexity reduction to enhance understanding	Pursuit of innovation meaningfulness and truthfulness
Collins et al. (2006)	Participant enrichment (optimising research samples)	Instrument fidelity/ appropriateness/ performance	Treatment integrity (i.e. intervention fidelity) and significance enhancement

Source: adapted from Johnson, Onwuegbuzie and Turner (2007, pp.115-117)

Following a deductive research approach, defined as a “relationship between theory and research” by Bryman (2008, p.694), the hypothesis formulated is tested by comparing the innovation systems in the selected case studies.

Figure 9: The relationship between epistemology, methodology and methods



Source: Morgan (2007, p.69)

4.3 Research design

The research design “provides a framework for the collection and analysis of data”, reflecting the prioritisation of different aspects like:

- *“expressing causal connections between variables*
- *generalizing to larger groups of individuals than those actually forming part of the investigation*
- *understanding behaviour and the meaning of that behaviour in its specific context*
- *having temporal (i.e. over time) appreciation of social phenomena and their interconnectedness”* (Bryman, 2008, p.31).

Stake (1994; 1995) has made a significant contribution towards (qualitative) case-study research. While emphasising the inability to “make precise definitions of cases and case studies because practices already exist for case study in many disciplines” (Stake, 1995, p.2), the author views the case study as “defined by interest in the individual cases, not by the methods of inquiry used” (Stake, 1994, p.236).

Other researchers propose precise definitions. Quoting Yin (1981; 1984), Eisenhardt (1989b, p.534) defines a case study as a “research strategy” (so does Creswell (2007,

p.13)) that makes use of triangulation (i.e. the use of multiple methods), possibly employing mixed methods (i.e. quantitative and qualitative), which are preferable for reasons of “synergy” (Eisenhardt, 1989b, p.538; see also Eisenhardt, 1991 and Eisenhardt and Graebner, 2007).

Yin (2003) proposes a more comprehensive, two-fold definition of case studies, emphasising data triangulation, preferably combined with mixed methods:

(1) “a case study is an empirical inquiry that investigates a contemporary phenomenon in-depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” and

(2) “the case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis” (Yin, 2003, p.13).

In later work, Yin (2009) defines case study as a “formal research method” (e.g. p. 17) and, at the same time, as a research “strategy” (e.g. p.20). The author argues that the “case study method” should be used when “(a) “how” or “why” questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context” (p.2). Case studies are divided into three major categories “explanatory”, “descriptive” and “exploratory” (p.8), distinguishing between “single-case designs” and “multiple-case” designs, which can be either “holistic (single-unit of analysis)” or “embedded (multiple units of analysis)” (p.46).

For Bryman (2008) case study is “a research design that entails the detailed and intensive analysis of a single case”, possibly covering more than one case “for comparative purposes” (p.691). The author labels the latter “comparative design”, while stating that the data collection usually occurs “within a cross-sectional design format”(p.58). Finally, he defines a cross-sectional design as “a research design that entails the collection of data on more than one case [...] and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two

or more variables [...], which are then examined to detect patterns of association” (p.693).

This research adopts Bryman’s (2008) view of case study as *research design* providing a general framework for data collection and analysis. This broad definition allows for accommodating general characteristics of case study research as stipulated for instance by Eisenhardt (1989b; 1991), Eisenhardt and Graebner (2007) or Yin (2003; 2009) above, even though the latter regard case studies as *strategies* or *methods* rather than defining it as *research design*.

Furthermore, the type of case study research adopted here could be labelled a “collective case study” (Stake, 1995) or, synonymously, according to Bryman's (2008) definition, a “multiple-case study” with a “comparative design” (Bryman, 2008, pp. 59-61), as two cases are examined and compared (i.e. two developing countries). However, Yin's (2009, p.46) definition “multiple embedded case study design” is more precise and therefore adopted: multiple embedded case studies refer to several units of analysis within different contexts (i.e. cases).

The main units of analysis for this research are parts of the NISs of the selected countries and the related AE policies. The embedded units of analysis are key organisations (i.e. institutional arrangements) implementing innovation policies and selected local enterprises (mainly SMEs from the ICT sector). The methodological aspects of selecting reciprocally relevant countries and the issues relating to the selection of indicators are outlined in the next two sections.

4.4 Case studies selection

Egypt and Morocco form the embedded case studies within a multiple case-study research design. This research builds upon the work conducted on AE by the researcher at UNCTAD and the subsequent analysis of the role of international organisations in the modernisation of Arab public institutions, with a focus on e-Government experiences in Egypt and Morocco.

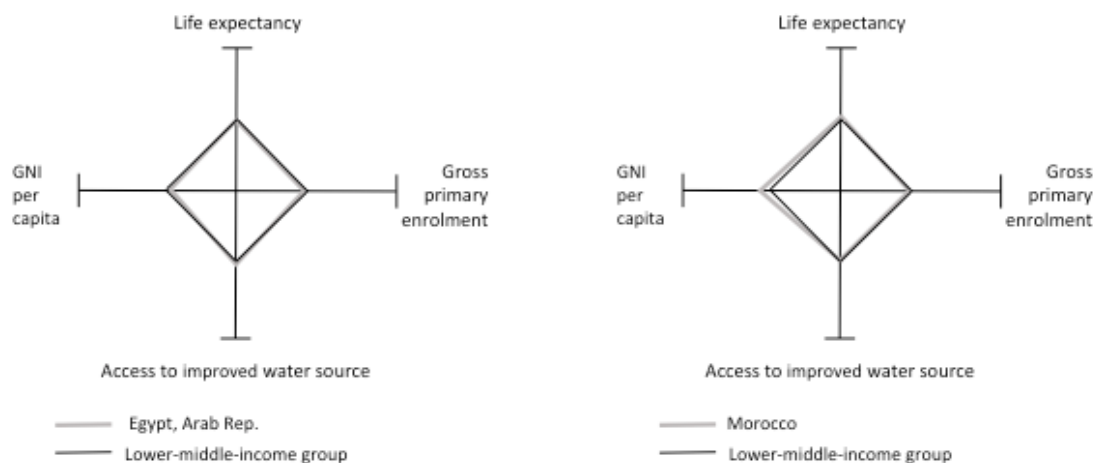
Egypt and Morocco are the leading non-oil economies in the MENA region, with a similar GDP composition per sector and a comparable weight of the shadow economy (ILO, 2010 in Mishrif and Selmanovic, 2010). The demographic structures of

the two countries are slightly different, with a higher percentage of urban population in Morocco than in Egypt (55 and 45 per cent respectively), despite Cairo being one of the two mega cities in the Arab world (with Teheran) (Mishrif and Selmanovic, 2010).

Their proximity, confirmed by the World Bank development assessment model (Figure 10), is also reflected by the cultural analysis of the two countries in Hofstede (1991), Helmreich and Merritt (1998) and Hofstede, Hofstede and Minkov (2010). Like for other countries in the MENA region, Egypt and Morocco are characterised by a large power distance and a strong preference for uncertainty avoidance, a mix that leads to rule-oriented societies with limited possibility of internal upward mobility.

In these overwhelmingly collectivist societies, the strong commitment (loyalty) to the needs of the "group" may represent a major limiting factor for the development of a culture that supports IPR. The comparison of the two countries according to the Global Innovation Index confirms their relatively high similarity as both score below 30, with Egypt and Morocco ranking respectively 87th and 94th out of 125 countries in 2011 (Cornell University, INSEAD and WIPO, 2011)²⁹.

Figure 10: Development diamonds for Egypt and Morocco



Source: World Bank (2010) in Mishrif and Selmanovic (2010, p.914)

²⁹ By 2013 Morocco's ranking slightly improved, while Egypt's ranking significantly deteriorated due to the difficult internal situation (respectively 92th and 108th out of 142 countries) (Cornell University, INSEAD and WIPO, 2013).

4.5 Methods and data collection

In the absence of specific indicators for measuring AE, the Government Effectiveness indicator developed by the World Bank has been used as a proxy variable. In 1996, aiming at measuring governance³⁰, the World Bank developed the Worldwide Governance Indicators (WGI), based on surveys with citizens, entrepreneurs and experts from public, private and non-governmental organisations. Currently covering over 200 countries, the indicators measure six dimensions: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption³¹ (Kaufmann, Kraay and Mastruzzi, 2010).

Out of the six, Celikel-Esser (2007) found that Government Effectiveness has the strongest association with innovation performance in developed countries. Government Effectiveness also appears to be the dimension most closely related to AE as it “captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies” (World Bank, n.d.). This dimension deals with the quality of bureaucracies, institutional effectiveness, resource efficiency and red tape among others³².

The WGI have been extensively used in social science research (see for example Neumayer, 2002; Apodaca, 2004; Hart, Atkins and Youniss, 2005; Llamazares, 2005; Andres, 2006; Das and Andriamananjara, 2006; Jung, 2006; Liu and San, 2006; Celikel-Esser, 2007) and even some of its opponents described them as “among the

³⁰ “Governance consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them” (World Bank, 2010).

³¹ See appendix VI for definitions of each dimension.

³² See appendix VII for a detailed overview of the concepts measured within the Government Effectiveness dimension.

most carefully constructed and widely used” indicators of governance (Arndt and Oman, 2006, p.42).

However, several academics and practitioners questioned the usefulness and validity of WGI. The surveys³³ used to collect the perceptions of government effectiveness (and the other indicators of good governance) are mostly conducted by international organisations imprinted by Western institutions (such as the World Bank), potentially biased in the interpretation of results. Furthermore, the WGI have been criticised in relation to their usefulness for cross-country and time-series comparison, the individual indicators used to build the aggregate indicators, the lack of construct validity and limited access to data sources used for the WGI (for more details on criticisms on WGI see Arndt and Oman, 2006; Knack, 2006; Kurtz and Schrank, 2007 and Thomas, 2010).

Kaufmann, Kraay and Mastruzzi (2007, pp.3-28) refute these criticisms in light of “misinterpretations of indicators, or of the empirical evidence involving these indicators” (p. 3). It is nevertheless questionable whether the WGI really measures what it sets out to measure, as the “perceptions” surveyed for each dimension of the composite indicators may well differ from ‘reality’, while the limited access to data sources used to inform the indicators presents an additional drawback of the measures (Thomas, 2010).

Despite the obvious drawbacks of the WGI, it is argued here that, in line with Arndt and Oman’s (2006) statement above and for the inherent difficulties in developing a self-constructed governance indicator³⁴, the use of WGI is justified for this study. The quantitative analysis aims at deriving only preliminary and tentative findings on the relationship between AE and innovation performance in developing countries, subsequently validated by qualitative data collection and analysis of the selected case studies.

³³ See appendix VIII for a comprehensive overview of data sources for the Government Effectiveness indicator for Egypt and Morocco.

³⁴ See Court, Hyde and Mease (2002) for a discussion on methodological challenges for assessing governance.

The analysis of the innovation performance of Egypt and Morocco is based on a composite index constructed according to the methodology used by the EC for its Innovation Union Scoreboard (IUS), presented in more detail in the next chapter, taking into consideration that, for some indicators, data are not available at all or for a significant number of occurrences (i.e. countries and/or years).

The composite indicator defined may represent a limitation for the robustness of the quantitative analysis as the notion of innovation performance and of the related technological capabilities of a country are an extremely complex construct, difficult to measure quantitatively and express through a single number (Archibugi and Coco, 2005). While it is legitimate to question whether it comprehensively captures innovation performance, the composite indicator of innovation performance defined in this research is built on (the aggregation of) widely used innovation indicators, chosen following the review of innovation indices and scoring models developed for cross-country comparisons (see Chapter 5).

Data has been collected from international sources with a reputation of objectivity and reliability, complemented with material retrieved from national governmental bodies, via their official Internet presence as well as from official publications of the respective statistical offices. Academic and scientific publications and other sources have been consulted and, whenever necessary (e.g. in case of ambiguity of the underlying definitions), the information gathered has been validated in interviews with agents of the relevant administration³⁵.

The use of linear regression to assess the relation between the chosen indicators could also be questioned, as it assumes a linear relationship between the two variables³⁶. However, as the purpose of the quantitative analysis was to extend the scope of Celikel-Esser's (2007) findings to developing countries, the same method had to be employed. To stress the point again, the quantitative analysis aims at

³⁵ These events are thoroughly documented in Appendix IX, which includes a protocol on how, when, where, and from whom data were collected.

³⁶ The usage of more sophisticated statistical analyses, such as Probit and Logit functions, should be explored in future research to further investigate the relationship between the two composite indices.

tentatively assessing the association between AE and innovation performance to be validated through interviews with stakeholders within the respective NISs of Egypt and Morocco.

Following the quantitative analysis, the research reviews the AE policies put in place in both countries to support innovation, focusing on organisational schemes. In a first phase, the information is derived from official Internet presences and publications of the government bodies in charge of their formulation and implementation.

A range of qualitative methods for the field trip has been considered: observations; focus groups; ethnographic studies; and in-depth interviews, the latter used for qualitative research by the vast majority of researchers (Lee and Lings, 2008). For this study the other methods presented a number of limitations:

- observations would have required a significantly higher amount of time to be spent in the two countries, not compatible with resource constraints as well as with the security situation in Egypt at the time the field trip was conducted;
- focus groups for the qualitative data collection were not practicable in view of the impossibility for high-level public officials and company CEOs to commit the amount of time required for this type of study; and
- an ethnographic study was excluded for similar reasons, i.e. time constraints and the limited availability of participants as well as the general issue associated with the objective evaluation of ethnic groups by foreigners (Geertz, 1988).

Therefore, the researcher has conducted semi-structured interviews to capture rich and in-depth information about the participants' views and interpretations of the nature of AE and organisational schemes supporting innovation, making use of open interview questions (Appendix X) to capture emerging themes within participants' responses (Bryman, 2012).

The choice of the data collection method was influenced by the fact that one of the supervisors of the author is from Egypt and offered in-depth knowledge of cultural specificities in Arab countries, greatly facilitating contact development: trust is of

paramount importance in Arab cultural settings and face-to-face interviews are the preferred option to obtain reliable data (Bryman and Bell, 2007).

Conducting research in developing countries is characterised, as Clark (2006, p.418) finds, by “challenges related to locating interviewees and data—the dearth of good directories and phone books, unreliable Internet, outdated telephone numbers, lack of accurate addresses, restrictive opening hours, and the cancellation of appointments”. With this in mind, all appointments were made weeks in advance by phone and confirmed by e-mail. Participants were reminded of the appointment by phone a few days in advance of the meeting³⁷.

The problems mentioned above have not been encountered in this research³⁸ and the author could make use of in-depth semi-structured interviews to address the limitations of the quantitative analysis, achieving a better understanding of the relationship between the two variables (i.e. governance effectiveness, as proxy of AE, and innovation performance) as well as of the underlying cultural specifics affecting this relationship in the two countries (Saunders, Lewis and Thornhill, 2012). By gathering data in a consistent manner (Bryman and Bell, 2011), semi-structured interviews have the potential to reveal phenomena that might otherwise remain unconsidered, maintaining the possibility to enrich the answers and further deepen the understanding of underlying issues and concepts (Saunders, Lewis and Thornhill, 2012).

The researcher’s role is crucial in data collection and interpretation (Teddlie and Tashakkori, 2009), even more when conducting interviews, as there are multiple risks of influencing the respondent (e.g. with attitude, behaviour and nature of questions posed, see Easterby-Smith, Thorpe and Lowe, 1991). Therefore, this research adopted the techniques proposed by Bryman (2012) to mitigate the researcher’s impact on responses from interview participants (Table 13).

³⁷ In a study on business incubation conducted by Hackett and Dilts (2008) involving interviews with 50 incubator managers in the USA, the authors arrange and confirm interview appointments by e-mail and telephone. Their approach is followed in this research.

³⁸ Apart from a few non-functioning web sites and out-dated phone numbers of organisational schemes in Egypt, which have been therefore excluded from the scope of this research.

Interviews made use of the *Critical Incident Technique*³⁹ (Butterfield et al., 2004) to elucidate the measures introduced by the two governments in the area of administrative simplification and innovation support as well as changes in administrative burdens in recent years and their effects on companies' innovation performance. Each interview lasted up to 90 minutes⁴⁰.

Table 13: Interview techniques

- | |
|--|
| <ul style="list-style-type: none"> • Active listening, i.e. paying close attention to what is (not) being said during the interview • Probing questions, e.g. "Could you say more about that?" • Specifying questions, e.g. "What did you do then?" • Direct questions, e.g. "Would you consider going back?" • Indirect questions, e.g. "What do your peers think about that? [...] And yourself?" • Structuring questions, e.g. "I would now like to move on to a different topic." • Silence, i.e. allowing pauses to give an opportunity for reflection to participants • Interpreting questions, i.e. summarising participants responses in one's own words to verify interpretations |
|--|

Source: Adapted from Bryman (2012, p. 478)

The size of the sample for the qualitative analysis has been carefully considered. There is extensive debate on when saturation is achieved when collecting qualitative data (see for example Lee, Woo and Mackenzie, 2002; Patton, 2002; Guest, Bruce and Johnson, 2006; Bryman, 2012). While some researchers argue that the sample size in qualitative research in social science is not determined by any specific guidelines (e.g. Patton, 2002), others attempt to define rules for the determination of adequate sample sizes (e.g. Lee, Woo and Mackenzie, 2002 or Guest, Bruce and Johnson, 2006).

Guest, Bruce and Johnson (2006) define the number of 15 as the minimum sample size in qualitative research while Lee, Woo and Mackenzie (2002) in Mason (2010) argue that a smaller sample size (i.e. number of participants) is legitimate in studies that use multiple methods of inquiry. However, the researcher opted for a larger

³⁹ The critical incident technique stems from the "Aviation Psychology Program" of the United States Air Force in World War II (Butterfield et al., 2004, p.476), was first formalised by Flanagan (1954) and has since been widely applied in a range of subject areas (Butterfield et al., 2004).

⁴⁰ Seidman (2013) suggests that face-to-face interviews in qualitative research should be approximately 90 minutes long.

number of interviews in consideration of the complexity of the thematic approached and the relative difficulty in assessing ex ante the quality of the contribution to be expected from the single participants.

“Purposive” (Bryman, 2012, p.418) and “reputational sampling” (Teddlie and Yu, 2007, p.81) were used for the selection of participants. A total of 72 interviews were conducted, out of which 37 private companies (18 in Egypt and 19 in Morocco) were interviewed as well as (sometimes multiple) representatives of 20 public sector entities in charge of innovation support (10 in Egypt and 10 in Morocco). In addition, four representatives of private entities involved in public private partnerships for innovation support were interviewed in Morocco as well as two in Egypt. Following the recommendation of several participants, a representative of an Egyptian non-governmental organisation (NGO) was included, in consideration of its relevance for innovation support in Egypt, particularly regarding support to young entrepreneurs.

Participants from the public sector were chosen on the basis of their relevance to the NISs of the two countries. Previous studies that attempted to assess the key actors of Egypt’s and Morocco’s innovation system were the first source for the selection of public sector participants (for example Saleh, El-Tobgui and El-Fayoumi, 2005; Hahn and Meier zu Koecker, 2008; Janischewski and Branzk, 2008; Waast and Kleiche-Dray, 2009; Arvanitis and Mhenni, 2010; Fraunhofer Institute for Production Systems and Design Technology, 2010; Azzioui, 2012; Dagault, Ziane-Cherif and Menendez, 2012).

The list was complemented following comprehensive desk research on innovation support programmes put in place in the two countries and the relevant public entities in charge of developing and implementing them. Official contacts with public entities forming essential parts of the countries’ innovation systems were obtained during the researcher’s consultancy at UNCTAD in the first phase of the PhD research and through contacts developed in past work at the European Patent Office. Finally,

during the course of the field trips, participants recommended further entities to be contacted because of their role for innovation support and policy implementation⁴¹.

Purposive sampling (Teddle and Yu, 2007; Bryman, 2012) on the basis of the researcher's judgement was employed for the selection of companies for the interviews. The indicators used for the development of the composite indicator of innovation performance for the regression analysis provided the first point of reference for the selection of innovative companies.

The innovation output indicators used for the composite indicator included PCT patent applications per billion GDP, high-tech product exports as percentage of total product exports, knowledge-intensive services exports as percentage of total service exports and license and patent revenues from abroad as percentage of GDP. While these data are available on country level from reputable sources, it is considerably more burdensome to acquire them at company level, with the exception of patent data⁴².

A further source of information is represented by the list of technology parks and technopoles set up to support high-tech companies in Egypt and Morocco⁴³. Companies participating in such organisational schemes have been included because of their demonstrated innovative capabilities or of their potential assumed on the basis of the eligibility for public innovation support. Hence, the representatives of these companies were able to comment on the effectiveness of the organisational schemes put in place.

Unfortunately, at the time interviews took place (March 2012 in Egypt and April 2012 in Morocco), Egypt greatly suffered from the aftermath of political unrest and the revolution that started in January 2011. It was not possible to reach any representative of the first established technology park (Mubarak City for Scientific Research and Technology Applications) either by phone or by e-mail. Their Internet

⁴¹ See Appendix IX for detailed information on public sector participants.

⁴² Available from online patent databases from EPO and WIPO.

⁴³ See Appendix XI for a list of technology parks and technopoles in the MENA region.

presence had also ceased to exist at the time interviews were planned. However, the researcher was able to establish contacts to another technology park and incubator, the Technology Innovation and Entrepreneurship Centre (TIEC), supporting several interviewed companies in the ICT sector (see Chapter 6).

This organisational scheme was however set up only in 2010 and, therefore, it was difficult to assess its effectiveness already in 2012. To compensate for these difficulties, the identification of innovative companies in Egypt was supported by the revision of the participants in innovation support programmes as well as by a comprehensive search of patent databases.

The selection criteria for the company interviewed in both countries included:

- ownership: only local companies (i.e. Egyptian and Moroccan) were used in order to assess the effect of public governance and support (particularly organisational schemes) on their innovativeness;
- company size: focus on SMEs, selected on the basis of their importance to the overall socio-economic environment in developing countries and their potential to contribute to economic development (two large companies, employing more than 250 staff, were included on the basis of their significant innovative capabilities as evidenced in patent filings and of their participation in governmental innovation support programmes);
- industry sector: many organisational schemes considered focus on the ICT sector and the sample includes mainly ICT companies (12 in Egypt and 17 in Morocco); other sectors covered include: for Egypt pharmaceuticals (two companies), engineering (two companies), agriculture and textiles (each one company); and for Morocco engineering and distribution (each one company).

The interviews in Egypt were conducted in English, as all participants were fluent English speakers. Out of the interviews in Morocco, eight were conducted in English with fluent English speakers and the rest in French as the interviewees did not feel comfortable with conversing in English, but were fluent French speakers. All questions were translated to French prior to the field trip by the researcher, who is fluent in French. A native French speaker validated the translations. Almost all

interviews were tape-recorded⁴⁴ and transcribed verbatim, whereby voice recognition software (*Dragon Naturally Speaking*, Version 11") was used to facilitate and accelerate the transcription process. The translations of French interview transcripts were again crosschecked by a native French speaker who confirmed their accuracy.

The list of research participants and the corresponding codes used to ensure their anonymity are provided in Appendix IX, which also includes short descriptions of interviewees, interview dates, times and locations.

For the analysis of the data obtained from interviews, thematic analysis was employed, which is the most widely used approach to analyse qualitative data (Guest, MacQueen and Namey, 2012). It is a "process for encoding qualitative information" (as opposed to a method), which allows for quantification of qualitative data (Boyatzis, 1998, p.4) and involves the generation of themes, elaborated on the basis of so-called "codes" on a micro level. The latter can be defined as "a textual description of the semantic boundaries of a theme or a component of a theme" (Guest, MacQueen and Namey, 2012, p.50). Other terms are often used as synonyms for codes, such as "incidents", "segments", "units", "data bits" or "chunks" (Ryan and Bernard, 2003 in Robson, 2011).

Miles and Huberman (1994, p.58) suggest developing a "start list of codes" on the basis of theory, research questions and objectives before data collection commences. In the course of and after conducting the fieldwork, these codes are adapted and complemented by additional or modified codes on a regular basis. The initial set of codes for this research was developed on the basis of the research questions of the study and the corresponding list of interview questions.

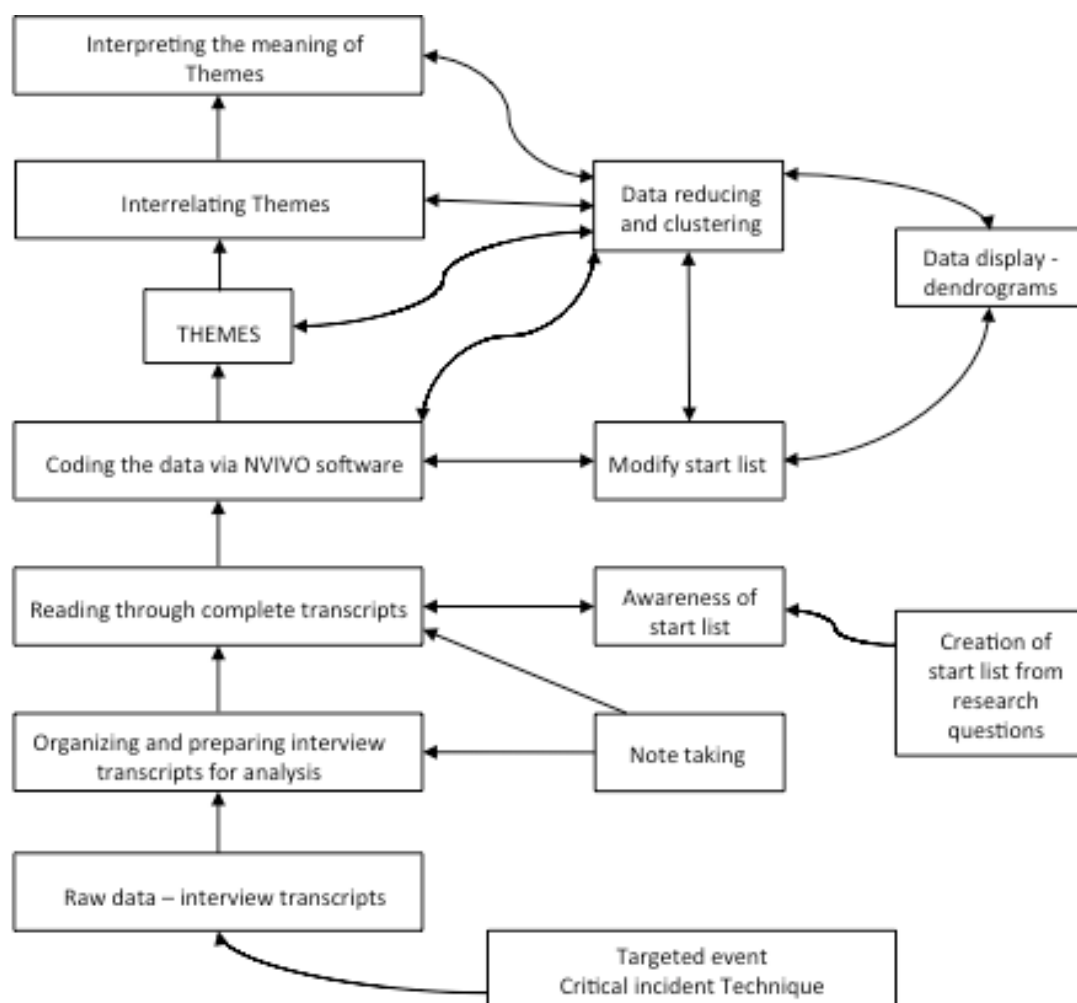
These pre-defined codes were subsequently complemented by additional codes and sub-codes that emerged during data collection and analysis. This resulted in a total of 24 final codes, which are listed in a comprehensive codebook, containing code

⁴⁴ One Moroccan and one Egyptian participant (two companies) refused to be recorded. Detailed notes were taken during these interviews.

names, their definitions and corresponding interview topics, as suggested by Guest, MacQueen and Namey (2012) (see Appendix XII).

The coding procedure and the theme generation were considerably facilitated by the use of Nvivo 10 Research Software. Some critics argue that the researcher could potentially lose out on closeness to the data when using software for qualitative data analysis (see Bazeley, 2007). This point was addressed by reading through the transcripts repeatedly and taking notes. In addition, in view of the large amount of transcript data for this study (over 400 pages!), NVivo proved extremely useful as an aid for the analysis (see Creswell, 2009; Bryman, 2012). The data analysis process followed the seven steps suggested by Creswell (2009) and extended by Stokes and Urquhart (2013) (Figure 11).

Figure 11: Data analysis process



Source: Stokes and Urquhart (2013) – based on Creswell (2009, p.185)

Through data reduction and clustering, the coding process in NVivo led to the identification of four main themes from the initial list of 24 codes: Governance, Funding, Capacity Building and Infrastructure. The next section addresses the mapping of the 10 main functions of an NIS (Edquist, 2004) to these themes within the analytical framework provided by the representation of NIS as interconnected systems of institutions in Groenewegen and van der Steen (2006).

4.6 Analytical framework

To ensure high validity and reliability, this research pays particular attention to four concepts commonly used to evaluate “empirical social research” (Yin, 2009, p.40):

- *“Construct validity”⁴⁵*: identifying correct operational measures for the concepts being studied
- *Internal validity* (for explanatory or causal studies only and not for descriptive or exploratory studies): seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships
- *External validity*: defining the domain to which a study’s findings can be generalized
- *Reliability*: demonstrating that the operations of a study – such as the data collection procedures – can be repeated, with the same results”.

As far as **construct validity** is concerned, this research makes use of the indicator of governance effectiveness developed by the World Bank, despite its limitations discussed above. Its association with the presented new composite indicator of innovation performance for developing countries is evaluated by means of linear regression.

The suggested causal relation is confirmed in interviews with stakeholders from industry, in particular SMEs, academia and public administration to ensure **internal**

⁴⁵ Synonymously referred to as “measurement validity” (see for example Bryman (2008, p.32)).

validity. On the basis of the interviews, the author establishes a more coherent picture on the impact of innovation supporting policies implemented.

After the validation of the results in interviews with stakeholders, the research evaluates the achievements of the NIS of Egypt and Morocco to assess their effectiveness by analysing how strategic objectives are defined, reviewing the major obstacles to innovation and comparing selected organisational schemes. The research applies the conceptual framework proposed by Groenewegen and van der Steen (2006) (see section 3.1) to support the analysis of institutions and organisations that constitute the two NIS and their systemic description (provided respectively in Chapters 6 and 7) highlights the driving factors of innovation performance in both countries.

The selection of Egypt and Morocco for the multiple embedded case study design is crucial for the external validity of this study, i.e. facilitating the generalisation of findings to other developing countries. The initially formulated hypothesis that countries can learn more effectively from each other's experiences if they are reciprocally relevant is, from this point of view, particularly demanding. **External validity** is addressed by the analysis of the regression between government effectiveness and innovation performance in separate contexts (i.e. low and low-middle income countries and Muslim countries) to ascertain the relevance of institutions (i.e. culture, norms and values).

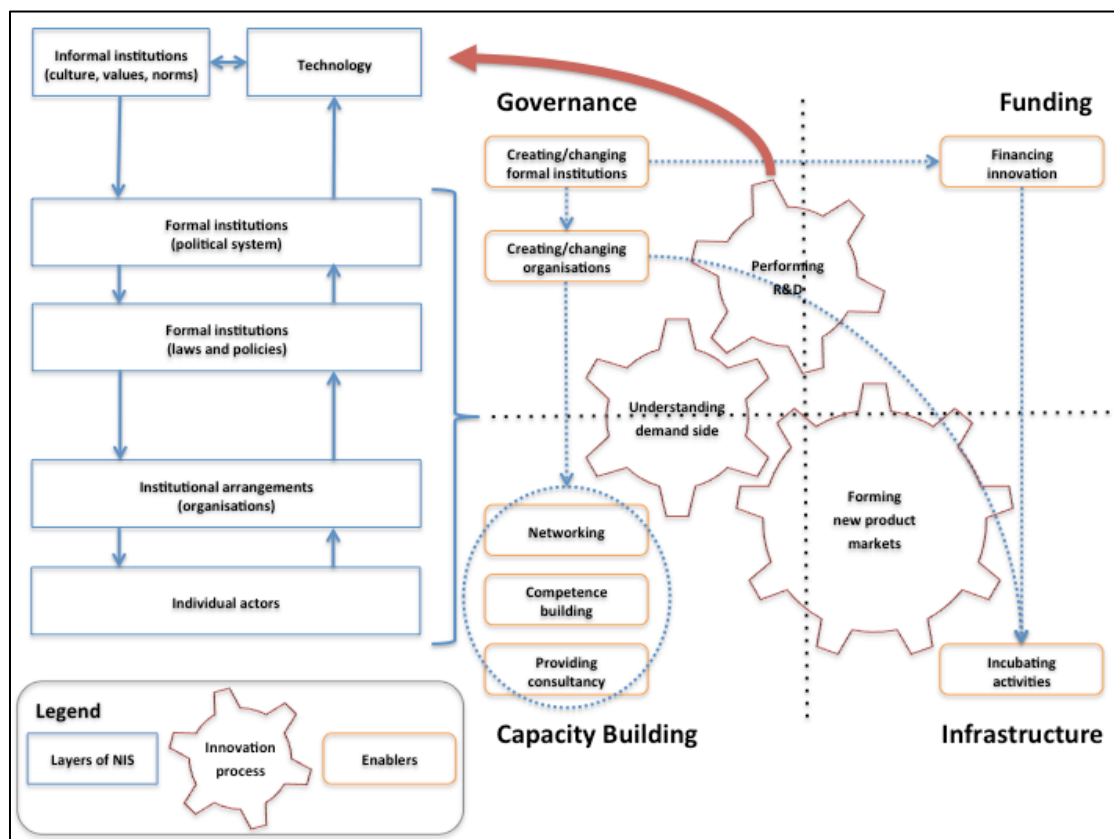
Finally, the **reliability** of the study's conclusions depends on the quality of data collected and their stability over time (Yin, 2009). Statistical data provided by international organisations (e.g. UN, World Bank and IMF), even if based on input provided by national authorities, are competently scrutinized. The data series obtained are relatively stable and divergences due to changes in measurement definitions are properly documented. Data published by national authorities in developing countries are less reliable. It is not only a question of methodological maturity of the authorities in charge, but also a consequence of the fact that these statistics are more prone to political abuse.

Furthermore, as emphasised in the literature review, a sheer comparison of indicators would follow a "one-size-fits-all" approach and would not sufficiently

consider the impact of the complex factors that have shaped the institutional evolution (Grindle, 2004; Pritchett, Woolcock and Andrews, 2010; Mishrif and Selmanovic, 2010; North, Wallis and Weingast (2009; 2013) and, consequently, NISs and the innovation performance of countries. This risk is mitigated by the analysis of the information collected in the interviews. The results of such contributions, however, are per definition more volatile, as the answers of interviewees depend on subjective perceptions that may be influenced by events (and corresponding emotions) taking place at the time of the interview.

Figure 12 summarises the analytical framework of this research, building on the concepts presented so far. The formal institutions that form the political system define the strategy, which is implemented through laws and policies, essentially determining the governance of and the resources available for the institutional arrangements that operate directly with the individual actors of the NIS (e.g. entrepreneurs, researchers, SMEs).

Figure 12: Analytical framework



Source: Author, based on Groenewegen and van der Steen (2006) and Edquist (2004)

Taking into consideration the 10 main functions of an NIS defined by Edquist (2004), three represent the roots of the innovation process (namely understanding the demand side, performing R&D and forming new products markets) and seven define enabling activities, of which three are primarily the responsibility of the highest political institutions: creating and changing formal institutions and organisations as well as financing innovation.

The interactions between organisations and individual actors take the form of initiatives providing capacity building or infrastructural support (including funding distributed within the limits set by the political stances). The remaining four enabling functions are involved at this level: networking, competence building, providing consultancy and, more generally, incubating activities.

Despite its apparent determinism, this analytical framework allows for a continuous evolution of the system observed, its imponderable element being constituted by the impact of innovation and technological development on the informal institutions, constantly altering the internal equilibrium of society.

4.7 Researcher's position and ethical considerations

According to Berger (2013, p.2), researchers need to “better understand the role of the self in the creation of knowledge [and] carefully self monitor the impact of their biases, beliefs, and personal experiences on their research”. Reflexivity is the process by which the researcher acquires awareness of his or her position in relation to the object of research and acknowledges the corresponding effect on the outcomes. This position is characterised by personal characteristics such as “gender, race, affiliation, age, sexual orientation, immigration status, personal experiences, linguistic tradition, beliefs, biases, preferences, theoretical, political and ideological stances, and emotional responses to participants” (Finlay, 2002; Kosygina, 2005; Bradbury-Jones, 2007; Padgett, 2008; Hamzeh and Oliver, 2010; all in Berger, 2013, p.2).

The position of the researcher is not neutral. In a first stance, it affects the accessibility to the field and, thereafter, the level and quality of the interaction between interviewer and interviewee (Berger, 2013). Finally, it influences the substance of the interaction, influencing both the content of the questions asked

and the “reading” of the answers received (Berger, 2013). Consequently, in-depth interviews for qualitative research are largely influenced by the researcher’s worldview and personality:

“The researcher is the key person in obtaining data from respondents. It is through the researcher's facilitative interaction that a context is created where respondents share rich data regarding their experiences and life world. It is the researcher that facilitates the flow of communication, who identifies cues and it is the researcher that sets respondents at ease” (Myburgh and Poggenpoel, 2003, p. 418).

This is particularly true for interviews based on open-ended questions, which offer more freedom to the interviewees to provide useful insights on the chosen topic. Making use of interviews to validate the outcome of the quantitative analysis, this research uses open-ended questions to identify potential spurious correlations, which would imply alternative explanations of the dynamics observed. Thus, it is necessary to formulate a strategy for identifying and, where possible, minimising the consequences of the researcher’s biases on the validity of the conclusions of the study.

The first, necessary step is to ensure “the credibility of the findings by accounting for researcher values, beliefs, knowledge, and biases” (Cutcliffe, 2003 in Berger, 2013, p.3), exposing the researcher’s background and how this has lead to the choice of the research topic. The author is a 30-year-old female researcher born into a Muslim family in Sarajevo, as Bosnia and Herzegovina still used to be part of the Socialist Federal Republic of Yugoslavia. In 1992, at the start of the civil war, the author left the country and was raised in Munich, Germany. Thereafter, the researcher spent several months in other European countries for work and study purposes (i.e. France, Spain, Switzerland and the UK).

The author holds a Masters degree in International Business Economics and conducted research and participated in projects related to performance management, innovation and intellectual property in two international organisations (i.e. the European Patent Office and the European Aeronautic Defence and Space Company), developing an interest for those topics.

The researcher was then awarded a scholarship from Anglia Ruskin University to continue research on doctoral level. As previously mentioned, the first part of this PhD work was a consultancy project at UNCTAD in Geneva, which started in January 2010. There the author worked on the collection and analysis of good practices for business facilitation in developing countries and policy transfer (see UNCTAD, 2010 and UNCTAD, 2011). An outcome of that work was a joint conference paper with one of the supervisors of this thesis on the role of international organisations for e-government efforts in developing countries (Mishrif and Selmanovic, 2010).

In that context, it became apparent to the author of this study that the heavily criticised practice of “copying and pasting” policy initiatives from more to less developed contexts is still common practice within projects initiated by international organisations. The author therefore decided to continue researching the subject of policy transfer in the area of innovation support, building on previous experience to help delivering the benefits that innovation and technology potentially have for fostering socio-economic inclusion in developing countries (see Chapter 3).

Looking at possible threats to the validity of the conclusions reached in a study by a (educational) researcher, Myburgh and Poggenpoel (2003) identify:

“the researcher's mental and other discomfort [which] could pose a threat to the truth value of data obtained and information obtained from data analyses; the researcher not being sufficiently prepared to conduct the field research; not being able to do member checking on findings; conducting inappropriate interviews; not including demographic data in the description of the results; the researcher not being able to analyze interviews in depth; and describing the research methodology and research results in a superficial manner” (Myburgh and Poggenpoel, 2003, p. 418).

The preparation and the evaluation of the interviews have already been addressed in the previous sections of this chapter. Here the focus is rather on the choices made by the researcher to facilitate a smooth interaction between interviewer and interviewees and the researcher's perception of how the outcome has reflected this objective.

Clark (2006) notes that the sex of the researcher may be an issue for qualitative research in cultural contexts characterised by male predominance, whereby women

may be disadvantaged or not taken seriously. However, their empirical findings in such cases show that, when interviewing female participants, it is of advantage for the researcher to be a female. Furthermore, “Western women” face less difficulties when interviewing male participants in Muslim countries⁴⁶, as they are often, to their advantage, considered “a third gender” (Schwedler, 2006 in Clark 2006, p.421).

Taking these points into consideration and, building on the personal “mixed background”, the author deliberately tried to blend in and opted for “appropriate” clothing and behaviour during the interviews. Being used to live in a laic environment, the researcher was faced with institutions conditioned by religion or, more precisely, by religiously motivated norms, whereby her Muslim heritage clearly helped in connecting with the participants, who were in general very receptive and cooperative.

The tragic events that hit the author’s community of origin were regularly referred to, particularly in Egypt where a difficult transition was (and still is) taking place. In this context, the author’s “familiarity” was striking and required particular effort to keep a neutral stance during the interviews, reducing the risk that information could be unwillingly withheld as self-evident and avoiding influencing the answers by sharing personal opinions. In general, the choice of aligning with local norms facilitated the interaction with male interviewees, just like being a relatively educated woman helped “building bridges” with female interviewees, all of them holding degrees, probably more at ease in discussing openly with an interviewer in a similar “position”.

As these countries tend to show high levels of uncertainty avoidance, building a trust-based relationship was of paramount importance to obtain valuable and informative answers. Therefore, participants were comprehensively informed of the purpose of the research (see information sheet in Appendix XIII) and were offered to co-sign a confidentiality agreement (see appendix XIV). Private sector participants in

⁴⁶ These findings are based on research conducted in 20 countries, i.e. Egypt, Morocco, Jordan, Lebanon, Israel/Palestine, Syria, Yemen, Tunisia, Turkey, Iraq, Kuwait, UAE, Saudi Arabia, Algeria, Bahrain, Iran, Qatar, Oman, Pakistan and Sudan (Clark, 2006).

Morocco were very open in voicing their concerns regarding AE and innovation support.

Revealing a more controversial situation, several participants in Egypt stated that they did no longer fear to provide honest answers in a tape-recorded interview, which would have been the case prior to the revolution and the fall of the regime of President Mubarak. Having documented verbatim the content of the interviews, its interpretation has been in most cases straightforward and the researcher is confident that in the process the necessary emotional distance could be kept.

In addition to the above outlined measures, the researcher has ensured that data is collected in an ethical manner by obtaining formal ethics approval from the research ethics committee of Anglia Ruskin University as well as completing relevant ethics training. The anonymity of participants has been safeguarded through the use of pseudonyms (see appendix IV). All contributions of participants have been confidentially stored on a password-protected computer and audio recordings of interviews have been deleted after transcription.

Regarding the last point raised by Myburgh and Poggenpoel (2003), namely the risk of superficiality, the researcher comprehensively discussed the research topic, data collection methods and findings with peers including colleagues and external experts. Training sessions within the university and faculty, annual monitoring procedures and supervisory meetings provided numerous opportunities for this purpose.

Paper submissions and presentations were conducted at the following conferences (ICPA 2010 – paper submission only; European Innovation Summit - Research & Networking, October 2011, Brussels, Belgium; Falling Walls Conference Lab, November 2011, Berlin, Germany; Anglia Ruskin University Research Student Conference, June 2012, Cambridge, UK). Furthermore, the research objectives, design, methodology and preliminary findings were informally discussed in several conferences attended: “Triple Helix International Conference”, July 2013, London; “Seminar on Administrative Simplification Strategies in MENA and OECD countries” organised by the OECD, February 2012, Budapest; Brussels.

The comprehensive discussions with specialists in the field offered valuable feedback, which covered both content and its delivery, helping the researcher to feel more comfortable with discussing her research with an expert audience.

Having reviewed the methodology used to answer the research questions, the next chapter addresses the measurement of innovation performance, presenting the most relevant indicators and critically evaluating three different Innovation Scoring Models. Thereafter, the relationship between AE and innovativeness in developing countries is assessed on the basis of a linear regression of governance and innovation performance indicators.

5 Measuring innovation performance

The importance of innovation for socio-economic development has already been emphasised in this thesis and, consequently, innovation policies are a major priority on many governments' policy agendas. However, the time-lag between the launching of a policy meant to increase innovative activity and its impact on innovative performance is much greater than in other cases, for instance policies aimed at macroeconomic improvements. While the impact of the latter can often be observed within months, it may take years for innovation policies to produce the expected results (see for example Gans and Hayes, 2010).

Moreover, it is relatively difficult to measure innovative performance and, consequently, define clear objectives for innovation policies. Many researchers have attempted to achieve a wide consensus on how to assess the innovative performance of companies, sectors and countries, proposing single or composite indicators. Despite some of them being used or cited more frequently than others, there is still no common approach available to analysts and policy makers. On the contrary, in the existing literature, the argument for choosing an indicator usually depends on the type of the study undertaken as well as on convenience considerations (Hagedoorn and Cloudt, 2003).

In the adopted definition of NIS, organisational schemes "influence the development, diffusion and the use of innovations" by facilitating the business of innovation, accelerating the innovation process with targeted support. As markets are not self-efficient (e.g. due to information asymmetries, in particular between principals and agents), "interconnected institutions" are needed to "create, store and transfer the knowledge, skills and artefacts which define new technologies" (Metcalf, 1995, p.38).

Therefore, NIE provides the necessary theoretical framework for analysing the innovation performance of countries. In accordance with the previously mentioned analysis of Aubert (2005) on the obstacles to innovation in developing countries, this research focuses on the (poor) quality of the business environment and on the

actions policy makers can take to improve it on the basis of relevant experiences made elsewhere.

The importance of good governance for innovation performance or innovativeness has been empirically proven in developed countries. As already mentioned, the EC commissioned a study in 2007, whereby innovation indicators and governance indicators for European countries were correlated (Celikel-Esser, 2007). The national indicators on governance were extracted from a series of the World Bank's Governance indicators (i.e. "voice and accountability, political stability and the absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption") (Kaufman, Kraay and Mastruzzi, 2009). Innovation indicators were taken from the EC's European Innovation Scoreboard (EIS) and its Global Innovation Scoreboard (GIS).

The results demonstrate a strong positive correlation between governance and innovativeness in the EU, both from a single country's perspective as well as on the "EU aggregate average" (Celikel-Esser, 2007). Celikel-Esser (2007) points to the need for adding micro-data to this type of analyses: the perspective of principals (i.e. enterprises) on how a country's governance (including the agents) affects their innovativeness, would help in drawing a much clearer picture of innovative performance and the possibilities for its improvement through targeted government action.

In contrast, there is limited empirical research on the relationship between governance and innovativeness in developing countries, the major barrier being the limited availability of data. In recent years, however, the situation has improved and attempts towards exploring the link between innovation and governance in developing countries have been undertaken.

A major empirical study on factors influencing economic development was conducted by Fagerberg and Srholec (2008), with data for 115 countries and 25 indicators. The researchers find the lack of four main "capabilities" detrimental to economic development, namely "innovation system, the quality of governance, the character of the political system and the degree of openness of the economy". Their analysis shows that, out of the four, "innovation systems" and "governance" are

particularly significant for “economic development” (Fagerberg and Srholec, 2008, p.1427). There is however little evidence of the significance of the nature of the political system (success stories of developing countries can be found among nations with very different institutional settings, for example China and India) and of the “openness of the economy”.

The authors find that “although the quality of the innovation system and that of governance represent different aspects of reality [...] there is also a connection between the two” (Fagerberg and Srholec, 2008, p.1423). This link is not further explored by Fagerberg’s and Srholec’s (2008) study, nor has it been explored systematically for developing countries, which represents a major gap in the current body of knowledge surrounding this theme.

In order to be able to relate governance to innovation performance in developing countries, it is necessary to determine the most suitable criteria for measuring the two phenomena. To ensure high validity, not only is it important to look at the relationship between governance and innovativeness at a single point in time, but also to observe its evolution over time. Consistent time series data on governance in developing countries are available from the World Bank’s *Governance Matters* reports⁴⁷. Despite a range of valid criticisms, the World Bank’s composite governance indicators are the most widely used for assessing the quality of public governance (see section 4.5).

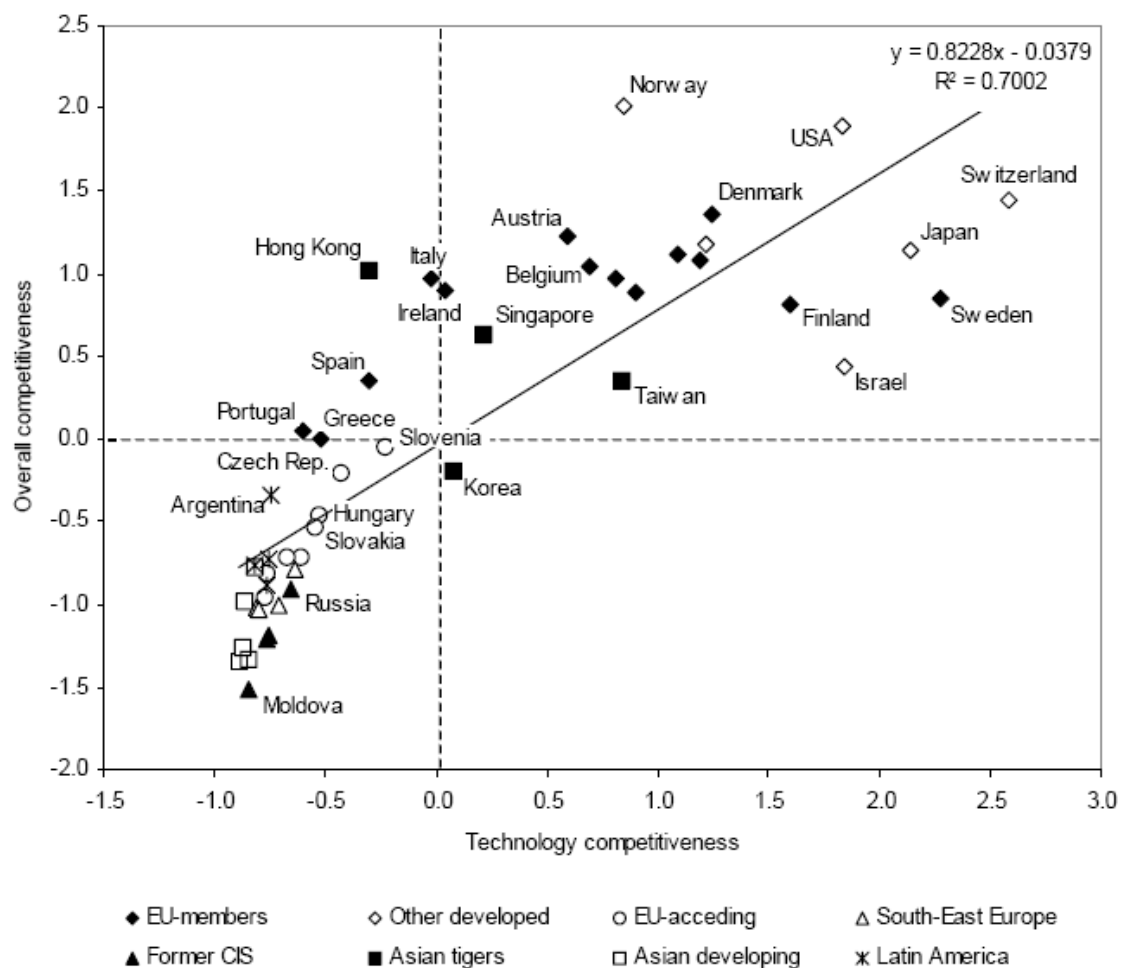
The measurement of innovation performance in developing countries is also not straightforward as the availability of data on innovativeness indicators is limited. Fagerberg, Knell and Srholec (2004), emphasising the close relation of a country’s innovativeness and its competitiveness, point to the difficulties of measuring the former. To increase the reliability of their measurements, the authors use a composite indicator including R&D expenditure (to obtain an overview of resources allocated to innovation), patent statistics (for the information on the “output of

⁴⁷ As used in the above-mentioned study on the link between governance and innovation performance in the EU (Celikel-Esser, 2007).

patentable inventions”) and the “quality of the science base [...] as reflected in articles published in scientific journals” (Fagerberg, Knell and Srholec, 2004, pp.12 and 15-16).

The comparison of the overall competitiveness (measured in GDP per capita) and the technological competitiveness (measured by the above mentioned composite indicator) in 26 countries (developed and developing) between 1993 and 2001 reveals a strong correlation between the two variables as shown in Figure 13, confirming the high significance of innovativeness for economic development⁴⁸ (Fagerberg, Knell and Srholec, 2004, p.12).

Figure 13: Overall and Technology Competitiveness (average levels 1993-2001)



Source: Fagerberg, Knell and Srholec (2004, p.12)

⁴⁸ This finding is confirmed in a more recent econometric analysis by Fagerberg, Srholec and Knell (2007).

The method used by Fagerberg, Knell and Srholec (2004) to assess the technological competitiveness relies on indicators which are particularly difficult to measure in contexts different from those it has been developed for and the authors point out that measuring innovativeness in developing countries is not an easy task.

Therefore, the following sections are dedicated to the evaluation of widely used innovation indicators, outlining their respective advantages and disadvantages and looking at possible ways and (potential) benefits of combining them, as well as three innovation scoring models, to establish their applicability for developing countries.

5.1 Indicators of innovative performance

Hagedoorn and Cloudt (2003) make a distinction between innovative performance in a narrow and a broad sense. The former refers to the companies' "rate of introduction of new products, new process systems or new devices" (Freeman and Soete, 1997 in Hagedoorn and Cloudt, 2003, p.1367), while the latter comprises "all stages from R&D to patenting and new product introduction" (Hagedoorn and Cloudt, 2003, p.1367).

The authors argue that, when adopting the narrow definition, innovative performance could be measured by the number of companies' "new product announcements" (presented in more detail below). The broader definition would, instead, require several indicators, the most common being R&D inputs, patent counts, patent citations as well as new product announcements (Hagedoorn and Cloudt, 2003).

These indicators, according to Freeman and Soete (2009), have been chosen as they are the "easiest to measure" (p.583) but might not address relevant aspects for innovation policy makers. They are presented in the following, reviewing their suitability for the assessment of innovativeness in developing countries.

In the OECD's *Standard Practice for Surveys of Research and Experimental Development* (or Frascati Manual), R&D is defined as "a term covering three activities: basic research, applied research and experimental development" (OECD, 2002, p.30). The amount of private and public spending on R&D as well as the number of employees involved in R&D have become the most extensively used

measures for technological performance and a major input indicator for measuring innovativeness⁴⁹ (see for example Hagedoorn and Cloudt, 2003; Fagerberg, Mowery and Nelson, 2006; Van Pottelsberghe de la Potterie, 2008; Freeman and Soete, 2009).

The rationale behind using **R&D expenditure** as an innovation input indicator is that usually investment in R&D is contributing to the generation of outputs, i.e. patents or new products. Hence, the more R&D is conducted, the more outputs are expected. Therefore, economic actors including national and private entities have been encouraged to invest heavily in R&D, particularly in high-tech sectors (Hagedoorn and Cloudt, 2003).

UNESCO adopts a broader view in their definition of R&D:

- *“Research and development services in natural sciences and engineering; social sciences and humanities and interdisciplinary*
- *Any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications*
- *Includes fundamental research, applied research in such fields as agriculture, medicine, industrial chemistry, and experimental development work leading to new devices, products or processes”* (UNESCO Statistical Yearbook in OECD, 2001b)

There are drawbacks when using R&D spending as an indicator of innovativeness. First, R&D expenditure does not translate necessarily into innovation depending on exogenous and endogenous factors. Hence, the “innovation process” itself is not being addressed when using R&D spending as an indicator for innovative performance (Kleinknecht, Van Montfort and Brouwer, 2002, p.110).

Furthermore, these authors note that it neglects other innovation inputs (e.g. “product design, trial production, market analysis, training of employees, or investment in fixed assets related to innovation”) and innovation in services, as R&D

⁴⁹ However, Freeman and Soete (2009) point out that a range of “supporting activities” that is included in R&D spending statistics is actually outside the scope of the above-presented Frascati definition (Freeman and Soete, 2009, p.586).

expenditure is normally associated with manufacturing (Kleinknecht, Van Montfort and Brouwer, 2002, pp.110-111)⁵⁰.

Still, R&D spending is a popular indicator among policy analysts, its major advantages being its simplicity and the availability of harmonised data for most countries for the past decades, with the possibility to analyse time series over half a century and the ability to differentiate between R&D efforts assigned to products and those assigned to processes (Kleinknecht, Van Montfort and Brouwer, 2002 and Fagerberg, Mowery and Nelson, 2005)⁵¹.

The most common indicator based on R&D expenditure is “R&D intensity”, i.e. “the ratio of R&D expenditure to some measure of output”. The type of output measure depends on the perspective adopted or the level of aggregation of the object of analysis and usually is as follows:

- For a company: “R&D/Sales ratio”
- For an industry: “ratio of business expenditure on R&D (BERD) to total production or value added”
- For a country: “gross expenditure on R&D (GERD) to GDP” (Smith, 2005 in Fagerberg, Mowery and Nelson, 2006, p.155)

These ratios are, for example, used by the OECD to produce country rankings, the improvement of which may be seen as an objective per se by policy makers. This, however, might be misleading as “R&D intensity depends on the industrial mix” and the “aggregate BERD/GDP ratio may simply be an effect of that fact that industrial structures are different across countries” (Smith, 2005 in Fagerberg, Mowery and Nelson, 2006, p.155).

⁵⁰ While large companies within conglomerates carried out major innovation activities in the 1950s and 1960s, meanwhile many SMEs increasingly invest in R&D activities. Unfortunately, they are underrepresented in surveys, as the questionnaires are often complex and time consuming, requiring excessive resources for their completion (Kleinknecht et al., 2002).

⁵¹ Kleinknecht, Van Montfort and Brouwer (2002, p.115) also mention the possibility to analyse “inter-sectoral technology flows”.

Consequently, the authors recommend a major modification of the indicator to include “acquired technology” to assess to what extent it directly supports R&D, possibly altering the picture obtained when looking at direct R&D intensity indicators only: the share of acquired technology in direct R&D increases significantly when moving “from high- to low-technology industries” (Smith, 2005 in Fagerberg, Mowery and Nelson, 2006, pp.156-158).

A limitation when using direct expenditure and intensity as R&D indicators is that many large companies try to reduce the visibility of their R&D activities for their competitors, leading to sectoral accumulation of R&D figures. This hampers innovation research as for measurement purposes sectoral data is needed in an “at least fairly disaggregated” form (Kleinknecht, Van Montfort and Brouwer, 2002, p.111).

Moreover, addressing “regional knowledge spillovers” can be difficult, as R&D activities taking place in sister companies located in different cities or countries are then erroneously attributed to the mother company (Kleinknecht, Van Montfort and Brouwer, 2002, p.112).

These difficulties are exacerbated when collecting R&D data in developing countries as the information provided by companies is generally less transparent than in developed countries (see for example UNESCO Institute for Statistics, 2010). In recent years, R&D investments in developing countries have increased considerably, (e.g. in China, see for example Zhou and Leydesdorff, 2006), however most developing countries do not regularly collect data on R&D.

This causes gaps of sometimes several years in existing time series and, in such cases, particular care must be paid when estimating missing data, especially for comparative purposes. The availability of data depends on (non-) existing institutional mechanisms for their collection and differs greatly among different regions in the world as shown in Table 14 (Gaillard, 2010).

Table 14: Availability of R&D Statistics by Region

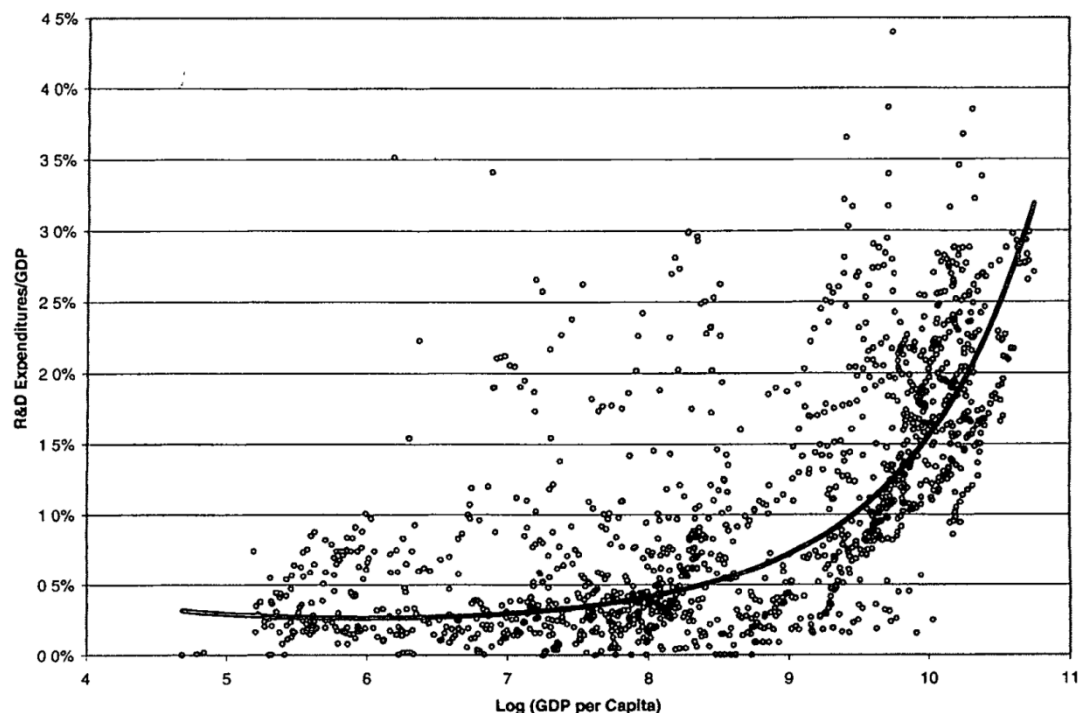
Regions	Countries and territories included	Data published by the UIS	Coverage (%)
Total	216	127	59
<i>Developed countries</i>	59	50	85
Triad (OECD + EU)	43	43	100
Others in Europe	16	7	44
<i>Developing world</i>	156	77	49
In Africa	54	27	50
Sub-Saharan Africa	46	22	48
Arab States in Africa	8	5	63
In Asia	43	26	60
Excluding Arab States	31	23	74
Arab States in Asia	8	5	63
In the Americas	42	22	52
Latin America (RICYT)	23	18	78
Caribbean and territories	19	4	21
In Oceania	17	2	12

Source: UNESCO Institute for Statistics (2004) in Gaillard (2010, p.79).

Lederman and Maloney (2003) note that R&D statistics in developing countries are usually collected for the “productive and non-productive sector” as opposed to the distinction between private and public R&D expenditure in developed countries. The “‘productive sector’ includes both public and private for profit and not-for profit firms while the ‘non-productive sector’ includes R&D financed or undertaken by the executive branch of government” (Lederman and Maloney, 2003, p.5).

Consequently, the authors choose to make use of “aggregate R&D expenditures” to build a data set including both developed and developing countries to analyse the relationship between aggregate R&D expenditures and economic development, measured by GDP per capita (Figure 14).

Figure 14: R&D/GDP and Economic Development



Source: Lederman and Maloney (2003, p.29)

The second most widely used group of indicators of innovative performance is built on **patent statistics**. Fagerberg, Mowery and Nelson (2005, p.158) define a patent as: “a public contract between an inventor and a government that grants time-limited monopoly rights to the applicant for the use of a technical invention”. As in the case of R&D indicators, the popularity of patents (filed nationally or internationally) as a measure of innovative output stems primarily from the availability of large data sets for long time periods (Fagerberg, Mowery and Nelson, 2005). National and regional patent offices as well as the World Intellectual Property Organisation (WIPO) publish consistent and comparable data on a large scale and comprehensive databases support detailed analyses, for example per sector, technical field, inventor or country of origin (Kleinknecht, Van Montfort and Brouwer, 2002, p.112).

Empirical evidence supports the use of patent statistics. Crosby (2000), in his study on the importance of innovation for economic growth in Australia, concludes that “increases in patenting activity lead to increases in both labour productivity and economic growth” (Crosby, 2000, p. 262). He argues that, as opposed to using R&D figures, patent data are clearly directly related to “innovation outputs” and, being

available for longer time periods than R&D data, are more suitable for “time-series analysis” (Crosby, 2000, p.256).

There are, however, important drawbacks in using patent data to measure innovation. First, the rationale for patenting inventions has stretched from the original aim to protect IPR and generate revenues through either commercialisation or licensing: strategic management of patent portfolios include using them for negotiation purposes (e.g. to prevent or support law suits) or even for ‘blocking’ competitors’ in a given field (Cohen, Nelson and Walsh, 2000). Kleinknecht, Van Montfort and Brouwer (2002) also mention the difficulties deriving from the strategic behaviour of companies that apply for patents without the intention to bring a product to the market but rather to stop competitors from owning a technology.

Second, it may take several years for a patent office to process an application from its filing until a final decision on granting the patent is taken and the backlog of most offices is increasing (close to six million pending patent applications worldwide according to WIPO, 2010), which reduces the possibility to properly assess the short term impact of innovation supporting measures on the basis of patenting activity.

Finally, the nature of patents filed in an economy differs considerably in terms of industrial applicability of the patented inventions as well as their contribution to economic growth: some patents may constitute a major breakthrough in a technical field of strategic relevance for a nation’s economy, while others might be only marginally significant. To assess the real impact of patent filings on innovation levels and the resulting contribution to economic growth/development, weights (i.e. values) could be assigned to patents according to the economic sector and their significance for the overall economy. However, Kleinknecht, Van Montfort and Brouwer (2002, p.112) point to the difficulties in classifying patents according to “the relevant industry or product lines”, which would represent an additional burden for analysts and researchers.

In general, there are several qualitative (e.g. one-dimensional, bi-dimensional and multi-dimensional patent portfolio evaluation) and quantitative (cost approach, market approach and income approach) methods to determine a patent’s value (see

for example Breesé and Kaiser, 2004; Anson, 2005; Gassmann and Bader, 2006; Selmanovic, 2008).

The major conclusion from their reviews is that there is no universal, consistent approach that would enable cross-country comparison. The theoretical approaches developed so far are more suitable for firm-internal purposes as they strongly depend on the stage of a particular technology within the technology life cycle (Selmanovic, 2008). As the value of the same patent varies considerably according to the approach selected and a vast effort would be necessary to determine the value of a large amount of patents on a national scale.

Another limitation associated with the use of patent data is that not all inventions are patented and, therefore, covered by patent statistics. This is also true for non-patentable inventions (e.g. software in Europe). Conversely, patented inventions, which were never “commercialised”, should not be considered when measuring innovation, despite contributing to a certain extent to the overall innovativeness of a firm, region or country (Kleinknecht, Van Montfort and Brouwer, 2002, p.112).

Different analysts have conducted empirical studies on companies' propensity to patent. For example, Arundel and Kabla (1998) in Kleinknecht, Van Montfort and Brouwer (2002) note that there are significant differences in the propensity to patent across sectors and these manifest themselves within three major findings:

- small companies are less likely to seek patent protection⁵²;
- companies cooperating with other firms usually have more protected IP than companies, which collaborate less (or not at all), probably to protect own IP prior to initiating cooperation activities;
- high-tech companies account for more patent applications than low-tech firms.

Kleinknecht, Van Montfort and Brouwer (2002) conclude that these might lead to the “underestimation of innovation in low-tech sectors as well as innovation of small

⁵² However, if they do apply for a patent, they usually protect more than one. This seems to be due to the high costs of information on IP protection in the initial phase, but once information is existent, the propensity to patent increases considerably.

firms” and, conversely, to the overestimation of “innovative activity among firms that collaborate on R&D” as well as “the innovation intensity of small-sized patent holders” (Kleinknecht, Van Montfort and Brouwer, 2002, p.113).

Table 15 summarises the major advantages and disadvantages of using patent statistics for measuring innovation output according to the OECD. It is possible to compensate for some of the drawbacks outlined. For example, despite diverging patent systems across countries, a comparison is possible by looking at so-called triadic patents, i.e. patents granted by the European Patent Office (EPO), the Japanese Patent Office (JPO) and the United States Patent and Trademark Office (USPTO) to protect the same invention. However, because of the related costs, in most developing countries triadic patents represent an exception and cannot be widely used for comparing their innovation performance (Kleinknecht, Van Montfort and Brouwer, 2002).

Table 15: Use of patent-statistics for measuring innovation performance

Advantages	Disadvantages
<p>Patents have a close link to invention</p> <p>Patents cover a broad range of technologies on which there are sometimes few other sources of data</p> <p>The contents of patent documents are a rich source of information (on the applicant, inventor, technology category, claims, etc.)</p> <p>Patent data are readily available from patent offices</p>	<p>The value distribution of patents is skewed as many patents have no industrial application (and hence are of little value to society) whereas a few are of substantial value</p> <p>Many inventions are not patented because they are not patentable or inventors may protect the inventions using other methods, such as secrecy, lead time, etc.</p> <p>The propensity to patent differs among countries and industries</p> <p>Differences in patent regulations make it difficult to compare counts across countries</p> <p>Changes in patent law over the years make it difficult to analyse trends over time</p>

Source: adapted from OECD.StatExtracts (January 2011)

Furthermore, as most patent applications contain citations of existing patents (normally in the same technical field), analysing the citations, i.e. how many times a

certain patent has been cited in another patent application, supports the assessment of the “relative importance of patents” (Kleinknecht, Van Montfort and Brouwer, 2002, p.112) for “relevant technologies” (Fagerberg, Mowery and Nelson, 2005, p.159). In this case too, the usability of the indicator is limited for developing countries as the number and quality of backward citations depends on the availability of patent data.

Despite the associated disadvantages of using patent data for deriving statements about the innovative performance of companies or countries, we can conclude that patent data are useful indicators for judging the innovative performance of countries, possibly in combination with other metrics. In this sense, Fagerberg, Mowery and Nelson (2005, p.160) assert that despite several drawbacks,

“[...] the analysis of patent data has proven very fruitful. Important achievements include the mapping of inventive activity over long time periods, assessing the impacts of economic factors on the rate of invention, the elucidation of the complexity of technological knowledge bases in large firms, the use and roles of science in industrial patenting, the mapping of inter-industry technology flows, the analysis of spillovers of knowledge using patent citations and the analysis of patent values”.

For completeness, other innovation performance indicators often mentioned in the literature are presented in the following: new product announcements, total innovation expenditures, the shares of imitative and innovative products in a firm’s total sales, and significant (or basic) innovations (see for example Kleinknecht, Van Montfort and Brouwer, 2002; Hagedoorn and Cloudt, 2003).

In contrast to the above outlined indirect innovation performance indicators (i.e. R&D data and patents), **new product announcements** represent a “direct measure of the market introduction of new products or services” (Kleinknecht, Van Montfort and Brouwer, 2002, p.115). Kleinknecht, Van Montfort and Brouwer (2002) point to the possibility of analysing the information “by type of innovation (e.g. new products, improvements of existing products, product differentiation etc.)” (Kleinknecht, Van Montfort and Brouwer, 2002, p.115) and Coombs, Narandren and Richards (1996) emphasise that information on new product announcements is

publicly available in journals, which simplifies data gathering as the innovating firms do not have to directly participate in the study.

Furthermore, Coombs, Narandren and Richards (1996) point to the timeliness of this literature-based innovation output indicator: the announcement of a new product in a technical journal is usually simultaneous or very close to its availability in the market. At the same time, with this indicator it is possible to address the “regional spread of innovation activity” (as opposed to R&D data for example) and trace “inter-sectoral technology flows” in a simple way (Kleinknecht, Van Montfort and Brouwer, 2002, p.116).

A further advantage of new product announcements is that it includes data on SMEs and Micro enterprises (the backbone of developing economies), often excluded from questionnaire-based surveys due to cost considerations. On the contrary, Coombs, Narandren and Richards (1996, p.405) state that “large firms are underrepresented by this indicator, since they may feel less need to report products in journals”.

Kleinknecht, Van Montfort and Brouwer (2002) argue that the collection of new product announcements data from technical and trade journals can lead to the accumulation of contact details of major innovators in a specific context (e.g. country or sector), useful for related purposes (e.g. interviews or case-studies). Furthermore, provided that journals are available for the relevant time period, product announcements offer the possibility to analyse long-term trends (Kleinknecht, Van Montfort and Brouwer, 2002).

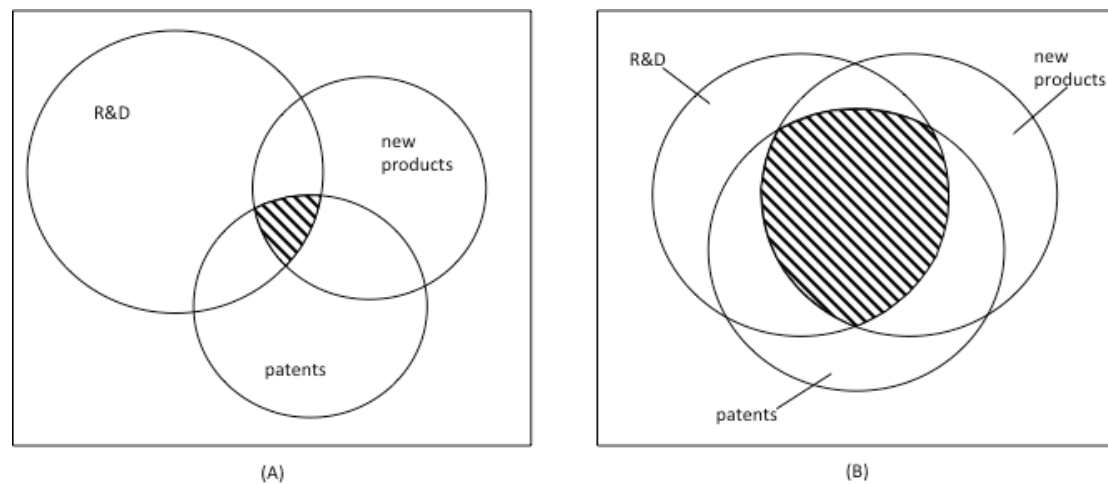
Finally, new product announcements potentially support inter-country comparisons: “If standard classification systems are used, the method can be applied in different countries” (Coombs, Narandren and Richards, 1996, p.405). Kleinknecht, Van Montfort and Brouwer (2002, p.116), however, emphasise that when comparing different countries one is “limited to the comparison of ratios (e.g. the share of small firms, of certain sectors or regions in the total innovation volume)”.

In this case too, there are drawbacks when attempting to measure innovation performance. First, the size of the sample and the choice of journals will largely determine the type and number of innovations found, e.g. excluding certain journals

might lead to the exclusion of important innovations (Kleinknecht, Van Montfort and Brouwer, 2002, p.116). Second, Fagerberg, Mowery and Nelson (2005, p.162) argue that this indicator only covers product innovations and therefore excludes any data on “innovation outputs, which are routine, incremental, part of the normal competitive activity of firms”, i.e. process innovations (see also Coombs, Narandren and Richards, 1996). However, as stressed by Kleinknecht, Van Montfort and Brouwer (2002), the latter can be extracted from “conventional productivity figures”, while “product and service innovations” are the areas with the major “knowledge gaps” and therefore of higher interest to researchers (Kleinknecht, Van Montfort and Brouwer, 2002, p.116).

The three indicators introduced (i.e. R&D expenditures, patent counts and citations and new product announcements) are the most widely studied, either in isolation or in combination. According to Hagedoorn and Cloodt (2003) the appropriateness of using one of those indicators or a combination of them depends on the degree of overlap between R&D, patents and new products in a particular industry: Figure 15 illustrates this relationship for two hypothetical industries.

Figure 15: Relationship between R&D, patents and new products (examples)



Source: Hagedoorn and Cloodt (2003, p.1367)

In their analysis, Hagedoorn and Cloodt (2003) clearly distinguish between inventive, technological and innovative performance. In their definition inventive performance is related to the “achievements of companies in terms of ideas, sketches, models of new devices, products, processes and systems” (Ernst, 2001 and Freeman and Soete, 1997 in Hagedoorn and Cloodt, 2003, p.1366). The authors suggest that inventive

performance is usually assessed by looking at patent counts and citations. Hence, to draw conclusions on the inventiveness of a company/industry/country, it would suffice to study the patent counts and citations of the respective unit of analysis.

Technological performance refers to “the accomplishment of companies with regard to the combination of their R&D input, as an indicator of their research capabilities, and their R&D output in terms of patents” (Hagedoorn and Cloodt, 2003, p.1367).

Finally, as anticipated at the beginning of this section, Hagedoorn and Cloodt (2003) argue that there is a distinction between innovativeness “in the narrow and in the broad sense”. In the first case, new product announcements represent a valuable indicator. Innovativeness in the broad sense comprises “the three previous measures of performance as it indicates the achievement in the trajectory from conception of an idea up to the introduction of an invention into the market” (Ernst, 2001 in Hagedoorn and Cloodt, 2003, p. 1367). Hence, we shall look at all the three indicators presented above (R&D, patents and new product announcements) in order to draw conclusions on innovativeness.

Hagedoorn and Cloodt (2003) empirically test the relationships outlined above using a large-scale survey comprising a sample of 1,200 companies from different countries (mainly the USA, but also Asia and Europe) in four high-tech sectors (i.e. aerospace and defence, computer and office machinery, electronics and pharmaceuticals). They conclude that the degree of overlap between the three indicators in each of the four sectors is so large that it is sufficient to use only one of them to derive conclusions on innovativeness in high-tech sectors, while other innovativeness indicators are needed for non-high-tech sectors.

Kleinknecht, Van Montfort and Brouwer (2002), in their widely cited analysis on the usefulness of different innovation indicators, analyse three additional indicators, namely “total innovation expenditures”, “shares of imitative and innovative products in a firm’s total sales” and “significant (or basic) innovations” (Kleinknecht, Van Montfort and Brouwer, 2002, pp. 113-117). Brouwer and Kleinknecht (1997), by studying innovation expenditures of companies in the Netherlands, find that “R&D budgets are just about one quarter of total product innovation expenditures”.

Consequently, in the first European Community Innovation Survey (CIS), they propose to use **total innovation expenditures** rather than only R&D expenditures. Companies providing services rather than manufactured products record a much higher share of “fixed investment related to [...] innovation”, validating the assumption that using only R&D expenditures as an indicator of innovativeness would neglect a large part of innovativeness in services (Kleinknecht, Van Montfort and Brouwer, 2002, p. 114).

However, the applicability of this indicator is reduced by the very limited data availability, as many firms do not keep track of such expenditures. Consequently, surveys to obtain such figures are likely to result in a low response-rate of participants as experienced by Brouwer and Kleinknecht (1993) or to provide only very “rough estimates” (Kleinknecht, Van Montfort and Brouwer, 2002, p. 114).

The indicator **sales of imitative and innovative products** is also introduced in the CIS. Companies are requested to provide information on the detailed nature of their products for the three past years. They are divided in products that: “remained essentially unchanged, underwent incremental change, were subject to radical change or were introduced entirely new” (Kleinknecht, Van Montfort and Brouwer, 2002, p. 114).

Furthermore, companies are requested to provide information (usually a “rough” estimation) on the share of these product types in their total sales. Despite the fact that the obtainable figures are just estimated, the indicator bears several advantages. First, it allows for including information on “certain types of service innovation”. Second, one can obtain information on whether the new products were “new to the firm” or “new to the firm’s market”. If the product is new to the firm (i.e. it had already been introduced by a competitor), then it can be considered an imitation. Alternatively, when the product is completely new to the market, it is considered an innovation. Finally, this indicator allows for a distinction between “incremental improvements” as opposed to “full innovations” (Kleinknecht, Van Montfort and Brouwer, 2002, p. 114).

As with total innovation expenditures, the sales of imitative and innovative products, when included into a questionnaire, tend to be ignored and response rates are not

high, hindering the drawing of conclusions at national level. At the same time, “inter-sectoral technology flows” are difficult to determine (Kleinknecht, Van Montfort and Brouwer, 2002, p. 115). Furthermore, as sales are often related to the “business cycle” of a product, data should be interpreted with caution: as emphasised by Brouwer and Kleinknecht (1996) in Kleinknecht, Van Montfort and Brouwer (2002), product life-cycles play a major role. Therefore the authors recommend explicitly asking for details when conducting innovation surveys (Kleinknecht, Van Montfort and Brouwer, 2002, p. 115).

A third possible additional indicator can be obtained by the **analysis of significant versus basic innovations**. This indicator requires categorising innovations in a firm/industry/country into those that were a real breakthrough and represented a major technological change and those of a more basic nature (Kleinknecht, Van Montfort and Brouwer, 2002). Specific expertise is needed in order to decide whether the innovation should be considered basic or significant. A major advantage is that data can be obtained without contacting the respective company; however, high costs might be involved as “expert judgment” is needed and “incremental” and “unsuccessful” innovations are not included (Kleinknecht, Van Montfort and Brouwer, 2002, p.117).

The collection of data for these three last indicators has proven challenging in the developed world and its availability in developing countries is likely to be even lower. Additionally, in these contexts it may be difficult to find locally the expertise needed to distinguish between significant and basic innovations, further reducing their applicability. Therefore, despite their potential interest, this research does not make use of any of them for analysing the innovation performance of developing countries.

Having outlined the major innovation performance indicators and their respective advantages and disadvantages, the following sections introduce three widely recognised innovation scoring models, explaining how they are used for comparing the innovation performance of countries. The selected scoring models, all relying on the definitions presented in the OECD’s Oslo Manual (OECD, 2005), are the Innovation Union Scoreboard of the EC, the Economist Intelligence Unit Innovation

Scoreboard and the innovation dimension used in the Global Competitiveness Report of the World Economic Forum.

5.2 Innovation scoring models

The Innovation Union Scoreboard (IUS), developed by the EC as of 2000 and up to 2009 called European Innovation Scoreboard (EIS), provides a comparative analysis of innovation performance across Europe on an annual basis. In addition, it includes an international benchmark against innovation performance in Brazil, China, India, Japan, Russia and USA.

The IUS methodology, based on the definitions provided in Frascati Manual (OECD, 2002), makes use of composite indicators (a large set of related but different indicators) to summarise the innovation performance of Europe across three dimensions “Enablers”, “Firm Activities” and “Outputs”, capturing the entire technical innovation process. The benchmarks against the innovation performance of the reference countries are based on a subset of these indicators (Hollanders and Tarantola, 2011), presented in Table 16.

The IUS 2010 makes use of a revised methodology for calculating innovation scores. The reason is that over the last decade, since the scoreboard’s inception, despite being recognised as a major tool for measuring innovation performance across Europe, a range of criticism has emerged on the underlying methodology (see for example Grupp and Moguee, 2004; Sajeve et al., 2006; Schubert, 2006; Peters, Gottschalk and Rammer, 2007; Schibany and Streicher, 2008 in Hollanders and van Cruysen, 2008; Grupp and Schubert, 2010).

The EIS was mainly criticised for: “not capturing all relevant dimensions of the innovation process, for using improper indicators, for not taking into account structural differences between countries, and for its methodology of summarizing countries’ innovation performance using composite indicators” (Hollanders and van Cruysen, 2008, p. 2). A detailed analysis of all the drawbacks of previous EISs (i.e. 2000-2007) is outside the scope of this research, as most of them have been eliminated leading to an improved methodology for the following years (i.e. 2008-2010).

Table 16: Indicators used for the international comparison in IUS

Main type	Innovation direction / indicator
ENABLERS	1.1 Human Resources
	1.1.1 New doctorate graduates (ISCED 6) per 1000 population aged 25-34
	1.1.2 Percentage population aged 25-64 having completed tertiary education
	1.2 Open, excellent and attractive research systems
	1.2.1 International scientific co-publications per million population
	1.2.2 Scientific publications among the top 10% most cited publication worldwide as % of total scientific publications of the country
	1.3 Finance and support
	1.3.1 Public R&D expenditures as % of GDP
FIRM ACTIVITIES	2.1 Firm Investments
	2.1.1 Business R&D expenditures as % of GDP
	2.2 Linkages & entrepreneurship
	2.2.3 Public-private co-publications per million population
	2.3 Intellectual assets
	2.3.1 Patent Cooperation Treaty (PCT) patent applications per billion GDP (in PPS€)
	2.3.2 PCT patent applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)
OUTPUTS	3.1 Innovators
	3.2 Economic effects
	3.2.2 Medium and high-tech product exports as % of total product exports
	3.2.3 Knowledge-intensive services exports as % of total service exports
	3.2.5 License and patent revenues from abroad as % of GDP

Source: Pro Inno Europe – Inno Metrics (2011, p.15) - *Innovation Union Scoreboard (IUS) 2010*

These critics were taken into account in drafting the EIS methodology for 2008, 2009 and the IUS in 2010, which led to a substantial revision of indicators and dimensions. The main objectives of the revised version of the EIS/IUS include “simplicity”, referring to the quantity of indicators, which is kept at low levels for enhanced manageability; “transparency”, which includes a comprehensive account of methodological approaches and issues; and “continuity”, which refers to the

comparability between the EISs of different years (i.e. those between 2000-2007 and those between 2008-2009).

The revised methodology, despite still using composite indicators to measure innovation performance, incorporates comments from a range of stakeholders within the EU and addresses the identified drawbacks by, for example, extending the relevant dimensions of the innovation process, redefining the respective indicators and better incorporating structural differences of countries in the scores (Hollanders and Tarantola, 2011).

The second innovation scoring model considered for this research was developed by The Economist Intelligence Unit (EIU) and ranks the world's most innovative countries on the basis of two dimensions: "innovation performance", comprising patent data and four other alternative indicators, and "innovation enablers", consisting of two composite indices that measure "direct innovation inputs" and the "innovation environment" (EIU, 2009a).

The problems arising from the usage of patent-based indicators to measure innovation performance have been already addressed above. To overcome the heterogeneity of national patent data for cross-country comparison, the EIU scoring model makes use of triadic patents, i.e. patents "that have been applied for at the EPO, the JPO) and granted by the USPTO to protect the same invention"⁵³ (EIU, 2009b, p.3).

However, triadic patents, despite being useful for international comparisons, represent only a small share of a country's total patents, usually "biased towards high-technology fields", distorting possible conclusions on the innovativeness of a country (EIU, 2009b, p.4). For these reasons the EIU additionally includes "the sum of patents applied for by, or granted to, a country's applicants by regional centres-that is the USPTO, the EPO and the JPO". The difference between the two "measures" is

⁵³ Triadic patents are a special type of patent family, that is, according to the definition of the OECD, "a set of patents taken in various countries to protect a single invention (characterised by a first application in a country – called the priority application – which has been extended to other offices)" (OECD Frascati Manual 2002, p.201).

that the latter requires the patent to be applied for in at least one of the three offices (EIU, 2009b, p.4).

The measure of triadic patents has proved to correlate closely with the other four proxies used for the index, i.e.:

- *“High-technology manufacturing output per head in constant 2000 US\$. The data is for 2006 from Science and Engineering Indicators 2008 published by the US National Science Foundation.*
- *High-technology services output per head in constant 2000 US\$. The data is for 2006 from Science and Engineering Indicators 2008 published by the US National Science Foundation.*
- *Royalty and licence fee receipts as a percentage of GDP. Data are for 2006 from the World Bank’s World Development Indicators 2008.*
- *A survey question from the WEF’s Global Competitiveness Report on “the extent to which companies in 134 countries were adept at, or able to absorb, new technology [...] as well as an additional survey question that asked companies to evaluate the extent to which countries relied on domestic, as opposed to imported, innovation” (EIU, 2009b, p.5).*

“Direct innovation inputs” is the first composite index of the second dimension of the scoring model, namely “innovation enablers”, calculated as the non-weighted average of six indicators (all originating from the Business Environment Ranking (BER), produced annually by the EIU): “R&D as a percentage of GDP; quality of the local research infrastructure; education of the workforce; technical skills of the workforce; quality of IT and communications infrastructure; broadband penetration” (EIU, 2009b, p.5).

The second composite index, the “innovation environment index”, is built according to a complex weighting of 12 single indicators (Table 17). The weights are assigned “on the basis of survey results on the relative importance for innovation of the various factors. [...] The source for all the indicators is the BER, with the exception of popular attitudes toward science, which is taken from the World Values Survey, compiled by a worldwide network of social scientists since 1981” (EIU, 2009b, pp.6-7).

Table 17: Weights for the innovation environment index

Indicator	Weight
Political Stability	0.109
Macroeconomic Stability	0.089
Institutional Framework	0.107
Regulatory Environment	0.108
Tax regime	0.075
Flexibility of labour market	0.072
Openness of national economy to foreign investment	0.083
Ease of hiring foreign nationals	0.069
Openness of national culture to foreign influence	0.063
Popular attitudes towards scientific advancements	0.058
Access to investment finance	0.056
Protection of intellectual property	0.112

Source: EIU (2009b, p.7) - A new ranking of the world's most innovative countries: Notes on methodology.

The highest weights are assigned to IP (0.112), followed by political stability (0.109) and the regulatory and institutional framework (0.108 and 0.107 respectively). In addition, the EIU scoring model provides findings on “Innovation Efficiency” by calculating the ratio between Direct Innovation Inputs and Innovation Performance (i.e. Input/output ratios) for each country (EIU, 2009a, p. 5; EIU, 2009b, p.8).

The last scoring model considered here is the innovation pillar within the Global Competitiveness Report (GCR), published annually by the World Economic Forum (WEF) to measure competitiveness across developed and developing countries. Twelve “pillars” constitute the main body of the GCR, namely “(1) institutions, (2) infrastructure, (3) macroeconomic environment, (4) health and primary education, (5) higher education and training, (6) goods market efficiency, (7) labor market efficiency, (8) financial market development, (9) technological readiness, (10) market size, (11) business sophistication and (12) innovation” (WEF, 2010, pp.4-9).

The innovation pillar is measured by eight sub-indicators, which are based on the “Executive Opinion Survey” conducted by the WEF. The respondents (local business executives) are asked to indicate, on a scale from one to seven, whether the

respective indicator is strong or weak in their country⁵⁴. The sub-indicators include: “Capacity for innovation, quality of scientific research institutions, company spending on R&D, university-industry collaboration in R&D, government procurement of advanced technological products, availability of scientists and engineers, utility patents and intellectual property protection” (WEF, 2010, pp. 488-494).

The sample size for all developing countries is below 100 and very often below 80. However, it is one of the farthest-reaching and most comprehensive indices available for a relatively long period, which enables time-series analysis, as in Celikel-Esser (2007) for the correlation of innovation- and governance indicators in Europe or Sun (2009) for the correlation of innovation- and cultural indices (see section 3.2).

Taking into consideration data availability, the analysis of the innovation performance of Egypt and Morocco is based on the composite index constructed according to the methodology used for the IUS. Still, for some indicators, data are not available at all or for a significant number of occurrences (i.e. countries and/or years).

Consequently, three indicators were abandoned (namely “Business R&D expenditures as % of GDP”, “Public-private co-publications per million population” and “PCT patent applications in societal challenges per billion GDP (in PPS€)”). In a further six cases, the indicators were replaced on the basis of the literature review:

- the indicator “New doctorate graduates (ISCED 6) per 1000 population aged 25-34” by the indicator “Gross enrolment ratio in tertiary education (%)”;
- the indicator “Percentage population aged 25-64 having completed tertiary education” by the indicator “Labour force with tertiary education (% of total)”;
- the indicator “Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country” by the indicator “Scientific and technical journal articles per million population”;

⁵⁴ A detailed description of the questions used for the survey is presented in Appendix V.

- the indicator “Public R&D expenditures as % of GDP” by the indicator “Research & Development expenditure (% of GDP)”;
- the indicator “PCT patent applications per billion GDP (in PPSE)” by the indicator “PCT patent applications per million population”;
- the indicator “Medium and high-tech product exports as % of total product exports” by the indicator “High-technology exports (% of manufactured exports)”.

Table 18: Selected indicators and data sources

Main type	Innovation direction / indicator	Data sources
ENABLERS	1.1 Human Resources	
	1.1.1 Gross enrolment ratio in tertiary education (%)	UNESCO Institute for Statistics
	1.1.2 Labour force with tertiary education (% of total)	International Labour Organisation
	1.2 Open, excellent and attractive research systems	
	1.2.1 International scientific co-publications per million population	Own calculation based on SJR (Scopus) data
	1.2.2 Scientific and technical journal articles per million population	Own calculation based on National Science Foundation and World Bank data
	1.3 Finance and support	
	1.3.1 Research & Development expenditure (% of GDP)	UNESCO Institute for Statistics, MHESRPT (Morocco)
FIRM ACTIVITIES	2.3 Intellectual assets	
	2.3.1 PCT patent applications per million population	Own calculation based on WIPO and World Bank data
OUTPUTS	3.2 Economic effects	
	3.2.2 High-technology exports (% of manufactured exports)	United Nations, COMTRADE database
	3.2.3 Knowledge-intensive services exports (NACE 64, 65, 66, 67, 72, 73) as % of total service exports	World Bank
	3.2.5 License and patent revenues from abroad as % of GDP	World Bank

Source: Author's elaboration

Table 18 summarises the final set of indicators adopted and the corresponding data sources. Because of the different units of measures (e.g. absolute numbers or percentages), indicators are normalised with the “min-max normalisation approach”: the lowest value for a given year of an indicator is subtracted from each country’s value for the same indicator and the result is divided by the difference between the lowest and the highest value. Consequently, the maximum normalised score equals one and the minimum normalised score equals zero.

For each country, linear aggregate values for the nine indicators are computed with equal weights. If one or two consecutive years are missing but previous and following years are available, the values for the missing data points are extrapolated. Else, the index makes use of the data of the previous one or two years, if available, or the data point is marked as not available.

In next section, the relevance of good governance for supporting innovation in developing countries is assessed on the basis of selected performance indicators, providing a preliminary answer to the first research question (i.e.: “what relevance does AE in general, and organisational schemes of the PA in particular, have for supporting innovation in developing countries?”).

5.3 Public governance and innovation performance in developing countries

According to the findings of the literature review, “the degree of effectiveness of a government is anticipated to have a close link to the innovation policy performance” (Celikel-Esser, 2007, p.13). The analysis of the evolution of socio-economic indicators on the basis of the data obtained on inputs (or enablers) and outputs (patents, patent citations, citations of scientific papers in journals) should confirm the positive correlation between good governance and innovation performance for developing countries as well.

As explained above, the reduced availability of data for developing countries does not allow making use of the same indicators and this research has developed a Composite Innovation Index (CII) to compensate for such limitations. On the basis of the chosen variables (i.e. the Government Effectiveness indicator and the CII), the

null hypothesis formulated is that there is no connection between them and that patterns emerge randomly (the p-value is the measure of the likelihood of the null hypothesis). The alternative hypothesis is that good governance has a real impact on innovation in developing countries as well.

In a first instance, the relation is investigated for the lower-middle-income countries, the income group of Egypt and Morocco according to the World Bank definition⁵⁵. Thereby, the Government Effectiveness indicator does not appear to be a valid explanatory variable of the CII: no significant correlation is found between the CII (2011) and the GE indicator (2006 or 2010)⁵⁶, indicating that, for this reference group, a similar level of government effectiveness can not be used to predict comparable innovation capabilities (Table 19, Figures 16 and 17).

Table 19: Linear regression for LMI countries (selected years)

Regression Statistics	GE 2006 – CII 2011	GE 2010 – CII 2011
<i>R</i>	0.11715	0.09973
<i>R Square</i>	0.01372	0.00995
<i>Adjusted R Square</i>	-0.00772	-0.01158
<i>Standard Error</i>	0.13256	0.13282
<i>Total Number Of Cases</i>	48	48

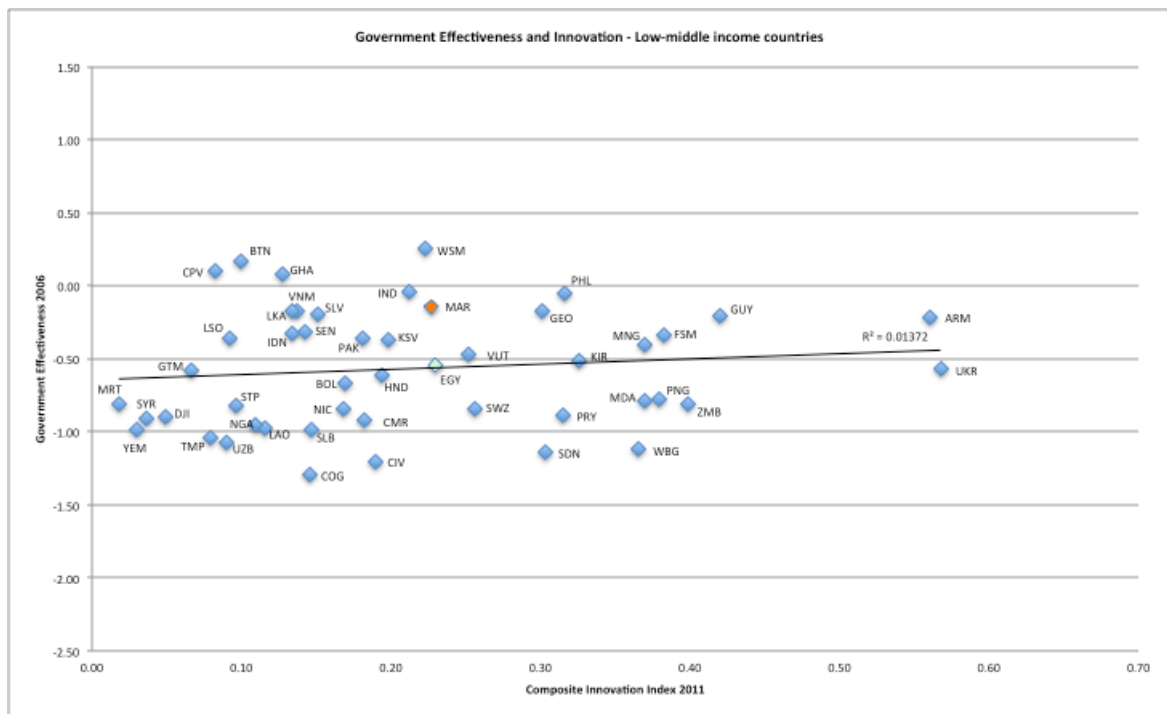
Source: Author

When looking at the relative positioning of the two case studies, Egypt slightly outperforms Morocco according to the CII despite the lower score in the GE indicator both for 2006 and 2010. Both combinations seem to indicate that governance effectiveness may not be relevant for the innovativeness of these countries.

⁵⁵ “Economies are divided according to 2012 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, \$1,035 or less; lower middle income, \$1,036 - \$4,085; upper middle income, \$4,086 - \$12,615; and high income, \$12,616 or more” (World Bank, 2014).

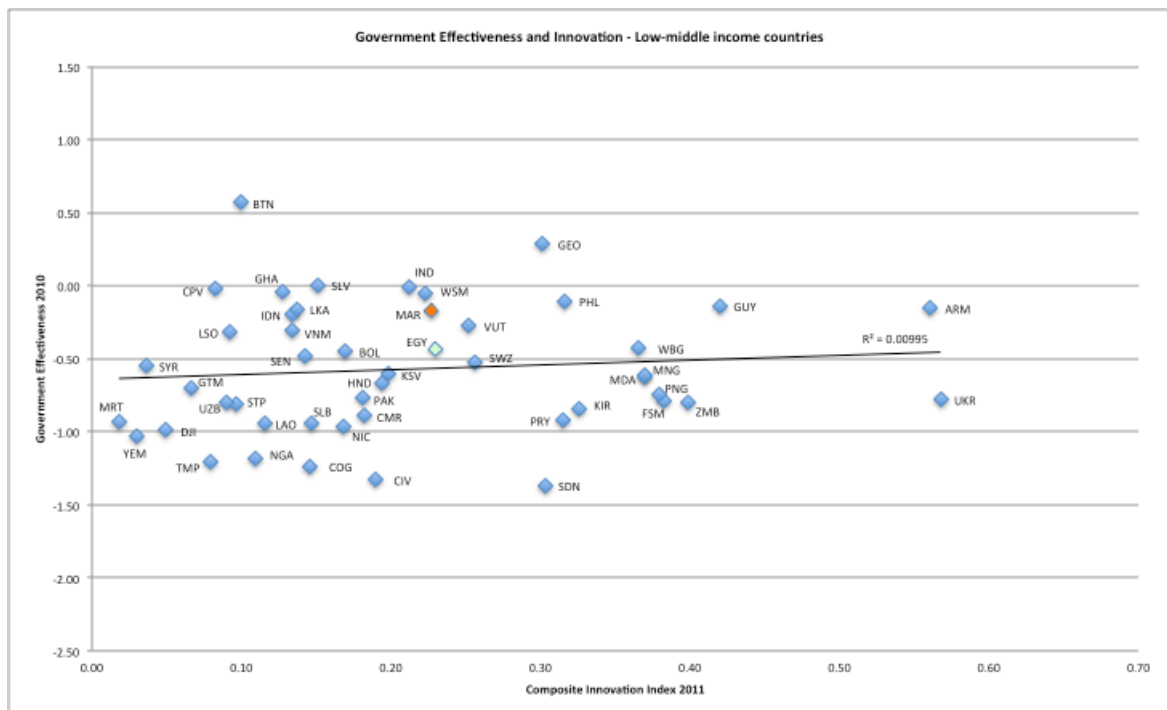
⁵⁶ The two reference years allow for a time-lag of respectively one or five years for policies implemented to become effective.

Figure 16: Low-middle income countries (GE 2006 – CII 2011)



Source: Author

Figure 17 Low-middle income countries (GE 2010 – CII 2011)



Source: Author

The adopted analytical framework prevents us from drawing premature conclusions on the basis of these results. As the Government Effectiveness indicator captures

perceptions, it is intrinsically influenced by the cultural values locally dominant. For example, the individual assessment of the quality of education or of the independence of the public service from political interference follows a personal judgement, which is naturally biased by the norms adopted in the context in which the interviewee lives.

Consequently, the research sample (or statistical population) is re-defined here on the basis of cultural proximity rather than making use of an apparently neutral criterion (i.e. level of income). Not surprisingly, the analysis on the basis of the same indicators for the Muslim world, defined geopolitically as the collection of Muslim-majority countries, indicates a much stronger association, statistically relevant for both years in consideration, within a 0.01 level of significance (Table 20, Figure 18 and Figure 19). The relative positioning of Egypt and Morocco appears also to confirm the adopted working hypothesis as, for the two pairs of years, Morocco outperforms Egypt in both variables⁵⁷.

The analysis of other Muslim countries is outside the scope of this research, nevertheless this representation provides a number of insights: in the Gulf States good governance does not appear to translate in successful innovation, likely as the competitiveness of their economies is based on the adoption of technology developed elsewhere (e.g. for the oil extraction industry).

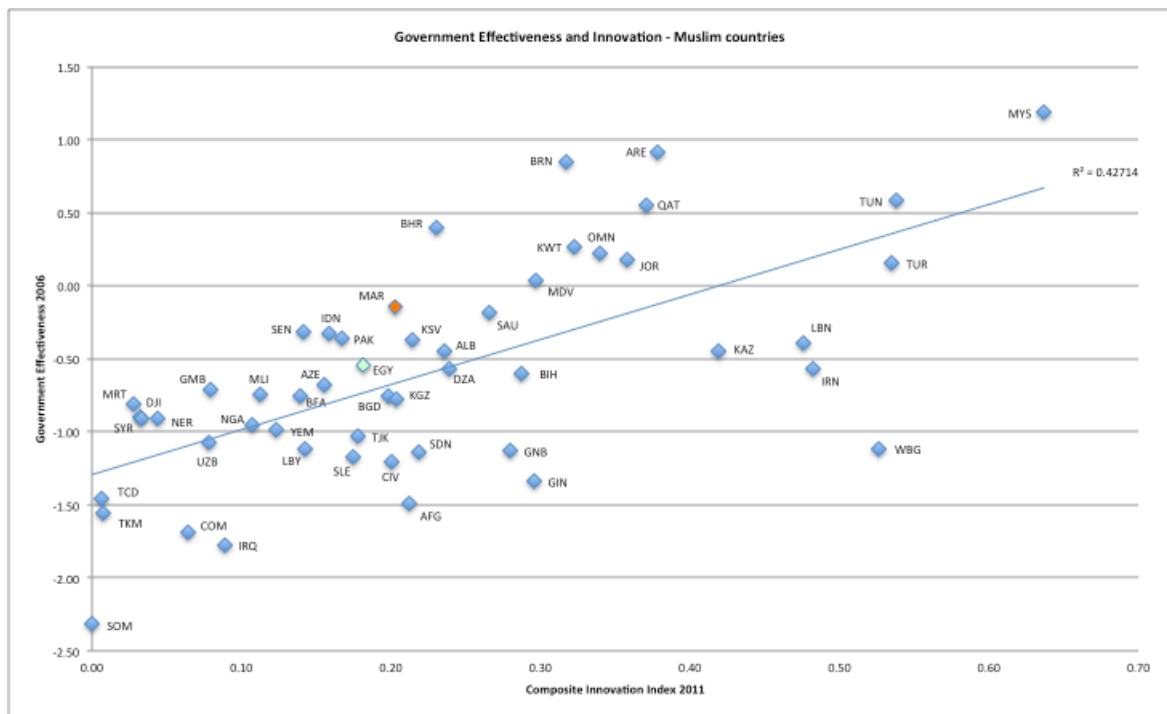
Table 20: Linear regression for Muslim countries (selected years)

Regression Statistics	GE 2006 – CII 2011	GE 2010 – CII 2011
<i>R</i>	0.65356	0.65356
<i>R Square</i>	0.42714	0.42714
<i>Adjusted R Square</i>	0.41545	0.41545
<i>Standard Error</i>	0.11799	0.11799
<i>Total Number Of Cases</i>	51	51

Source: Author

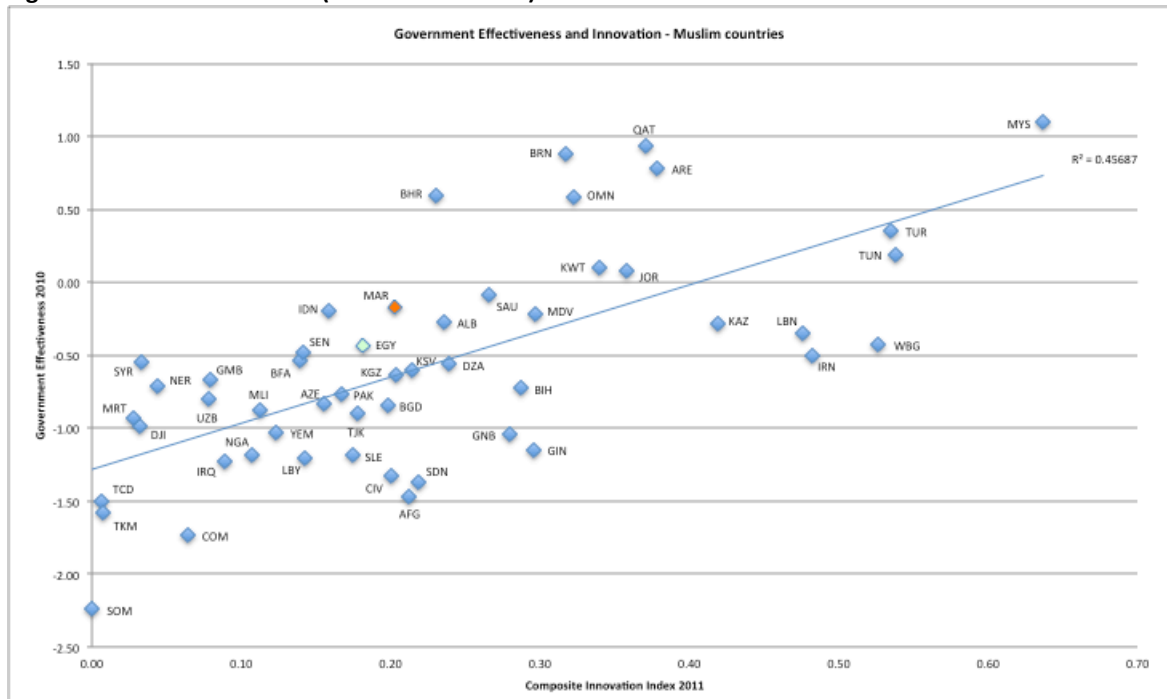
⁵⁷ The different relative positioning of the two case studies when considering Muslim countries only (Figure 19 and 20) rather than all low-middle income countries (Figure 17 and 18) is explained by “min-max normalisation” approach, whereby the value for each sub-indicators of both countries depends on the relative performance of the other countries in the sample.

Figure 18: Muslim countries (GE 2006 - CII 2011)



Source: Author

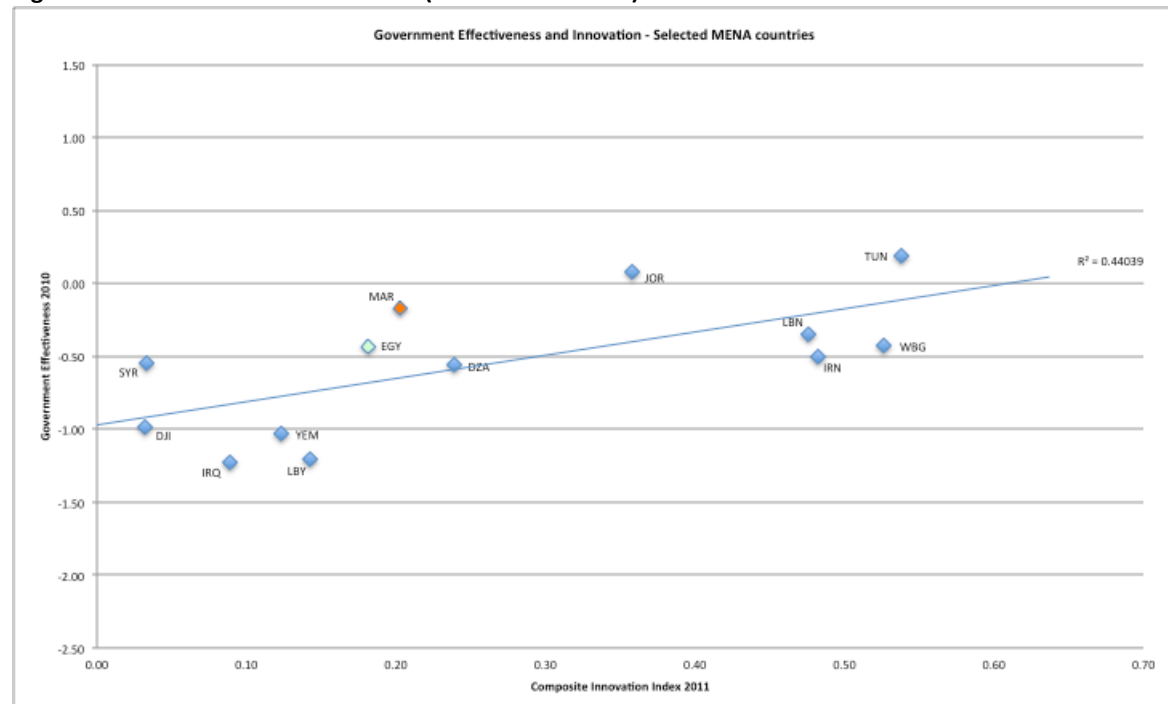
Figure 19: Muslim countries (GE 2010 - CII 2011)



Source: Author

The association is confirmed when reducing the scope of the regression to the MENA countries belonging to the low and low-middle income group (i.e. excluding the Gulf States, see Figure 20). Despite the lower number of occurrences reducing validity, they confirm the previous analysis of all Muslim countries.

Figure 20: selected Muslim countries (GE 2010 - CII 2011)



Source: Author

The evaluation of the two sub-indexes composing the CII (i.e. enablers and outputs) for the same period provides further elements for reflection. Firstly, the results of the regression for the composite index are confirmed for the enablers sub-index. However, the resulting pattern appears quite dissimilar (see Figure 22 and, for comparison, Figure 21).

The relative performance of several countries fluctuates significantly, indicating an inverse variation for the outputs sub-index. In some cases, this is due to the limited availability of data, with the consequently higher relative relevance of the indicators for which figures are available⁵⁸. In general, however, deviations in performance could indicate different outcomes of the government action (e.g. policy definition or

⁵⁸ An example is West Bank and Gaza: in August 2013, as the last data update for this research was performed, for 2011 only tertiary enrolment statistics were available, very likely overrating the country's overall result.

In this chapter, the author has assessed the impact of Government Effectiveness (as a proxy for AE) on the innovation performance of developing countries, measured by a composite index developed in this research for this purpose. The initial results indicate that the relationship is weak if countries are selected simply on the basis of income level. However, if the selection criteria are based on the similarity of institutions, a pattern appears. The results are confirmed if further criteria are then added, for example when looking at countries in the MENA region characterised by low-middle income levels.

Further patterns emerge when looking at the dynamics of the composite index sub-indicators measuring respectively enablers and outputs. Countries more efficient in their innovation processes (i.e. higher output to enablers ratio) show in general higher levels of Government Effectiveness. The analysis of trends support these findings, however they are based on relatively short time series due to the limited availability of the necessary underlying data and should be confirmed in further research.

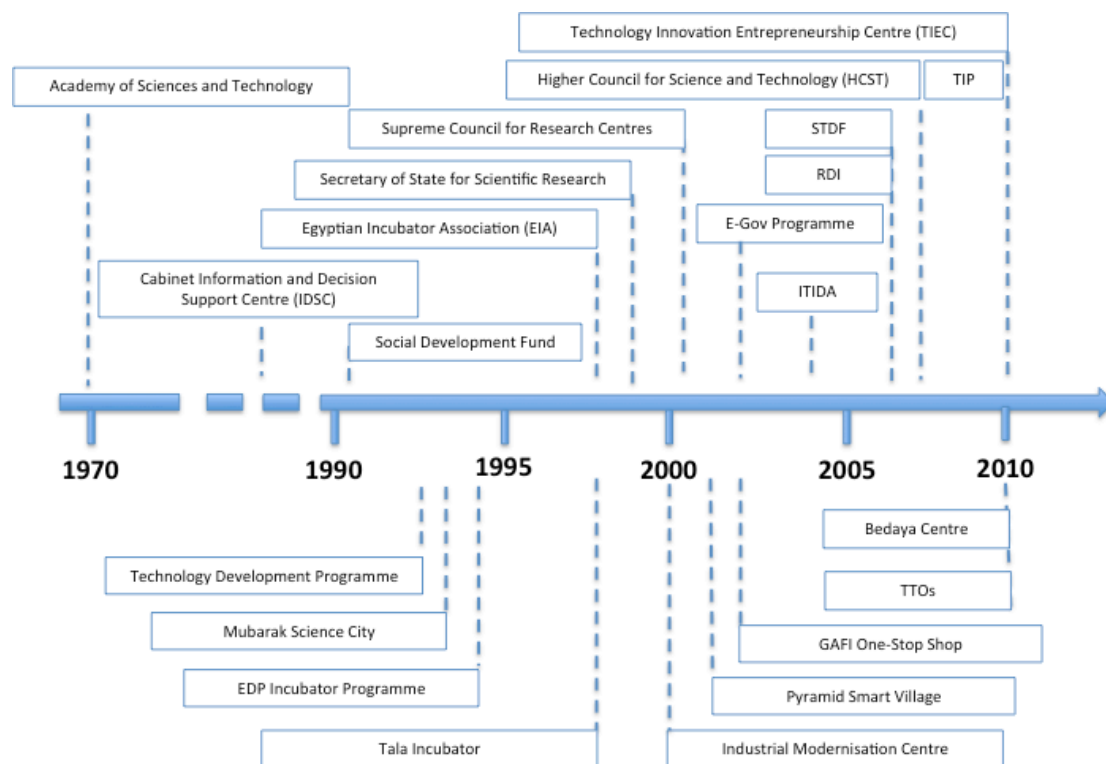
The next two chapters present in detail the NIS of Egypt and Morocco before comparing the effectiveness of selected organisational schemes in Chapter 8. For both countries, the respective chapter will review the AE policies put in place to support innovation, with a focus on organisational schemes.

6 Organisational schemes in the NIS of Egypt

In this section, the main events that have forged the Egyptian NIS are summarised before outlining the country's industrial development strategy. Thereafter, the main actors of the Egyptian NIS are presented in greater detail and qualitatively evaluated on the basis of the interviews.

6.1 The making of the Egyptian NIS

Figure 22: The evolution of the Egyptian NIS (1970-2010)



Source: Author's elaboration, based on Academy of Science and Technology (ASRT), n.d.

Innovation policy development and implementation in Egypt is in a relatively early phase, with most of the initiatives starting in the 1990s and only a few actors already active before (see Figure 22 for the major milestones in the evolution of the Egyptian NIS).

The establishment of the Egyptian NIS started in 1971 with the creation of the **Academy of Scientific Research and Technology (ASRT)**, a non-profit organisation under the Ministry of Scientific Research active in developing strategies for science and technology, overseeing their implementation and conducting impact assessments. Initially, it was also responsible for allocating funds to universities and

research centres; however, following its transformation in 2007 into a think-tank with policy advisory functions to the Science Ministry, ASRT lost this responsibility⁶⁰. Currently, it is the major coordinator of governmental research programmes and has established 15 “specialised scientific councils⁶¹”, which serve as discussion forums and contribute to policy development (Bond et al., 2012, p.17).

The next milestone was the launch in 1985 of the **Information and Decision Support Centre** (IDSC), a think-tank advising the government on a variety of political and socio-economic issues. Managed by the Cabinet of the Prime Minister, its mission is to foster technological development throughout the country, in particular by disseminating modern equipment and building up an IT infrastructure.

In 1993, the IDSC launched the **Technology Development Programme** (TDP). It foresaw inter alia to establish four high-level technology parks in different governorates: the Sinai Technology Valley (envisaged to start its activities in 1996), the Quena Technology Park, the Northern Coast Technology Valley and the **Pyramid Smart Village**, just outside Cairo (Medibtikar, 2006)⁶². Out of the four technology parks, only the latter became operational in 2001 (introduced in section 6.3.3.3). In 1993, independently from TDP, another technology incubator was established in Alexandria, the **Mubarak Science City**⁶³.

Thereafter, the **Social Fund for Development** (SFD), created in 1991 to support the development of small and micro enterprises, initiated the **Entrepreneurship Development Programme** (EDP), implemented via two projects: EDP I and EDP II, respectively in 1994 and in 1996, both funded with 6.1 million Euros. One of the activities that started in 1995 within the scope of EDP I was the implementation of

⁶⁰ Grant-giving functions were transferred to the Science and Technology Development Fund (see section 6.3.3.2)

⁶¹ The specific councils are presented in more detail in section 6.3.1.

⁶² There is no reference to the current state of the TDP in official documents of the Egyptian government or on the website of the IDSC (IDSC, 2013). Therefore, after verification through personal communication with interview participants, this research assumes that the programme has been abandoned or its components have been transferred to other programmes.

⁶³ The website (<http://www.mucsat.sci.eg/citypages/home.aspx>), still online in 2011, is no longer available nor was it possible to arrange an interview.

technology incubators, the first one being the **Tala Business Incubator** in 1998 (Medibtikar, 2006). Meanwhile, the **Egyptian Incubator Association** was established in 1995 as an executive arm of the SFD to assist in the planning and implementation of technology and business incubators in Egypt (Medibtikar, 2006).

Funded by the Egyptian Government, the EU and the private sector, **the Industrial Modernisation Centre (IMC)** followed in 2000 to increase the export competitiveness of Egyptian industries, supporting the modernisation of national companies with a particular focus on training⁶⁴.

In view of the high level of administrative burdens placed on entrepreneurs when starting a business, the **General Authority for Investment (GAFI)** created a one-stop shop for company registration in 2002, considerably facilitating business development and foreign direct investment. This was complemented in the same year by the comprehensive **E-Government Programme** of the **Ministry of State for Administrative Development (MSAD)** with the aim to increase transparency in the public sector by formalising administrative procedures in a first phase and digitalising them thereafter⁶⁵.

In 2004, the **Information Technology Industry Development Agency (ITIDA)** was created to develop the ICT industry in Egypt, initially focusing on job-creation in the areas of business process outsourcing and IT services outsourcing. It then introduced a range of support mechanisms for local ICT firms to hone their local and international competitiveness. In 2008, ITIDA launched the **Technology Incubation Programme (TIP)**, further promoting the sector by incubating highly innovative local ICT companies⁶⁶.

A major milestone was the substantial reform initiated in 2007, which led to “the creation of the **Higher Council for Science and Technology (HCST)** (directly under the Prime Minister), increased funding for S&T [science and technology] and a national

⁶⁴ Interview EO-07; see interview transcript pp.161-168.

⁶⁵ Interview EO-04; see interview transcript pp.149-152

⁶⁶ See section 6.3.3.3.

initiative for human resources development” (Janischewski and Branzk, 2008, p.8, emphasis added). Another important outcome of the reform was the creation of the **Science Technology Development Fund (STDF)** under the **Ministry of Scientific Research**, with the main task of administering and allocating research grants from local authorities or international donors.

The **Research Development and Innovation (RDI) Programme** was introduced in the same year in the framework of the EU-Egypt Innovation Fund to support innovative enterprises in national priority areas, including ICT. Following the successful conclusion of the first phase in 2011, the EU decided to continue its support to the programme with increased funds⁶⁷.

In 2010, ICT incubation activities were transferred from ITIDA to the **Technology Innovation Entrepreneurship Centre**, now involved in a range of innovation support activities for start-ups and SMEs. **Technology Transfer Offices** were opened in four Egyptian universities in the framework of an initiative launched by the American University in Cairo and GAFI launched the **Bedaya Centre for Entrepreneurship and SME Development** to provide financial and consultancy support to local enterprises through a range of initiatives⁶⁸.

Following the revolution in January 2011, most innovation support or research activities abruptly stopped for approximately one year. By April 2012, many responsibilities had been redistributed in a process lacking transparency without a proper assessment of the competencies and the situation was still characterised by conflict and chaos. Nevertheless, activities of entities in charge of innovation support have resumed, though with much less intensity⁶⁹.

6.2 Egyptian Industrial Development Strategy

The **Egyptian Industrial Development Strategy (IDS)** was published in January 2006 defining the goal of becoming “the leading industrial power in the Middle East and

⁶⁷ see section 6.3.3.2.

⁶⁸ introduced in sections 6.3.3.3 and 6.3.3.4.

⁶⁹ Interview EO-10a; see interview transcript pp.180-190.

North Africa by the year 2050” (Ministry of Trade and Industry (MTI), 2006, p.1). Accordingly, Egypt should achieve by 2025 the status of “a leading industrializing nation in the MENA region in terms of industrial performance as well as a main export hub for medium-technology manufactured products” (MTI, 2006, p.3). The implementation foresaw three phases with corresponding objectives:

- Phase one (short-term): increase exports and employment
- Phase two (medium-term): increase industrial efficiency
- Phase three (long-term): building innovation capacity (MTI, 2006, p.2)

These high-level objectives were cascaded down in operational objectives along “three major axes” for action:

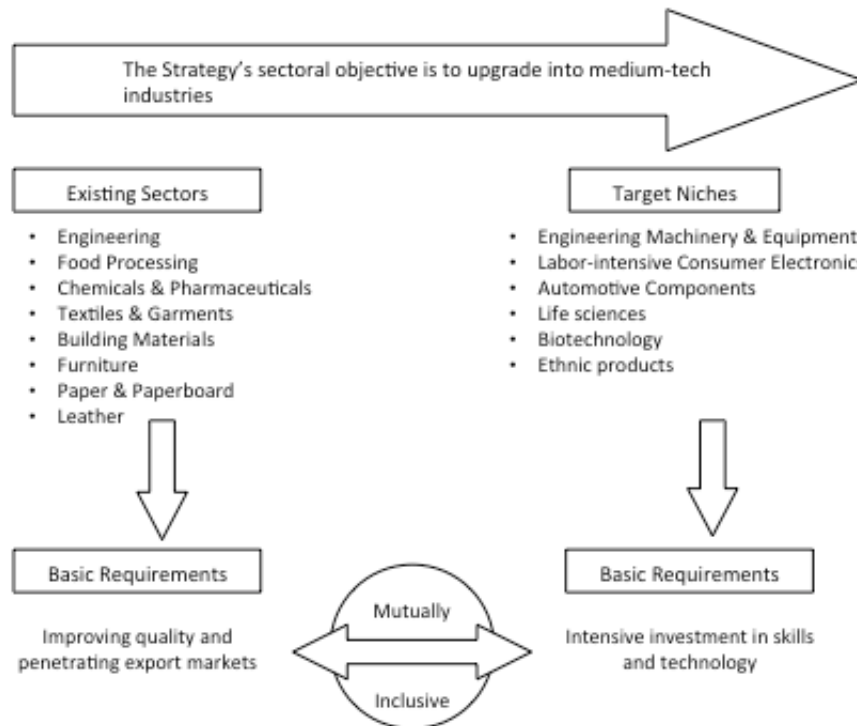
- *“achieving higher growth in industrial production through an aggressive utilization of export development and FDI attraction where both are vehicles for deepening Egypt’s regional and global integration drive;*
- *effecting a leapfrog in industrial productivity through a carefully-designed set of policies and programs aiming at leveraging industrial competitiveness; and*
- *achieving a gradual shift in the industrial structure from resource-based and low-tech activities to medium- and high-tech industries” (MTI, 2006, p.3).*

The IDS focused on a number of economic sectors, either established ones or target niches with great potential, and their “basic requirements” (Figure 23). The high-level objective of transforming industries from “resource-based and low-technology” to at least “medium-tech” was reflected in the following sub-objectives: “improving quality and penetrating export markets” for existing sectors and “intensive investment in skills and technology” for niche sectors (MTI, 2006, p.10).

To address them, in its industrial policy the MTI defined three building blocks (Figure 24): building domestic capabilities, explicitly mentioning the NIS; strengthening the links to global markets by promoting FDI and developing export capabilities; and

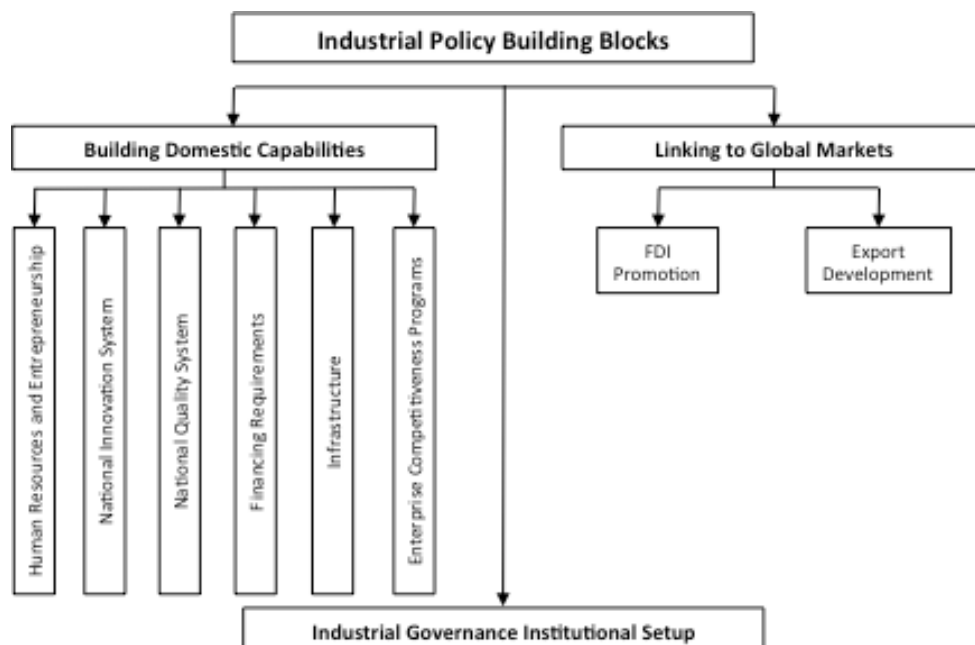
improving relevant institutions by enhancing “the presence of a set of social values conducive to the desired development⁷⁰” (MTI, 2006, pp.10-11).

Figure 23: Sectors targeted by the IDS



Source: MTI (2006, p.10)

Figure 24: Industrial Policy Building Blocks



Source: MTI, 2006, p.11

⁷⁰ This approach is in line with the NIS model adopted (see section 4.1).

6.3 The NIS of Egypt

In this section, the main actors of the Egyptian NIS are presented according to the approach introduced in section 3.1. Table 21 summarises those particularly relevant for the purpose of this research.

Table 21: Selected actors of Egyptian NIS

Layer 2: High-level political Institutions
<ul style="list-style-type: none"> • Higher Council for Science and Technology • Academy of Scientific Research & Technology • Information and Decision Support Centre
Layer 3: Formal Institutions (operational level)
<ul style="list-style-type: none"> • Ministry of Higher Education and Ministry of State of Scientific Research • Ministry of Communications and Information Technology • Ministry of State for Administrative Development • Other Ministries
Layer 4: Organisational schemes supporting Innovation
<ul style="list-style-type: none"> • Governance (schemes providing or supporting a regulatory framework) <ul style="list-style-type: none"> ○ The Egyptian Patent Office • Funding (schemes offering or promoting financial support) <ul style="list-style-type: none"> ○ Social Fund for Development ○ Science Technology Development Fund ○ Research Development and Innovation Programme ○ Technology Development Fund • Infrastructure (schemes offering technological infrastructure or means for its development) <ul style="list-style-type: none"> ○ Technology Innovation and Entrepreneurship Centre • Capacity building (schemes promoting awareness, knowledge exchange and positioning of R&D outputs) <ul style="list-style-type: none"> ○ Industrial Modernisation Centre ○ General Authority for Investment ○ Egyptian Center for Intellectual Property and Information Technology ○ Misr El Kheir ○ Nahdet El Mahrousa • Information Technology Industry Development Agency

Source: Author's elaboration on the basis of desk research and interviews with actors in the NIS in Egypt

6.3.1 High-level Political Institutions

The **Higher Council for Science and Technology**⁷¹ is the highest-level think-tank and policy advisor to the government. Members are “eight key ministers responsible for higher education, trade and industry, electricity and energy, health, agriculture, planning, communications, and international relations” in addition to “non-governmental experts (including expatriate scientists)”. It was established on the basis of similar practices in Japan and South Korea (Bond et al. 2012, p.21).

HCST has developed a national priority plan for Egypt, not publicly available, which focuses on the following priority areas for research: “new and renewable energies, water resources, life sciences (especially medical in the area of the hepatitis C virus), food and agriculture, space technology, [...] social sciences and humanities in general, [...] urban planning and housing, and industrial development in general”⁷².

The **Academy of Scientific Research & Technology** was established by Presidential Decree No. 2405 of September 1971 as the national body responsible for science and technology policy in Egypt, initially attached to the Prime Minister. Having changed affiliation several times, since 1986 it is chaired by the Minister of State for Scientific Research, who is “the official spokesman for ASRT towards political and legislative authorities” (InterAcademy Panel, n.d.).

Since 1998⁷³, ASRT has been an independent public authority with the vision “to be effective and reliable national think-tank for the service of Science, Technology and Innovation (STI) in Egypt, as the main pillar of knowledge-based economy” (ASRT, n.d., p.4). Accordingly, its mission is “to create an enabling and stimulating environment, to maximize the outcomes of STI, through promotion, coordination, assessment, encouragement and appreciation of excellence in STI” (ASRT, n.d., p.4).

⁷¹ Following the start of the revolution in January 2011 the council stopped its activities and had not met since (status May 2012). It was not functional at the time the interviews in Egypt took place (March 2012).

⁷² Interview EE-09; see interview transcript, p. 176.

⁷³ Following the Presidential Decree No. 377.

ASRT is the major coordinator of governmental research programmes and has established 15 “specialised scientific councils”⁷⁴, which serve as discussion forums, facilitate contacts between industry and research centres and contribute to policy development (Bond et al., 2012, p.17). A council:

“... encourages research projects leading to new end products, new production lines, introduction of starting materials of Egyptian origin and environmentally friendly products and processes. Projects are announced and peer reviewed. Projects should have feasibility and market studies and the outcomes of the results are applied in an industry that took place at the inception of the project” (Saleh et al., 2005 p.6.).

In addition, ASRT has established five **Regional Development Centres**⁷⁵, support structures in charge of implementing its policies in the areas of basic and applied research, technology transfer and science and technology studies throughout the country. Furthermore, ASRT is supported by additional structures, namely “virtual research consortia and networks, TV channel, monthly scientific magazine for public, national committees, scientific societies, patent office”⁷⁶, and regional office for ethics and national network for information” (ASRT, n.d., p.5).

Helolnabeokolna (“Solutions with our Mind”) is a programme run in cooperation between ARST and the foundation Misr El-Kheir⁷⁷. Accepted projects are funded with up to 250,000 EGP⁷⁸ and the ARST industrial design unit “helps them to promote their idea and to put it in a format that is easy to [...] become a product that people are interested in selling into markets”⁷⁹.

⁷⁴ These are: “basic and applied research, engineering, health, food and agriculture, environment, energy, industry, space, ITC, water, economy, humanities, ethics, culture and strategic planning” (ASRT, n.d., pp.6-7).

⁷⁵ These are: Delta Regional Research Centre, Tanta; New Valley Regional Development Centre, Al Kharga City; Suez Canal Regional Development Centre, Ismailia; Zagazig Regional Development Centre, Sharqia; South Upper Egypt Regional Development Centre, Sohag” (ASRT, n.d., p.24).

⁷⁶ The Egyptian Patent Office is introduced below (see 6.3.3.1).

⁷⁷ see section 6.3.3.4.

⁷⁸ one EGP = 0.14 USD (as of 29/01/2014).

⁷⁹ Interview EO-10a; see interview transcript, p.200.

ASRT assesses the impact of its initiatives by measuring “scientific development and the publication rate, the international publication rate, the impact factors, [and] the number of patents”⁸⁰ and conducts a comprehensive bi-annual survey on innovation capabilities of Egyptian firms⁸¹.

Despite their wide range, there was very limited awareness of the initiatives of ASRT and its support structures among the interviewees from the private sector. This could possibly be attributed to the fact that most interviewed companies operate in the ICT sector and are targeted by specific innovation support programmes of the Ministry of Communications and Information Technology (MCIT) and its agencies⁸². In this context, one company stated:

“the Academy of Scientific Research and Technology do interesting programs and support, but when they design these programs, they do it on their own and they don't involve the community [...] the programs of the Academy of Scientific Research are not very good compared to ITIDA in publicising their services or reaching the community”⁸³.

However, according to Saleh (n.d.), the Head of the Innovation Management Unit of the RDI Programme, the Academy is involved in innovation support programmes, such as: the **Innovation Investment initiative** (Triple I) launched in 2010 with a budget of three million Euros, the “2012-2015 Strategy to establish TTOs in all Egyptian Universities” and the “Genius Initiative” (Saleh, n.d.).

One interviewee from a body funding innovative projects collaborating closely with ASRT explicitly mentioned Triple I:

“[...] an initiative in the Ministry of Scientific Research, called the Triple I, [...] is based on innovative products that are released by researchers. Then we try to help them to move into the market. [...] The net result of these projects usually produce revenue and 80 per cent of that revenue usually goes back to the

⁸⁰ Interview EO-09; see interview transcript, p.177.

⁸¹ Interview EO-10a; see interview transcript, pp.180-190

⁸² see section 6.3.2.2.

⁸³ Interview EO-04; see interview transcript, p.25.

Institute and 20 per cent of the revenue goes back to the Ministry, so that we can repeat it in the same cycle again”⁸⁴.

The respondent also referred to the Egypt Genius Initiative, about to be launched in 2012:

“We are going to start this program now; it is not yet in place. We are going to make a selection of one to two prominent ideas that are economically feasible and cannot be only on the national scale, but also on the international scale. We will support as long as it will take to implement this idea in the markets”⁸⁵.

The **Information and Decision Support Centre** is a think-tank advising the government on a variety of political and socio-economic issues. The broad areas of research and consultancy work include: economy and economic policies, energy and environment, society and culture, population, global trends, social policies and services, and politics. The IDSC publishes periodicals on a regular basis, conducts opinion polls in relation to the themes outlined above and organises different events including “seminars, conferences, workshops and training programs” (IDSC, 2011).

In 1993, IDSC launched the **Technology Development Programme** “to accelerate technological development by using state-of-the-art IT and to build up the national infrastructure” (Hahn and Meier zu Koecker, 2008, p.7), developing a “research-based science and technology infrastructure” (i.e. high-quality academic centres and research institutes) in cooperation with universities, governmental bodies and industry. For this purpose, IDSC established in the same year the **Information Technology Institute**⁸⁶ to offer graduates courses on software development (IDSC, 2011).

⁸⁴ Interview EO-10a; see interview transcript, p.200.

⁸⁵ Interview EO-10a; see interview transcript, p.200.

⁸⁶ As of 2005 under the auspices of MCIT.

6.3.2 Political institutions for policy development and implementation

6.3.2.1 Ministry of Higher Education and Ministry of State for Scientific Research

In their paper on “Innovation Policy Trends in Selected Countries”, Janischewski and Branzk (2008) considered the Ministry of Higher Education and Scientific Research (MHESR) the most important actor in shaping the Egyptian innovation landscape. Despite mechanisms to ensure independence of research institutions, the NIS in Egypt is “highly centralised and dominated by the public sector with R&D happening mostly in state-run universities and research centres supervised by the Ministry of Higher Education and Scientific Research” (Bond et al., 2012, p.17). As the main stakeholder in the area of research policy and strategy, it led the reorganisation and harmonisation of Egyptian research centres operating under different ministries as shown in Table 22 (Bond et al., 2012).

Three supreme councils formed the executive branches of the MHESR: the **Supreme Council for Scientific Research Centres and Institutes**, coordinating the work between the research institutes associated with the ministry; the **Supreme Council for Coordination between Research Centres in the Different Ministries**, coordinating the work within all research centres independently of the associated ministry; and the **Supreme Council for Universities**, responsible for higher education policy development and implementation (e.g. harmonising the academic activities in public and private universities) as well as promoting and funding scientific research within Egypt’s public universities (Bond et al., 2012).

Furthermore, the MHESR oversaw and coordinated the work of other administrative bodies in the area of higher education such as the Central Administration of Al-Azhar religious institutes and the National Authority for Quality Assurance and Accreditation of Education, “an independent agency charged with developing quality assurance and accreditation standards for various educational levels” (Bond et al., 2012, p.20).

Table 22: Scientists in Egyptian government research centres

Ministry	Research Centre	Total
Scientific research	Central Metallurgical Research and Development Institute	166
	Egyptian Petroleum Research Institute	343
	Electronic Research Institute	217
	City of Scientific Research and Technology Applications	129
	National Authority for Remote Sensing and Space Sciences	89
	National Institute of Oceanography and Fisheries	425
	National Institutes of Standard	196
	National Research Center	4002
	National Research Institute of Astronomy and Geophysics	252
	Research Institute of Ophthalmology	249
	Theodor Bilharz Research Institute	403
Agriculture	Agricultural Research Center	6000
	Desert Research Center	630
Communications	National Institute of Telecommunications	60
Education	National Center for Educational Research and Development	140
Electricity and Energy	National Center for Radiation Technology and Research	400
	National Center for Nuclear Safety and Radiation Control	265
	Nuclear Materials Authority	278
Health	Center for Applied Research and Field	20
	Research Institute of Medical Insects	32
	National Organisation for Drug Control and research	346
	National institute of Nutrition	96
	Center for Dental Research	45
Housing	Housing and building National Research Center	264
	New and renewable energy Authority	171
Industry	Tabin Institute for Metallurgical Studies	21
Water Resources	National Water Research Center	1017
Total		16256

Source: adapted from Bond et al. (2012, p.19)

Recently⁸⁷, MHESR has been split into the Ministry of Higher Education (MOHE) and the Ministry of Scientific Research (MOSR). According to the information collected by the researcher in interviews, there have already been in the past several

⁸⁷ As of the installment of the first cabinet of Egyptian Prime Minister Hesham Qandil (02/08/2012).

reorganisations within cabinets and ministries leading to a repeated separation and unification of the two bodies.

6.3.2.2 Ministry of Communications and Information Technology

The MCIT complements the activities of MOHE and MOSR in the area of technological advancement and innovation support. Mainly concerned with R&D in the ICT sector, MCIT drafted the ICT Strategy 2007-2010 as well as the Research and Innovation Strategic Plan 2007-2010. The former focused on developing fundamentals, such as enhancing the ICT capacity as well as increasing exports and FDI in the ICT sector. Objectives of the latter included the setting up of ‘excellence centres’ and “increasing the number of innovative start-up companies in the sector” (Janischewski and Branzk, 2008, p.9).

Building upon the ICT Strategy 2007-2010, the Technology Innovation and Entrepreneurship Strategy 2011-2014 places more emphasis on strengthening innovation in Egypt by pursuing the following goals:

- *“Enabling ICT companies to become established, to operate and to innovate in Egypt.*
- *Enticing foreign and local ICT companies to generate, enrich and expand on innovative ideas.*
- *Building Egypt’s brand as a regional hub for innovation.*
- *Engaging diverse stakeholders in the task of generating financing, supporting and deploying ICT-related innovation” (TIEC, 2011, p.4).*

To achieve these goals, 13 initiatives, all focusing on direct or indirect support to innovation and entrepreneurship (see Appendix XV), are planned between 2011 and 2014, structured in three layers determining the priority of the corresponding programs of activities (i.e. “Establishing the foundation of innovation and entrepreneurship in Egypt”, “Empowering businesses” and “Recognizing innovation and entrepreneurship”).

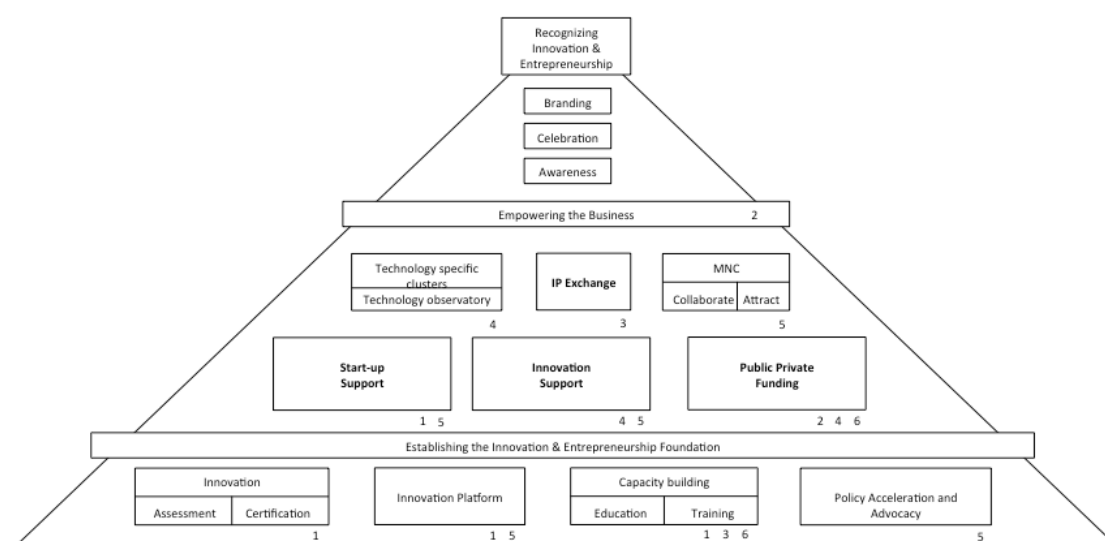
Each initiative directly supports one or more strategic pillars representing an integral part of the adopted strategic framework:

1. *“Stimulating a culture of innovation at the national and firm level*

2. *Branding Egypt's ICT sector as well as celebrating innovation and entrepreneurship*
3. *Facilitating intellectual property management and enabling the exchange of intellectual property*
4. *Establishing innovation clusters and offering common infrastructure*
5. *Creating a business environment that facilitates innovation and entrepreneurship practices*
6. *Capitalizing on improving resources"* (TIEC, 2011, pp.49-53).

Figure 26, linking layers, pillars and initiatives, provides a visualisation of this rather complex strategic framework (TIEC, 2011, p.58). Initiatives two, five, six and nine⁸⁸ deal with the provision of improved innovation support services to economic actors in terms of an improved interaction with PA. Coherently, they strongly relate to pillars three and five.

Figure 25: MCIT strategic framework



Source: TIEC (2011)

Innovation support offered to ICT companies (mainly SMEs) by MCIT via its agencies, programmes and awards includes incubation services⁸⁹ (e.g. space, equipment,

⁸⁸ Namely "Egypt's ICT innovation and entrepreneurship platform", "Start-up support"; "Innovation support for businesses" and "Intellectual property exchange" (TIEC, 2011).

⁸⁹ The Ministry was the first entity in Egypt to provide incubation services to innovative start-ups in the ICT sector within the technology park Smart Village (see 6.3.3.3).

coaching and networking), funding, consultancy and training in the area of marketing, innovation management, and human resource management⁹⁰.

Most interviewed participants from the ICT sector were very much aware of MCIT's programmes and initiatives. A senior manager from a private innovation consultancy expressed a minor criticism of the MCIT, pointing out that responses to requests of ICT companies are at times not provided in a timely manner and that funding of projects, once awarded, is often delayed⁹¹.

Nevertheless, several companies had been assisted by the ministry or its executing agencies and highly praised their effectiveness. Referring to MCIT's flexible approach towards implementing and managing innovation support activities in the ICT sector, a former senior official in charge of incubation commented:

*"Until just before the revolution, we used to be called the heaven of the government. [...] We were more tolerant to rectify whatever was taking place in a timely manner, more responsive to the needs. [...] Just after the revolution things are turning upside down. You cannot really judge on things right now, but I would be optimistic if I said that we are doing 10 per cent of what we were doing earlier"*⁹².

6.3.2.3 Ministry of State for Administrative Development

The mission of MSAD is to increase effectiveness and efficiency of the Egyptian PA, enhancing the quality of services it provides. Four major programmes have been implemented to this purpose, entailing a range of projects for administrative reform: institutional development, government services development, state resource planning and development and establishing and integrating national databases (MSAD, n.d.).

Objectives and programmes are coherently presented in its Administrative Development Framework 2010-2012 (see Appendix XVI). The agenda for administrative reform is clustered around two main axes, each with an overall

⁹⁰ See Interviews EO-02a, EO-06, EE-07, EO-05a, EE-05, EE-17 and EE-18.

⁹¹ Interview EO-05a, see interview transcript, pp.114-119.

⁹² Interview EO-06; see interview transcript, p.159.

objective and several related action points: **Institutional development** and **Government services development** (MSAD, n.d.).

The latter is particularly relevant in the context of this research. The corresponding department is responsible for administrative simplification, mainly addressed through its E-Government programme launched in 2002 to tackle several deficiencies of the Egyptian PA: “a lack of documentation of processes”, a missing “service level for delivering services”, unsuitable “working environments [...] for employees and service providers” and “a lack of transparency towards service providers and service receivers”⁹³.

Through its activities, the Government Services Department does not directly deliver improved services to citizens or businesses but provides the relevant bodies (mainly ministries) with the necessary tools to implement them. In addition to hardware equipment for infrastructure development and expertise in the area of “multi-channel delivery for services, like Internet, mobile phones, [and] call centres”, the range of contributions offered to other governmental entities for the modernisation of services includes financial backing⁹⁴.

In 2004, the portal Bawaba (www.egypt.gov.eg) was launched in association with a range of governmental entities to offer their services on-line to businesses and citizens. Today the portal provides “more than 200 e-services” and “700 informational services”, the latter detailing administrative procedures, including steps, locations, timelines and documentation to be completed and submitted⁹⁵.

Furthermore, MSAD supports GAFI in developing and improving its services for business facilitation and development. According to a senior official of MSAD:

“All the services offered by GAFI have been developed by us. They are all meant to support businesses and they can tell you more about it. We studied the processes at GAFI, identified the problems they had and started preparing the

⁹³ Interview EO-04; see interview transcript, p.149.

⁹⁴ Interview EO-04; see interview transcript, p.150.

⁹⁵ Interview EO-04; see interview transcript, p.149.

one-stop shop with them for business registrations to start a company and getting work licenses”⁹⁶.

When asked about the contribution of business representatives in designing and implementing policies, the respondent replied:

“Here at our ministry, we first try to do what we studied and what we know and to implement it. Thereafter we ask our customers, the citizens and businesses, what they think about it. If they have any comment, we can add it and adapt our systems [...]”⁹⁷.

MSAD searches for good practices from other countries before developing and implementing new initiatives. For example, in the design phase for the portal Bawaba, the project evaluated the government portals of the UK and of several countries in the Arab region, whereby it became apparent that Egypt enjoyed an early-mover advantage and was in the position to offer support and advice to other Arab countries. At the time as the interview took place, MSAD was participating in a “peer-review” exercise with Mexico and the UK⁹⁸.

The major challenge in implementing administrative simplification measures is that most services are associated with laws and decrees, which need to be adapted when the former are revised, and the majority of processes underlying them are not properly documented. Many public servants define their own processes, usually complicated and lengthy, without following any formal manual of procedures: these processes may not conform to the law but are nevertheless institutionalised, merely because of their regular application⁹⁹.

To prepare for a systematic reduction of these administrative burdens, MSAD is “trying to document all of the processes in the government and to put standards for the processes and also standards for delivering services, for example [according to] Service Level Agreements” and clearly defining “roles and responsibilities of both

⁹⁶ Interview EO-04; see interview transcript, p.150.

⁹⁷ Interview EO-04; see interview transcript, p.150.

⁹⁸ Interview EO-04; see interview transcript, p.151.

⁹⁹ Interview EO-04; see interview transcript, pp.149-152.

parties, the service provider and the service receiver”. Unfortunately, the heterogeneity of the situations in the Egyptian PA requires MSAD to define specific measures for each entity, which is extremely time consuming¹⁰⁰.

6.3.2.4 Other Ministries

Janischewski and Branzk (2008) emphasise the role of the **Ministry of Trade and Industry** in Egypt’s NIS, in particular through the **Industrial Development Agency** (IDA), its executing body established in 2005 to contribute to industrial policy development and implementation, manage and develop industrial zones, conduct and disseminate industrial development studies and propose legislative reforms in relation to industrial development¹⁰¹ (IDA, n.d.). Furthermore, MTI is concerned with increasing inward FDI in Egypt, emphasising the importance of developing technologies locally, and encouraging industrial exports. To this purpose, it offers a range of courses on export development through its Foreign Trade Training Centres (FTTC) (MTI, 2008; FTTC, 2007).

As direct innovation support activities for the ICT sector are under the responsibility of MCIT, MTI mainly focuses on the other industrial sectors. However, MTI manages a key institution dealing with innovation policy implementation in Egypt, the **Industrial Modernisation Centre**, which has in its portfolio also innovation support activities for the ICT sector¹⁰².

During desk research conducted prior to the field trip to Egypt, the role of the **Ministry of Finance** (MOF) and its **SME Development Unit** seemed relevant. However, according to a former senior official of the unit, its role in assisting innovative SMEs is “very minimal” in comparison to other financial entities like the Central Bank of Egypt (e.g. with the exemption from the 14 per cent reserves requirement for banks lending to SMEs or with the creation of Nilex, providing SMEs

¹⁰⁰ Interview EO-04; see interview transcript, p.152.

¹⁰¹ The agency provides 18 electronic forms via its website that mainly relate to the development of industrial projects and the associated procedures (IDA, 2006).

¹⁰² see 9.3.3.4

easier access to capital), the Egyptian Financial Supervisory Authority (e.g. its financial leasing to reduce investment costs when starting a new activity (EFSA, n.d.)) or the Social Development Fund¹⁰³.

The interviewee claimed to have tried to promote work on SME related issues when working for the MOF in the SME development unit and, following the analysis of a similar practice in Malaysia, proposed without success the creation of an inter-ministerial council “to synchronise on a very high level”: “people in the MOF do not really see their role related to SMEs”, concluding that the “SME development unit” is “just a name, but it is not really working” as “[...] it is really dormant and does not add value”¹⁰⁴.

6.3.3 Organisational schemes supporting innovation

6.3.3.1 Schemes providing or supporting a regulatory framework

One of the ASRT main support structures is the **Egyptian Patent Office**¹⁰⁵ (EGYPO), the mandate of which includes registering of applications for and granting of patents, provision of legal support to inventors in the area of IPRs and publishing of legal, technical and general information on patents¹⁰⁶ (EGYPO, 2013). Following the signing of the TRIPS agreement, in 1995 patent protection was extended to inventions in the pharmaceutical, chemical and agricultural fields and new IPRs were added (i.e. utility model, layout design and integrated circuits).

Since 2012, following the agreement between ARST and WIPO, EGYPO is International Searching Authority and International Preliminary Examining Authority under PCT, serving the goal of becoming the reference patent office in the Arabic world (WIPO, n.d.). To support this strategic objective, EGYPO continuously improves the services offered via its Internet presence, e.g. offering on-line access to the

¹⁰³ Interview EO-08; see interview transcript, p.169.

¹⁰⁴ Interview EO-08; see interview transcript, p.169.

¹⁰⁵ Established by the law 132 in 1951, EGYPO is attached to ASRT since 1971.

¹⁰⁶ In addition to publishing a monthly gazette with basic patent statistics, the EGYPO offers through its website online access to its own patent database and those of WIPO and EPO (EGYPO, 2013).

patent literature databases of WIPO and EPO in addition to its own collection (EGYPO, 2013). Furthermore, EGYPO provides face-to-face and distance learning courses on IP matters in collaboration with the Academy of the WIPO to make “people understanding what IP is through our Patent Office”¹⁰⁷.

Comprehensive online services were not available and patent data could only be obtained by physically visiting the office and paying for it (STDF, 2012). This criticism, now addressed with improved online services, is reflected in a comment of a participant in charge of technology transfer in an Egyptian academic institution:

“we [the technology transfer office] are now looking at prior art search on patents and unfortunately someone has to go all the way down to the patent office to ask for a copy of a patent”¹⁰⁸.

More fundamentally, several participants expressed rather negative judgements on the lack of technical and legal expertise among EGYPO’s staff members and Egyptian patent attorneys and, worryingly, the usefulness of their services:

“Obviously the patent office is dealing with the files that are handed in, but it is at the same time an impediment for innovation”, the major reason being a lack of legal expertise in the area of IPRs¹⁰⁹.

“We need to raise the capacity of the examiners at the patent office, they are not that good. [...] For example if you hire someone in the Egyptian patent office, he should first have a science degree and then take the Masters degree on IP before he joins [...]”¹¹⁰.

“[...] we badly need very efficient lawyers in Egypt, which have a very good background in the area of engineering, software and computer science. [...] It could increase the number of our patents a lot if we had trained people”¹¹¹.

“The problem that we have with the patent office here is that they do not know who patents what and where. They do not have comprehensive statistics. [...]

¹⁰⁷ Interview EO-10a; see interview transcript, p.201.

¹⁰⁸ Interview EO-01; see interview transcript, p.111.

¹⁰⁹ Interview EO-01; see interview transcript, p.111.

¹¹⁰ Interview EO-05b; see interview transcript, p.122.

¹¹¹ Interview EE-05; see interview transcript, p.34.

Not too many companies patent in Egypt. You have to keep your secrets. Nobody should be able to get it”¹¹².

Even a participant from a funding agency working closely with ASRT observes that:

“Many of the companies, even if they are working in R&D and produce a very brilliant idea or a very innovative product, they tend to stay away from the patent office. It is not expensive, but the way it works and the evaluation is not really effective. So the companies would rather keep it as a secret, an industrial secret or a Copyright or start commercialising straight away, rather than going into patenting and licensing”¹¹³.

On a positive note, one interviewee praises the examiners who “got training courses” and “know how to search patent databases” and underlines the improvements:

“[even though] sometimes their website is down, [...] the efficiency of the patent office has been increased to a great extent. [...] The paperwork was very complicated at the beginning and it's getting easier and easier. Finally it is user friendly and they [...] give you a CD with all the instructions” and “they now explain to you what it means to have intellectual property and [...] how to write the legal claims of the patent”¹¹⁴.

6.3.3.2 Schemes focusing on funding

The **Social Fund for Development** provides financial and non-financial assistance to small- and micro enterprises¹¹⁵. It is funded by the Egyptian government with support from international partners including the Arab Fund for Social and Economic Development, the Kuwait Fund for Arab Economic Development, the EU and the UNDP. Its mission is to increase employment as well as living and working conditions of the Egyptian population, particularly those less well off (SFD, 2011). Accordingly, its mandate is to “(i) reduce poverty by supporting community-level initiatives, (ii)

¹¹² Interview EE-01; see interview transcript, p.11.

¹¹³ Interview EO-10a; see interview transcript, p.189.

¹¹⁴ Interview EE-08; see interview transcript, p.45.

¹¹⁵ Defined respectively as companies employing less than 50 and less than 10 workers (IMC, 2010; El Hilaly, 2012).

increase employment opportunities, and (iii) encourage small-enterprise development” (Abou-Ali et al. 2009, p.2).

The SFD operates in all governorates through 31 regional offices via four main programs: “Community Development” (mainly in the areas of health and education), “Public Works” (addressing issues around potable water, sanitation, infrastructure and the environment), “Microcredit” (loans) and “Small Enterprises” (loans and technical assistance) (SFD, 2011; Abou-Ali et al., 2009). Most of the regional offices operate one-stop shops for company registration, providing services for business licenses, paying taxes and access to finance, thereby assisting members of the poorest communities to formalise their business activities (SFD, 2011).

Abou-Ali et al. (2009) evaluate comprehensively the achievements in the areas of community development and microcredit: “as a source of funding for projects, which are implemented by other agencies”, by 2008 the fund had distributed 11.4 billion EGP (2.5 billion USD, 0.15 per cent of GDP) to develop small businesses (62 per cent of total expenditure), provide microcredit to individuals (9 per cent of total expenditure) and source infrastructure development projects (28 per cent of total expenditure). In their estimation, approximately one third of the Egyptian population did benefit to some extent from these initiatives “in the sense that they live in villages or wards where there is at least one SFD intervention” (Abou-Ali et al., 2009, p.2).

Finally, SFD was the first entity to offer **incubation services** in Egypt, starting with the **Entrepreneurship Development Programme**, implemented via two phases: EDP I in 1994, directly managed by the SFD, and EDP II in 1996, managed by the Small Enterprise Development Organisation, an organisation operating under the umbrella of SFD. Planned and actual durations were respectively 18 and 48 months for EDP I and 36 and 86 months EDP II¹¹⁶.

¹¹⁶ The investments for each project totalled 6.1 million Euros and the ex-post evaluation resulted in an “overall slightly insufficient degree of developmental effectiveness” marking from the German Development Bank (KFW Entwicklungsbank, 2005).

One of the activities within the scope of EDP I was the implementation of technology incubators, the first one being the **Tala Business Incubator** in 1998 (Medibtikar, 2006). Meanwhile, the **Egyptian Incubator Association** was established in 1995 as the SFD executive arm to assist in the planning and implementation of business incubators (Medibtikar, 2006), currently seven distributed in different governorates¹¹⁷.

Only a few participants were aware of SFD as an innovation support mechanism for innovation and entrepreneurship. A former incubation manager from ITIDA stated:

“The Social Fund for Development is much older than the Ministry of Communications and Information Technology. [...] They are finding some challenges in making it pick up. At that time, in 2008, there were these two so-called incubation programs, [one from] the Social Fund for Development (very low profile) and the famous one was [from] the Ministry of Communications and Information Technology”¹¹⁸.

The only private sector participant aware of the SFD activities did not relate them to innovation support but rather to provision of micro-financing: “There is the SDF, which is micro-finance, but as [...] very low-interest loan [...] aimed at what we call an entrepreneur by necessity, not for innovative businesses”¹¹⁹.

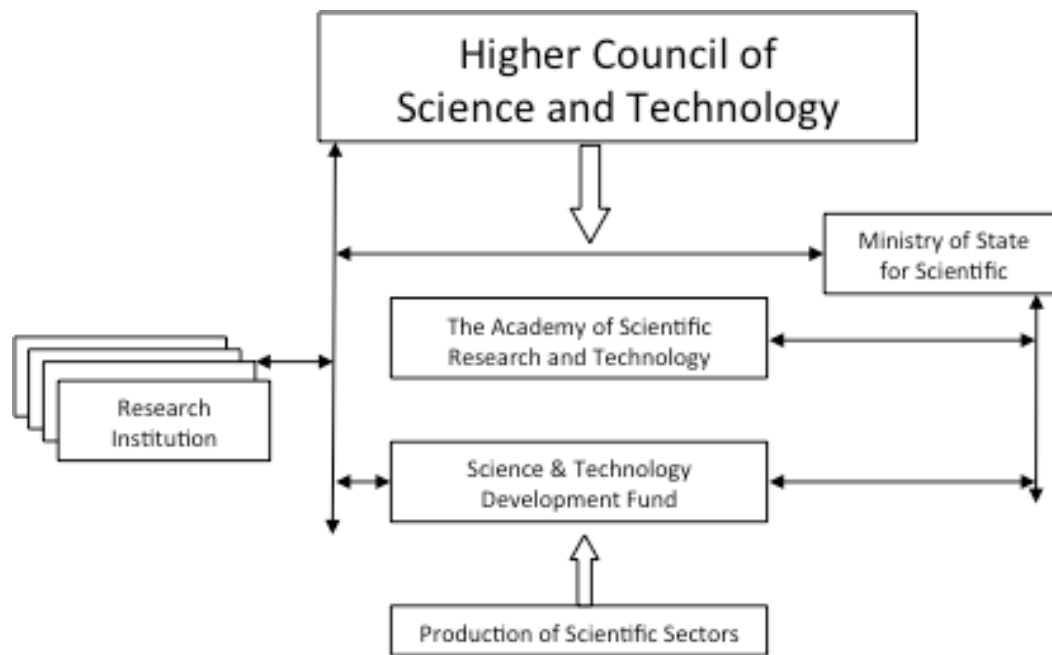
In 2006 the mechanisms for public funding were restructured on the basis of a study that evaluated existing science and technology support structures in Egypt and abroad. The proposed changes in governance and management, in particular on policy development and funding, led to the transfer of most “grant-giving functions” from ASRT to the **Science and Technology Development Fund**, formally established together with the HCST in 2007 by the presidential decrees No. 217 and 218 (STDF, 2010, p.3) (Figure 26).

¹¹⁷ see section 6.3.3.3.

¹¹⁸ Interview EO-06; see interview transcript, p.156.

¹¹⁹ Interview EE-17; see interview transcript, p.90.

Figure 26: Governance and Management for Science and Technology in Egypt



Source: STDF (2010, p.3)

STDF offers grants for innovative activities across sectors via innovation funding programmes like:

- the “Basic and Applied Research Grants” (one million Egyptian Pounds (EGP) over three years) for any researchers wishing to conduct “innovative and competitive research” in any disciplines;
- the “Young Researchers Grants” (750,000 EGP over three years) for researchers aged under 40 and in possession of a PhD degree not older than 10 years as well as at least two high-quality journal publications in their subject area;
- the “Reintegration Grants” (1.5 million EGP over three years) for researchers not more than 40 years old who have completed their PhD degree at a reputable foreign university and wish to return to Egypt to continue their research (STDF, 2013).

Private foreign higher education institutions are not eligible to apply¹²⁰. A professor of the American University in Cairo (AUC) comments that: “[...] we are Egyptian

¹²⁰ Interview EO-05b and EO-05c; see interview transcripts, pp.120-134.

professors and students working on Egyptian problems. Even if we are working in a foreign institute, but we are working on a national problem, I think we should also receive funds”¹²¹.

In addition, the STDF provides a range of grants in collaboration with international partners from France, Germany, Italy, Japan and the USA (STDF, 2013).

Currently the STDF funds over 500 projects in the area of basic and applied research, focusing on capacity building by providing training and equipment for academia and other research centres¹²².

The selection committee for the obtained proposals is usually composed of three well-known and reputable scientists from different Egyptian institutions. Depending on the nature of the project, eight to 10 reviewers might be consulted and their work is being re-reviewed by a technical committee of STDF staff. The review process usually takes between six and eight months and in some cases proposals are sent back to applicants for modification and the process can then take up to one year¹²³. The technical committee of STDF constantly monitors each project and upon completion, a member of the evaluation team that approved the project is asked to assess its outcome¹²⁴.

Asked about the concrete activities of STDF, a senior official of the fund replied that the main task is to fund the complete cycle of innovation, from basic research to applied research, prototyping and, potentially, product development:

“In the end of the cycle we [should] take the prototype and try to transform it into a real product. I do not think that we will ever be able to do that, because this is outside our financial capabilities. It is very important to have the industry going into that. I think the way to do that is that the Ministry of Investment and the General Authority for Investment should be doing this part of the cycle”¹²⁵.

¹²¹ Interview EO-05c; see interview transcript, p.124.

¹²² Interview EO-09; see interview transcript, pp.173-179.

¹²³ Interview EO-09; see interview transcript, pp.173-179.

¹²⁴ Interview EO-09; see interview transcript, pp.173-179.

¹²⁵ Interview EO-09; see interview transcript, p.173.

This dilemma is reflected in the statements of two senior managers:

“The STDF would be happy to do research and publish a few papers. So you just have to develop things, it is not within their scope that you have to have a product that is marketable”¹²⁶.

“There is the Science Technology Development Fund (STDF), but it is more research oriented rather than industrial”¹²⁷.

According to a senior executive of the STDF, funding of product development is a “grey area”, as it presumes a close cooperation between academia and industry. The problem is that the STDF is not allowed to grant funds to industrial entities, but only to academia and public research centres¹²⁸. For this reason, in several projects it cooperates with IMC, a funding body in charge of supporting the industrial modernisation of Egyptian industries and firms¹²⁹.

In collaboration with the IMC, STDF run the programme “**Professor for every factory**”, whereby an academic was meant to spend one year in a company to identify problems and recommend solutions. The overall goal was to encourage public-private partnerships, promoting technology transfer and R&D in industry, mitigating the lack of TTOs as well as of firm-internal R&D departments. In general the number of Egyptian enterprises with effective R&D departments is relatively low, limiting the uptake of TTOs, which should interact with them¹³⁰.

Since its creation, no impact assessment has been conducted in terms of the socio-economic effects of the projects funded by STDF. When asked, a STDF senior official justified it with its relatively short existence and the interruption of activities

¹²⁶ Interview EE-14; see interview transcript, pp.72-73.

¹²⁷ Interview EE-17; see interview transcript, p.90.

¹²⁸ Interview EO-09; see interview transcript, pp.173-179.

¹²⁹ See section 6.3.3.4.

¹³⁰ Interview EO-09; see interview transcript, pp.173-179. In future the STDF aims at becoming more involved in the setup of TTOs and industrial R&D departments.

following the revolution. A rigorous impact assessment of STDF activities and funded projects is however envisaged for the future¹³¹.

Proposals for STDF projects from academia considerably outnumbered those from industry (respectively 70 and two). A cause of the low interest of industry is how the programme was communicated: the main channel was the STDF's website, mainly followed by researchers from academia who are the main target group of the fund's grants. Consequently, the programme is being revised in collaboration with IMC to increase awareness in industry¹³².

Nine out of the 19 private sector participants were aware of the activities of STDF. Three senior managers were part-time lecturers and had research roles at academic institutions, explaining their familiarity with research funding¹³³. Another senior manager was previously a senior executive at the STDF¹³⁴, while a fifth interviewee used to be a board member of the fund¹³⁵.

Only three companies without direct links to the academic world or STDF had applied for a grant and, interestingly, each of them had a substantially different experience: one had not yet received a response¹³⁶, the second considered the application process very bureaucratic and time-consuming¹³⁷ and only the third considered the process efficient and transparent¹³⁸.

Funding is distributed in instalments according to progress reports submitted by the beneficiary and assessed by six or seven independent reviewers. On the basis of their comments, STDF either approves the progress report and proceeds with transferring the next instalment, requests changes or adaptations to be implemented, or

¹³¹ Interview EO-09; see interview transcript, pp.173-179.

¹³² Interview EO-09; see interview transcript, pp.173-179.

¹³³ See Interviews EE-05, EE-14 and EE-17.

¹³⁴ Interview EE-10; see interview transcript, pp.51-56.

¹³⁵ Interview EE-04; see interview transcript, pp.21-29.

¹³⁶ Interview EE-09; see interview transcript, pp.47-50.

¹³⁷ Interview EE-15; see interview transcript, pp.75-81.

¹³⁸ Interview EE-08; see interview transcript, pp.42-46.

terminates the support if progress is entirely unsatisfactory. Having received the first instalment, the second company experienced severe delays in obtaining feedback on its progress report and the financial support was terminated at that stage. The representative of the beneficiary was evidently disappointed and stated that: “STDF had several problems. They had a change of management many times. Sometimes the people revising the products are not very specialised in it. [...] It takes a very long time”¹³⁹.

The point of view of the third company is completely different: the fund is “[...] very understandable, the guide for applicants is very clear and the criteria are very transparent”¹⁴⁰. Contrary to the statement of the previous company, the evaluation of applications for grants is perceived efficient and reviewers are considered competent and neutral. The interviewee concluded that without the funding obtained from STDF, the company would have had to terminate innovation activities and most probably run out of business¹⁴¹. The reasons for experiences so diverse could be multiple and their analysis is outside the scope of this research. However, this diversity suggests that the limited number of applications from industry may not be simply due to a communication deficit.

On the ownership of the IPRs deriving from the funded projects, in the perception of a senior manager, the STDF “is directed towards individual scholars, because it states that it will own 80 or 85 per cent of the IP. That doesn't encourage us as a company [...] if I am given a fund to implement something on what I have spent 20 years of research”. The interviewee applied for funding and met an STDF executive to discuss the issue surrounding IP. Despite the STDF executive offering to equally divide IP ownership between the company and the fund, in consideration of all past

¹³⁹ Interview EE-15, see interview transcript; p.78.

¹⁴⁰ Interview EE-08, see interview transcript; p.46.

¹⁴¹ Interview EE-08, see interview transcript; pp.42-46.

investments the senior manager preferred to retain full IP ownership and abandoned the application¹⁴².

However, a former STDF executive's comment indicates how unlikely a revision of the fund's IP ownership policy is:

“According to the Egyptian patent law, the Science and Technology Development Fund retains intellectual property. [...] The owner of the intellectual property is the source of funding. [...] We decided that Egypt is small; we need a centre place and cannot just leave it to the universities at this point in time”¹⁴³.

The **Research Development and Innovation Programme** promotes innovation and entrepreneurship in privately owned SMEs. It is managed by MOSR and funded with 11 million Euros by Europe AID via the EU-Egypt Innovation Fund. The first round between 2007 and mid 2011 focused on three areas: the Innovation Fund, the RDI Network and the assessment of the Egyptian innovation landscape.

The **Innovation Fund** (6.9 million Euros) covered two schemes¹⁴⁴, the first one funding applied research conducted in a partnership between an industrial enterprise and a scientific research entity. Qualified projects, which received up to 500,000 Euros, had to address a particular problem of the company for which substantial work has already been conducted, so that a product could be developed and introduced to the market within two to three years¹⁴⁵.

The second scheme focused on honing a culture of innovation in Egypt. Eligible projects from entrepreneurs, individual inventors or SMEs received between 10,000 and 25,000 Euros for: “establishing technology transfer offices”, organising “exhibitions for inventors or sending inventors to exhibit their products and prototypes at international exhibitions and speak at international conferences”, and

¹⁴² Interview EE-05, see interview transcript; p.31.

¹⁴³ Interview EE-10; see interview transcript, p.55.

¹⁴⁴ By mid 2011 the total amount of proposals submitted for the two schemes equalled 719 out of which 406 proposals were for scheme one and 313 for scheme two. Eventually 22 proposals were funded under scheme one and 29 under scheme two (RDI, 2011).

¹⁴⁵ Interview EO-10a; see interview transcript, pp.180-190.

awarding “frontier researchers, frontier entrepreneurs or inventors”, who have engaged in patenting in Egypt. Furthermore, this scheme funded workshops on innovation and creative thinking for pupils between eight and 14 years to supplement the standard scholastic curriculum and “science communication”, such as “science festivals, forums and seminars”, to increase general awareness of the importance of “research and innovation”¹⁴⁶. The **RDI Network** fostered the understanding of funding mechanisms among academia and industry to increase the utilisation of funds available for research and innovation. To this purpose, it promoted networking via “focal points” in research entities:

“The main purpose of these focal points is to learn about the funding mechanisms, different funding instruments like FP7 or even the innovation fund in Egypt [...] and introduce these funding mechanisms to their colleagues, help them to follow up calls for proposals, how to write proposals themselves and how to find partners, etc.”¹⁴⁷.

The **assessment of the Egyptian innovation landscape** was complemented by the identification of good practices from Europe to address detected issues. To this purpose, RDI collaborated with the Fraunhofer Institute, a major German research institute. The main findings included weak academia-industry links and “a lack of strategies” in Egyptian research institutes, findings confirmed by several participants in this study¹⁴⁸. In particular research entities, especially universities, do not have a viable IPR strategy and the benefits of public-private partnerships are generally underestimated by academic researchers as well as by the industry¹⁴⁹. In 2011, the Fraunhofer Institute conducted workshops with two major research centres in Egypt, the National Research Centre and the Central Metallurgical Research and Development Institute, to propose good practices to address these gaps.

The positive assessment of the achievements of the first round led to the renewal of the programme for another four years (2011-2015). EU funding almost doubled to

¹⁴⁶ Interview EO-10a; See interview transcript, p.180 and RDI, 2011.

¹⁴⁷ Interview EO-10a; see interview transcript, pp.180-181.

¹⁴⁸ See Interviews EE-03, EE-05, EE-07, EO-01, EO-09 and EO-10a.

¹⁴⁹ See Interviews EO-01, EO-09 and EO-10a.

20 million Euros, with 12 million Euros for the Innovation Fund schemes. The size and duration of the grants in scheme one have been increased respectively up to 600,000 Euros per project and three years or more¹⁵⁰. The focus of scheme two has shifted from funding individuals to communication events like

“science festivals, more conferences, brokerage events between the science community and the industrial community [...], introduce more activities into the schools and to the young generation”. Furthermore, it “will again help with supporting technology transfer offices, perhaps establishing more offices or supporting the existing ones to improve their performance”¹⁵¹.

Furthermore, two additional activities are planned within scheme two in 2013:

- the creation of “innovation clusters”, “physical” and “virtual” (i.e. “innovation networks”), with substantial financial resources allocated (one to 1.5 million Euros) to improve the collaboration among “public or private research organisations” in large projects addressing major national problems¹⁵²
- the creation of additional “centres of excellence” following the performance assessment of those already existing, which will receive support in terms of “capacity building” for the commercialisation of research outputs, e.g. by licencing their patents or establishing spin-off companies¹⁵³.

RDI Network will “continue supporting the focal points throughout the next few years and in addition to the research organisations focal points [and] [...] try to concentrate more on technology transfer focal points” particularly in industry as funding bodies “always require an industrial organisation to be part of the proposals”, which has so far been problematic due to the lack of interest in collaborating with research entities¹⁵⁴.

¹⁵⁰ Interview EO-10a; see interview transcript, pp.180-190.

¹⁵¹ Interview EO-10a; see interview transcript, pp.181-182.

¹⁵² Interview EO-10a; see interview transcript, p.182.

¹⁵³ Interview EO-10a; see interview transcript, pp.180-190.

¹⁵⁴ Interview EO-10a; see interview transcript, p.183 and Fraunhofer Institute, 2010.

Finally, RDI will continue to collaborate with the Fraunhofer Institute to identify and address gaps in the innovation system of Egypt, whereby the scope is no longer limited to “research organisations and industry” but also includes “the education system”, “infrastructure”, “telecommunications”, and “the patent office”¹⁵⁵.

The impact of the funded projects is assessed by measuring “the outputs of the projects” including the number of “publications”, filed “patents”, the number of new “products” and the number of “jobs created” during the project. The head of the Innovation Management Unit at RDI mentioned that the revenues generated by the supported projects exceed by far the investments made: “six of the projects that received funding of maybe two million Euros are getting revenues of around 42 million Euros”¹⁵⁶.

Another senior official working at RDI Programme recalls the difficulties faced when launching the fund’s activities and issuing the first calls for proposals in 2007:

“[...] innovation was not one of the objectives of the companies. It was not really integrated in the companies’ core missions and activities. The reason was that it is much easier and quicker to make financial gains through manufacturing and through reverse engineering, which some companies call innovation”¹⁵⁷.

As mentioned above, the initial low number of applications filed is also explained by the lack of interest of academia and industry to cooperate with each other, a pre-condition to apply for funding from RDI Programme, and a more general lack of trust in government funded projects, usually associated with high administrative burdens¹⁵⁸. However, the communication efforts outlined above have been successful and RDI is now among the most visible and well-known innovation support programs¹⁵⁹.

¹⁵⁵ Interview EO-10a; see interview transcript, pp.183-184.

¹⁵⁶ Interview EO-10a; see interview transcript, p.181.

¹⁵⁷ Interview EO-10b; see interview transcript, p.191.

¹⁵⁸ Interview EO-10b; see interview transcript, pp.191-199.

¹⁵⁹ see section 8.3.2.

RDI Programme now plans to fund innovation stemming from individuals, rather than solely from research institutes and industry, introducing a scheme to transform ideas of the vast pool of Egyptian talents into proofs of concept, modelled after a similar experience from India. A senior manager enthusiastically presents the initiative by stating: “I want farmers to come; I want people who work in the field, whether this field is in the farm or in the street, I want people with ideas to come”¹⁶⁰.

Given the success of RDI to date and its close relationships with ASRT and MOSR, an institutionalisation is planned once the programme comes to an end, whereby it would be transformed into an “innovation support” and “networking unit” within MOSR¹⁶¹.

The R&D department of the **National Telecommunication Regulatory Authority** (NTRA) is another entity fostering industry-academia collaboration in the ICT sector, investing part of the tax revenues from telecommunications operators in Egypt in projects jointly run by academia and industry¹⁶². In funding projects, it prioritises (with “bonus scores”) proposals involving research institutes or researchers based outside the governorates of greater Cairo and Alexandria, where most of the country’s R&D take place, to promote innovation in the rest of Egypt (NTRA, 2013, p.3).

The department also sponsors innovative graduation projects and usually requires all projects to prove the involvement of research assistants, either young graduates or PhD researchers. The latter, if conducting their doctoral research outside Egypt and aiming to return to their home country within six months or at the start of the project, are also eligible to apply for project funding and even assume the role of a principal investigator (NTRA, 2013).

¹⁶⁰ Interview EO-10b; see interview transcript, p.197.

¹⁶¹ Interview EO-10b; see interview transcript, p.195.

¹⁶² Interview EE-17; see interview transcript, p.92.

The **Technology Development Fund (TDF)** was created in 2004 by MCIT to invest in innovative start-ups in the ICT sector. It is managed by **IDEAVELOPERS**, a venture capital firm subsidiary of EFG Hermes Private Equity. For its first phase (TDF I), the fund received 10 million USD, fully invested. In the second phase (TDF II), the fund portfolio has been increased to 40 million USD, currently being invested (IDEAVELOPERS, 2010a). In addition to funding, IDEAVELOPERS provides “strategic advice” in marketing, organisational matters and product development as well as networking support with relevant entities or potential partners in the sector (IDEAVELOPERS, 2010b).

Two interviewed companies have received financial support from the fund¹⁶³, however the other services provided by IDEAVELOPERS seem not to be widely known: “We received money from this fund [TDF], but we never got any kind of [other] support. We know the people from IDEAVELOPERS very well, but they never offered any kind of support and they are not active in really supporting the companies [through consultancy]”¹⁶⁴.

6.3.3.3 Schemes focusing on infrastructure

The first Egyptian science park was **Mubarak City for Scientific Research & Technology Applications (MUSCAT)**, established in 1993 with the following objectives:

- *“Developing centers of Scientific Excellence to serve both economic and social developments of the Egyptian Society.*
- *Developing new technologies and provide new scientific methods in different fields of industry to link research programs to national development plans.*
- *Providing training, consultancy and technology transfer to different production and services agencies in Egypt.*
- *Conducting applied projects to ensure better performance in different areas that can benefit Alexandria region and the national economy.*
- *Cooperating with different national and international institutes in the various areas of technology” (MUSCAT, 2011).*

¹⁶³ i.e. EE-04 and EE-05.

¹⁶⁴ Interview EO-04; see interview transcript, p.26.

According to its web presence, in 2011 the science park hosted 12 research centres¹⁶⁵ (MUSCAT, 2011). Following the revolution in spring 2011, the activities of MUSCAT seem to have stalled¹⁶⁶ and in the course of the author's desk research no evidence of impact assessment studies could be found.

Apparently more active, the **Smart Villages Company** (SVC) was established in 2001 as a public-private partnership¹⁶⁷ "to establish and manage a branded chain of Technology cluster and business parks" (SVC, 2012a). The first one has been the **Pyramid Smart Village** in Giza: within an area of over three square kilometres, it offers office space in 59 state-of-the-art buildings (as of 2011) as well as a range of business and recreational services to a total of 500 multinational and local companies, financial institutions, education entities and government bodies¹⁶⁸, employing approximately 100,000 staff (World Bank Info Dev, 2013; SVC, 2012b). SVC plans to open further structures in different locations (e.g. Smart Village Damietta Business and Logistics Park, and Smart Village Alexandria Business Park).

Further parks are planned, however no information could be found on the status of the respective projects: the **Sinai Technology Valley** in an area of 72 square kilometres in the Ismailia Governorate, with a focus on six strategic sectors (i.e. ICT, microelectronics, biotechnology, new materials, fine tools and renewable energy) (Magdy, 2011)¹⁶⁹; and the **Northern Coast Technology Valley** in the Alexandria governorate, still at a "study stage" by MOHE, MOSR and SFD (Magdy, 2011, p.253).

¹⁶⁵ These were: Advanced Technologies and New Materials Research Institute, Arid Lands Cultivation Research Institute, Engineering Industries Development Centre, Environmental and Natural Resources Research Institute, Fine Chemical Research Institute, Genetic Engineering and Biotechnology Research Institute, Informatics Research Institute, Laser Research Institute, New and Renewable Energy Research Institute, Pharmaceutical and Fermentation Industries Development Centre, Small Scale Industries Development Centre, Technology Capabilities Development Centre.

¹⁶⁶ The website of MUSCAT was no longer functional (status April 2013) and all attempts to communicate via phone and e-mail in preparation of the field trip were unsuccessful.

¹⁶⁷ 80 per cent of the shares are owned by the private sector and the rest by MCIT.

¹⁶⁸ Between them, there are a technology incubator and a private university, the Nile University, one of the few higher education institutions offering degrees in technology management.

¹⁶⁹ There is no official website for the park, none of the participants was aware of its existence and more recent studies of Egypt's innovation landscape do not mention it (see for example Dagault et

SFD was the first governmental program to offer **business incubation** in Egypt and is currently operating seven incubators¹⁷⁰. Planned activities include the expansion of the Tala Business Incubator to focus intensively on IT projects incubation, the establishment of a new technology incubator jointly with the City for Scientific Research and Technology Application in Alexandria and the construction of new incubation facilities in the Abou Rawash Industrial Zone for 8,000 square meters to host general business as well as technology projects (El Hilaly, 2012; STDF, 2012).

The incubation services offered include training, mentoring and office space excluding equipment. Financial support is only granted in form of a low-interest loan at an interest rate of six per cent. All support mechanisms are limited to a time period of five years after which incubated companies need to leave the premises. SFD has not conducted any impact assessment of its incubation activities nor has it kept track of companies which left its incubators (STDF, 2012).

The most comprehensive effort in the area of incubation is the **Technology Innovation and Entrepreneurship Centre**. Created in September 2010 by MCIT to stimulate innovation in Egypt with the vision “to become the leading regional hub and world class centre for ICT based innovations and entrepreneurship”, its objectives are defining, managing and coordinating “the various programs and initiatives derived from the Innovation and Entrepreneurship Strategy jointly with the different stakeholders” (TIEC, 2010a).

Hosted in **Pyramid Smart Village**, it currently operates five competence centres running 13 support programmes. The **Mobile Social and Cloud Computing Competence Centre**¹⁷¹ (MSCC) leads “technology development efforts” in the area

al., 2012) despite it being mentioned in the UNESCO’s list of science parks in the MENA region (UNESCO, 2012b).

¹⁷⁰ Namely: Tala Business Incubator, Tabbin Technology Incubator, Mansoura Business Incubator, Assuit Technology Incubator, Luxor Heritage and handy crafts incubator, Port-said virtual incubator and Douwaika Virtual incubator

¹⁷¹ MSCC acts as an independent entity, however TIEC provides assistance and expertise in the area of programme coordination and management.

of “Social Networking and Cloud Computing Technologies” offering the following services:

- *“In-house labs in Social Networking and Cloud Computing.*
- *Lab resources sharing with other labs in Egypt.*
- *Egyptian ICT companies support to develop new products ideas and prototypes.*
- *Mentor incubated companies.*
- *Common development projects establishment with multinational branches in Egypt.*
- *Research projects establishment with International-Regional-Egyptian Universities/Institutes.*
- *Summer and winter schools for graduated and undergraduate students” (TIEC, 2010d).*

Its main programme is the **Hayiy Initiative** for developing Arabic online content in form of social networks and mobile applications. Having collected project proposals and selected the best 100 ideas in the first phase (March – June 2012), in the second one the selected proponents received incubation space and support to develop prototypes and a business plan (e.g. workshops on “content development” and “e-marketing”); the evaluation of prototypes and business plans as well as the selection of the best 10 concluded the second stage (July – September 2012). In the last phase (September – June 2013), the 10 finalists were to receive more intensive training by specialised consultants on “digital marketing, content management and innovation management” as well as “a 20-thousand [Egyptian] pound advertising package, to be paid in three instalments [...] based on the progress achieved with the developed idea” (TIEC, 2010e).

The **Embedded Systems and Integrated Circuit Competence Centre** (EIC) facilitates the development of integrated circuits (IC) by improving the local infrastructure, offering R&D facilities and establishing links between academia and industry. Its services include: the “Design and Fabrication Support Centre”, providing support for IC development; the “TIEC labs”, IC laboratories situated in six Egyptian universities; “research collaboration”, which involves the establishment of academia-industry partnerships and includes training provision in the area of IC; and the Very-large-

scale Integration Academy (TIEC, 2010f). The EIC's main focus is on the **"Industry Support Programme"**, whereby it recruits engineering teams for project-specific requirements of companies active in the field (TIEC, 2010f).

The **E-Learning Competence Centre (ELCC)**, created in 2004 in a partnership with Cisco Systems, developed the first e-learning platform in Egypt. Through its "lifelong learning platform", the centre offers "e-Learning content in different disciplines" free of charge to educational institutions as well as to individuals (Interview EO-02b; TIEC, 2010g). Its dedicated R&D unit is specialised in the identification, development and dissemination of good practices in the field of e-learning (ELCC, 2013).

The centre initially made use of Cisco's e-learning platform to support business start-ups. It subsequently further developed the content of Cisco's platform and established the "national delivery network", certifying so-called "Delivery Centres" or "Cisco Academies" throughout Egypt. These include governmental organisations, schools, universities, SMEs, IT Clubs and NGOs. Following the Cisco model of certification, 700 delivery centres have been certified to disseminate the developed e-learning modules, including "online assessment, student performance tracking, hands-on labs, instructor training, support and preparation for industry standard certifications". So far "over 60000 students, instructors and administrators have participated in the programme"¹⁷².

Within the framework of the Global Entrepreneurship Programme, the centre has developed a "platform for e-mentoring for entrepreneurs", the "Entrepreneurship Education Programme", which is the "Egyptian version" of the international portal "imagine nations"¹⁷³. The portal informs entrepreneurs about "education support and training"¹⁷⁴ and provides the so-called "SME start-up kit" containing all necessary information on the company creation process, including the required

¹⁷² Interview EO-02b; see interview transcript, p.137 and TIEC, 2010g.

¹⁷³ Interview EO-02b; see interview transcript, p.137 and TIEC, 2010g.

¹⁷⁴ In this context, the "ELCC developed and localized Cisco's Business Essentials Course (iExec), delivered training to 3,000 entrepreneurs and 260 SMEs, certified 40 instructors as facilitators of the program and certified six NGOs as official training centres to the program" (TIEC, 2010g).

documents and forms. It serves as “social network” for entrepreneurs, facilitating the mentoring process with ELCC as well as the exchange between the entrepreneurs themselves¹⁷⁵.

The **Innovation Support Center** is engaged in an array of support activities at the macro level, which aim at establishing a socio-economic environment conducive to innovation in the ICT sector. The centre’s activities are structured around the three main layers of the Egyptian Technology Innovation and Entrepreneurship Strategy 2011-2014: “Establishing a foundation for innovation”, “empowering business” and “recognizing innovation”, pursuing the following objectives:

- *“Branding Egypt as a hub for ICT innovation.*
- *Engaging the ecosystem of stakeholders in generating, financing, supporting and deploying ICT-related innovations.*
- *Creating and nurturing the innovation culture.*
- *Enticing foreign and local ICT companies in Egypt to generate enrich and expand innovative ideas” (TIEC, 2010h).*

The main activities of the centre include: capacity building, mainly through training in the area of innovation management for enterprises and students; partnership development between Egyptian and multi-national enterprises, primarily by promoting joint ventures and organising networking events; and the elaboration of innovation recognition mechanisms, such as innovation awards and promotion programs (TIEC, 2010h).

Its **Collaborative Innovation Network** serves as a forum for ICT innovation stakeholders from industry and academia, bringing together experts from national and international enterprises and higher education institutes to “share experiences, lessons learnt, technology trends, opportunities and challenges” (TIEC, 2010i). The network has so far had seven gatherings, the last one in January 2012 (status January 2013). In the area of valorisation of innovation, the centre runs the **ICT Innovation**

¹⁷⁵ Interview EO-02b; see interview transcript, p.138.

Award, whereby awarded companies receive inter alia training in the area of innovation management and IP (TIEC, 2010k).

The **Entrepreneurship and IP Commercialisation Centre** (EIPC) has the overall responsibility¹⁷⁶ for the **Technology Incubation Programme** (TIP), set-up to “provide outstanding incubation management to seed and start-up IT companies” with the objective of creating “a new tier of seed companies and start-ups that contribute towards economic development” (TIEC, 2010b).

The first incubation centre opened within the Pyramid Smart Village premises. The expansion of TIP’s scope to include university-based incubation led to the creation of the Alexandria University Incubation Centre in September 2010. Today the programme operates five incubation centres, two located inside the Pyramid Smart Village and three within the three biggest Egyptian universities: Cairo University, Alexandria University and Assiut University (TIEC, 2010b).

EIPC has designed a range of additional support mechanisms for start-up companies that have existed for no more than two years, providing “location, equipment, mentorship and consultancy services in areas such as legal, accounting, financial, project management, IP registration plus networking activity to VCs, Technology MNCs as well as technology funds” (TIEC, 2010c). They also cover training on soft skills such as presentation skills, and networking with established ICT companies like Vodafone or Nokia¹⁷⁷.

Companies join the programme through an **annual competition**, whereby ideas are collected and applicants receive training in the area of business plan writing, with a special focus on five fields, i.e. “knowledge management, innovation, sales and marketing, project management and financial management”¹⁷⁸. Thereafter, participants have the opportunity to improve their business plans with the EIPC

¹⁷⁶ According to a former senior employee of MCIT and later ITIDA, the TIP was launched by MCIT in 2006, moved to ITIDA in 2008 and was finally transferred to TIEC in 2010 (Interview EO-06; see interview transcript pp.153-161).

¹⁷⁷ Interview EO-02d; see interview transcript, p.142.

¹⁷⁸ Interview EO-02d; see interview transcript, p.144.

examining them and providing suggestions as necessary. A jury composed of CEOs of large ICT enterprises, such as IBM or Vodafone, then selects the best business plans for incubation, their number depending on the places available in the TIEC incubators¹⁷⁹.

EIPC organises further events to select talented entrepreneurs and promising start-ups for incubation. For example, **Next Gen**¹⁸⁰ had North American and Danish entrepreneurs come and train Egyptian applicants for three days in the area of investor pitching, i.e. how to best present their ideas to a potential investor. Four participating teams were selected to spend three months in a Danish incubator or an internship with entrepreneurs in the USA and, upon their return, were incubated by TIEC¹⁸¹.

The **Water Hackathon** two-day event on water consumption optimisation was organised in collaboration with the World Bank and sponsored by Pepsi Cola and Farm Frites. The Ministry of Irrigation provided real life problems and participants were asked to develop during the event a mobile application to address them. The teams that managed to propose a viable solution according to a panel of technology experts received funds from the sponsors to continue working on their proposal¹⁸².

The **Mobile Monday** is an “awareness creation” event held in three locations in Egypt, i.e. Cairo, Alexandria and Asyut¹⁸³, whereby experts in mobile technology give talks on the status of the mobile phone industry and outline expected areas of development. It also offers possibilities for networking between entrepreneurs and public entities¹⁸⁴. The **Start-up Weekend** is a three-day event whereby up to 130 participants can present their ideas in the area of ICT and are judged by an expert

¹⁷⁹ Interview EO-02d; see interview transcript, pp.142-145.

¹⁸⁰ Organised in cooperation with USAID and the Embassy of Denmark.

¹⁸¹ Interview EO-02d; see interview transcript, pp.142-145.

¹⁸² Interview EO-02d; see interview transcript, p.145.

¹⁸³ TIEC has expanded its incubation activities and now offers incubation services in the three universities in these cities (STDF, 2012)

¹⁸⁴ Interview EO-02d; see interview transcript, p.145.

panel formed by employees of large companies such as Google or IBM. Up to three ideas are then funded for further development¹⁸⁵.

Alternatively, individuals or start-ups can directly contact TIEC by e-mail to submit proposals for projects to be incubated which are then evaluated by TIEC's board of trustees in their monthly meetings. The best ideas, usually one or two per month, are then selected and the applicants are asked to prepare a business plan. Upon successful completion of the latter, the companies are eligible for incubation at TIEC¹⁸⁶.

EIPC activities in the area of IP registration and commercialisation were not yet extensively developed at the time interviews took place. According to an employee of the department, only one event had been organised, namely a two-day awareness session on the USA patenting system whereby participants were briefed on how to file a patent at USPTO. The participation fee was 100 USD and 30 companies participated in the workshop meant to address concerns of entrepreneurs considering patenting difficult and expensive. Eventually eight participants filed real patents, most of which were "software applications"¹⁸⁷.

Mainly because of the relatively short life of the entity, no attempts have yet been made to measure the impacts of TIEC's activities:

*"According to our strategy, we are still in our awareness phase, where you really try to spread awareness about innovation, the importance of innovation, why the SMEs should have an innovation culture and how to create [it]. At the moment we do not have a method of measuring the impact"*¹⁸⁸.

A former senior director of TIEC also expressed some reservations. In the view of this interviewee, the hand-over of innovation and entrepreneurship support activities from ITIDA to TIEC was "not a well-managed move": as a semi-governmental organisation ITIDA was relatively more independent while TIEC is part of MCIT and

¹⁸⁵ Interview EO-02d; see interview transcript, p.145.

¹⁸⁶ Interview EO-02d; see interview transcript, p.144.

¹⁸⁷ Interview EO-02c; see interview transcript, p.141.

¹⁸⁸ Interview EO-02a; see interview transcript, p.136. See also interview EO5a.

therefore enjoys considerably less freedom in the delivery of its services, a crucial aspect in this fast-paced area. As an example of the lack of flexibility in TIEC's operational procedures, the respondent stated:

"[...] we have launched an initiative called Mobile Monday and we got sponsorships from multinational organisations like Vodafone and Nokia. So we got money from them and later we discovered that we couldn't accept that money, because a ministry cannot get money from companies. But ITIDA can"¹⁸⁹.

When asked about the feedback provided by incubated companies at TIEC, the interviewee reinforced the previous claims: "the suggestions of start-ups were mainly focusing on flexibility and the financial side of it. Very few were suggesting more services to be added"¹⁹⁰.

A number of privately run services with a focus on ICT have recently been launched in Egypt, complementing the offer of incubation services from the public sector. **Flat6Labs**, based in Giza at the outskirts of Cairo, is a start-up accelerator rather than an incubator, as it provides intensive support in the form of finance, space, equipment and training to high-potential entrepreneurs with innovative ideas for a short period of time (three months). Sponsored by Sawari Ventures, an international venture capital firm, as well as by AUC, at the end of 2012 it incubated 24 ICT companies (Flat6Labs, 2012).

Flat6Labs offers an initial seed funding of between 60,000 and 75,000 EGP in exchange of 10 to 15 per cent of the project's equity. Entrepreneurs receive extensive training from experts (e.g. product development, marketing and business plan development) and get the opportunity to present their products and demonstrate their "market potential" to prospective investors and to the media. If successful, additional funds allow moving to the following stages (i.e. company creation and operation) (Flat6Labs, 2011).

¹⁸⁹ Interview EO-06; see interview transcript, p.158.

¹⁹⁰ Interview EO-06; see interview transcript, p.159.

Plug and Play Egypt, also focusing on innovative ICT start-ups, is sponsored by Plug and Play Tech Center, an international venture capital firm headquartered in Silicon Valley and has so far incubated six companies. Selected projects receive funding between 10,000 and one million USD and coaching from experienced local and international entrepreneurs, whereby they can draw on the substantial expertise accumulated in supporting innovative entrepreneurs in Silicon Valley. Through its network, Plug and Play Egypt organises regular events with potential investors and mentors worldwide (Plug and Play Egypt, 2013).

Tahrir Square is an incubator based in Alexandria as its owners felt that the “entrepreneurial ecosystem” had to expand outside Cairo, which, according to a senior executive of the incubator, is already overcrowded with entrepreneurs and support mechanisms¹⁹¹. The scheme provides a very small amount of funding in the early phase of high-potential projects, setting rigorous criteria to be met before further support is provided in terms of financial aid (between 10,000 and one million USD), mentoring, space and equipment as well as networking with likeminded individuals¹⁹².

So far, Tahrir Square has successfully incubated six companies. A seventh was forced to terminate its activities due to legal and administrative issues. The managers of the incubator plan to launch in the near future the **Empower Program**, whereby a large space (e.g. factory or hangar) will allow (potential) entrepreneurs to gather, discuss and test their ideas, obtain advice from experienced entrepreneurs and meet potential investors¹⁹³.

Technology Transfer Offices, relatively new in Egypt, are present in only five universities: Alexandria University, AUC, Assuit University, Cairo University and Helwan University (STDF, 2012). A senior official from the RDI Programme remarks:

¹⁹¹ In their view, the attention of the public and private sector needs to shift to other regions and, consequently, Tahrir Square is engaged in entrepreneurship promotion activities in universities and schools, particularly but not limited to the Alexandrian community (Interview EE-16).

¹⁹² Interview EE-16; see interview transcript, pp.82-87.

¹⁹³ Interview EE-16; see interview transcript, pp.82-87.

“We don't have many technology transfer offices in Egypt. We have a population of 88 million and [...] only a handful of TTOs”¹⁹⁴.

The Technology Transfer and Industry Collaborative Office at Alexandria University was established in 2008 through an EU-funded programme as part of a larger unit, the Grants, Innovation & Technology Transfer Centre (Alexandria University, n.d.). The other four were inaugurated in 2010 as a result of a project initiated by AUC, funded by the EC and rolled out in cooperation with several partners¹⁹⁵, their main role being: “to take ideas, research, and innovations from Egyptian universities and market them in industry” (AUC, 2010). Their directors and officers were comprehensively trained by experts from the EPO and from the TTO at Oxford University.

The professor who submitted the proposal for the project stated that prior to it technology transfer was generally understood in Egypt as importing technologies from abroad and using them. Having experience of TTOs in the United States, the respondent strongly felt the need to introduce them in Egypt in the form of academia-industry technology transfer¹⁹⁶. Several participants lamented the lack of understanding in academia of the potential of technology transfer and, consequently, the limited available expertise in universities on the legal basis for related activities, like university spin-offs and IPRs revenue-sharing schemes¹⁹⁷.

Many higher-level managers of universities appear not to be keen on supporting the establishment of TTOs or offering “formal education” on technology transfer and commercialisation: time allowances for academics to operate a TTO are in general inadequate and “universities and research centers are not very concerned with having a clear Intellectual Property, revenue sharing, and commercialization policies for the inventions that come out of their labs” (STDF, 2012, p.16).

¹⁹⁴ Interview EE-10a; see interview transcript, p. 189.

¹⁹⁵ “Freie Universität Berlin, Germany; Polytechnic University of Turin, Italy; Linköping University, Sweden; Vienna University of Technology, Austria; and the EPO” (AUC, 2010).

¹⁹⁶ Interview EE-05b; see interview transcript, pp.120-122.

¹⁹⁷ See Interviews EO-01, EO-05b, EO-05c, EO-09 and EO-10a.

Some institutions try to cope with resource constraints and get more support from higher management by linking TTOs to other income-generating undertakings: one university introduced additional vocational training courses to finance the activities of its TTO and the TTO at University of Alexandria was attached to the entity in charge of writing grant proposals: according to a technology transfer officer, “[...] the university looks at them as people who bring the money. And that’s why they are very supportive to their side project, which is technology transfer”¹⁹⁸.

Furthermore, it is burdensome to spin off companies as a result of academic research. The director of a university TTO, leading a research team on healthcare and nanotechnology, faced considerable obstacles when trying to spin off a company resulting from the team’s project:

“We managed to successfully develop this technology and we are trying to spin off a company [...] in a culture that does not recognise spinning companies off and [...] we are facing one problem after another, trying to spin-off and creating the system to spin-off at the same time”¹⁹⁹.

These difficulties and the recent introduction of TTOs in Egypt explain the limited impact of these organisational schemes so far: “We have only a few success stories, because those officers started only three years ago”²⁰⁰. The pragmatic attitude of those operating them is probably the right approach in an environment that still considers TTOs as “side projects”. Exploiting their potential should however become a strategic priority for policy makers as “by far most of the output of the research centres and universities are kept in the drawers or kept in the minds of the researchers and inventors and are not fully utilised in the market or by the industry”²⁰¹.

¹⁹⁸ Interview EO-01; see interview transcript, p.110.

¹⁹⁹ Interview EO-05c; see interview transcript, p.126.

²⁰⁰ Interview EO-05b; see interview transcript, p.120.

²⁰¹ Interview EO-10a; see interview transcript, p.189.

6.3.3.4 Schemes focusing on capacity building

The **Industrial Modernisation Centre** is an independent body²⁰² whose mission is to “support all industrial enterprises²⁰³, individually or sectorally, according to their development needs, through comprehensive and customized business development competitiveness programmes” (IMC, 2010, p.6). Its main strategic objective is to strengthen the global competitiveness of Egyptian enterprises by developing local human resources capabilities (e.g. skills and competences), aiming at a substantial increase of Egyptian exports (IMC, 2010). It employs 300 staff across 19 offices and its executive board consists of 15 members, eight coming from the private sector. According to a high-level executive, the centre operates at three major levels: company level, sector level and national level²⁰⁴.

At **company level**, the **business development services** support capacity building and quality assurance mainly via professional and technical training. Companies need to identify the area of concern (for example: strategy definition, quality certification, productivity, management of waste levels, inventory or cash flow). Thereafter, IMC conducts a gap analysis, identifies possibilities for improvement and proposes action plans to be implemented by the companies with the support of local or foreign specialised consultants whose fee is subsidised up to 80 per cent²⁰⁵.

Business development services also cover export promotion, one of the major objectives of the national industrial development strategy (see section 6.2): IMC subsidises exhibition and travel costs for companies attending international trade fairs and exhibitions to promote their products and services. Usually companies

²⁰² According to Hahn and Meier zu Koecker (2008), the centre is managed by the MTI. However, IMC official publications state that it is an independent body created by the Presidential Decree 477 in the year 2000 and this was confirmed in the interview with a senior executive of IMC. In any case, MTI contributed to its establishment: the initial funding of 426 million Euros was provided by the EU, the MTI as well as the private sector, respectively contributing with 250, 103 and 73 million Euros (IMC, 2010 and Interview EO-07; see interview transcript, p.162).

²⁰³ Targeted are companies employing more than 10 workers as well as industrial clusters.

²⁰⁴ Interview EO-07; see interview transcript, pp.162-168.

²⁰⁵ Interview EO-07; see interview transcript, p.163.

make first use of consultancy services to improve internal processes and thereafter apply for additional support to market their products²⁰⁶.

Table 23: Number of companies served by IMC per sector

Industrial Sector	Number of Companies
Textile and Ready Made Garments Sector	3,680
Construction and Building Materials & Metallurgical Industries Sector	923
Chemicals Sector	1,330
Engineering Sector	1,420
Food Sector	1,950
Furniture Sector	1,383
Agricultural Sector	555
Leather Sector	623
Pharmaceutical Sector	102
Packaging and Printing Sector	485
Information Technology and Communication Sector	231
Industry-related Services	2,074
Total	14,936

Source: Adapted from IMC (2010) – IMC Achievements up to date (30 September 2010, p.8)

Table 24: Services provided until September 2010 by the IMC per type

Services	Number	%
Trade Fairs & Exhibitions	6,054	6.3%
Financial Services	2,502	2.6%
Training	53,937	55.9
Recruitment	1,269	1.3%
In-Company Experts	1,779	1.8%
Ethnic and Traditional Crafts Clusters	3,891	4%
Information System	2,993	3.1%
Marketing	2,418	2.5%
Quality	13,455	14%
R&D	60	0.1%
Technical Assistance (Production, Management and Human Resources)	7,072	7.4%
Sustainable Development Services (Energy, Environment and Social Responsibility)	995	1%
Total	96,425	100%

Source: Adapted from IMC (2010) – IMC Achievements up to date (30 September 2010, p.8)

²⁰⁶ Interview EO-07; see interview transcript, p.163.

Up until September 2010, IMC served almost 15,000 companies in different industrial sectors (Table 23), the provision of training accounting for more than 50 per cent of the interventions while support in the area of R&D represented only 0.1 per cent (IMC, 2010, p.8) (Table 24).

A high-level executive of the IMC outlines the reasons underlying the low share of R&D support services:

“There is a cultural problem between the factory owners on the one side and the people working in the MOSR and in academia on the other side [...] Academia is a kingdom on its own and industry is a kingdom on its own. The ones think that the others are only theoretical and not useful to them and the others think that the businessmen are just traders who do not understand the value of science. [...] in three years we only had 60 projects in the area of R&D, although we are subsidising 80 per cent of the costs”²⁰⁷.

Elaborating further on the low level of support activities in the area of R&D, the respondent adds:

“The calibres from academia and research centres don’t have an interest in that. They get promoted and keep their posts at the University through papers [...]. They get their funds from the government, so they are not really keen on applying it in the industry. This missing link as well as the cultural issues are the major reasons for not being able to provide more services in the R&D area”²⁰⁸.

At **sector level**, IMC works with representatives of industrial chambers to develop support services addressing sector-specific issues. IMC established 13 **Egyptian Technology Transfer and Innovation Centres** ²⁰⁹ (ETTIC) to improve the competitiveness of Egyptian firms through technology transfer and innovation:

“The main objective of the establishment of ETTICs is to fulfil the technological needs of the Egyptian industry and in particular of the exporters to become constantly competitive. They are meant for transfer and diffusion of new

²⁰⁷ Interview EO-07; see interview transcript, p.167.

²⁰⁸ Interview EO-07; see interview transcript, p.167.

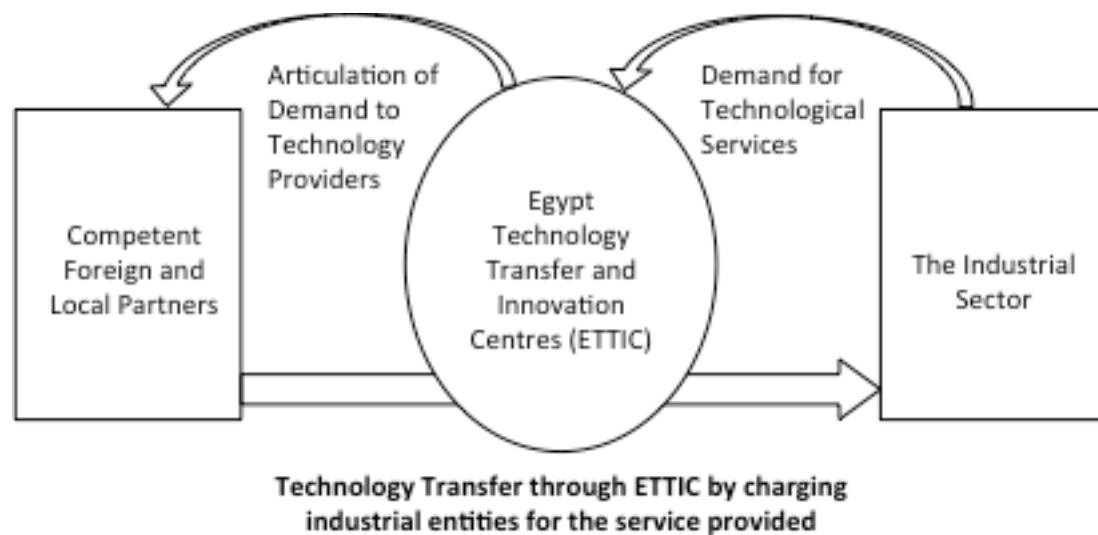
²⁰⁹ Currently there are 11 sector specific ETTICs (i.e. Fashion Design, Marble and Quarries Technology, Plastics Technology, Food Technology, Leather Technology, Leather Tanning Technology, Furniture Technology, Jewellery Technology, Textile and Clothing Business, Engineering Industries Technology and Ethnic Products) as well as two “horizontal” centres (i.e. Productivity and Quality Improvement Center and Egypt National Cleaner Production Center).

technologies and innovations by the efficient management of top-notch technologies, brought about from global technology markets” (MTI, 2006, p.17).

The Industrial Development Strategy 2006 foresaw them to provide (Figure 28):

“a broad range of services to the industrial sector: technology transfer through patents and licensing, technical assistance in product and production development, quality audits and management, advanced human resources development such as training designers and senior engineers, environment and social management, and contracting R&D and innovation projects” (MTI, 2006, p.18).

Figure 27: Egypt Technology Transfer and Innovation Centres



Source: Adapted from MTI (2006, p.18) – Egypt’s Industrial Development Strategy – Industry: The Engine of Growth

No impact assessment of the ETTICs has been conducted to evaluate whether concrete benefits have been achieved with their implementation. In this case, the field study²¹⁰ allows for a preliminary appraisal. Only one participant, manager of a private university TTO, was aware of ETTICs, and commented:

“To my surprise, [...] the IMC has a technology transfer office in every sector [...] or an incubation-type of programme for every sector, e.g. for agriculture,

²¹⁰ Attempted communication efforts with all ETTICs via phone and e-mail were unsuccessful.

*textiles, food and beverage, etc. But they do not have much to offer and I think they have been dubbed a failure*²¹¹.

The IMC executive interviewed did not mention them and IMC's most recent brochure (October 2010) does not refer to ETTICs nor does the MTI website. This research concludes that their relevance is marginal and activities may have been abandoned, temporarily suspended or significantly reduced in scope.

At **national level**, IMC assists MTI in the elaboration of its strategic directions, such as drafting the "export development strategy of Egypt". It also provides consultancy in the area of quality assurance and accreditation, thereby assisting several institutions in becoming "internationally recognised accreditation bodies"²¹². Finally, IMC cooperates with the STDF in three major programmes granting funds for applied research: the "Scientific R&D program", the "Professor for every factory" and the "Innovation programme" (STDF, 2012, p.7).

Considering one of its major purposes, i.e. substantially increasing Egyptian exports, in the seven years after the creation of IMC their value increased by 400 per cent from 25 billion EGP to 125 billion EGP. According to an IMC executive, the relevance of IMC's contribution becomes evident when evaluating the performance of enterprises having received support from IMC.

In 2011, particularly difficult for the Egyptian economy due to political unrest, exports of companies that benefited from it increased by six per cent, whereas Egypt's exports as a whole decreased by five per cent²¹³. Furthermore, the accreditation of quality assurance entities, not existing before, is likely to have contributed to the export performance of the sectors affected.

The **General Authority for Investment** is a "one-stop shop" offering a range of services to local companies and entrepreneurs as well as to foreign investors. To support SMEs, which account for 98 per cent of private enterprises, GAFI launched

²¹¹ Interview EO-01; see interview transcript, p.112.

²¹² Interview EO-07; see interview transcript, p.162.

²¹³ Interview EO-07; see interview transcript, p.166.

the **Small and Medium Investment Initiative** in 2008. Modelled after the Canadian Business Development Services Support Project and with the help of Canadian experts, the initiative pursues the following two goals:

- *“Increase the share of SMEs in GDP to 40% by 2015, and 50% by 2025 (compared to 25% [...] in 2008, benchmarked against the achievements of Malaysia and Japan).*
- *Increase SME share in employment to 42%, or 12 million out of a projected labor force of 28.6 million by 2015 (compared to 35% in 2008)”* (GAFI, 2012, p.5).

To contribute to their achievement, GAFI launched in 2010 the **Bedaya Centre for Entrepreneurship and SME Development**, a special unit dedicated to SMEs and entrepreneurship “facilitating SMEs’ and entrepreneurs’ accesses to different financial and non-financial services required for their growth and development”²¹⁴.

Within the **SME Clinic programme**, the centre works with a “network of volunteer consultants” from reputable local and international consultancy firms to offer thematic workshops or deliver training on specific needs expressed by SMEs. Each SME or entrepreneur is entitled to three workshops for each of the areas covered by the programme: “business planning”, “marketing” and “legal” issues, such as “intellectual property rights”²¹⁵. Workshops, free of charge, are advertised on GAFI’s website and on Facebook and usually have 15 to 25 participants selected on a first-come first-served basis²¹⁶. Furthermore, the **Bedaya Centre** actively supports several entrepreneurship competitions in Egypt (e.g. *Cairo Start-up Weekend*, *Alexandria Start-up Weekend*, *Injaz Entrepreneur Competition*, *Start with Google*), whereby it organises a range of training sessions dedicated to start-ups, for example on legal aspects, marketing or taxation²¹⁷.

²¹⁴ Interview EO-13; see interview transcript, p.203.

²¹⁵ Interview EO-13; see interview transcript, p.203.

²¹⁶ Interview EO-13; see interview transcript, p.204.

²¹⁷ Interview EO-13; see interview transcript, p.205.

Recognising the difficulties SMEs face in obtaining financial support, GAFI analysed their relationship with financial institutions, such as banks or the SFD. As funding is usually conditioned to lengthy and complicated processes, GAFI launched the **Fund Management Company**, a “venture capital fund to finance SMEs during the start-up phases or the early beginning of the project” with a capital between two and 50 million EGP, thereby complementing the offer of SFD, which “funds SMEs with a capital of up to two million EGP”²¹⁸. The fund has a total seed capital of one billion EGP and steers the activities of two private companies (i.e. Beltone Egypt and CFH) in charge of the operational management of the fund as well as selecting the “high potential investments”²¹⁹.

The fund was not yet operational in April 2012 and, therefore, the interviewee was not in the position to judge its usefulness or evaluate its impact. In general, GAFI does not run systematic assessments of its activities in the area of entrepreneurship and SME support and therefore a quantitative evaluation of their effect on local enterprises and the socio-economic environment is difficult to make²²⁰.

However, a preliminary evaluation can be made on the basis of the results of the interviews: senior executives of four companies were aware of GAFI’s activities and private sector participants of this study considered the establishment of the one-stop shop for company registration very positive²²¹. One senior executive stated that prior to the creation of the one-stop shop “[...] you had to take your papers and go to 12 or 13 places of which each [could take] three to four working days, so it would take you three months [to complete the process]. So the one-stop shop now is a very good thing”²²². The positive effect of the organisational scheme introduced by GAFI

²¹⁸ Interview EO-13; see interview transcript, p.204.

²¹⁹ Interview EO-13; see interview transcript, p.204 and GAFI, 2012.

²²⁰ Interview EO-13; see interview transcript, p.206.

²²¹ See Interviews EE-02, EE-03, EE-05 and EE-17.

²²² Interview EE-17; see interview transcript, p.100.

was summarised by a senior executive as follows: “All your communication with the government happens in one building. This supports us a lot”²²³.

Nahdet El Mahrousa (NM) is an NGO founded in 2003 by a group of volunteers whose activities have evolved substantially towards supporting entrepreneurship, to the point of becoming “the first incubator for social entrepreneurship in Egypt and the Middle East”²²⁴. At the time of the interview, NM had a total of 25 incubated projects of different sizes related to political and religious awareness, arts, radio programmes, green enterprises and environmental sustainability, as well as an education portal for high school students. It employs 25 full time staff and has around 120 permanent and 300 to 400 “revolving” or informal members (i.e. former members that irregularly get involved in activities) as well as 10,000 “fans” who are kept informed about NM undertakings and get occasionally involved²²⁵.

NM collaborates with a range of local and international partners in some of their social innovation projects, such as Yahoo, British Petroleum, Barclays, Master Card Foundation, The World Bank, USAID, UNICEF and many others²²⁶. In its incubator, it essentially provides space (one large room), equipment and access to Internet as needed to develop ideas in the area of social entrepreneurship. As ideas evolve into projects and programmes, full-time staff are hired to work on them with the aim to eventually create a spin-off company or a foundation.

Its activities are structured around two main schemes: the **Young Innovators Awards** (YIA) and the **Career and Entrepreneurship Development Offices** (CEDO). YIA started in 2007 as a small scheme for sponsoring graduate projects in public universities. Award announcements are issued on a yearly basis and successful project proposals receive 6,000 EGP (around 1,000 USD) to complete their graduate projects as well as “awareness lecture series on research, development and innovation” covering four major topics: grant proposal writing, IPRs, access to finance and postgraduate

²²³ Interview EE-03; see interview transcript, p.19.

²²⁴ Interview EO-11; see interview transcript, p.209.

²²⁵ Interview EO-11; see interview transcript, p.209.

²²⁶ Interview EO-11; see interview transcript, p.220 and NM, 2012.

research opportunities. A slightly higher amount is given to students who are working on more advanced projects that lead to a prototype with high commercialisation potential. Around 3,500 students have benefited from the sponsorship so far²²⁷.

At the time of the interview, YIA was about to become a “foundation of science”, structured within three major “triangles”: graduation projects, prototype development and a “Fab-Lab”²²⁸, directly addressing the general lack of experimental laboratories and equipment in Egypt; internships or work placements for young Egyptian students and researchers in industry R&D departments abroad²²⁹; “Intensive Research and Development Areas”, whereby experienced scientists will be “scouted” to conduct applied research in strategic areas such as “agriculture”, “renewable energy” or “health”²³⁰.

In addition, CEDO focuses on enhancing the employability of university graduates via dedicated “career counselling and advising” offices within universities. The first office opened in 2006 in the Engineering School of Cairo University. Since then, three additional offices have been opened in universities of three other governorates (Asyut, Minya and Sohag) and it is planned to establish at least one office per Egyptian university by 2014²³¹.

Misr El Kheir (MEK) is an NGO particularly effective in supporting research and innovation. Its peculiarity is that it is headed by the highest religious representative

²²⁷ The first project was with the telecommunications department at Cairo University. In subsequent years the scheme expanded to cover 18 universities and 67 faculties by 2012, serving between 700 and 800 students annually (Interview EO-11; see interview transcript, p.213).

²²⁸ A common concept in the USA, Germany and several developing countries, whereby students have access to a laboratory giving them the opportunity to experiment with different innovative ideas (Interview EO-11; see interview transcript, p.213).

²²⁹ E.g. in Europe, Japan or the USA; according to an executive employee of NM, the major reason for seeking internship opportunities abroad is that “we don’t have research and development in Egypt. Even though we are trying to stimulate it, we know that it is not there [...]” (Interview EO-11; see interview transcript, p. 214).

²³⁰ At the time of the interview NM was selecting the themes.

²³¹ Interview EO-11; see interview transcript, p.215.

in Egypt, the Mufti, and uses Zakat²³² money to fund its projects²³³. Established in 2007, it “aims at developing and empowering the Egyptian Communities to reach a favourable level of quality of life through a self-sustainable development model” (MEK, n.d). To achieve this overall objective, MEK is engaged in a range of projects in five different fields: “life aspects”, “education”, “social solidarity”, “health care” and “scientific research” (MEK, n.d).

To fulfil its mission, MEK launched in 2008 the **Science, Technology and Innovation Programme** to support applied research in the areas of medicine, renewable energy, agriculture, water and social sciences. The programme’s objectives are to: “Develop & Promote World Class Scientific Research; Capacity Building; Promote a Culture of Scientific Research; and Encouraging NGOs to support Science and Technology” (MEK, n.d). In cooperation with ASRT (see section 6.3.1 above), MEK supports the development of prototypes within the framework of Helolnabeokolna: “if you have an innovative idea and you have a proof of concept, then they will support to pay for the patenting and the commercialisation costs”²³⁴.

The **Egyptian Center for Intellectual Property and Information Technology** (ECIPIT) is an NGO offering comprehensive services on IPR matters for the ICT sector. Its objectives are:

- *“Spread and develop awareness of IP and all fields linked to it.*
- *Spread the cultural usage of information and telecommunications in all life fields which have a great effect on development in Egypt.*
- *Sharing in availing the legal atmosphere for information technology, IP together with all fields linked to it.*
- *Sharing in building the Egyptian information society.*
- *Sharing, forming and achieving a whole strategy for developing IP and protecting it.*

²³² Zakat is one of the five pillars of Islam and refers to a kind of income and capital tax Muslims pay to people in need.

²³³ See Interviews EO-05a, EO-09, EO-10a and EE-17.

²³⁴ Interview EO-05b; see interview transcript, p.121.

- *Developing and adhering SME's by vitalizing the role of IP and Information Technology through registering, evaluating and administrating Intellectual Property Rights.*
- *Sharing finding chances of work for youth.*
- *Sharing in building, improving and organizing software industry.*
- *Haring in attracting and encouraging foreign investments by implementing the law of copyright and fighting piracy” (ECIPIT, n.d.).*

Having signed a cooperation protocol with MCIT and ITIDA in 2005, ECIPIT is accredited to serve as a portal for IPR registration and information. It offers training and consultancy on IPR and runs IPR Awareness Programs. Thereby, it conducts and publishes research to inform the wider public on state of the art practices and developments related to IPR, disseminating the outcome via conferences, newsletters, brochures, papers and studies (ECIPIT, n.d.).

Four participants, out of whom only one was a private company executive, mentioned NM and MEK as important innovation support entities in Egypt²³⁵. None of the other private sector participants cited ECIPIT activities.

6.3.3.5 Information Technology Industry Development Agency

The agency is the executive branch of the MCIT established in 2004 in partnership with the private sector to improve the competitiveness of Egyptian ICT companies, providing financial incentives, building capabilities through targeted training programs, supporting public private partnerships in innovative projects as well as increasing awareness on IPRs, and developing the national ICT infrastructure. Furthermore, ITIDA promotes Egyptian ICT exports and inward ICT FDI by engaging with public and private actors on a global scale (ITIDA, 2010a).

A former senior executive summarised the activities as follows:

“Starting from 2006, its main focus was on the business process outsourcing and IT services outsourcing to create more job opportunities and to help Egypt leverage on its mass population, [...]. At the same time, they are trying to develop the local industry through many initiatives. One of them is building

²³⁵ i.e. EE-17, EO-05a, EO-09 and EO-10a.

capacity inside the companies themselves. The other initiative is helping them exporting more products to outside markets. And the third is building bridges between academia and industry [...]. Another department we have is for IP rights, but as a pure registration service, it is only for local IP registration and licensing for IT companies”²³⁶.

The agency’s web presence structures the activities in four areas: Access to Finance; Industry Support and Capacity Building; Research and Innovation; and Industry Infrastructure.

Within **Access to Finance**, the agency cooperates with financial institutions, such as the National Bank of Egypt and the United Bank, to offer loans to Egyptian SMEs in the ICT sector to support their development (300 million Egyptian Pounds over three years) (ITIDIA, 2010b). Furthermore, ITIDA runs a programme with the Egyptian Exchange (EGX) to assist ICT companies in their listing in the Egyptian Stock Exchange for SMEs (NILEX²³⁷) through “technical support and consultancy” and funding 80 per cent of related costs (ITIDA, 2010c). Finally, it collaborates with SFD to offer “loans with a flat interest rate of 6 per cent [whereby] ITIDA will pay 3 per cent of that interest” (ITIDA, 2010d).

The area of **Industry Support and Capacity Building** covers three major initiatives:

- **Grow IT**, a “capacity building programme” meant to increase “the international competitiveness of 100 leading Egyptian IT companies” by offering to eligible companies heavily subsidised consultancy services²³⁸ (ITIDA, 2011a, p.6);
- the **Regional IT Institute Advanced Management Program**, which offered until mid-2011 free training on topics, such as marketing and sales, quality management, leadership, problem solving, business strategy and finance²³⁹ (ITIDA, 2011b); and

²³⁶ Interview EO-06; see interview transcript, p.156.

²³⁷ The Nile Stock Exchange (NILEX) was created in 2007 to support SMEs in the MENA region, in particular by facilitating access to finance for them (NILEX, 2007).

²³⁸ ITIDA covers 90 per cent of the consultants’ fees (ITIDA, 2011a).

²³⁹ From December 2009 until May 2011 employees from 122 Egyptian ICT companies took advantage of the program (ITIDA, 2011b).

- **Egypt on Exports**, aiming at boosting ICT exports through the programmes “Go to GCC”, which puts Egyptian ICT companies in contact with potential partners in the Gulf States to enter that market²⁴⁰, and “Export IT”, which reimburses eligible companies up to “a maximum of 10% of their value added exports (with a ceiling of USD 500,000 per company per year) provided that the related proceeds were transferred by importers and collected by the company in their bank account maintained in Egypt during year 2011” (ITIDA, 2012).

In the area of **Research and Innovation**, the **Information Technology Academic Collaboration** encourages R&D cooperation between industry and academia by funding joint research projects: “preliminary research projects”, whereby ideas are translated into proofs of concepts; “advanced research projects”, from proofs of concepts stage to prototypes; and “product development projects”, whereby prototypes are transformed into final products²⁴¹. In addition, it supports graduation projects of university students and internships in ICT companies²⁴² (ITIDA, 2013).

In the same area, the **Centres of Excellence Program** “funds applied research carried out by experts from academia and industry” (ITIDA, 2011a, p.15) through the **Center of Excellence in Data Mining and Computer Modelling**, established in 2005 and currently employing researchers from Cairo University, IBM Egypt, American University in Cairo, Alexandria University and RDI Egypt (DMCM, 2009; ITIDA, 2010f), and the **Egypt Nanotechnology Centre**, established in 2008 by ITIDA (representing MCIT), STDF, MOHE and IBM Corporation. Initially 10 Egyptian researchers travelled to Switzerland and the USA to gather direct R&D experience and, two years later, returned to Egypt to apply their knowledge in national research and education institutes (EGNC, 2011 and ITIDA, 2010f).

²⁴⁰ 80 Egyptian companies participated in the program so far (ITIDA, 2010e).

²⁴¹ Maximum funding is respectively 130,000 EGP, one million EGP and two million EGP (ITIDA, 2010f).

²⁴² Since its launch, ITAC has supported 57 collaborative research projects as well as 620 graduation projects from 40 faculties (until the end of 2012) and 5,285 university students have conducted summer training internships at ICT enterprises (ITIDA, 2013).

Finally, in the area of Industry Infrastructure, ITIDA offers **training on IPRs** to judges and general prosecutors to strengthen the rule of law and increase awareness on IPR matters, organising so far “advanced training courses with 1960 judges representing various courts around the country as well as 1013 general prosecutors” and “258 enforcement officers from around Egypt” (ITIDA, 2010g).

There was high awareness of ITIDA’s role amongst the interviewed participants of this study. Six enterprises provided detailed information on its activities and evaluated them very positively, four having received substantial financial support for innovation activities²⁴³ and two consultancy and training in the area of marketing²⁴⁴. A senior manager of one of these companies explained the success of the “ITIDA model”:

“ITIDA is a semi-governmental organisation. Its budget comes from the industry. [...] Companies pay one per cent of their annual revenue to ITIDA. The main bulk comes from the big companies, the four big communication companies. We have three major mobile phone operators and the National Telecom Egypt. So these four companies provide the budget for ITIDA. And this budget goes back to the industry, so it comes from the industry and goes back to the industry. This is a very interesting system of collaboration. It has been very useful and successful”²⁴⁵.

According to the interviews, the support in the area of IPRs is not sufficient: some participants have explicitly complained about it²⁴⁶ and one senior manager stated that “in the beginning ITIDA had the intention to push in this area [financial support and training in the area of IPRs] and to help companies, but suddenly they discontinued this effort”²⁴⁷.

The apparent change of priorities probably reflects the low level of IPR enforcement in Egypt. Another senior manager commented: ITIDA “started an intellectual property office and there is also an intellectual property police. We can send them

²⁴³ i.e. EE-04, EE-05, EE-08 and EE-17.

²⁴⁴ i.e. EE-03 and EE-18.

²⁴⁵ Interview EE-04; see interview transcript, p.25.

²⁴⁶ Interviews EE-04 and EE-05.

²⁴⁷ Interview EE-04; see interview transcript, p.25.

complaints if necessary and they will investigate it. However, the level of respecting intellectual property in Egypt is less than [in] other countries”²⁴⁸.

This opinion is shared by a senior manager of a TTO in a higher education institution, who commented on the level of IPR protection and enforcement in Egypt: “Unfortunately, we do not have that mechanism and the culture is simply not there for that. Instead what we have is companies that are just happy to sell somebody else’s products”²⁴⁹.

6.4 Summary of findings

The extensive overview of Egypt’s NIS provided in this chapter offers significant insights into the nature of innovation support activities and their implementation throughout the country. The major findings are discussed in the following before reviewing Morocco’s NIS in the next chapter and, thereafter, conducting a comparative analysis of selected organisational schemes set up to support innovation in the two countries.

The starting point for the strategic definition of innovation and entrepreneurship support in Egypt is of particular interest in the context of this thesis. Despite general consensus among policy makers and academics world-wide that transplanting policies from more developed to less developed contexts usually does not lead to the expected results (e.g. Rodrik, 2004; North, 2009), Egypt’s Innovation and Entrepreneurship Strategy 2011-2014 is “based on benchmarking Egypt to other countries in terms of its innovative capabilities, the SWOT analysis and **best practices adopted by highly innovative nations**” (TIEC, 2011, p.49, emphasis added).

Evidence from several interviews indicates that the private sector is usually not asked to contribute to policy development²⁵⁰ and, in general, has minimal influence over the design, implementation and operation of innovation support mechanisms. However, despite limited in scope and mostly relating to the ICT sector (e.g. ITIDA

²⁴⁸ Interview EE-03; see interview transcript, p.20.

²⁴⁹ Interview EO-01; see interview transcript, p.111.

²⁵⁰ EO-04, EO-09, EO-10a and EO-10b.

and TIEC, but also IMC in other sectors), a number of sectoral innovation support initiatives have recently profited from some consultation with representatives from the industry²⁵¹.

Moreover, centrally planned initiatives are rarely launched with clear expected outcomes (e.g. achievement measurable via key performance indicators (KPIs) against declared targets), making post-implementation evaluations and impact assessments difficult when not impossible. In general, the majority of governmental innovation support programmes do not foresee such reviews²⁵². A significant exception is the RDI programme, whose performance is monitored via a limited amount of indicators (i.e. project beneficiaries, physical outputs including products, prototypes, patents and scientific publications, as well as return on investment). Furthermore, MHESR produces periodically an holistic overview of the country's innovation performance, the "Egyptian National Innovation Indicators Survey" and IMC tracks the export and employment performance of supported companies²⁵³.

Another major finding, or rather a confirmation, is the reluctance of businesses to collaborate with academia and vice versa²⁵⁴. Several governmental innovation support programmes try to stimulate public private partnerships (e.g. a professor for every factory, a joint initiative between IMC and STDF or some of the RDI and TIEC grants), however with limited success: the establishment of sectoral TTOs proceeds with difficulties despite recent successes on initiative of a private foreign university²⁵⁵.

These results are in line with the outcomes of other studies, which conclude that industry-academia collaboration is particularly weak in developing countries (e.g. Joseph, 2009) and especially so in Egypt (see for example Janischewski and Branzk,

²⁵¹ See for example Interviews EO-02a, EO-06, EO-07.

²⁵² See interviews EO-04, EO-05a, EO-08 and EO-09.

²⁵³ See section 6.3.3.4.

²⁵⁴ See interviews EE-03, EE-05, EE-07, EO-05b, EO-09, EO-10a, EO-10b.

²⁵⁵ See interviews EE-10, EO-05b, EO-09, EO-10a and EO-10b

2008; Fraunhofer Institute for Production Systems and Design Technology, 2010; Bond et al., 2012).

SMEs find it difficult, time-consuming and expensive to engage in R&D activities with large research institutes. However, the lack of trust between industry and academia may also be due to cultural factors. Characterised by long power distances, strong group orientation and high uncertainty avoidance, relationships within the Egyptian society tend to be personal and trust-based (Hofstede, 1991; Helmreich and Meritt, 1998; Hofstede, Hofstede and Minkov, 2010).

It is therefore not surprising that “triple-helix” collaborations, which denote “not only the relationship of university, industry and government, but also internal transformation within each of these spheres” and require participants to accept “the dynamics of a system which lives from the perturbations and interactions among its subsystems” (Etzkowitz and Leydesdorff, 2000, pp.118-119), are less common in Egypt.

Confirming the results of other studies on Egypt’s NIS (e.g. Janischewski and Branzk, 2008; Bond et al., 2012), public financial support to R&D and innovation is characterised by major bureaucratic burdens (e.g. long and complicated granting procedures). It could be expected that large firms would enjoy better access to information and comply more easily with requirements: this does not appear to be the case. While the majority of private sector interviewees for this research mainly consisted of CEOs of SMEs in the ICT sector, the sample included three representatives of larger corporations (see interview protocol in appendix IX). The field trip revealed that the experience with publicly administered innovation support mechanisms was very similar among large²⁵⁶ and small firms²⁵⁷ all but one experiencing excessive administrative burdens in their interaction with PA for accessing innovation support means.

²⁵⁶ See interviews EE-08 and EE-15.

²⁵⁷ See Interviews EE-01, EE-05, EE-07, EE-11, EE-13, EE-14, EE-16, EE-17 and EE-18.

Private sector initiatives, such as venture capital companies and business angels, have recently emerged to address the needs of those who do not get or do not seek financial support from public actors. The offer is, however, still very limited²⁵⁸. The slow development of this market can also be explained with the dominant values: venture capital investments usually involve high risks for investors and operators may not necessarily be considered trustworthy partners by fund seekers and vice versa.

An interesting trend, however, seems to be under way in the area of non-governmental financial and non-financial innovation support, i.e. the recent emergence of NGOs as innovation support entities²⁵⁹. Particularly interesting is the concept of MEK, an NGO headed by the highest religious authority advocating the collection of funds for innovation support from the broader public. This approach seems to have high potential for success in a strongly religiously minded community²⁶⁰.

The feedback collected on IPR management support is more diverse, indicating that in some cases larger companies may have a competitive advantage in managing more complex interactions with PA. One large pharmaceutical enterprise noted that the patent information is more transparent, advice is readily available and the patenting process is considerably facilitated by the staff of the EGYPO²⁶¹. However, all other participants who directly dealt with EGYPO expressed dissatisfaction with the support provided (more detail is provided in Chapter 8).

In general, there was high consensus among participants that IPRs are not respected nor properly enforced in Egypt²⁶². Firms often prefer to keep their inventions secret out of fear that others may copy their work unpunished²⁶³. This is in line with other

²⁵⁸ See interviews EE-04, EE-16, EE-17, EO-05c and EO-06.

²⁵⁹ e.g. Interview EO-11.

²⁶⁰ See for example EO-10a or EE-17.

²⁶¹ See interview EE-08.

²⁶² See interviews EE-02, EE-03 and EE-05.

²⁶³ See for example interviews EE-01, EO-01, EO-10a or EO-11.

studies' findings on the Egyptian innovation landscape and the related IPR issues (e.g. Fraunhofer Institute for Production Systems and Design Technology, 2010; Bond et al., 2012) and on the difficulties of enforcing IPRs in developing countries (Joseph, 2009).

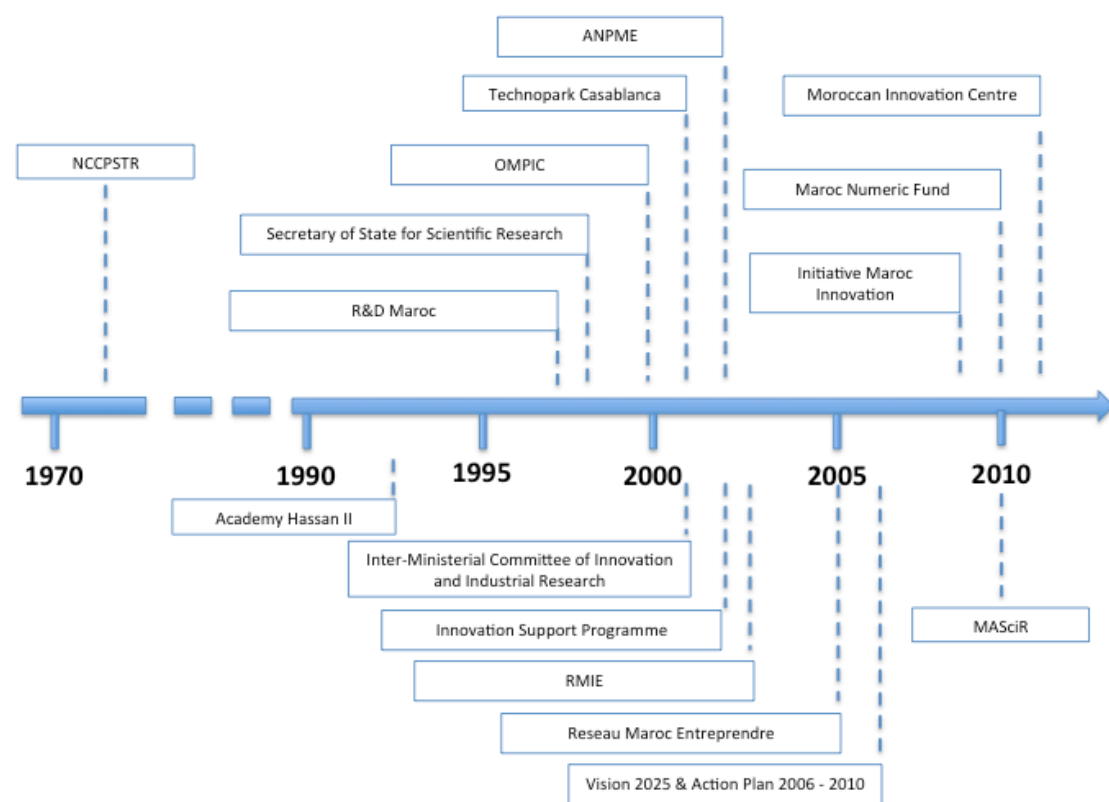
Chapter 7 presents in similar detail the NIS of Morocco and the summary of findings. The comparative analysis of selected organisational schemes within the two NIS follows in Chapter 8.

7 Organisational schemes in the NIS of Morocco

In this section, following the structure adopted for the first case study, the main events that have forged Morocco's NIS are summarised before outlining the country's industrial development strategy. Thereafter, the main actors of the Moroccan NIS are presented in greater detail and some preliminary qualitative evaluation of their effectiveness is presented on the basis of the interviews.

7.1 The making of the Moroccan NIS

Figure 28: The Evolution of the Moroccan NIS (1976 – 2011)



Source: Author

The maturation of the Moroccan NIS is recent, with most of its actors established since the late 1990s. The first step towards its formalisation was the creation of the **Centre National de Coordination et de Planification de la Recherche Scientifique et Technique**²⁶⁴ in 1976, which was transformed in 2001 into the **Centre National de la**

²⁶⁴ English: National Centre for the Coordination and Planning of Scientific and Technical Research

Recherche Scientifique et Technique²⁶⁵ (CNRST) and comprises research entities in strategically important areas (CNRST, 2011).

In 1993, the **Academy Hassan II** was established to promote scientific and technical research in Morocco by contributing to the definition of the national policy for scientific and technical research, evaluating and funding science and technology programmes and integrating related activities in the national and international socio-economic environment (Academy Hassan II, n.d.).

R&D Maroc followed in 1997. The private entity is involved in the development, execution and evaluation of most public sector initiatives relating to innovation support, and ensures the active involvement of the private sector in innovation and research policy implementation in Morocco²⁶⁶.

The creation of two entities marked the beginnings of a higher political commitment towards research and innovation in Morocco: the **Ministerial Office for Research at the Secretary of State** (1998) and the **Permanent Inter-ministerial Committee of Scientific Research and Technological Development**, established by the decree Nr. 2-00-1019 du rabii II 1422 in 2001 (MHESRPT, 2001).

The need for reform in the area of laws and procedures related to IPR led in 2000 to the merge of the Office for the Registration of Trademarks with the IP Division in the MTI to create a single entity in charge of all aspects related to IP, **Office Marocain de la Propriété Intellectuelle et Commerciale**²⁶⁷ (OMPIC), today offering a variety of services to entrepreneurs and enterprises²⁶⁸.

These reforms were followed by the creation in 2001 of the first technology park in Morocco, **Technopark Casablanca**, through a public-private partnership, a relatively new concept for Morocco at the time. Hosting the first incubator for the ICT sector in Morocco, in the past decade it has substantially contributed to the funding,

²⁶⁵ English: National Centre for Scientific and Technical Research

²⁶⁶ Interview MO-04; see interview transcript, pp. 355-365.

²⁶⁷ English: Moroccan Office for Intellectual and Commercial Property

²⁶⁸ Introduced in section 10.3.3.1; Interview MO-11; see interview transcript, pp.414-420.

development and commercialisation of ICT innovations, particularly from young entrepreneurs²⁶⁹.

The **Ministry of Trade, Industry and New Technologies (MTINT)** and the **Ministry of Higher Education, Scientific Research and Professional Training (MHESRPT)** launched in 2002 an integrated programme for innovation support, which resulted in the creation of the **Agence Nationale de la Petite et Moyenne Entreprise**²⁷⁰ (ANPME), in charge of programmes in the area of enterprise modernisation, and, one year later, of the **Réseau Marocain d’Incubation et d’Essaimage**²⁷¹ (RMIE), which comprises 13 incubators, 10 located in public universities, one in Technopark Casablanca and two in national research centres²⁷².

As of 2005, experienced entrepreneurs who are members of **Réseau Maroc Entreprendre**²⁷³ (RME), a private innovation and entrepreneurship support initiative part of the International Entrepreneurship Network, provide voluntary consultancy support to young entrepreneurs with innovative ideas²⁷⁴.

In 2006 the **National Strategy for the Development of Scientific Research by 2025** was published, setting priorities in the areas of “education and training”, “access to basic services (infrastructure, potable water, electricity, health, etc.”, “fight against poverty and social exclusion” and “other challenges: fight against droughts’ effects, environmental degradation, slums and diseases (AIDS, Malaria, etc.)” (Azzoui, 2011, p.16). The related **Action Plan 2006-2010** aimed at the modernisation of the corresponding governance structures and the provision of resources dedicated to scientific research and innovation (Azzoui, 2011).

The growing relevance of high-tech sectors led to the inclusion of nanotechnology, biotechnology and microelectronics into the long-term innovation strategy of

²⁶⁹ See interview MO-01 and section 7.3.3.3.

²⁷⁰ English: National Agency for the Promotion of SMEs

²⁷¹ English: Moroccan incubator and Spin-off Network

²⁷² Introduced in sections 7.3.3.4 and 7.3.3.3; see also interviews MO-09, MO-10a and MO-10b.

²⁷³ English: Moroccan Entrepreneur Network

²⁷⁴ Introduced in section 7.3.3.4; Interview MO-03; see interview transcript, pp. 351-354.

Morocco and sparked in 2007 the creation of the **Moroccan Foundation for Advanced Science, Innovation and Research** (MASciR). Initially an association, the entity was transformed into a foundation in 2010, when it officially started to conduct core applied research activities²⁷⁵.

The **Moroccan Innovation Initiative** set out in 2009 a comprehensive action plan with 13 detailed initiatives to be implemented by 2015. Part of the **Maroc Numeric 2013** initiative launched by the government in the same year, MTINT established in 2010 the **Maroc Numeric Fund** (MNF)²⁷⁶ to support innovative projects in the ICT sector in view of the increasing importance of the digital economy in the Arab world (MNF, 2010)²⁷⁷. Finally, with an agreement signed between MTINT, Ministry of Finance and ANPME in March 2011, the **Centre Marocain d’Innovation**²⁷⁸ (CMI) was established to finance innovation in key sectors, including biotechnology, IT, nanotechnology and renewable energy²⁷⁹.

7.2 The Moroccan national innovation strategy

In 2006, MHESRPT published the “**National Strategy for the Development of Scientific Research by 2025**”, which outlines the vision for Morocco in 2025 (i.e. “a Muslim and modern country with an open and competitive economy and a strong cohesive society conciliating specificity and universality” (MHESRPT, 2009, p.2)) and the pre-conditions for the realisation of its underlying objectives: modernising the country by fostering education and fighting poverty and exclusion.

The document lists 41 concrete measures to promote scientific research, development and innovation on a long-term basis. These measures mainly relate to the governance of research and innovation structures, human resources development and training, increased public R&D expenditure (to three per cent of

²⁷⁵ Interview MO-05a; see interview transcript, pp.366-373.

²⁷⁶ English: Digital Morocco Fund

²⁷⁷ See section 7.3.3.2.

²⁷⁸ English: Moroccan Innovation Centre

²⁷⁹ Introduced in section 7.3.3.2.

GDP), modernisation of funding mechanisms and incentive structures for researchers, improvements of communication and information channels, the promotion of public-private partnerships, strengthening of IPR and the intensification of international cooperation (MHESRPT, 2009).

Within this strategic framework, a number of high level themes considered critical towards strengthening the national research and innovation system were prioritised in the so-called “Plan d’Urgence 2009-2012”:

- *“Governance and performance of the national research and innovation system, including regulation, organisation, structure, coordination, evaluation, commercialisation, communication and information.*
- *Promotion, motivation and mobilisation of human resources, including recruitment strategy, improvement of working conditions, staff development, legal status of researchers and contract development.*
- *Diversification of financial resources and improving the financial management of research activities (e.g. public-private co-financing, sponsorship/foundations, customising financial management of research budgets).*
- *Increasing the scientific output of research activities and entities (moral and material incentives, visibility, encouraging international publications, support for scientific publications and events, restructuring the skills pool, updating of national research priorities, institutionalisation of innovation, doctoral research).*
- *Improvement of scientific infrastructure, R&D and innovation (technological platforms, commercialisation structures, science and technology monitoring, science parks and R&D centres, institutionalisation of incubators/interfaces, prototyping, technology platforms).*
- *International cooperation (politics, capitalisation, enlargement: Africa and the Arab world, joint research programmes, scientific exchange)” (MHESRPT, 2009, p.18)*

These themes echo the findings of a comprehensive study examining the situation of national R&D and innovation activities published earlier in the same year by the Academy Hassan II, which identifies a range of weaknesses of the Moroccan research system and recommends corresponding policy initiatives to strengthen the country’s NIS (Academy Hassan II, 2009). These are arranged around five axes, each proposing a set of measures to strengthen and advance Morocco’s NIS: strengthening and mobilising research staff (including evaluation of research and promotion of

researchers); financing and management of research activities; priorities, coherence and coordination of the national research system; partnerships with enterprise and science education; and development of a scientific culture (Academy Hassan II, 2009)²⁸⁰.

With a focus on teaching and education, MHESRPT²⁸¹ has cooperated with the MTINT and the **Confédération Générale d'Entreprises du Maroc (CGEM)**²⁸² to define and implement measures directly supporting innovation and R&D activities, addressing the high-level themes identified in the “Plan d’Urgence”. This resulted in **Initiative Maroc Innovation**²⁸³, a comprehensive road map for supporting innovation launched during the first Moroccan Innovation Summit in 2009 (MTINT, 2010). Its main goal is to position Morocco as a technology producer, developing a higher value-added economy, which can attract foreign investment. In March 2011, during the second Innovation Summit, two performance indicators were identified, namely the number of Moroccan patents filed by nationals and the number of new innovative start-ups, for which the 2014 targets were respectively set at 1,000 and 200 (MTINT, 2010).

The “National Strategy for the Development of Scientific Research by 2025” and the Morocco Innovation Initiative provide a consistent reference framework for R&D and innovation support policies. Eleven entities²⁸⁴ have signed a further agreement to implement the Kingdom’s **National Pact for Industrial Emergence (NPİE)** 2009-2015, which outlines the national industrial development strategy. This pact, whose vision and objectives are set out in Table 25, constitutes a separate set of policies defined

²⁸⁰ A detailed review of the policy initiatives recommended by the Academy is provided in Annex XVII.

²⁸¹ Mainly through the Directorate of Science and the Directorate of Technology (Interview MO-07).

²⁸² English: General Confederation of Moroccan Enterprises

²⁸³ English: Morocco Innovation initiative

²⁸⁴ Nine of these entities are public (i.e. Ministry of Justice; Ministry of Interior; Ministry of Economics and Finance; Ministry of Agriculture and Fisheries; Ministry of Higher Education, Scientific Research and Executive Training; Ministry of Employment and Professional Training; Ministry of Industry, Trade and New Technologies; Ministry of Foreign Trade and the Ministry delegated by the Prime Minister in charge of General and Economic Affairs) and two private (i.e. the General Confederation of Enterprises of Morocco and the Professional Group of Banks of Morocco).

at inter-ministerial level, focusing on strengthening six priority areas: off-shoring, automotive, aerospace, electronics, textile and food processing (MTINT, 2009, p.3). As of 2011 the scope includes further high-tech sectors, namely biotechnology, microelectronics and nanotechnology, with an additional 500 million Moroccan Dirham (MAD) / 50 million Euros available to conduct applied research in these areas²⁸⁵.

Table 25: National Pact for Industrial Emergence 2009-2015

Vision...	...and Objectives for 2015
1. Focus on sectors with competitive advantages	a) Creation of 220,000 direct jobs, reduction of urban employment
2. Improving the competitiveness of enterprises	b) Creating wealth through an increase in GDP of 50 billion MAD
3. Strengthening implementation capacity	c) Generate an additional volume of exports, 95 billion MAD
	d) Generate additional private investment of over 50 billion MAD

Source: *NPIE 2009-2015* - Ministry of Industry, Trade and New Technologies (2009, p.3)

The NPIE, with a total budget of 12.4 billion MAD²⁸⁶, foresees 111 measures to be implemented by 2015: 56 to develop and strengthen the priority sectors, 48 to increase the competitiveness of related enterprises and seven to support the governance, implementation and evaluation of the pact (MTINT, n.d.).

Furthermore, the NPIE aims at attracting inward FDI by introducing financial incentives as well as (further) developing industrial integrated platforms. It also sets out to improve R&D capacities of enterprises, but does not define explicit objectives as to which levels R&D activities shall be increased or what the priorities are in this context. However, an explicit plan is introduced for the establishment of organisational schemes that would support competitiveness, but also bear potential to support innovation directly. This refers to the progressive introduction of a network of 16 integrated industrial platforms: nine sector-specific, five generalist

²⁸⁵ Interview MO-05a; see interview transcript, p.372.

²⁸⁶ one Moroccan Dirham (MAD) = 0.12 USD (As of 29/01/2014)

and two “regional/national”²⁸⁷ (NPIE, 2009). Moreover, the strategy envisages the development of four so-called “SME cities” or technology parks (three generalist and one high-tech) where innovative enterprises would be incubated. These technology parks could be situated in four of the nine integrated industrial platforms outlined above (NPIE, 2009).

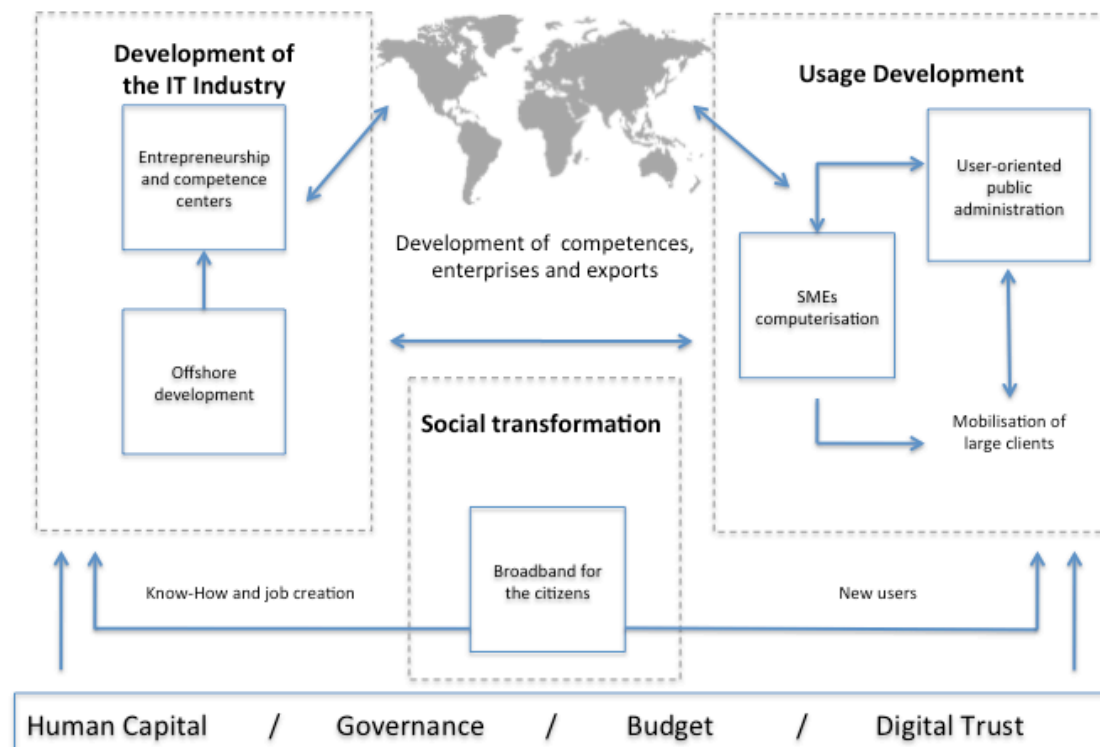
Finally, the NPIE indirectly supports innovation with the facilitation of administrative procedures and the improvement of governance structures and processes, like the set-up of one-stop shops for company creation within the Regional Investment Centres, the fight against corruption, the modernisation of the legal framework for business activities as well as the annual monitoring of the NPIE implementation (NPIE, 2009).

In October 2009, under the leadership of MTINT, the Moroccan government launched its strategy for the ICT sector, **Maroc Numeric 2013**, defining 18 initiatives and 53 corresponding measures to be taken by the end of 2013. Four strategic priorities were identified: social transformation, user-oriented public administration, productivity of SMEs and development of the IT industry. The implementation of the initiatives relied on the development of four capabilities: human capital, governance, budget (i.e. management of resources) and digital trust (Figure 29) (MTINT, 2009).

To address **social transformation**, the Ministry for National Education (MNE) has launched two programmes: *GENIE*, pushing the use of ICT for education in all educational institutions (total budget 1.715 million MAD) (MNE, 2011), and *Injaz*, providing high-speed Internet and laptops to students in higher education institutions (MNF, 2010).

²⁸⁷ The generalist industrial platforms are: Industrial Platform of Casablanca (comprising an area for Electronics), Tanger Free Zone, Industrial Platform of Fes, Industrial Platform of Laayoune and Industrial Platform of Dakhla. Six platforms are dedicated to Offshoring: Casanearshore, Rabat Technopolis, Fes Shore, Tetouan Shore, Oujda Shore, Marrakech Shore. Two are dedicated to the Automotive sector: Tanger Automotive City and Kentira Atomotive City. Finally, Nouasser Aerospace City dedicated to the Aeronautic industry (encompassing also an area for the Electronics industry). The two “regional/national” platforms are in Settat, dedicated to a group of Spanish industrial enterprises, and one additional platform for which the exact location still remains to be determined (NPIE, 2009). The government is also considering the introduction of agricultural industrial platforms (“agropoles”) in six Moroccan cities, i.e. Meknes, Oriental, Souss, Gharb, Haouz and Tadla.

Figure 29: Maroc Numeric 2013 Strategic Priorities



Source: Adapted from *Maroc Numeric 2013* (2010)

The attainment of a **user-oriented public administration** relied mainly on the E-Government initiative to answer the needs of the citizens, increasing the efficiency and effectiveness of public services as well as their transparency and quality. Key performance indicators have been identified with corresponding targets for 2013: Morocco's scoring in the UN E-Government index (from 0.2 in 2008 to 0.8 in 2013); number of E-government services (from 16 in 2008 to 89 in 2013); percentage of enterprises with a turnover greater than 100 million MAD using transactional e-services (from less than one per cent in 2008 to 100 per cent in 2013); and number of E-Government websites ranked within the top 100 ".ma" sites (from one in 2008 to five in 2013) (EGOVMA, 2011)²⁸⁸.

²⁸⁸ The latest available UN E-Government report, 2012 edition was published in 2013 (status as of 20 June 2014). According to the Moroccan government, by 2013 E-Government services increased from 16 in 2008 to 56, 100 per cent of Moroccan enterprises are now using transactional online services and the number of E-Government websites ranked within the top 100 .ma sites was 10. These results, even if not all objectives have yet been reached, indicate that the attention the Moroccan government is paying to AE is producing positive results (EGOVMA, 2014).

The government aimed to increase the **productivity of SMEs** by supporting their computerisation, mobilising public and private decision-makers to promote and accelerate that process with incentives for using ICT in their operations²⁸⁹ (MTINT, 2009).

The **development of the ICT industry** focused on the creation and growth of centres of excellence with high export potential. Initiatives included the launch of CMI²⁹⁰, the establishment of MNF to support innovative start-ups in the ICT sector, the creation of Technopark Rabat modelled after the existing Technopark Casablanca, and the creation of an IT cluster (MTINT, 2009).

7.3 The NIS of Morocco

In the next sections selected actors of the Moroccan NIS are presented in more detail (Table 26). As for the Egyptian NIS, formal institutions informed by culture, norms and values of the society are represented at the highest level by the political institutions, which elaborate and regulate national policies (Groenewegen and van der Steen, 2006). In Morocco, institutions defining and implementing innovation policies include the Permanent Inter-ministerial Committee for Scientific Research and Technological Development, the National Business Environment Commission and the Hassan II Academy of science and Technology.

At the operational level, two ministries are particularly effective: MHESRPT (mainly through the Directorate of Science and the Directorate of Technology) and MTINT. The Ministry of the Modernisation of Public Sectors has initiated reforms relating to administrative simplification. Further relevant intermediary organisations are detailed in the next sections as well as organisational schemes, like technology parks, incubators and technology transfer offices, which are increasingly supporting research and innovation in Morocco.

²⁸⁹ See *Moussanada* programme in section 7.3.3.4.

²⁹⁰ Introduced in section 7.3.3.2.

Table 26: Selected actors of Moroccan NIS

Layer 2: High-level Political Institutions
<ul style="list-style-type: none"> • Permanent Inter-Ministerial Committee • National Business Environment Commission • Hassan II Academy of Science and Technology
Layer 3: Formal Institutions (operational level)
<ul style="list-style-type: none"> • Ministry for Higher Education, Scientific Research and Executive Training • Ministry of Industry, Trade and New Technologies • Ministry of the Modernisation of Public Sectors • Other ministries
Layer 4: Organisational schemes supporting Innovation
<ul style="list-style-type: none"> • Governance (schemes providing or supporting a regulatory framework) <ul style="list-style-type: none"> ○ Office Marocain de la Propriété Intellectuelle et Commerciale • Funding (schemes offering or promoting financial support) <ul style="list-style-type: none"> ○ Centre Marocain de l'Innovation ○ Maroc Numeric Fund • Infrastructure (schemes offering technological infrastructure or means for its development) <ul style="list-style-type: none"> ○ Moroccan Foundation for Advanced Science, Innovation and Research ○ Technopark Casablanca ○ Réseau Maroc Incubation et Essaimage • Capacity building (schemes promoting awareness, knowledge exchange and positioning of R&D outputs) <ul style="list-style-type: none"> ○ National Centre for Research in Science and Technology ○ Agence Nationale de la Petite et Moyenne Entreprise ○ R&D Maroc ○ Réseau Maroc Entreprendre ○ Maroc Entrepreneurs

Source: Author

7.3.1 High-level Political Institutions

The *Comité Permanent Interministériel pour la Recherche Scientifique et le Développement Technologique*²⁹¹ (CPIRSDT) is chaired by the Prime Minister and

²⁹¹ English: Permanent Inter-Ministerial Committee for Scientific Research and Technological Development

includes government representatives in charge of science and technology in their respective entities (Boshoff and Kleiche, 2007). This high-level committee plays a key role in policy development, advice and implementation, being in charge of advising government on strategy for the promotion of public scientific and technical research as well as coordinating and monitoring scientific and technical research conducted by research entities affiliated to the different ministerial departments.

Furthermore, it contributes to the definition of guidelines for projects implemented within science and technology research programmes, advising the government on the allocation of resources to various research programmes and projects in line with national priorities (MHESRPT, 2001).

In 2002, Morocco and France signed an agreement to encourage research in industrial entities as well as promote research collaboration between enterprises and universities with the financial support from the French *Fonds de Solidarité Prioritaire*. When the agreement expired in 2007, the committee decided to continue the activities with support of MTINT, CNRST, OMPIC and R&D Maroc in the ***Programme d'Appui à l'Innovation et au Développement Technologique***²⁹² which foresees four main actors²⁹³:

- RMIE²⁹⁴;
- the Moroccan Institute of Scientific and Technological Information (IMIST);
- Réseau de Diffusion Technologique (RDT)²⁹⁵; and
- The Industrial Engineering Network, which organises expert training in the area of industrial engineering (e.g. “technical audits, training of trainers, etc.”) (Belcadi, 2006 in Boshoff and Kleiche, 2007, p.30).

²⁹² English: Programme for the Support towards Innovation and Technological Development

²⁹³ Interview MO-07; see interview transcript, pp. 379-388 and MHESRPT (2011).

²⁹⁴ See 7.3.3.3.

²⁹⁵ English: Technology Dissemination Network.

Several participants mentioned another committee managing funds for CPISRDT and intermediating between CPISRDT and CMI. However, this structure was replaced in 2012 by the **Inter-Ministerial Committee for Innovation and Industrial Research**, presided by the head of government²⁹⁶.

The **Hassan II Academy of Science and Technology** complements the activities of the CPISRDT, providing highly relevant input to the government for the elaboration of the national innovation strategy. Its mission can be summarised as follows:

“[...] promoting and developing the scientific and technical research, contributing at setting the general orientations for the scientific and technological development, making pertinent recommendations regarding the national priorities in terms of research, evaluating the research programs and ensuring their grants and contributing at integrating the Moroccan scientific and technical research activities within the national and international socio-economical environments” (Academy Hassan II, n.d.).

Examples of the Academy's role are the study on national R&D and innovation activities published in March 2009 mentioned above (Academy Hassan II, 2009) as well as its participation in the development of indicators for a national science and technology information system (IS). However, in the view of a participant with substantial experience with innovation support programmes, the positioning of the Academy and the corresponding responsibilities in the area of innovation support require clarification²⁹⁷.

Created in December 2009, the **Commission nationale de l'environnement des affaires**²⁹⁸ (CNEA) is a public-private body in charge of conducting wide-ranging reforms in four areas: the simplification and reinforcement of the transparency of administrative procedures; the modernisation of the legal framework for business; the improvement of the resolution of commercial litigations; and the improvement of communication in relation to reform initiatives²⁹⁹.

²⁹⁶ See Interviews MO-04 and MO-14.

²⁹⁷ Interview MO-04; see interview transcript, p.360.

²⁹⁸ English: National Business Environment Commission

²⁹⁹ See Interviews MO-06 and MO-13.

The latter is particularly important to increase awareness of governmental support and reform initiatives, especially among SMEs: “There are many initiatives that are launched, but when we talk to the private sector, if we exclude the large entities, there are only a few that are aware of the projects that are being implemented”³⁰⁰.

The commission brings previously dispersed initiatives and reform programmes of different governmental bodies under one umbrella, following the feedback received from the private sector. The governing body is presided by the head of government and composed of high-level representatives from public and private entities^{301 302}.

Several international organisations have supported its creation. The World Bank provided technical assistance for the set-up and EU and USAID offered financial support. UNCTAD helped in the decentralisation of certain administrative procedures, building an IS for administrative procedures at regional level: regional committees within the **Regional Investment Centres**, modelled on the CNEA itself, should disseminate the information in their area of competence³⁰³.

To simplify administrative procedures for businesses, CNEA has identified 30 procedures perceived as most burdensome or problematic. It started in 2010 with the company creation process, eliminating the requirement for minimum capital and reducing the number of documents requested for company registration³⁰⁴. This work is conducted in “public-private working groups”, involving the MTINT, the Ministry of Justice, the CRIs, private consultancy firms and the CGEM. The latter had developed

³⁰⁰ Interview MO-13; see interview transcript, p.422.

³⁰¹ The Commission is chaired by the Prime Minister. Permanent members are: the Minister for Justice; the Minister for the Interior; the General Secretary of the Government; the Minister of Economy and Finance; the Minister for Industry, Trade and New Technologies; the Minister in charge of Foreign Trade; the Minister Delegate near the Prime Minister in charge of Economic and General Affairs; the Minister Delegate to the Prime Minister in charge of Public Sector Modernization; the Director General of the Moroccan Agency for Investment Development; the President of the General Confederation of Enterprises of Morocco; the President of the Professional Association of Banks in Morocco; the President of the Moroccan Federation of Chambers of Commerce, Industry and Services. Public and private organisations concerned by the agenda may be invited to meetings of the National Commission to contribute to its work.

³⁰² Interview MO-13; see interview transcript, p.421 and CNEA (2013).

³⁰³ Interview MO-13; see interview transcript, p.422.

³⁰⁴ See interviews MO-13 and MO-06.

the so-called “white book”, containing reform proposals from the private sector. At the time the interview took place, CNEA was also working with tax authorities towards reducing red tape (e.g. number of stamps and certified copies of documents) as well as fees requested for company registration³⁰⁵.

An important point of reference for the activities of CNEA is the World Bank’s Doing Business Report (for which it is the main contact point in Morocco), which outlines 11 indicators directly related to administrative procedures: “[...] this really allows to have an idea and to be evaluated upon the procedure itself. What we take into account in the reforms in our action programme is that we track the Doing Business Report”³⁰⁶.

Furthermore, within the framework of **Maroc Numeric 2013**, CNEA intends to enable entrepreneurs to conduct the entire company registration process online following a recent reform of the law on limited liability enterprises which introduced “the notion of digitalisation”, enabling the full digitalisation of administrative procedures in the future. A first step was the online provision of digital forms by the centres, which can be downloaded and printed³⁰⁷.

According to an employee of CNEA, enterprises have problems in acquiring correct information on administrative procedures (e.g. necessary documentation or duration): “Today information is available on in-shop posters, is published or you need to ask people, it depends on the institution”³⁰⁸.

Building on consultations with the EU and existing procedures in Belgium and France, CNEA aims at having “forms that are certified by an organism, something similar to the ISO certification [...] in this [administrative] form there is a list of necessary papers, so when someone comes to the administration, he knows exactly what is required and nobody can ask him for additional papers/documents”. The expected

³⁰⁵ Interview MO-13; see interview transcript, p.424.

³⁰⁶ Interview MO-13; see interview transcript, p.425.

³⁰⁷ Interview MO-13; see interview transcript, p.425.

³⁰⁸ Interview MO-13; see interview transcript, p.426.

duration of administrative procedures should also be clearly indicated on administrative forms³⁰⁹.

Additional work in progress at CNEA includes efforts and consultations with banks to facilitate the access to finance for SMEs as well as a range of activities related to the formalisation of informal enterprises (almost one third of enterprises in Morocco), whereby “financial incentives” are foreseen “to ‘gently’ support their move”³¹⁰.

CNEA is introducing evaluation mechanisms in the public administration, whereby the planned realisation of governmental programmes/activities would be compared against the actual on a regular basis using pre-defined objectives and quantitative key performance indicators. At the time of the interview, CNEA had not yet conducted any impact assessment studies of its own activities, however, in the words of a CNEA employee: “We really want to enter in this notion of evaluation, with the possibility for sanctions when objectives are not met. [...] Eventually this is the difficulty: introducing in the notion of the public service the notion of performance”³¹¹.

The World Bank and USAID support these efforts within a project on the evaluation of reform initiatives, starting with reforms related to “property, taxation and justice”, whereby users of administrative services will be tracked and surveyed during and after their interaction with the public administration to identify areas for improvement³¹². Examples of administrative simplification for businesses positively evaluated by CNEA are **Badr System** (online processing of customs procedures) and the online services for submitting tax payments. These were however criticised by some private sector participants³¹³.

³⁰⁹ Interview MO-13; see interview transcript, p.427.

³¹⁰ Interview MO-13; see interview transcript, p.428.

³¹¹ Interview MO-13; see interview transcript, p.427.

³¹² Interview MO-13; see interview transcript, p.428.

³¹³ See Interviews ME-11 and ME-18.

Furthermore, the central entity in charge of fighting corruption in Morocco³¹⁴ developed “an alert-mechanism against administrative abuse” in cooperation with the German Agency for International Cooperation and the CGEM in October 2010: an online portal (stopcorruption.ma) allows enterprises to anonymously report negative experiences of corruption or administrative burdens (e.g. delays of procedures or improper handling of files). The portal is an important point of reference for the activities of CNEA³¹⁵.

CNEA is relatively new and probably better known by larger companies. None of the private sector participants was aware of its activities in relation to administrative simplification, pointing to the need for a targeted information campaign.

7.3.2 Political institutions for policy development and implementation

7.3.2.1 Ministry for Higher Education, Scientific Research and Professional Training

The MHESRPT is in charge of elaborating and implementing government policies related to higher education and scientific research and has a lead role in initiatives related to capacity building (MHESRPT, n.d.). Accordingly, it is responsible for planning, coordinating and evaluating the activities in the area of (professional) training and leadership in collaboration with other relevant ministries³¹⁶.

³¹⁴ French: “*Instance Centrale de la Prévention de la Corruption*” (ICPC)

³¹⁵ Interview MO-13; see interview transcript, p.426.

³¹⁶ The activities of the Ministry include: implementing the national system for higher education as well as overseeing its application and elaborating reforms; establishing and encouraging basic and applied research; maintaining dynamic cultural cooperation – bilaterally and internationally; elaborating plans for the development of higher education in universities, overseeing their execution and evaluating the educational university system; undertaking social, cultural and sports activities on behalf of students; exercising administrative, scientific and pedagogic control over private higher education; preparing projects as well as all legislation and regulation concerning higher education and scientific research; assure the superiority of universities and of the national centre for the coordination and planning of scientific and technical research; implementing administrative acts relating to physical and intellectual property of higher education establishments and scientific research conducted at public universities, managing related budgets research personnel.

The ministry was created through a merger between the previously existing Ministry of Higher Education and Professional Training and the Ministry of Scientific Research. The main department in charge of innovation support is the Department for Technology. Its activities focus on public-private partnerships between universities and enterprises and on increasing awareness of the importance of R&D and innovation among SMEs, which represent over 90 per cent of Moroccan enterprises (MHESRPT, n.d.)³¹⁷.

According to an employee of the Department for Technology, “the principal mission is fundamentally the rapprochement of universities and enterprises, creating the bridge between the world of research and the world of the enterprise” with the main purpose of tackling the relatively high unemployment rates in Morocco, particularly among the young population. To achieve this, the MHESRPT Technology Department tries to increase awareness of the importance of R&D and innovation among young graduates by linking their research projects to market needs and incentivises SMEs, through a range of inter-ministerial programs and projects, to conduct internal R&D³¹⁸.

The latter represents a particular challenge for the MHESRPT, as most SMEs are family-owned businesses, which according to the interviewee from MHESRPT do not particularly welcome innovation activities:

“When we talk to them [SMEs] about innovation and R&D, it is as if we would tell them that they have to leave what they know to do in order to introduce something that they do not know how to do and cannot control. This is not automatically accepted by them”³¹⁹.

A promising initiative to hone the collaboration between academia and industry collaboration was enabling spin-off enterprises to be created out of university

³¹⁷ See also Interview MO-07; see interview transcript, pp.379-388.

³¹⁸ Interview MO-07; see interview transcript, p.379.

³¹⁹ Interview MO-07; see interview transcript, p.379.

research projects³²⁰. However, it has not led to satisfactory results, as private entrepreneurs seem to lack trust in academic institutions. The ministry is well aware of the situation: “This is an issue as we cannot directly intervene inside the companies, however we try to influence with communication, seminars, invitations to all the manifestations we prepare, diffusion of information, we are trying to sensitise [...]”³²¹.

Despite these efforts, none of the participants from private enterprises mentioned the MHESRPT as an innovation support entity. The MHESRPT usually implements its initiatives in collaboration with other public and private entities, introduced in the following sections, for which the awareness appears to be higher.

One of the major innovation-related activities of the Technology Department at the MHESRPT is the elaboration of the Moroccan Innovation Initiative, devised in cooperation with MTINT, ANPME, OMPIC and R&D Maroc (the latter representing the private sector)³²².

The MHESRPT, together with MTINT and CGEM, is in charge of implementing the innovation strategy for Morocco and major revisions of the previous strategy took place in 2009, following a confidential study on the gaps and issues within the innovation strategy at the time. The study covered a large international benchmarking exercise and its results revealed an urgent need to undertake considerable restructuring activities in the national innovation support system. The major difference to past support mechanisms is that the new strategy proposes a support structure that addresses each stage in the innovation life cycle, including idea generation, prototyping, incubation and the creation of an innovative enterprise³²³.

³²⁰ Dahir No. 1.00.199 of 15 Safar 1421 (19 May 2000) promulgating the Law No. 01.00 on the organisation of higher education.

³²¹ Interview MO-07; see interview transcript, p.385.

³²² Interview MO-07; see interview transcript, p.382.

³²³ Interview MO-07; see interview transcript, p.382.

The new strategy was announced to the scientific and industrial community during the first public Innovation Summit in 2009, which was organised by all Ministries involved in the strategy elaboration and implementation. A second gathering, the “National Innovation Summit”, took place in 2011, where achievements, the status quo and outstanding activities were presented to the public³²⁴. One of the major outcomes was the creation of the Moroccan Innovation Centre, a one-stop shop for the distribution of funds related to innovative projects.

A public entity under private management was created for that purpose: “To avoid that people are dispersed between the Ministry of Research, the Ministry of Industry and the ANPME, it was part of the strategy to have a one-stop shop that we call Centre Marocain d’Innovation with a private management”³²⁵. According to the interviewee, the new structure will allow for an easier distribution of funds, as laws for public funds distribution do not apply and it will facilitate the monitoring of projects, their follow-up and impact assessment within a single privately managed entity³²⁶.

As the involvement of MHESRPT in concrete and targeted innovation support activities is relatively recent (Innovation Summit 2009 and 2011), no impact assessment of the related initiatives has yet taken place. According to the Ministry, the next innovation summit (planned for 2013, but not yet taken place at the time of the submission of this thesis) would serve as an opportunity to showcase the achievements and evaluate the impact of the measures taken so far³²⁷.

7.3.2.2 Ministry of Industry, Trade and New Technologies

The MTINT is in charge of the conception and implementation of government policies related to industry, trade and new technologies. Within the wide range of responsibilities of the ministry, the following are more relevant for this research:

³²⁴ Interview MO-07; see interview transcript, p.383.

³²⁵ Interview MO-07; see interview transcript, p.383.

³²⁶ Interview MO-07; see interview transcript, pp.383-384.

³²⁷ Interview MO-07; see interview transcript, p.388.

- elaborating strategies for the development of industrial sectors, industry and new technologies and breaking them down into operational programmes;
- elaborating strategies for the development of investments and the improvement of the competitiveness of SMEs and breaking them down into operational programmes;
- promoting innovation in industrial sectors and in the area of new technologies;
- developing and coordinating local industrial, commercial and technological structures as well as clusters (MTINT, 2010).

Together with ANPME, CNRST and CMI, the Ministry manages three major innovation support programmes (i.e. *INTILAK*, *TATWIR* and *PTR*) and provides financial support for two programmes launched within the NPIC (i.e. *IMTIAZ* and *MOUSSANADA*). While maintaining a coordination role, particularly in the communication processes, the MTINT has delegated the operational management of the programmes to other entities³²⁸.

The reforms undertaken by the Ministry are based on studies of innovation policies in a range of countries³²⁹ as well as on references obtained from international organisations, such as the OECD, the World Bank and UNESCO³³⁰. Supported by an international consultancy firm, an inter-ministerial task force charged with analysing the existing legal framework for innovation and research activities has considerably inspired the **Moroccan Innovation Initiative**. Important changes in the legal framework were initiated in 2012 and continued in 2013, in particular:

“the statute of the young, innovative enterprise, the spin-off framework, the industrial convention on research training, and also the definition of research and development and of innovation. Then there are also other deliverables that

³²⁸ i.e. *INTILAK*, *TATWIR* and *PTR* to CMI and *IMTIAZ* and *MOUSSANADA* to ANPME, see sections 7.3.3.4 and 7.3.3.2

³²⁹ for example Germany, Singapore, South Korea and Turkey.

³³⁰ Interview MO-14; see interview transcript, p.435.

*are related to the statute of the researcher, to intellectual property, the sharing agreements of intellectual property rights, etc.*³³¹.

The corresponding action plan is structured in four areas. The first one, **governance and legal framework**, has led to the implementation of an Inter-Ministerial Innovation Committee replacing the Permanent Inter-Ministerial Committee for Scientific Research and Technological Development and to the creation of a one-stop shop³³² in charge of managing funds for several innovation programmes.

Furthermore, MTINT entrusted an international consulting firm (Deloitte) to conduct a study of the legal framework for innovation in Morocco in cooperation with several stakeholders of the Moroccan NIS (e.g. to improve the promotion of spin-off companies or clarify the definition of a “young innovative enterprise” or of what constitutes R&D activities) (MTINT, 2012).

The second area focuses on ensuring the necessary **infrastructure** with dedicated technical centres per industrial sector meant to support enterprises. MTINT launched a comprehensive study in 2011 defining a strategic development plan for these centres for the period 2013-2016. The study is confidential, however its main aims are public and include the establishment of strategic, organisational and technological evaluation tools for the centres, the definition of their new positioning in terms of responding to the needs of the concerned industrial sectors, the definition of an efficient governance and management structure and the implementation of an appropriate financing system for the technical centres (MTINT, 2012).

A further initiative focuses on “innovation cities” hosting incubators, market-oriented R&D centres and technology transfer offices: 14 should be attached to Moroccan universities by 2014, starting with University Mohammed V in Rabat, University Cadi Ayyad in Marrakech, University Hassan II in Casablanca and University Med Ben Abdellah in Fes (MTINT, 2012).

³³¹ Interview MO-14; see interview transcript, p.435.

³³² Moroccan Innovation Centre (CMI), see section 7.3.3.2.

In parallel, the MTINT supports the development of 15 clusters in priority sectors with a dedicated fund of 62 million MAD (6 million Euros) for the period 2011-2013. A first call for projects was launched in 2011 and four clusters have been selected³³³. A second call for projects followed in February 2012 and was closed in August 2012, but no information on the outcome is available yet (MTINT, 2012).

The third area covers the access to **funding**. Two main investment funds were created in March 2011, namely the Innovation Support Fund (380 million MAD/ 38 million Euros) and the Programme for Financing R&D in the Field of Advanced Technologies (50 million MAD/ 4.5 million Euros) (Rabat Chamber of Trade, Industry and Services, 2012).

A second group of initiatives attempt to stimulate venture capital, as limited venture capital funding is currently available in Morocco³³⁴ (Azzoui, 2012). Finally, the development of the IP market is considered a priority and in this context OMPIC has initiated a range of activities to promote IP, disseminate related information and increase public awareness of the importance of IPRs³³⁵.

The fourth area addresses the **mobilisation of talents**. Initiatives include the creation of the Moroccan Innovation Club³³⁶, the promotion of an innovation culture³³⁷ and the “Innovative Enterprise Trophy”, a prize awarded since 2011 by MTINT in cooperation with CGEM and *R&D Maroc* to innovative enterprises in several categories. Incentives are also offered to R&D centres, subsidising locations and equipment, and to technological universities, funding professorships to be filled by globally recognised researchers (MHESRPT, n.d.).

³³³ These include the ICT Cluster (Maroc Numeric Cluster), the Morocco Microelectronics Cluster, The Morocco Electronics and Mechatronics Cluster and the “Oceanopole de Tan Tan” Cluster, which aims at commercialising products of the sea.

³³⁴ Maroc Numeric Fund and other initiatives are presented in section 7.3.3.2.

³³⁵ see section 7.3.3.1.

³³⁶ The Moroccan Innovation Club is an integrated online platform launched in March 2011 by the MTINT in cooperation with partners meant to offer information to innovation and entrepreneurship projects and enable for information exchange between the Moroccan and foreign innovation community.

³³⁷ e.g. introduction of university modules on entrepreneurship and provision of mentoring, coaching and support for students with innovative project ideas.

Finally, several conventions, signed in March 2011 at the National Innovation Summit, target the creation of SMEs through the CRIs and the upgrading of the managerial, technological and organisational capabilities of existing companies in specific sectors through ANPME.

Other parts of the Moroccan Innovation Initiative, such as the implementation of the Moroccan Innovation Club and the introduction of innovation and entrepreneurship modules in higher education institutions, together with inter-ministerial efforts and international consultancy expertise, have enabled the Moroccan Government to develop a comprehensive innovation strategy and define clear objectives to be pursued in the short-, medium- and long-term³³⁸.

In addition to leading the Moroccan Innovation Initiative, the MTINT is working towards establishing a comprehensive database of R&D and innovation information and indicators, which in the words of an employee, should serve as: “[...] a repertoire of official reference for the situation of innovation in Morocco” and finally reach “[...] a stage of implementing national observatories for technology and innovation”. This work is still in the development phase and eventually will support international benchmarking³³⁹.

In terms of impact assessment, the MTINT has not yet conducted any studies that would provide an insight into the socio-economic impact of the programmes implemented in the framework of the Moroccan Innovation Initiative, nor cost-benefit analyses of the single initiatives³⁴⁰.

As in the case of the MHESRPT, private sector participants remain largely unaware of the exact activities of the MTINT in the area of innovation support, as the support mechanisms and funding are largely announced and distributed by other entities (e.g. CMI, ANPME), which interact directly with applicants.

³³⁸ Interview MO-14; see interview transcript, p.435.

³³⁹ Interview MO-14; see interview transcript, p.434.

³⁴⁰ Interview MO-14; see interview transcript, p.436.

Only one private sector participant remarked that the MTINT has several programmes for supporting innovation and start-ups, the take-up of which is however relatively low, due to large administrative burdens placed on the applicants:

[...] in terms of administrative procedures it is really complicated, they [MTINT] are not entering quickly, they are not reactive, and they are not proactive with people who would like to benefit from these programs. At the end you can see them on TV saying that nobody is making use of those programs and that nobody is coming, but this is not the reality. People are trying to get help, but the answer is really weak in terms of proactivity. It is too complicated and it takes a lot of time and people don't have that much time for this”³⁴¹.

7.3.2.3 Ministry of the Modernisation of Public Sectors

The **Ministry of the Modernisation of Public Sectors** (MMPS) was established already in 1956 to simplify administrative procedures for Moroccan businesses and citizens. For this purpose, it chairs the National Commission, an inter-ministerial committee where the majority of the Ministries is represented. This is supported by “sector-specific” commissions, which examine the administrative procedures related to a specific sector and propose simplification measures for validation by the National Commission. A senior employee of the ministry explained:

“the objective of the simplification is [...] to reduce delays for citizens, [...] the amount of paperwork and [...] the number of interventions. The objective is above all to remove everything that is not required by law” and “[...] to transcribe and simplify the procedures and digitalise them thereafter”³⁴².

The Ministry has put in place a web portal, where “more than 700 procedures” can be accessed online³⁴³. The portal does not allow for the completion of services online, but rather provides information on the procedures as well as links to the web sites of other governmental entities where certain procedures can be completed online (e.g. the payment of the value-added tax). The procedures are outlined in

³⁴¹ Interview ME-13; see interview transcript, p.283.

³⁴² Interview MO-06; see interview transcript, p.375.

³⁴³ www.service-public.ma, several procedures relevant for innovation support are included (e.g. how to manage IPRs).

detail and the responsible departments of PA can directly update the content using a unique login ID and password. The National Commission reviews the changes before they become available to the public³⁴⁴.

An additional committee, the Strategic Committee for Information Systems, has been created to oversee the digitalisation of administrative procedures. In 2013, the MMPS listed 89 public services to be digitalised with the help of this committee³⁴⁵.

Another working group created under the auspices of MMPS in cooperation with CNEA aims at intervening in four major areas:

1. "Identification of procedures related to enterprises"
2. "Simplification of the business creation procedure"
3. "Elaboration of a legal framework for common identification for the enterprise"
4. "Implementation and development of an alert mechanism that allows the enterprise to make complaints related to corruption"³⁴⁶.

The MMPS maintain close links with the OECD, consulting their studies on good practices in the area of administrative simplification. A revision of administrative simplification practices from Belgium, Canada and France, all French speaking countries, has taken place and the Ministry is in general very interested in good practices from Europe³⁴⁷.

At the time interviews took place, the MMPS had not conducted any cost-benefit analyses or impact assessments of its initiatives. As the interviewee remarks "it is quite difficult to determine the costs of each service [...]. Even in the private sector there are issues with that [...]. In the administration it is not easy. We should do it as well, as it would be a gain for the citizen"³⁴⁸.

³⁴⁴ Interview MO-06; see interview transcript, p.375.

³⁴⁵ Interview MO-06; see interview transcript, p.376.

³⁴⁶ Interview MO-06; see interview transcript, p.376.

³⁴⁷ Interview MO-06; see interview transcript, p.377.

³⁴⁸ Interview MO-06; see interview transcript, p.377.

However, the Ministry has conducted with the support of an international consultancy firm a survey to identify the most “complicated” administrative procedures for firms and the general public. A total of 100 procedures requiring substantial simplification were identified, 70 relating to processes between the government and citizens and 30 to those between government and businesses. Within the latter, company creation was particularly in need of attention and is one of the first to be tackled with the help of the CRIs³⁴⁹.

7.3.2.4 Other Ministries

The **Ministry of Economy and Finance** (MOEF) runs a range of financial support programmes for start-ups and SMEs relevant in the context of this research: **Moukawalati** [Arabic for “my enterprise”] to encourage entrepreneurship among young Moroccans, the **Guarantee for Loans to Young Entrepreneurs** fund for start-ups, the **Investment Loan Guarantee Fund for SMEs** and the **Support Fund for Innovation in the Information Technology and Communication Sector** for enterprises operating in the ICT sector³⁵⁰.

7.3.3 Organisational schemes supporting innovation

7.3.3.1 Schemes providing or supporting a regulatory framework

Created in 2000 through a merger of the IP division within the Ministry of Industry and Trade and the Office for the Registration of Trademarks, the **Moroccan Intellectual Property Office** currently employs 90 staff members and is self-financed through revenues from patent fees and IP information services³⁵¹.

Its main function is to register IPR including “trademarks, industrial designs and patents” as well as commercial names of companies. Furthermore, OMPIC offers

³⁴⁹ Interview MO-06; see interview transcript, p.376.

³⁵⁰ These schemes are explained in section 7.3.3.2.

³⁵¹ Interview MO-11; see interview transcript, pp.414-415.

“financial, legal and technological information” and participates in projects related to IPR training, promotion and dissemination of related information³⁵².

In the framework of a project initiated by WIPO, OMPIC has established **Technology Innovation Support Centres** (TISC) to encourage the “utilization of technological information included in the documentation of patents”³⁵³ by:

- “Facilitating access to databases;
- Training of trainers and local users (on-site and distance learning);
- Providing information and training materials;
- Supporting awareness-raising activities;
- Disseminating best practices and experiences among TISCs” (WIPO, 2009).

The implementation of the TISC network started in 2011 and approximately 30 research entities, universities or schools have signed agreements with OMPIC to act as TISCs and serve as “focal points”, performing searches of technical databases to provide information related to IPRs protection, technological trends as well as advice on firm-internal innovation processes³⁵⁴ (TISC, 2011).

In March 2012, OMPIC and the Ministry of Justice signed a convention on the digitalisation of the commercial register, easing the burdens related to company creation by allowing the online registration in the commercial register and facilitating the access to legal information by making it publicly accessible online (prior to signing the convention, the register could only be accessed online by professional bodies)³⁵⁵.

Together with MTINT, OMPIC launched in 2011 **Moubtakir** (Arabic for *creative* or *innovative*) to promote innovation. Through an online portal as well as physical presence in universities and companies, OMPIC collects and screens innovative ideas

³⁵² Interview MO-11; see interview transcript, p.415.

³⁵³ Interview MO-11; see interview transcript, p.415.

³⁵⁴ Interview MO-11; see interview transcript, pp.416-417.

³⁵⁵ Interview MO-13; see interview transcript, p.430.

from individuals, researchers and enterprises in different fields. To improve outreach, OMPIC experts regularly tour the country on a bus, offering further opportunities to submit and discuss project ideas³⁵⁶.

After an initial screening undertaken by OMPIC, a jury composed of individuals from organisations involved in R&D select the most original ideas, which then undergo an economic feasibility study conducted by representatives from industry and research entities on the basis of previously agreed criteria. Viable projects are then presented in dedicated events to potential investors (mainly established companies), which can support ideas “either by obtaining licenses or by working with the project leader to exploit it”³⁵⁷. Two cycles took place in 2011 and 2012, where respectively 19 and 10 projects were selected and received funds from enterprises or research entities (Moubtakir, 2013).

OMPIC actively promotes the awareness of IPRs, particularly patents, in universities and research centres. Special conventions encourage the commercialisation of research outputs via patent filings, whereby the TISCs liaise with researchers to inform and encourage them to patent and universities provide forecasts on the number of expected patent filings per year. Partnership agreements with universities foresee the provision of training sessions and seminars on the importance of IPRs as well as on writing patent applications. The goal is to increase the number of patents filed by Moroccan universities: according to an OMPIC employee, in 2009 “there were no deposits of patents on behalf of universities”, but rather only individual filings by university researchers³⁵⁸.

An important administrative simplification of the Moroccan patenting system was introduced with these agreements: universities can file a patent without having to pay for it immediately and fill in the associated paperwork but only sign a “letter of commitment”. Universities are notified on a quarterly basis on outstanding fees for

³⁵⁶ Interview MO-11; see interview transcript, p.417.

³⁵⁷ Interview MO-11; see interview transcript, p.417.

³⁵⁸ Interview MO-11; see interview transcript, p.417.

patents filed, which are reduced by 50 per cent to further encourage universities to patent³⁵⁹.

Since the agreements³⁶⁰ were introduced, patents filed from universities have considerably increased: “in 2009 we had no deposit for universities, in 2010 we had 11 patent applications on behalf of the member universities and in 2011 we had 40 patent applications from member universities”. The forecast for 2012 was 38 patents at the time of the interview³⁶¹. In addition to promoting national patent filings, OMPIC actively encourages universities to seek wider protection, these efforts leading to the filing of 12 international patents by March 2012.

However, universities that filed these patents did not know how to manage these IPRs or how to assess their value. Therefore, OMPIC has proposed to create an entity in charge of “the valuation of patents”: it would buy patents filed by universities, group them according to technology fields and promote and sell them to interested parties. Such an entity could be financed and managed by Moroccan research support structures, for example R&D Maroc, the MTINT or the MHESRPT. A feasibility study was to be launched in 2012 and, if positive, the entity would start its operations in 2013³⁶².

Extending the scope of its training activities to cover more interested parties, OMPIC decided to launch the **Moroccan Academy for Intellectual Property**, which started its activities in June 2012 and took over the overall responsibility for training in the area of IPRs. Prior to the launch of the academy, a benchmarking exercise reviewed similar structures operating in Belgium and France³⁶³.

³⁵⁹ The fee reduction applies also to SMEs and individuals.

³⁶⁰ As the interviews took place, OMPIC had signed agreements with 14 public universities and was in the process of signing agreements with all Moroccan private universities as well as engineering schools that do not belong to any particular university (Interview MO-11; see interview transcript, p.418.

³⁶¹ Interview MO-11; see interview transcript, p.418.

³⁶² Interview MO-11; see interview transcript, p.418.

³⁶³ Interview MO-11; see interview transcript, p.419.

Nine interviewed companies had dealt with OMPIC and all private sector participants (mainly CEOs) rated very positively the services received, the timeliness of procedures and the responsiveness of staff:

“There are no particular problems for filing patents, it is easy”³⁶⁴; “Since 2004 I find that the services of the regional centre for investment and OMPIC have very much improved [...] and we are happy with them”³⁶⁵; “We have several patents and it is very easy to file a patent at OMPIC. [...] They are very efficient”³⁶⁶; “Actually I was surprised. To register the brand name, you can do it on the website of OMPIC online”³⁶⁷, “In terms of the patenting, it was quite easy, because the people there were responsive”³⁶⁸.

One participant expressed concerns in relation to patent protection in Morocco, not directly related to OMPIC but rather highlighting an important issue related to IPRs in developing countries which OMPIC might consider addressing in its training offer:

“The question is: ‘Will it really protect your invention or not?’ For me at least, we are making these patents only to protect ourselves from the claims of the competition, but not to attack the competition. It is more to protect yourself, so that tomorrow you cannot have somebody coming to sue you. But nobody thinks about attacking others”³⁶⁹.

7.3.3.2 Schemes focusing on funding

Headquartered in Technopark Casablanca, the **Centre Marocain de l’Innovation** is a private entity managing public funds meant to become the one-stop shop for innovation funding for SMEs. Its creation in July 2011 addressed two axes of the national innovation strategy: priorities, coherence and coordination of the national research system and financing and management of research activities:

“We are part of the national initiative called Maroc Innovation, which was a strategy defined in March 2009. [...] They came up with five areas of development. [...] The third [area] is financing and this is where the Moroccan

³⁶⁴ Interview ME-10; see interview transcript, p. 268

³⁶⁵ Interview ME-05; see interview transcript, p.248.

³⁶⁶ Interview ME-01; see interview transcript, p. 229.

³⁶⁷ Interview ME-16; see interview transcript, p.310.

³⁶⁸ Interview ME-14; see interview transcript, p.299.

³⁶⁹ Interview ME-13; see interview transcript, p.290.

Innovation Centre comes in. We are supposed to be the unique desk [one-stop shop] for innovation financing at least from the government side and we are hoping to be more than that [... and] start working with the private sector as well”³⁷⁰.

Managed funds total 450 million MAD (40.5 million Euros) over four years. Sectors eligible for funding include “industry, information technology, nanotechnology, biotechnology and advanced technologies”³⁷¹. CMI fulfils its mission through three major “investment vehicles” whose purpose is summarised by an executive manager of CMI as follows (Table 27):

“INTILAK is a financing vehicle for companies that are two years old or less. It is meant for start-ups. Tatwir is meant for companies that have more than two years of existence. Prestation Technologique Réseau (PTR)³⁷² is open to small to mid-size companies for supporting specific actions like patenting, patent applications, prototypes or any consulting missions to help them improve their processes and implement innovation in the companies”³⁷³.

Table 27: CMI funding schemes

	INTILAK	Tatwir	PTR
Scope	Innovative projects	Innovative projects	Innovation resulting in improvements of products or processes.
Eligible firms	SME < two years of existence (start-up)	SME or group of SMEs > two years of existence	SME or group of SMEs (Turnover < five mio Euros)
Funding	Up to 90,000 Euros	Up to 360,000 Euros	Up to 100,000 MAD
Share of costs paid by CMI	90 per cent	50 per cent	75 per cent
Duration	five years	five years	N/A (SMEs can apply up to twice a year, provided that previous activity is completed).

Source: Author’s own representation

³⁷⁰ Interview MO-02; see interview transcript, p.338.

³⁷¹ Interview MO-02; see interview transcript, p.340.

³⁷² English: Technology Service Network

³⁷³ Interview MO-02; see interview transcript, p.339.

A high-level committee, which consists of the MTINT's secretary general and the general directors of OMPIC and ANPME, is responsible for all governance aspects related to the funds. A monitoring committee with representatives of MTINT, Ministry of Finance, ANPME, OMPIC and CGEM, is in charge of designing project calls, setting the eligibility criteria and selecting the expert entities from which successful applicants can obtain consultancy services. Finally, the evaluation committee, together with some private sector representatives from the CGEM, decide on the eligibility of proposals with a secret voting procedure whereby unanimous approval is required³⁷⁴.

The decision is based on four sets of criteria: the expected outcome is innovative according to the OECD's Oslo Manual definition; the applicant has skills, financial resources and organisational capabilities to complete the project and risks are properly assessed; the potential economic impact is explicit in terms of expected employment creation and revenue streams; and the project is of strategic importance for the country's economic development and addresses a specific national need³⁷⁵.

Before the evaluation committee, OMPIC and possibly an expert, usually holding a PhD in the subject area or a Master's degree with substantial professional experience, do a preliminary assessment. In the evaluation process, CMI has an advisory function, providing recommendations on the suitability of projects to the evaluation committee. The CMI administers the approved project, however the financial means are managed and released by ANPME³⁷⁶.

Start-ups applying at **INTILAK** with an innovative project idea are awarded, if selected, with 90 per cent of the project cost³⁷⁷ (up to one million MAD/90,000

³⁷⁴ Interview MO-02; see interview transcript, p.341.

³⁷⁵ Interview MO-02; see interview transcript, p.345.

³⁷⁶ Interview MO-02; see interview transcript, p.345.

³⁷⁷ Eligible costs include salaries (up to 10,000 MAD/900 Euros per person per month), equipment, material and patent licensing costs related to the project, consulting services (e.g. feasibility studies, business plan conception, prototyping, marketing and patent protection), rental space (up to 50

Euros) as an interest-free loan to be paid back after five years (in instalments or as a lump sum) in case the project is successful. In the case of failure, the project holder does not have to repay the loan, which becomes a governmental subsidy or grant. Since the first call for projects in July 2011, 39 enterprises submitted project proposals, out of which 12 were accepted (80 per cent in the IT sector)³⁷⁸ (CMI, 2013a).

Tatwir targets SMEs or groups of SMEs (consortia) in operation for more than two years. The programme covers up to 50 per cent of the cost of innovative projects (up to 4 million MAD / 360,000 Euros). The timescales for repayment are the same as for INTILAK (Interview MO-02). Up to 25 per cent of the loan can be used to cover feasibility studies, proofs of concept, business plan development, prototyping and marketing plans. Eligible costs include expenses for equipment, IP (e.g. patent licensing, up to one million MAD / 900,000 Euros) and salaries (up to 10,000 MAD / 900 Euros per person per month)³⁷⁹ (CMI, 2013b).

The programme attracted 24 project proposals, however only two were successful and obtained the funding. A major reason for the low acceptance rate was that “[CMI] asked the companies to demonstrate that they can finance 25 per cent of the project from their assets [...]. This was a limiting factor”. Nine applications, unsuccessful despite their projects’ high potential, came from applicant groups relating to university-industry collaborations “to provide the legal agreement that would define how they intend to share the profits, how the intellectual property rights would be divided and how the costs and charges would be taken by the different entities”³⁸⁰.

MAD per square meter in addition to 1.8 per cent of the grant for the office space or 200,000 MAD for industrial space) (Interview MO-02).

³⁷⁸ Interview MO-02; see interview transcript, p.340.

³⁷⁹ Interview MO-02; see interview transcript, p.339.

³⁸⁰ Interview MO-02; see interview transcript, p.340.

PTR, the third funding mechanism, offers SMEs and consortia³⁸¹ with a turnover below 50 million MAD (five million Euros) support in activities or projects that will result in an improvement of products or processes, whereby 75 per cent of the costs are covered up to a limit of 100,000 MAD (10,000 Euros). Eligible costs include expenses for technological diagnostics to assess the specific needs (with a limit of 36,000MAD / 3,000 Euros), collaboration with research centres, proofs of concept, feasibility studies and patent drafting³⁸² (CMI, 2013c).

A senior executive of CMI claimed applications are processed within three to four months, which was confirmed by a participant who applied for funding, albeit unsuccessfully³⁸³. Another participant located in Technopark had been waiting for the release of funds for almost six months at the time of the interview:

“We still do not have the money, but supposing that we get it this week it will be five months or almost six months between the application and getting the money. This is a limit. We could be faster, especially for the small amount of money: it is only 100,000 Euros”³⁸⁴.

The decision-making and the fund releasing processes were also considered too bureaucratic by a senior executive of R&D Maroc:

“The CMI receives the project of the enterprise [...], does the evaluation with experts and it ranks projects into the more and the less innovative ones. [...] Once this ranking is done according to the available budget, they communicate the results to the MTINT, which communicates to the enterprises whether they have been accepted or not. For those who are accepted, it communicates to the ANPME for the release of the subsidy. So there is the CMI, there are the experts, there is the MTINT, there is ANPME, which is four organisms. [...] The first tender was announced in November 2011. Today in April 2012 the files are still at the MTINT. The tender was announced, the enterprises replied, the

³⁸¹ As of April 2012, CMI had not received any applications for *PTR* as it had only recently been announced.

³⁸² Interview MO-02; see interview transcript, pp.339-340.

³⁸³ Interview MO-07; see interview transcript, p.256.

³⁸⁴ Interview ME-16; see interview transcript, p.306.

*evaluation was done, the classification had been done and the files are at the level of the MTINT*³⁸⁵.

The file processing time had taken six months and the ANPME was still meant to release the funds. With four entities involved, the respondent maintained that these processes were not only too lengthy, but ran the risk of compromising confidentiality. In the respondent's view, further issues arise from the ranking procedure of submitted projects: as applicants operate in different sectors, it is difficult to judge which proposal is more innovative: "We cannot compare a project from the heavy industry with an IT project [or] with a project in biotechnology"³⁸⁶.

Following the first call for proposals, CMI and the other entities involved have reviewed the processes, aiming at considerably reducing them in the following rounds. Accordingly, CMI has set an ambitious target whereby application are to be processed and funds released within six weeks after the deadline for submission. To meet it, CMI is automating with the other entities the entire process, paper based in the first edition, to become the first innovation support entity in Morocco whose procedures can be entirely completed online:

*"When we started, we were asked to manage the three vehicles electronically. All the process now is electronic - from the application process to the approval and the follow-up [...] This is linked to our management platform. [Demonstrating the system live on the PC] This is real-time information. Every time our platform data is updated, this information here is updated as well"*³⁸⁷.

In addition to digitalisation, CMI is further simplifying administrative procedures: the number of documents to be submitted by applicants will be reduced by requesting them directly from the issuing authorities and, where still necessary, applicants may initially submit copies of documents and provide originals only if successful at a later stage. The elaborate tracking, filing and evaluation procedures at CMI should also

³⁸⁵ Interview MO-04; see interview transcript, p.363.

³⁸⁶ Interview MO-04; see interview transcript, p.363.

³⁸⁷ Interview MO-02; see interview transcript, p.340.

enable comprehensive impact evaluation studies, which are planned for the future³⁸⁸.

Moukawalati³⁸⁹ is a public support programme encouraging entrepreneurship among young Moroccans (between the age of 20 and 45) managed by the **Agence Nationale de Promotion de l'Emploi et des Compétences** (ANAPPEC)³⁹⁰. Launched in 2006, its objective was the creation of 30,000 small companies and 90,000 jobs by the end of 2008. Young entrepreneurs holding a diploma (e.g. A-levels, apprenticeship, higher education), or at least a certificate evidencing the acquisition of some basic education, were entitled to financial and consultancy support for starting a business. Successful applicants holding projects for investment below 250,000 MAD received pre- and post-creation support, including a grant of 10,000 MAD (L'Economiste, 2009; ANAPPEC, 2009).

Neither the government nor ANAPPEC have published any evaluation or monitoring reports of the programme despite repeated requests from the International Labour Organization (ILO) to assess the number of enterprises and jobs created through the programme (ILO, 2012). However, in 2009 "l'Economiste", a reputable Moroccan newspaper, published what it claimed to be official ANAPPEC figures: the start-ups created through the programme by the end of 2008 were only 526 (L'Economiste, 2009).

The reasons for the low uptake could not be discussed with representatives from ANAPPEC or MOEF during the field trip. However, a participating CEO had applied for support from *Moukawalati* and the experience made by this interviewee sheds some light on the reasons of its limited success: in the respondent's view, the process was rather a formality than a serious effort to help the applicant set-up a business, no advice was offered during the first six months and finally the terms and conditions

³⁸⁸ Interview MO-02; see interview transcript, p.348.

³⁸⁹ Arabic for "my enterprise".

³⁹⁰ English: Moroccan National Agency for Promotion of Employment and Skills

for the loan of 250,000 MAD were different from what the respondent initially understood:

“At the end, after six months, they are supposed to lend you 250,000 Dirham each for two people, so 500,000 Dirham in total. But in the last minute they say: ‘yes, the bank lends you this, but you need to give them a guarantee’ and I go: ‘I am a young entrepreneur and now after all the explanation on what I’m trying to do and how I am going to do it, you are asking me for a guarantee for a loan. So why do I talk about my project? It would be better not to talk about my project and ask me for the guarantee first. That’s it. I don’t have a guarantee. I am a young entrepreneur, so I don’t have a house or a building to put in as a guarantee for a loan’. They say: ‘we can’t’. I say: ‘why do you say it is for entrepreneurs who have an idea?’”³⁹¹.

Caisse Centrale de Garantie, a public financial institution, manages two additional funds. The **Guarantee for Loans to Young Entrepreneurs** was launched in 2002 to fund enterprise creation by young Moroccan individuals (aged between 20 and 45 years) with viable business ideas. Successful applications receive a loan for a maximum of 90 per cent of project costs (capped at one million MAD³⁹²), to be paid back within seven years at a flat interest rate of 1.5 per cent. The **Investment Loan Guarantee** targets SMEs producing goods or services that intend to engage in expansion or modernisation projects. Eligible companies need to present a feasible investment plan. The loan covers 80 per cent of the costs (capped at 10 million MAD) at an interest rate of 0.4 per cent (MOEF, n.d.).

The **Support Fund for Innovation in the Information Technology and Communication Sector** focuses on ICT companies with at least three years of existence. Successful applicants launching innovative projects receive a loan of up to 50 per cent of project costs (capped at two million MAD), repayable within six years at an interest rate of two per cent per year (MOEF, n.d.).

MOEF, involved in these three schemes, has not published any impact assessments or evaluation studies and it was not possible to meet a representative of the

³⁹¹ Interview ME-16; see interview transcript, p.307.

³⁹² three million MAD for joint projects with two or more entrepreneurs.

programmes to assess their contribution in stimulating entrepreneurship and innovation of their target population.

Launched in 2010 by MTINT³⁹³, **Maroc Numeric Fund** was the first investment fund for innovative start-ups in the ICT sector (MNF, n.d.). Endowed with 100 million MAD, its objectives include promoting entrepreneurship, encouraging the emergence of new enterprises, filling the gaps in Morocco's environment for start-up finance and providing opportunities for long-term investment partnerships (MNF, n.d.).

The MNF has so far supported eight start-ups³⁹⁴, all still successfully in operation. Two were interviewed during the field trip to Morocco and reported very positive experiences with the fund management team, highlighting responsiveness, timeliness and the quality of advice received³⁹⁵. Further 10 participants were aware of MNF³⁹⁶, though four were not entirely sure of its purpose and procedures³⁹⁷.

Moussahama I was the first venture capital fund in Morocco, created with a capital of 140 million MAD in 1993 by *Banque Centrale Populaire* upon authorisation of MOEF. Managed by *Chaabi Moussahama*, a bank subsidiary, it supported 20 companies between 1993 and 2008. **Moussahama II** followed in 2008 with a capital of 200 million MAD. In exchange for minority shares (maximum 49 per cent) in their company, entrepreneurs can obtain venture capital for development and growth purposes of their enterprise (Banque Populaire, 2009).

The **Dayam Fund** is a private venture capital (seed) fund of 50 million MAD managed by Sherpa Finance Club, a subsidiary of SAHAM Group, a large Moroccan financial institution with operations in the areas of insurance, offshoring, health and real estate. It funds innovative projects with up to 49 per cent of the costs (capped at five

³⁹³ In partnership with MITC (see section 10.3.3.3) and four Moroccan banks: BMCE Bank, Attijari WafaBank, Caisse de Dépôts et de Gestion and Banque Central Populaire du Maroc.

³⁹⁴ Status as of 1st September 2013.

³⁹⁵ See interviews ME-16 and ME-12.

³⁹⁶ See interviews ME-01, ME-03, ME-04, ME-05, ME-07, ME-10, ME-11, ME-15 and ME-17.

³⁹⁷ See interviews ME-03, ME-05, ME-07 and ME-10.

million MAD) over a time period of four to seven years in exchange for shares in the company (Sherpa Finance Club, 2013a; SAHAM Group, 2013).

So far, the fund has supported five companies between 2007 and 2009, which are all still in operation (Sherpa Finance Club, 2013b), while one of them participated in this study (ICT sector). The CEO established the company in 2007 and has been very successful on an international scale. Having had several disappointing experiences with other innovation funding mechanisms in Morocco when attempting to start a business, the respondent appreciated the direct approach experienced when dealing with Dayam Fund: “We came there with our paper and showed them our idea. They said: ‘okay, we will give you money and we will take shares of your company, so you can do it’. They gave us money and we did it”³⁹⁸.

7.3.3.3 Schemes focusing on infrastructure

Launched in 2007 as the **Moroccan Association for Research and Development** to improve the R&D environment in Morocco in cooperation with two Moroccan universities (University of Meknes and University of Fez), the **Moroccan Foundation for Advanced Science, Innovation and Research** was transformed in 2010 following the Moroccan innovation initiative into a foundation to simplify the administrative procedures with governmental authorities. Prior to its creation, the Moroccan government analysed similar practices in Europe, particularly France, as well as China, Korea, Singapore and the USA. Several international consultancy firms as well as national public and private entities also took part in this process³⁹⁹.

MASciR attracts significant public attention and has obtained support from several governmental entities in Morocco. This is reflected in the composition of the board of trustees, which includes representatives of MTINT, Ministry of Finance, MHESRPT, Ministry of Energy and Mining, Hassan II Academy of Science and Technology,

³⁹⁸ Interview ME-16; see interview transcript, p.307.

³⁹⁹ Interview MO-05a; see interview transcript, p.368.

CNRST, Al Akhawayn University in Ifrane, Council of the Presidents of Moroccan Universities and the national Moroccan Phosphates Company⁴⁰⁰.

An employee emphasised the foundation's focus on public-private partnerships between universities, research institutes and enterprises: "The mission was to improve the environment of R&D in Morocco by creating the bridge between industry and university"⁴⁰¹. However, according to an executive manager at MASciR, encouraging public-private partnerships between universities and industry is only one aspect of the foundation's mission. The main purpose is "to accompany research conducted to create solutions for national problems and not international ones"⁴⁰². However, the foundation promotes international cooperation in the area of R&D with partners in Egypt, Japan, Qatar and South Africa⁴⁰³.

Early after its creation, MASciR selected "nanotechnology, microelectronics and biotechnology" as priority fields and € 50 million (500 million MAD) were made available over five years to conduct applied research to address issues related to "environment, health, energy and new technologies"⁴⁰⁴. The foundation employs 100 researchers from nine countries in its three research platforms corresponding to the three fields mentioned above and operating within the Good Laboratory Practice framework⁴⁰⁵ (MASciR, 2011).

MASciR operates according to three models. In the first model, the foundation's scientific committee evaluates a project proposal submitted, usually by a group of researchers or a research entity. If accepted, funds are released to complete the project and the IP commercialisation team at MASciR markets the resulting IPRs⁴⁰⁶.

⁴⁰⁰ Interview MO-05a; see interview transcript, p.368. See also MASciR (2011).

⁴⁰¹ Interview MO-05b; see interview transcript, p.367.

⁴⁰² Interview MO-05a; see interview transcript, p.367.

⁴⁰³ Interview MO-05a; see interview transcript, p.369.

⁴⁰⁴ Interview MO-05a; see interview transcript, p.366.

⁴⁰⁵ Good Laboratory Practice is an international framework for quality assurance in laboratories.

⁴⁰⁶ Interview MO-05a; see interview transcript, pp.367-368.

The second model foresees the co-development of a common idea by MASciR and a university, enterprise or research centre. The project is co-financed and conducted in co-operation between the researchers of MASciR and of the other research entity. The resulting IPRs are also marketed by the IP commercialisation team, however revenues are shared⁴⁰⁷.

The third model relates to the activities of the business development unit, which actively seeks out clients looking for a solution to a particular problem somehow related to biotechnology, microelectronics or nanotechnology. When necessary, for example if the problem touches upon other areas, MASciR seeks support from relevant expert entities (e.g. universities)⁴⁰⁸.

Examples of projects in MASciR's portfolio include: projects in the areas of solar power with the Atomic Energy Commission and biofuels made from algae with the Ministry of Energy (renewable energies); R&D on clay purification to achieve higher added value in an export sector with low economic benefit (environment); development of a low-cost diagnostics kit for cervical cancer to be used in rural areas, where there is a need for low-cost health care (health)⁴⁰⁹.

MASciR research outputs include 60 scientific publications and seven patents (MASciR, 2011). According to an executive manager: "We would like to increase the number of patents to more reasonable levels. [...] They might not all be usable in R&D, maybe three per cent will reach the industry, but this would be already good, this would already create a patenting culture. Today we do not have it"⁴¹⁰. For this reason, MASciR has launched an incentive scheme offering researchers financial awards for filing patents⁴¹¹.

⁴⁰⁷ Interview MO-05a; see interview transcript, p.368.

⁴⁰⁸ Interview MO-05a; see interview transcript, p.368.

⁴⁰⁹ Interview MO-05a; see interview transcript, p.370.

⁴¹⁰ Interview MO-05a; see interview transcript, p.373.

⁴¹¹ Interview MO-05a; see interview transcript, p.373.

Apart from quantifying the scientific outputs (publications and patents), MASciR has so far not conducted any wider impact assessment of its activities. This is however foreseen in the future: “We have a unit within MASciR that is called the Business Development Unit and they work on creating a certain number of co-operations with institutions and they are working on the strategic plan. Among the things they will be working on is to calculate the impact”⁴¹². An executive manager summarised the potential impact of MASciR’s activities as follows:

“MASciR are not that big and not that rich in order to revolutionise Morocco. However, if we succeed in other operations and that there are people who work like us, this could work. It is more about giving a model, showing the people that they can gain by doing research and that we can do innovation in Morocco with Moroccan researchers. This will be more stimulating than what we do ourselves, because we cannot change Morocco with 100 researchers”⁴¹³

Technopark Casablanca was established in October 2001 as the first Moroccan business and technology incubator. It is owned by the **Moroccan Information Technology Company** (MITC), a limited liability company created through a public-private partnership between MTINT (35 per cent of shares) and public and private banks, whose involvement is justified by the prospect of future returns from a more developed Moroccan ICT sector (65 per cent of shares)⁴¹⁴.

When launched, Technopark was incubating solely Moroccan ICT companies and, since 2010, also those active in the “green technology” sector. Meanwhile, rules have relaxed: foreign enterprises, like Microsoft, as well as some local public agencies are present, like ANPME. RME and the Centre of Young Directors, were about to move their headquarters to Technopark at the time interviews took place in April 2012. Technopark also hosts two innovation-funding entities, MNF and CMI⁴¹⁵.

⁴¹² Interview MO-05b; see interview transcript, p.367.

⁴¹³ Interview MO-05a; see interview transcript, p.372.

⁴¹⁴ Interview MO-01; see interview transcript, p.329.

⁴¹⁵ See section 7.3.3.2.

MITC aims at increasing the number of risk capital funds physically present to facilitate access to funding for the companies incubated⁴¹⁶.

The management of MITC is in general very keen on cooperating with local and foreign partners who could potentially benefit the enterprises at Technopark:

“Every time there is someone who is working in the area of ICT and innovation, we try to get them here in order that our enterprises are the first ones to benefit from these services. And at the same time we want these agencies to be physically present here at Technopark”⁴¹⁷.

In April 2012, when the interviews took place, 161 companies of different sizes accounting for 10 per cent of the ICT sector in Morocco were hosted, employing around 1,500 employees on an area of three hectares (UNIDO, n.d.; Technopark, n.d.). In May 2012, MITC launched Technopark Rabat with a capacity for additional 25 to 50 enterprises and, by March 2013, the two Technoparks together hosted a total of 217 companies. Further structures are planned in other Moroccan cities (Meknes, Agadir and Uzda) (Technopark, 2013)⁴¹⁸.

Start-ups may stay at Technopark for up to 18 months. Thereafter, they either remain in Technopark, moving to the “SME category”, or they leave to establish their headquarters elsewhere. According to an executive manager at Technopark, the turnover is necessary to be able to incubate new enterprises on an annual basis⁴¹⁹.

The immediate advantage for qualifying start-ups is the availability of office space at low prices: they pay three times less than the market price, SMEs 30 to 40 per cent below the market price, while hosted large enterprises do not qualify for a rent reduction. Moreover, MITC offers a range of “communal” services: a fast Internet connection enabled via fibre optics, 24/7 security services, air-conditioning, cleaning and gardening services, conference and training rooms, parking and a restaurant⁴²⁰.

⁴¹⁶ Interview MO-01; see interview transcript, p.333.

⁴¹⁷ Interview MO-01; see interview transcript, p.330.

⁴¹⁸ Interview MO-01; see interview transcript, p.331.

⁴¹⁹ Interview MO-01; see interview transcript, p.329.

⁴²⁰ Interview MO-01; see interview transcript, p.333.

A web television (TV) channel is freely accessible, offering video clips of the companies based in Technopark, which are uploaded on YouTube and available for marketing purposes. Particular attention is given to social networks (e.g. Facebook, LinkedIn or Twitter), whereby a MITC employee is fully dedicated to maintaining and updating profiles. Furthermore, MITC organises or is present at exhibitions throughout Morocco to promote Technopark's enterprises and establish links with potential customers⁴²¹.

Finally, Technopark offers "community services" like a pool purchasing agreement for equipment and training/consultancy services as well as a loyalty card, which enables Technopark employees to purchase a variety of products and services for their professional and private needs⁴²².

Further entities are located within the premises. **Boulevard**, a cultural association, organises music events and operates an online radio station as well as a recording studio and theatre. It is also entrusted with the task of conducting research on the "creation of new professions, which will appear globally" in order for Morocco to exploit potential first-mover advantages in new fields such as "new modes of distribution". Service providers (e.g. telecommunications services, postal services, banks and a travel agent) benefit from the proximity to potential customers, while the companies incubated have easy access to the products and services they offer⁴²³.

Softcentre is an association created in the end of 2010 within the framework of **Maroc Numeric 2013**, whose mission is to promote R&D in the software sector in Morocco and enable Moroccan IT companies, in particular SMEs, to produce innovative software at low cost. Its administrative council is composed of MTINT, MOEF, MHESRPT, the National Telecommunications Regulation Agency, the Caisse de Dépôt et de Gestion (a wholly owned subsidiary of the Moroccan government, which manages investments, savings and pension funds) and the Federation of

⁴²¹ Interview MO-01; see interview transcript, p.330.

⁴²² Interview MO-01; see interview transcript, pp.329-330.

⁴²³ Interview MO-01; see interview transcript, pp.331-332.

Information- and Telecommunications Technologies and Off-Shoring (Softcentre, 2012).

Softcentre is located in Technopark Casablanca and provides software development and consultancy services to public and private entities in four main areas: applied research and development (i.e. software R&D projects on demand); prospective research, covering the implementation of long-term academic projects as well as the commercialisation of research outputs (including IP); common services for SMEs (e.g. sharing of infrastructures, databases, technological expertise and networking); and self-financed research in four priority themes, i.e. mobile services, internet banking, software packages and multimedia (Softcentre, 2012).

For the R&D projects it manages, Softcentre pulls the necessary skills from local engineering schools and universities (researchers, doctoral students, engineering students) to create research teams to which it provides the necessary technological R&D infrastructures (Softcentre, 2012).

In the words of the Centre's director: "[...] the role of the Softcentre is to help IT operators develop innovative IT solutions by using the competencies located in the field of software within the universities and engineering IT schools". Five permanent staff members are employed at Softcentre and its administrative council is composed of MTINT, MOF, MHESRET, Apebi (the Moroccan IT association to ensure involvement of the private sector) as well as CNRST and the National Telecommunications Regulation Agency)⁴²⁴.

In 2011 and 2012, Softcentre worked on three projects: an award-winning e-government solution for the Moroccan parliament, a web services portal for the Chamber of Commerce and Industry in the city of Tangier (to be developed for the other 28 Chambers of Commerce throughout Morocco) and a mobile marketing platform⁴²⁵.

⁴²⁴ Interview MO-15; see interview transcript, p.437.

⁴²⁵ Interview MO-15; see interview transcript, p.438.

Due to its relatively short existence, Softcentre had not yet conducted any detailed impact studies of its projects at the time of the interview⁴²⁶, however the success of the two projects introduced above indicates that the model works well in terms of promoting innovation in the Moroccan ICT sector. When asked about the efficiency of public sector innovation support, the interviewee commented:

“One of the conclusions we have made during the last administrative council is that there are too many initiatives in Morocco that work alone. For example, you have CMI - they give financing. You have Maroc Numeric Fund, which provides funding as well. There is an incubator within CNRST and also another public IT fund located in Rabat. We think that today to be more powerful these organisations could be centralised into one organisation to give the private IT companies one single point of contact to get support in the field of R&D”⁴²⁷.

Finally, Technopark hosts ASTEC⁴²⁸, the association of the enterprises located in it established in 2010.

No comprehensive impact assessment of Technopark’s impact (e.g. generated employment or IPRs) has been conducted and there is no systematic tracking of enterprises once they leave the premises. However, in 2008 a market need assessment was carried out and since then a comprehensive satisfaction survey has been conducted annually among the enterprises in Technopark. The major priorities identified in the framework of the market needs assessment were “access to finance”, which is mainly addressed through the MNF and the creation of CMI as well as “access to markets” and a need for training in the area of developing business plans⁴²⁹.

The latter was addressed through providing comprehensive training to enterprises in Technopark on business plan development. To facilitate the access to markets, MITC is organising events with potential buyers, where large enterprises participate in conferences along with the companies from Technopark to facilitate their access to

⁴²⁶ Interview MO-15; see interview transcript, pp.438-439.

⁴²⁷ Interview MO-15; see interview transcript, p.440.

⁴²⁸ French: “Association des Sociétés du Technopark” (ASTEC)

⁴²⁹ Interview MO-01; see interview transcript, p.333.

markets and potential clients. ASTEC is also involved in that process and in future MITC plans to have closer ties with ASTEC in order to rapidly address any internal or external issues faced by enterprises in Technopark⁴³⁰.

Furthermore, it is planned to create a foundation, whereby Technopark employees could deliver short courses at schools, potentially contributing towards the development of “new programmes in the area of education”⁴³¹.

Réseau Maroc Incubation et Essaimage was created in 2002⁴³² by the Moroccan government in partnership with other stakeholders⁴³³ to “bring together universities and the world of business and [...] encourage innovation and creation of innovative companies”⁴³⁴. During the pilot phase⁴³⁵, activities were co-financed by the French Service for Cooperation and Cultural Action. Since 2007, the network is entirely funded by the Moroccan government and managed by CNRST with support from MHESRPT and MTINT.

According to an employee of its central coordination unit, its main objective is to:

“create incubators inside universities to accommodate the research projects of the university that can lead to the creation of innovative enterprises and to help them to develop their ideas from research ideas to a well defined project, ready for investors to invest in it to create an enterprise”⁴³⁶.

The network of technology incubators⁴³⁷ provides financial support to successful applicants in form of direct project funding up to 230,000 MAD, which needs to be

⁴³⁰ Interview MO-15; see interview transcript, p.438.

⁴³¹ Interview MO-15; see interview transcript, p.334.

⁴³² Effectively launched in 2003.

⁴³³ Inter alia with the Moroccan “Solidarity Priority Fund” and the French Service for Cooperation and Cultural Action (French: “*Service de coopération et d'action culturelle*”).

⁴³⁴ Interview MO-09; see interview transcript, p.397.

⁴³⁵ The pilot phase was accompanied by KPMG, the consultancy firm, which helped with the launch and set-up of RMIE.

⁴³⁶ Interview MO-09; see interview transcript, p.397.

⁴³⁷ The participating institutions (as of March 2013) are: Technological Innovation Centre (CIT) of the Mohammadia School of Engineers (EMI), Rabat; Centre for Incubation and Reception of Innovative Companies (CIAEI) of the National School of Mineral Industry (ENIM), Rabat; The University of Marrakesh Incubator (INMA), University Cadi Ayyad; The University Centre Doukkala Incubation

paid back interest-free five years after incubation in case the company is successful, i.e. still in operation. Space and basic equipment (e.g. phones, computers, internet connection, etc.) are also provided within the premises of RMIE at CNRST for successful projects for a period of 18 months.

Furthermore, RMIE organises training sessions given by local and foreign experts in the areas of business plan development, business models, market assessments, legal studies, prototype development and travel expenses⁴³⁸.

Since 2007, RMIE actively encourages spin-off companies in universities, organising and co-funding “projects, seminars, colloquiums [and] research projects about entrepreneurship in academia”⁴³⁹. These events represent the main communication channel for its incubation and spin-off activities, complemented by its website, the presence in social networks such as “LinkedIn, Facebook [and] Twitter” and the participation in exhibitions⁴⁴⁰.

In the future, RMIE intends to look into incubating projects from Moroccans living abroad who wish to return to Morocco to set up an innovative enterprise. These potential entrepreneurs are not properly supported by the network’s university incubators, mainly focused on projects originating from their own researchers and students⁴⁴¹.

Since its launching, RMIE has received around 100 project proposals and funded a total of 50 (as of April 2012). Out of those projects, 10 enterprises were eventually

(CUDI) of the Faculty of Sciences of El Jadida; The Regional Interuniversity Incubator of the South (IRIS), University Ibn Zühr, Agadir; The RESIN Incubator of the National Institute of Posts and Telecommunications (INPT); The Technopark Incubator, Casablanca; The Dynamic Incubator East of the Faculty of Economic, Law and Social Sciences. Oujda; The University Incubator of the University Hassan 1st, Settat; The Al Akhawayn Incubator, Al Akhawayn University in Ifrane; The Incubator "Morocco Incubation" of the National Centre for Scientific and Technical Research (CNRST), Rabat; The University Incubation Center of Tadla-Azilal (CUITA), Sultan Moulay Slimane University, Beni Mellal; The University Incubator of the University Moulay Ismail, Meknes.

⁴³⁸ Interview MO-09; see interview transcript, p.397.

⁴³⁹ Interview MO-09; see interview transcript, p.397.

⁴⁴⁰ Interview MO-09; see interview transcript, p.398.

⁴⁴¹ See interviews MO-08 and MO-04.

created. The high failure rate (40 out of 50) among the incubated projects is explained by an RMIE employee as follows:

“More than 50 per cent of the projects were abandoned, because there are quite some administrative problems with the slowness of de-blocking/releasing the funds vis-à-vis the universities and incubators. [...] The problem arises when the money is paid to the university [...] because there is no fixed legal status for the project proposers at the level of the universities, at the level of the incubators [...]. Sometimes the release of funds can be delayed by up to one year”⁴⁴².

The low number of companies actually resulting from successful projects is linked to the lack of post-incubation support, in particular in terms of venture capital: “This has contributed to the accumulation of unsuccessful projects, the projects that finished the incubation phase, but did not create companies, because there was no other organism that could help after the incubation phase”⁴⁴³. The situation has however improved since the creation of CMI in 2010⁴⁴⁴ and Atlas Business Angels (a network of private investors)⁴⁴⁵.

No impact assessment or follow-up has taken place for the successfully incubated companies of the network and therefore it is difficult to comment on the concrete benefits generated for the enterprises as well as the Moroccan society. However, during the field trip to Morocco it was possible to interview two companies incubated within CNRST premises.

The first company won a competition on innovative ideas in the ICT sector during the “start-up weekend” in Morocco and was referred to RMIE in October 2011. It got financial support, rent-free space, and financial and legal advice. According to the CEO, the company could not have started its operations without the support received. The respondent could not comment on the effectiveness of the obtained

⁴⁴² Interview MO-09; see interview transcript, p.399.

⁴⁴³ Interview MO-09; see interview transcript, p.400.

⁴⁴⁴ Introduced in section 7.3.3.2.

⁴⁴⁵ Interview MO-09; see interview transcript, p.400.

support in relation to the success of the company, as its very promising⁴⁴⁶ product was still offered free of charge and undergoing further development at the time of the interview⁴⁴⁷.

The second entrepreneur used to live and work in France where, when participating in a start-up competition, the respondent met an employee from CNRST and was introduced to the incubation programme. The interviewee considered it a great opportunity to return to Morocco and set up a business, despite having initially understood that the financial support of 23,000 Euros would be a grant and not a loan to be re-paid after five years in case of success. Having also started in October 2011, the respondent had already acquired several customers at the time of the interview⁴⁴⁸.

The participant experienced difficulties in using the grant to purchase equipment and other supplies: the procedure requires offers from three different suppliers to be presented to CNRST, which would then select one, normally according to the price. A greater issue were the frequent delays of payments to suppliers, sometimes up to four months:

“So in terms of this financial scheme, I personally do not rely on that for very important charges or expenditures. It is only for communication and things that won't really have an impact if there is a delay of three or four months. So that is the major issue here”⁴⁴⁹.

Despite these difficulties, the respondent was overall satisfied with the support received during the incubation process, in particular the rent-free space at CNRST premises and the consultancy received to develop the business⁴⁵⁰.

⁴⁴⁶ At the time of the interview, the software application had already been downloaded over one million times worldwide and several websites, newspapers and a TV channel had reported on it (Interview ME-15; see interview transcript, p.201).

⁴⁴⁷ Interview ME-15; see interview transcript, p.301.

⁴⁴⁸ Interview ME-14; see interview transcript, p.294.

⁴⁴⁹ Interview ME-14; see interview transcript, p.296.

⁴⁵⁰ Interview ME-14; see interview transcript, p.297.

From the above, it is clear that the legal status of RMIE affects its operations: its affiliation to the government causes its procedures to be administratively burdensome, in particular in managing (and releasing) funds for incubation. The major recommendation out of two studies on the purpose of the network as well as its strengths and weaknesses was that it should no longer be a governmental but rather an independent body to decrease administrative burdens and speed up the fund granting procedure⁴⁵¹. The urgency was underlined by a CNRST employee:

“The fact that it [the RMIE] does not have a proper legal status, has of course limited this project to what it is now. Unless this is solved, I think we cannot grow this initiative to reach the critical or required point so that it could have a significant impact”⁴⁵².

As the interviews took place, RMIE was in the process of changing its legal status to become a public interest group and, once the process is concluded, it is expected that funding procedures will become less administratively burdensome and the scheme will be in the position to address more promptly the needs of the market⁴⁵³.

Réseau de Diffusion Technologique was first set up with the support of the EC in 2002 to offer innovative enterprises “free technological pre-diagnostics to identify and formulate needs” and contacts “with bodies having the appropriate skills that are able to respond to the needs identified” (EC, 2011).

RDT offered support via the **Diagnostic Technologique Réseau (DTR)**⁴⁵⁴, a “service leading to the determination and formulation of needs and innovative and technical or technological development projects”, and PTR (whose management was transferred to CMI in 2011) for “the creation of services to promote innovation and/or technological growth” (EC, 2011).

The three major objectives of the programme were:

⁴⁵¹ Interview MO-09; see interview transcript, p.399.

⁴⁵² Interview MO-08; see interview transcript, p.391.

⁴⁵³ Interview ME-09; see interview transcript, p.399-400.

⁴⁵⁴ English: Technological Diagnostics Network.

- *“To assist industrial companies with their innovation and technological development projects on the basis of the needs identified.*
- *To establish a link between businesses and service providers (university laboratories, advice boards, technology centres, Réseau du Génie Industriel (Network of Industrial Engineering) etc.)*
- *To promote a culture of innovation and technology transfer” (EC, 2011).*

For the period 2009-2012, the programme was entirely financed by Moroccan funding bodies including the MTINT, MHESRPT, OMPIC, ANPME CNRST and R&D Maroc. Table 28 summarises the objectives of the programme for the period 2009-2012 (R&D Maroc, 2011a). By 2011, over 600 enterprises had benefited from the services (EC, 2011), however it is not possible to assess the concrete impact the programme has had on enterprises as the necessary data could not be obtained from official government publications nor from interviewees⁴⁵⁵.

Table 28: Contacts and services provided by RDT (2009-2012)

	2009	2010	2011
Number of visits	400	600	800
Number of DTRs	100	150	225
Number of PTRs	80	150	250

Source: R&D Maroc (2011a)

In 2002, the King of Morocco issued a directive outlining the decentralisation and regionalisation strategy for investment projects in Morocco, which entailed the creation of 16 **Regional Investment Centres**, which serve as one-stop shops for company creation in each of Morocco’s 16 administrative regions. Entrepreneurs and investors can obtain all the necessary information and documentation in these centres and advice is provided on all matters in relation to business creation and regional investment (Ministry for Moroccans Residing Abroad, 2010). Parts of these procedures, which involve the registration of the business, trademarks, patents or other IPRs can be completed online with OMPIC.

⁴⁵⁵ See interviews MO-02 and MO-07.

7.3.3.4 Schemes focusing on capacity building

The **National Centre for Research in Science and Technology** is the oldest actor in the Moroccan NIS. It focuses on scientific research and technology development and its main tasks comprise the implementation of research and technology development programmes and the dissemination of scientific and technical information. Furthermore, CNRST supports the development of the national science and research infrastructure, while at the same time engaging in the transfer of research results (CNRST, 2011).

Originally meant to directly conduct scientific research, with the adoption of the law Nr 80 00 in 2001 its mission was redefined to offer a broad range of innovation support services, while still hosting a number of research centres and institutes. Its activities now fall into four main categories, briefly described below⁴⁵⁶ (CNRST, 2012a).

Firstly, CNRST provides **logistical support and services** to research projects through a unique range of facilities providing state-of-the art technological equipment as well as various other resources for the scientific community:

- The *Institut Marocain de l'Information Scientifique et Technique (IMIST)*⁴⁵⁷, which is in charge of collecting scientific and technical information and disseminating it to the scientific community in the country (CNRST, 2012b). For example, it manages subscriptions to academic journals databases for all public universities⁴⁵⁸. It also informs researchers and professionals on national and international scientific research results and supports them in designing research projects (CNRST, 2012b).

⁴⁵⁶ Organisational schemes particularly relevant for this research are outlined in separate sections as indicated in the text.

⁴⁵⁷ English: Moroccan Institute for Scientific and Technical Information

⁴⁵⁸ Interview MO-08; see interview transcript, p.389.

- **Unités d'Appui a la recherche scientifique (UATRS)**⁴⁵⁹ make heavy and costly equipment, such as “electronic microscopes”, available to researchers in the areas of molecular biology and chemistry, basic research, materials and quality assurance⁴⁶⁰. Universities and enterprises are invited to perform their research within the premises of UATRS, which offer training to SMEs and micro enterprises on the utilisation of equipment (CNRST, 2012c).
- **Moroccan Academic and Research Wide Area Network (MARWAN)** is an academic network linked to the European research and education network GEANT⁴⁶¹, facilitating the information exchange with the European research community (CNRST, 2012d). Furthermore, MARWAN manages **MaGrid**, a grid computing implementation encouraging the creation of content and the development of new applications shared by the network (CNRST, 2012d).

Secondly, CNRST offers **research support by** granting funds to promote the creation of scientific output (e.g. publications, events, doctoral research, etc.) and allowing local researchers to engage with the international scientific community through programmes and initiatives such as:

- **FINCOME**, a programme launched with *R&D Maroc* in 2006 and the financial support of MHESRPT to establish and exploit scientific research links with the Moroccan diaspora, encouraging Moroccan nationals residing abroad to actively contribute to the development of Morocco (e.g. providing expertise, contributing to projects, transferring know-how); meant for higher education establishments, research centres and the industrial sector; requests for support can be submitted in the area of expertise provision, meetings, research and innovation projects and the creation of innovative enterprises (CNRST, 2012e)⁴⁶².

⁴⁵⁹ English: Scientific Research Support Units

⁴⁶⁰ Interview MO-08; see interview transcript, p.389.

⁴⁶¹ Interview MO-08; see interview transcript, p.389.

⁴⁶² See also Interviews MO-04 and MO-08.

- **Support for scientific publications and events**, whereby it sponsors innovative research dissemination events to foster links between local and international researchers, to encourage the participation of young researchers in scientific manifestations/events, and to promote the publication of original scientific work (CNRST, 2013a).
- **Research units associated with the CNRST**, aiming at promoting and financially supporting centres of excellence. To qualify for the label, high-performing research institutes need to demonstrate the presence of a clear research strategy and associated programmes, an adequate pool of human resources to execute the programmes, involvement in research with a concrete scientific, technological and/or socio-economic impact and produce significant scientific results (CNRST, 2013b).
- **Cooperation programmes** with European research centres, supporting research visits of local researchers to European counter-parts of CNRST for the duration of one week to one month. CNRST has signed several conventions with European national scientific research centres in France, Germany, Italy, Portugal and Spain, which resulted in regular exchange visits (CNRST, 2013c).

Thirdly, CNRST offers **research commercialisation services**, managing and coordinating networks to promote entrepreneurship and scientific culture:

- The **Moroccan Incubation & Spin-Off Network**⁴⁶³ is the national coordinator of a network of 13 incubators across the country, out of which eleven are based at public higher education institutions. One is a privately managed incubator in Technopark Casablanca and another incubator is located at CNRST itself (CNRST, 2012f)⁴⁶⁴;
- The **National Network for Scientific and Technical Culture division** is in charge of developing the scientific, technical and industrial culture within Morocco's educational and university networks. It provides a platform (i.e. auditoriums with

⁴⁶³ See section 7.3.3.3.

⁴⁶⁴ See also Interview MO-04.

state of the art equipment for projection as well as translation facilities and conference halls), for all social actors interested in science and technology, organising meetings and expositions and hosting national and international scientific networks and projects (CNRST, 2012g).

Finally, CNRST hosts several research laboratories for geophysics, microbiology, renewable energies and scientific instruments. According to an employee these research laboratories are a “legacy from the past”, as the core mission of CNRST is now to provide support for rather than conducting research⁴⁶⁵.

Similarly to most other governmental innovation support structures, evaluation of results and impact assessment are not normally performed within CNRST. According to an employee of the institution:

“Evaluation is not well embedded in this country. It is not embedded in the general culture of this country, simply because there was no accountability for many years, for decades. But I assume it will start for what is going on at the moment, if what is going on succeeds and it will maybe take 10 to 15 years until we have more accountability as well as until the level of Moroccans increases in terms of education and they will be asking for more and more accountability and therefore the politicians will have to put in place some evidence-based policies”⁴⁶⁶.

ANPME was created in 2002 as a state agency in charge of implementing governmental policies to support and promote the competitiveness of local SMEs and coordinate national networks, tools and projects for their modernisation. It is involved in activities in the area of administrative simplification of procedures for entrepreneurs, as explained in more detail in the following sections. The agency’s administrative council is chaired by the MTINT⁴⁶⁷ (ANPME, n.d.). The strategic

⁴⁶⁵ Interview MO-08; see interview transcript, p.389.

⁴⁶⁶ Interview MO-08; see interview transcript, p.392.

⁴⁶⁷ The administrative committee is composed of representatives of various governmental bodies and other organisations: Minister of Industry and Commerce, Minister of Finance, Minister of Economic Affairs, Minister of Labour, President of the Federation of the Chamber of Trade and Industry, President of the Federation of the Chambers of Agriculture, President of the Federation of the Chambers of Handicrafts, President of the Federation of Marine Fisheries, President de la Commission of SMEs in the General Confederation of Moroccan Enterprises, President of the Association of Female Business Leaders, President of the SME union Morocco, President of the

objective of enhancing SMEs competitiveness is pursued in two major programmes: *Moussanada* and *Imtiaz*.

Moussanada (Arabic for “support”) provides technical assistance to improve productivity, internal organisation and marketing by linking SMEs to competent consultants in the relevant area and partially subsidising the consultant’s fees. The focus is not on R&D per se, but rather on the commercialisation of the company’s outputs, offering support in “conducting a market study or implementing a marketing strategy or reorganising itself on the commercial/trade level” or in the development of products addressing specific market needs⁴⁶⁸.

Upon request, ANPME analyses the SME’s situation to identify potential areas of intervention and rank them in consultation. From a comprehensive database of consultants and service providers, the most suitable to address the issues prioritised is selected in agreement with the SME. The consultancy costs are shared between ANPME and the recipient, respectively 60 per cent (up to one million MAD) and 40 per cent of the fee⁴⁶⁹.

Imtiaz (Arabic for “excellence”) provides support for projects not necessarily related to innovation but rather to the modernisation of SMEs, with the aim to back “championing enterprises, which have the potential to go really very far”⁴⁷⁰. Unlike *Moussanada*, which provides expertise in the form of consultancy, this programme offers direct financial awards (up to five million MAD) in cooperation with local banks: the state funds 20 per cent of the project costs provided that a bank finances the remaining part through a loan at favourable conditions⁴⁷¹.

ANPME is involved in a range of national and international initiatives: it is the national contact point for the EU’s FP7 framework and is present in the steering,

Institute of Chartered Accountants, President of the Centre for Young Business Leaders (ANPME, n.d., translated from French).

⁴⁶⁸ Interview MO-10b; see interview transcript, p.407.

⁴⁶⁹ Interview MO-10b; see interview transcript, p.407.

⁴⁷⁰ Interview MO-10a; see interview transcript, p.402.

⁴⁷¹ Interview MO-10b; see interview transcript, p.408.

evaluation and awarding committees of several programmes and projects discussed in this study⁴⁷² as member of steering, evaluation and awarding committees. Furthermore, it releases project-related funds, which are provided by MTINT and distributed by CMI. Its involvement in the release of funds is justified by an ANPME employee as follows:

“The reason that the funds are under our supervision is to facilitate the de-blocking/release, because if the Ministry was in charge, it would be more complicated. It is true that we are a public entity, but we are autonomous and we have an autonomous budget. We have a particular mission which is to support/accompany the modernisation of the enterprise”⁴⁷³.

Finally, ANPME is the national coordinator⁴⁷⁴ for the **Enterprise Europe Network** (EEN), which Morocco joined in 2012 to support local enterprises in the area of internationalisation, encourage technology transfer and increase the range of information services available to national enterprises. With over 600 member organisations, the EEN serves as a one-stop shop to enterprises in the 27 EU countries as well as another 27 non-EU countries for support services in the area of internationalisation, “technology transfer”, “access to finance”, “research funding”, “EU law and standards” and “intellectual property” (EEN, 2013).

ANPME attempts to reduce the bureaucratic burden by minimising the number of steps and the amount of paperwork required to benefit from its programmes. According to an ANPME employee, only four main documents need to be submitted along with the application form: “a certification of the turnover” of the SME, “a fiscal certificate, a certificate of the National Social Security and a copy of the excerpt from the commercial register”⁴⁷⁵.

⁴⁷² i.e. *Tatwir*, *INTILAK* and *PTR*, see section 7.3.3.2.

⁴⁷³ Interview MO-10b; see interview transcript, p.409.

⁴⁷⁴ ANPME has “constituted a consortium of public enterprise support entities to form part of the network”. These include MTINT, MHESRPT, OMPIC, R&D Maroc, Maroc Export and Foreign trade departments (Interview MO-10b; see interview transcript, p.404.).

⁴⁷⁵ Interview MO-10b; see interview transcript, p.409.

For *Moussanada*, ANPME requests an assessment of the financial credibility of the requesting company directly from the bank before deciding on its eligibility. The consultant contracted then takes over the preparation of project files and after completing its mission, the 60 per cent of the fee born by ANPME are directly paid to the consultant. The process for *Imtiaz* is slightly more complicated as the direct financial support is provided in form of reimbursements in several instalments after expenses have occurred and milestones of the project have been achieved⁴⁷⁶.

ANPME has not yet conducted a systematic impact assessment of its activities, however it monitors their effectiveness via the **SME competitiveness barometer**⁴⁷⁷, a survey conducted with enterprises participating in ANPME's programmes as well as a control group of enterprises that have not yet benefited from them. The barometer assesses the evaluation of the future evolution of the firms' national and foreign product markets, their local and international expansion in terms of sales and employment creation and the general opinion on the effectiveness of ANPME's services for enterprises that participated in the programs (ANPME, 2013)⁴⁷⁸.

R&D Maroc is a professional association whose members include public and private enterprises, the CGEM as well as governmental departments in charge of innovation and R&D in Morocco. It aims at generating synergies between R&D laboratories within Moroccan enterprises and other national research institutions, whereby its main task is to promote R&D within Moroccan enterprises: external and internal funding is collected and distributed to finance Moroccan R&D projects, encouraging operational links between R&D Maroc, local and expatriate Moroccan researchers (R&D Maroc, 2011b; R&D Maroc, 2012).

⁴⁷⁶ Interview MO-10b; see interview transcript, p.410.

⁴⁷⁷ Explained in more detail in section 8.3.4.

⁴⁷⁸ Interview MO-10a; see interview transcript, p.405.

Its **Innov'Act Programme**⁴⁷⁹ encourages SMEs to engage in R&D as well as to conduct collaborative research with universities and other research centres. In addition to R&D Maroc, the current steering committee of Innov'Act includes representatives of MTINT, MEHSRPT and CNRST, which provide the necessary funds⁴⁸⁰. In its first pilot version, a total of 20 projects were selected and 18 actually funded with a total budget of 1.1 million Euros between 1998 and 2004 (see Table 29 for a sector-specific distribution of the projects).

Table 29: Distribution of projects funded by Innov'Act (1998-2004)

Sector	Nature of Project	Number of Projects
Environment	Cost & Quality	2 (11%)
Industrial Development	Process	3 (17%)
Public Works	Prototype & Process	2 (11%)
Agro-food	Product & Production Unit	4 (22%)
Energy	Prototype	1 (5.5%)
Artisanal Development	Product	2 (11%)
Materials - Metallurgy	Process & Process	3 (17%)
Science of Life	Product	1 (5.5%)

Source: EC (n.d.)

The success of the programme convinced the organising parties to launch a second edition for the period of 2005-2009 with a budget of 600,000 Euros. Twenty projects received financial (up to 20,000 Euros), logistical, technical and administrative support⁴⁸¹ (EC, n.d.). A third round was launched in 2011 with a budget of 400,000 Euros, whereby the focus shifted towards higher education institutions: projects conducted in collaboration with academia are particularly encouraged and SMEs can

⁴⁷⁹ The programme was launched in 1997 by R&D Maroc and supported by "ANPME, Project Taahil Al Mokawalat (TAM) of the GTZ (German Association for Technical Cooperation), MEHSRPT and the International Finance Corporation (IFC) of the World Bank" (EC, n.d.).

⁴⁸⁰ Interview MO-04; see interview transcript, p.356.

⁴⁸¹ This time the repartition was as follows: "38 % chemical and para-chemical industries, 30% Agro-industries, 16% Technologies for Water and Environment, 8% electronic and electrical industries, 8% Textile – Apparel" (EC, n.d.).

receive up to 50,000 Euros, depending on their size (Azzoui, 2011; EC, n.d.). At the time of the interview (April 2012), there were 21 on-going projects⁴⁸².

Thus, R&D Maroc addresses the strategic objective of establishing industry-academia partnerships in Morocco, insufficiently spread in absence of a legal framework allowing university researchers to be remunerated when engaging in partnerships with private enterprises. To further tackle the issue, the association has started to directly manage research projects for private enterprises, remunerating academic researchers and the universities they belong to for using their facilities during the research project⁴⁸³. A senior executive from a Moroccan incubator and technology park criticised the programme for being too minimalistic and, therefore, not having a great impact: “The projects that had been submitted for InnovAct were not the best projects. InnovAct was too small [a grant of 20,000 Euros] and it was not worth it to put together the files to apply. The carrot must be sufficiently interesting”⁴⁸⁴.

R&D Maroc conducts studies and surveys on R&D and innovation, such as studies on the gaps in research and innovation in the building and civil engineering sector or the innovation surveys of Moroccan enterprises (two were conducted in 2004 and 2010, one planned for 2013 will provide data for the planned Moroccan Innovation Scoreboard) (R&D Maroc, 2012)⁴⁸⁵.

The association organises seminars and training sessions (e.g. workshops) on innovation management, covering themes such as innovation performance measurement and strategic foresight implementation. For example, the main topics covered in the seminars series of 2013 include tools for successful innovation, success factors for innovative projects, strategies in the area of innovation and R&D as well as innovation and R&D management, specific training on creative and innovative products and services (R&D Maroc, 2013a). Regular meetings between

⁴⁸² Interview MO-04; see interview transcript, p.356.

⁴⁸³ Interview MO-04; see interview transcript, p.356.

⁴⁸⁴ Interview MO-01; see interview transcript, p.335.

universities and enterprises are organised to encourage their collaboration (R&D Maroc, 2011c and 2013a).

An executive manager of R&D Maroc stated that French and Belgian experts in innovation-related areas are often consulted and hired to provide the necessary training within companies. The respondent summarises this activity as follows:

“We also offer support to enterprises that want to organise the internal innovation system. We help them manage organisational matters, how to organise a team and creativity. We teach them on strategy and how to manage innovation projects, how to find partners and how to find finance for the projects”⁴⁸⁶.

R&D Maroc actively promotes research and innovation through two major initiatives: **Salon Medinnova** and the **National Innovation Competition**. Launched in 1998, the first one is a bi-annual international exhibition dedicated to innovation, R&D and technology organised together with MHESRPT in partnership with the Ministry of Economic Affairs, MTINT and CNRST. The main objectives of the exhibition are the following:

- *“Promote research and innovation and strengthen the links between academia and industry*
- *Identify the competences and the know-how of public and private research centres and promote the support mechanisms available to enterprises in the area of R&D and innovation*
- *Promote national and international cooperation in the area of research and innovation*
- *Contribute to the creation of a market for innovation and provide an opportunity to inventors, researchers, fund managers and innovative enterprises to present their projects, discover funding opportunities and establish partnerships*
- *Implement an exchange mechanism for innovation strategies in the Euro-Mediterranean area and encourage cooperation and the exchange of experiences in order to foster innovation and territorial development in mutually relevant priority areas⁴⁸⁷” (MEDINNOVA, 2011).*

⁴⁸⁶ Interview MO-04; see interview transcript, p.355.

⁴⁸⁷ Translated from French.

The annual **National Innovation Competition** aims at encouraging innovation among young Moroccans under the age of 19 as well as doctoral researchers and other young inventors. The former need to submit an outline of their ideas and some “evidence of its implementation”, while the latter need to provide stronger evidence, such as prototypes and patents. Selected experts from industry and academia evaluate the applications and award prizes in different categories⁴⁸⁸. The eighth edition of the competition was launched in April 2013 (R&D Maroc, 2013b).

Finally, R&D Maroc is involved in a range of **additional innovation support activities** in collaboration with public and private partners:

- Fincome Programme jointly with CNRST⁴⁸⁹;
- Réseau Maroc Incubation et Essaimage⁴⁹⁰ (jointly with CNRST);
- Réseau de Diffusion Technologique⁴⁹¹;
- Trophée de l’entreprise innovante⁴⁹², a prize awarded annually since 2011 for innovation resulting from private R&D activities at firms, in cooperation with MTINT, CGEM and Academy Hassan II;
- Grand Prix of Research and Innovation, a prize awarded annually to innovative Moroccan researchers in the area of science and technology since 2010, jointly with MHESRPT and Academy Hassan II;
- Development of science and technology indicators with Academy Hassan II;
- Participation in the Moroccan national committee of the Europe Enterprise Network with ANPME (R&D Maroc, 2012).

Furthermore, the association coordinates and manages the funds of national and European research and innovation projects. For example, the association managed

⁴⁸⁸ Interview MO-04; see interview transcript, p.356.

⁴⁸⁹ See section 7.3.3.4.

⁴⁹⁰ English: Moroccan Incubation and Spin-Off Network

⁴⁹¹ See section 7.3.3.3.

⁴⁹² English: Innovative Enterprise Trophy.

research projects for four large Moroccan enterprises with a total budget of 200,000 Euros and, at the time of the interview, was coordinating two European projects jointly with MHESRPT and CNRST and had served as a third partner in 10 European projects in Morocco⁴⁹³.

The reasons for the involvement of R&D Maroc in almost all innovation support related initiatives are summarised by a private sector executive as follows: “R&D Maroc has the merit of being here for more than 10 years and they have done a lot of work”⁴⁹⁴. A public sector employee from MHESRPT explains the role of R&D Maroc in the development of the National Innovation Strategy as follows:

*“The strategy is elaborated with all the actors that you have on your papers, the Minister of industry and trade, the ANPME, the OMPIC for everything that is related to patents, R&D Maroc which represents the enterprises and which is with us in all the steering committees, all strategies, and it is there to give the view of the enterprises on what we do. If we do not know the real requests of the enterprises, we cannot develop the strategies for them without knowing their needs”*⁴⁹⁵.

Réseau Maroc Entreprendre was created in 2005 as a member of the International Entrepreneurship Network (IEN), which was created in 1986 in France and operates in six countries⁴⁹⁶ connecting 6,800 laureates (entrepreneurs) and 4,800 members (business owners) (IEN, 2013). RME is financed by IEN (30 per cent) and members’ contributions⁴⁹⁷. Starting off with an office in Casablanca in 2005, it has expanded to include additional sections in Marrakesh and Agadir in 2012 (IEN, 2013). Four additional offices are planned by 2015 in further Moroccan regions⁴⁹⁸.

⁴⁹³ Interview MO-04; see interview transcript, p.357.

⁴⁹⁴ Interview MO-02; see interview transcript, p.348.

⁴⁹⁵ Interview MO-07; see interview transcript, p.380.

⁴⁹⁶ Belgium, Italy, Morocco, Spain, Switzerland and Tunisia.

⁴⁹⁷ Interview MO-03; see interview transcript, p.351.

⁴⁹⁸ Interview MO-03; see interview transcript, p.352.

The network's main goal is to help entrepreneurs realise their project idea and create start-up businesses with a high potential to generate employment in Morocco:

“The most important aspect of our aid is that the young entrepreneurs applying for our support have to prove that they will create employment in the future. [...] They can start with only one person, but they have to have a perspective to create more employment within one or two years”⁴⁹⁹.

To achieve this, four principal services, explained in more detail below, are offered to qualifying start-ups/young entrepreneurs free of charge:

- mentoring services provided by other experienced entrepreneurs for three years;
- monthly meetings with the “Laureates’ Club”, where participating entrepreneurs have the opportunity to exchange experiences and obtain advice from peers;
- membership of an international and local network of entrepreneurs;
- interest-free loans to support the financing of firm activities (5000 to 10000 Euros to be paid back within five years) (RME, 2013).

RME organises regular events to communicate its activities and interested entrepreneurs are encouraged to submit a file containing a project summary and a business plan. Thereafter, the applicant receives a questionnaire from RME to complete and submit it along with an updated/improved business plan, a project summary, his/her Curriculum Vitae and a reference letter. The documentation is forwarded to an experienced entrepreneur in the relevant subject area, who reviews it together with the applicant.

If the review process is successful and the project proposal validated, it passes to the next stage, which is another review by a steering committee consisting of six to eight experienced entrepreneurs. The applicant then needs to explain and justify his or her application in front of the steering committee during an interview of 20 minutes. After the interview, a consultation among committee members takes place and they

⁴⁹⁹ Interview MO-03; see interview transcript, p.352.

vote for or against accepting the project idea. If accepted, the applicant is assigned an experienced entrepreneur who will provide mentoring services and advice over a period of three years⁵⁰⁰.

In a second stage, the laureate receives the loan, which he/she only starts paying back after a year of obtaining the loan and then has another five years to return it interest-free. RME releases 50 per cent of the loan once the entrepreneur becomes a laureate, i.e. passes through the committee interview stage, and after a period of an additional six months, RME releases the second half of the loan. Local banks provide the loan, which is offered to RME free of interest, as it is an association supporting employment creation⁵⁰¹.

Additional support is provided through the membership of the national and international network as well as regular “Laureates’ Club” meetings, whereby a discussion forum emerges for entrepreneurs who have the opportunity to voice concerns related to their work or the network, exchange experiences and discuss subject areas such as “fiscal issues, recruitment, patent protection, etc.”⁵⁰².

After three years of mentoring from an experienced company owner, the entrepreneur can remain member of the club and, if successful with the business venture, become either a supporting entrepreneur and mentor or an experienced member of the network and contribute a membership fee, which will be used to support the network’s activities⁵⁰³.

As of April 2012, RME supported 44 projects and disbursed 44 loans between its creation in 2005 and 2009. According to a senior executive at RME: “Between 2009 and the beginning of 2011 we had many issues to solve”, reflecting inter alia the tensions in the MENA region during that period. However, Morocco was not as affected as most Arab countries in the region and RME was able to resume its

⁵⁰⁰ Interview MO-03; see interview transcript, pp.351-352.

⁵⁰¹ Interview MO-03; see interview transcript, p.352.

⁵⁰² Interview MO-03; see interview transcript, p.352.

⁵⁰³ Interview MO-03; see interview transcript, p.353.

activities in 2011: “In the year 2011 we granted six loans for six innovative projects”⁵⁰⁴.

The main communication channel for RME is the **National Investment Centre** in Casablanca through which companies need to pass through when starting a business. The Centre communicates about the RME support programmes and organises breakfast meetings with experienced enterprise owners (mentors), whereby existing and potential new members are invited. At these events, RME present their activities and the participating company owners can opt for providing financial aid or engaging in mentoring and consultancy services to the young entrepreneurs⁵⁰⁵.

Impact assessment is conducted systematically, whereby the main criteria are the number of enterprises and employment created:

“Each of the laureates has to indicate within his business plan how much employment he will create and we are obliged to report to the International Entrepreneurship Network on it in terms of how many laureates we support and how many staff they recruited”⁵⁰⁶.

Maroc Entrepreneurs is a non-profit organisation headquartered in London and Paris created in 1999 to contribute to Morocco’s economic development by encouraging Moroccans residing abroad or individuals strongly attached to Morocco to create their enterprise in Morocco⁵⁰⁷ (Maroc Entrepreneurs, 2013a). It is actively engaged in creating opportunities for Moroccan enterprises to meet high potential individuals from the Moroccan diaspora. Maroc Entrepreneurs has accumulated 10,000 members and organises a range of events with the Moroccan diaspora, Moroccan entrepreneurs and investment funds as well as conferences, debates and competitions (Maroc Entrepreneurs, 2013b).

⁵⁰⁴ Interview MO-03; see interview transcript, p.351.

⁵⁰⁵ Interview MO-03; see interview transcript, p.353.

⁵⁰⁶ Interview MO-03; see interview transcript, p.354.

⁵⁰⁷ Unfortunately, it was not possible to obtain any statistics on the number of enterprises created with the support from Maroc Entrepreneurs.

Two entrepreneurs interviewed had previously lived in France and made very different experiences with the network's support. One, having won a competition with Maroc Entrepreneurs in Paris, was subsequently put in touch with RMIE and the company was eventually incubated at the premises of CNRST. The respondent remarks that this was not an official procedure, but rather the result of informal contacts developed via the network⁵⁰⁸.

The other was informed by Maroc Entrepreneurs about financing opportunities for Moroccans residing abroad and willing to return to their home country to start a business. On their advice, the respondent returned to Morocco to seek the necessary funding for a start-up. The entrepreneur summarises the experience as follows:

*"They say to people outside of Morocco: 'come with your project and give 15 per cent, the state will give you 15 per cent and for the rest we can guarantee that the banks will lend you this money'. I came here to a bank and nobody knew about it"*⁵⁰⁹.

7.4 Summary of findings

As for the first case study, a number of conclusions can be drawn from the overview of Morocco's NIS. In this case as well, the starting point is the process for the formulation of the country's innovation strategy and the corresponding strategic priorities. A comprehensive innovation strategy is still lacking as the focus has been on a limited number of sectors, though the "Research 2025 Strategy"⁵¹⁰ and the Moroccan Innovation Initiative represent a positive development.

The NIS in Morocco is centrally managed. Though, a certain degree of decentralisation has been recently introduced with the transfer of competencies to the

⁵⁰⁸ Interview ME-14; see interview transcript, p.294.

⁵⁰⁹ Interview ME-16; see interview transcript, p.306.

⁵¹⁰ "National Strategy for the Development of Scientific Research by 2025" (see section 7.2).

regional investment centres to support local entrepreneurship and disseminate information on national public innovation support initiatives⁵¹¹.

There is no structured consultation process in place with the business community in the area of R&D and innovation policy development and implementation. In areas related to administrative simplification and legal aspects related to the business- and investment environment in general, the private sector is included through the involvement of the CGEM⁵¹².

There is high awareness that such a participation is also necessary in the areas of innovation and research and, at the time interviews took place, a change of legal texts was envisaged to include private enterprises in the inter-ministerial committee for research, previously comprising only public sector members⁵¹³.

A very positive development is the increased attention given to performance measurement by policy makers, which has led to the identification of clear and measurable key performance indicators to monitor the implementation of Moroccan industrial development- and innovation strategies. The concrete targets and progress towards their achievement will be discussed in more detail in Chapter 8.

Still, impact assessment of public innovation support initiatives is not yet fully embedded in the country's innovation policy implementation mechanisms⁵¹⁴. This was clearly stated by almost all public sector participants in this study and is in line with findings of other studies on innovation support and performance in Morocco (e.g. Arvanitis and Mhenni, 2010; Janischewski and Branzk, 2008; Azzioui, 2011; Azzioui, 2012).

Positive exceptions are the efforts made by Technopark Casablanca, ANPME and RME to assess the impact of their initiatives, i.e. by means of annual satisfaction

⁵¹¹ See interviews ME-05, ME-14, ME-17, MO-06 and MO-10b.

⁵¹² See interviews ME-05, ME-14, ME-17, MO-06 and MO-10b.

⁵¹³ Interview MO-04; see interview transcript, p.359.

⁵¹⁴ See interviews MO-01, MO-02, MO-04, MO-06, MO-07, MO-08, MO-09, MO-10b, MO-13 and MO-14.

surveys⁵¹⁵. Yet, these commendable efforts would require a more systematic approach to provide more precise conclusions on the effectiveness of the initiatives measured.

For example, to assess the impact of its Moussanada programme, ANPME queries enterprises about jobs created in different areas of their firm as well as new investments (see table 32). As the questions simply focus on deviations in comparison to the previous year (e.g. investments, markets, exports, jobs created, etc.), they do not allow for isolating the effect of the support provided⁵¹⁶.

There is however very strong consensus among Moroccan officials (echoed by some private sector participants) that a comprehensive evaluation framework for the country's innovation policy and support mechanisms is very much needed⁵¹⁷ and some ministries (MTINT and MHESREPT), OMPIC, R&D Maroc and the Academy Hassan II for Science and Technology have initiated to collaborate on the subject⁵¹⁸. Furthermore, other entities are planning more sophisticated impact assessments, such as the Ministry of the Modernisation of Public Sectors, CNEA, CMI, and Mascir⁵¹⁹.

In the area of IPRs, the interviews revealed concerns about the ability of the relevant authorities to examine and enforce them⁵²⁰, a general problem in developing countries (see e.g. Joseph, 2009). However, most private sector participants were satisfied with the services provided by OMPIC, stating that these were quick and efficient⁵²¹. The recent initiative to facilitate IPR protection for universities and the

⁵¹⁵ See interviews MO-01, MO-03 and MO-10b.

⁵¹⁶ This would be possible by incorporating the concept of additionality, i.e. assessing whether these investments or jobs may have been created anyway, even without the support (OECD, 2006).

⁵¹⁷ See for example Interviews MO-01, MO-02, MO-04, MO-06, MO-07, MO-13 and MO-14.

⁵¹⁸ Interview MO-04; see interview transcript, p.356. No results of these consultations have been published yet (status as of January 2014).

⁵¹⁹ See Interviews MO-02, MO-05a, MO-06 and MO-13.

⁵²⁰ See interviews MO-08, ME-13 and ME-14.

⁵²¹ See for example interviews ME-01, ME-05, ME-06 and ME-16.

convention on IPRs sharing between enterprises and research centres have produced positive results⁵²².

As in Egypt, public-private partnerships encounter in Morocco severe difficulties⁵²³, reflecting the common cultural traits. The underlying issues are well summarised in the words of an interviewee: “The Ministry of Higher Education launches a project to support the research, asking it to be done in cooperation with an enterprise and the researchers come with a signature of an enterprise which just gives its signature to please the researcher. There is nothing behind it”⁵²⁴. Other studies conclude that the lack of public-private partnerships in Morocco represents a major impediment to innovation (e.g. Boshoff and Kleiche, 2007; Azzioui, 2011).

Similar patterns may also explain the slow take-up of TTOs⁵²⁵. In this case too, PA stakeholders appear to be well aware of the issues and plan initiatives accordingly: for example, at the time interviews took place, ANPME was about to join the Europe Enterprise Network to stimulate technology transfer between Moroccan universities and enterprises as well as the European Community⁵²⁶.

Finally, the fieldwork confirmed that private seed- and venture capital is very limited in Morocco. MNF and CMI are good examples of a public-private seed capital initiative in addition to private providers such as the DAYAM fund⁵²⁷ or Atlas Business Angels, mentioned by some participants as interesting developments in the offer of privately funded innovation support⁵²⁸.

Having completed the review of the NIS of Egypt and Morocco, the next chapter presents first the comparative analysis of their overall performance before assessing the impact of similar organisational schemes set up to support innovation.

⁵²² See interview MO-11 and MO-14; see also section 7.3.3.1.

⁵²³ See Interviews MO-02, MO-04, ME-07 and ME-05.

⁵²⁴ Interview MO-04; see interview transcript, p.364.

⁵²⁵ See interviews MO-08, MO-10b and MO-11.

⁵²⁶ Interview MO-10b; see interview transcript, p. 411.

⁵²⁷ See section 7.3.3.2.

⁵²⁸ Interview MO-09; see interview transcript, p.400.

8 Comparative analysis

This chapter builds on Chapters 6 and 7 to address the last research question: how to evaluate the impact of organisational schemes on local innovation and entrepreneurship in developing countries. First, it compares how formal institutions at the highest level of the NIS in Egypt and Morocco have approached the definition of their innovation strategy. Do they have clear and shared strategic objectives? Are they translated in measurable targets? How are the respective governments measuring and monitoring their performance in achieving these objectives? How are the NISs performing in addressing these challenges? How does the performance relate to AE?

Thereafter, it reviews the obstacles to innovation identified during the fieldwork to assess to what extent challenges faced by innovators in Egypt and Morocco are common. The focus is on the interactions between the individual actors of the respective NIS and the formal institutions and institutional arrangements at the operational level to analyse how enabling activities support the innovation process.

According to the adopted analytical framework⁵²⁹, the comparison is structured in four areas, derived from the functional approach toward NIS suggested by Edquist (2004) and confirmed in the thematic analysis of transcripts of the interviews with participants: Governance, Funding, Infrastructure and Capacity Building.

Thirdly, selected organisational schemes supporting innovation, one for each country for the four thematic areas, are compared to evaluate their effectiveness in addressing the challenges entrepreneurs and innovators face in the two countries. Are such contributions comparable for similar schemes in place in Egypt and Morocco? The final section of the chapter summarises the findings.

⁵²⁹ See section 4.6.

8.1 Strategic objectives: definition and achievements

Morocco has published a detailed Innovation Strategy⁵³⁰ involving all public stakeholders as well as the CGEM, representing the private sector. Within its innovation strategy, priority areas are clearly defined: biotechnology, ICT, materials and nanotechnology. In Egypt, such a strategic framework is either missing or not publicly accessible and, therefore, of limited use. Priorities were not public at the time interviews took place, however in 2013 the STDF published nine research priority areas on its website⁵³¹ with targeted calls for funding (STDF, 2013).

In absence of comparable innovation strategies, this research makes use of the respective industrial strategies and the achievement of the corresponding objectives to compare the effectiveness of the respective NISs. The rationale supporting this choice is based on the extended review of indicators of innovation performance presented in Chapter 5: despite innovation having a broader scope, there is wide consensus in the literature to make use of indicators that are particularly related to the secondary sector (e.g. R&D, patents and new products). This choice also reflects the efforts of the respective governments in sustaining and enhancing the capability of the national industry to compete successfully in the global economy.

The comparison of the industrial strategies indicates that the two countries share common objectives, albeit expressed differently: increase employment, industrial competitiveness and exports⁵³². The Egyptian IDS explicitly includes building innovation capacity in its objectives, while in Morocco's NPIE this is addressed rather implicitly by the envisaged development of 16 so-called integrated industrial platforms and three SME cities/technology parks.

Morocco is able to follow up its achievements on the basis of defined KPIs for the declared objectives and corresponding targets to be achieved within a relatively

⁵³⁰ "Initiative Maroc Innovation"; see section 7.2.

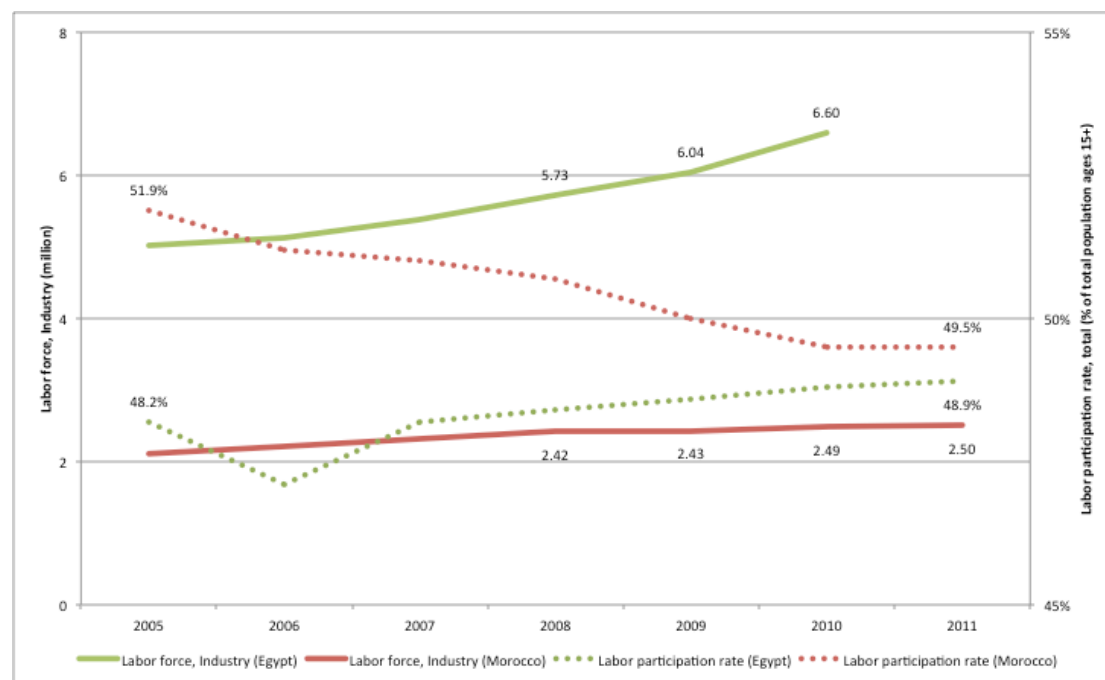
⁵³¹ These are aqua cultures and fisheries, development of Sinai, health (in particular the Hepatitis C virus), metallic industries, pharmaceutical industries, renewable energy, sustainable food production, textiles and silicon, and water desalination (STDF, 2013).

⁵³² See sections 6.2 and 7.2.

short timeframe (seven years). The IDS in Egypt does not set clear targets and foresees a much longer timeframe for achieving its objectives (i.e. 2006-2025/2050). However, as the overreaching goals are very similar, Morocco's KPIs can be used with due care to measure progress in implementing the industrial strategy in Egypt.

The first objective mentioned in the NPIE is an increase in the total number of employment in industry (i.e. 220,000 direct jobs). Since the start of the plan, the labour force in industry has increased by 70,000 units. However, the labour participation rate has continued to drop, following a trend initiated already at the beginning of the century. Egypt⁵³³ is doing comparatively better, creating jobs in industry at higher pace and increasing the labour participation rate almost to the same level of Morocco (Figure 30).

Figure 30: Labour force in Industry (millions) and labour participation rate (%)

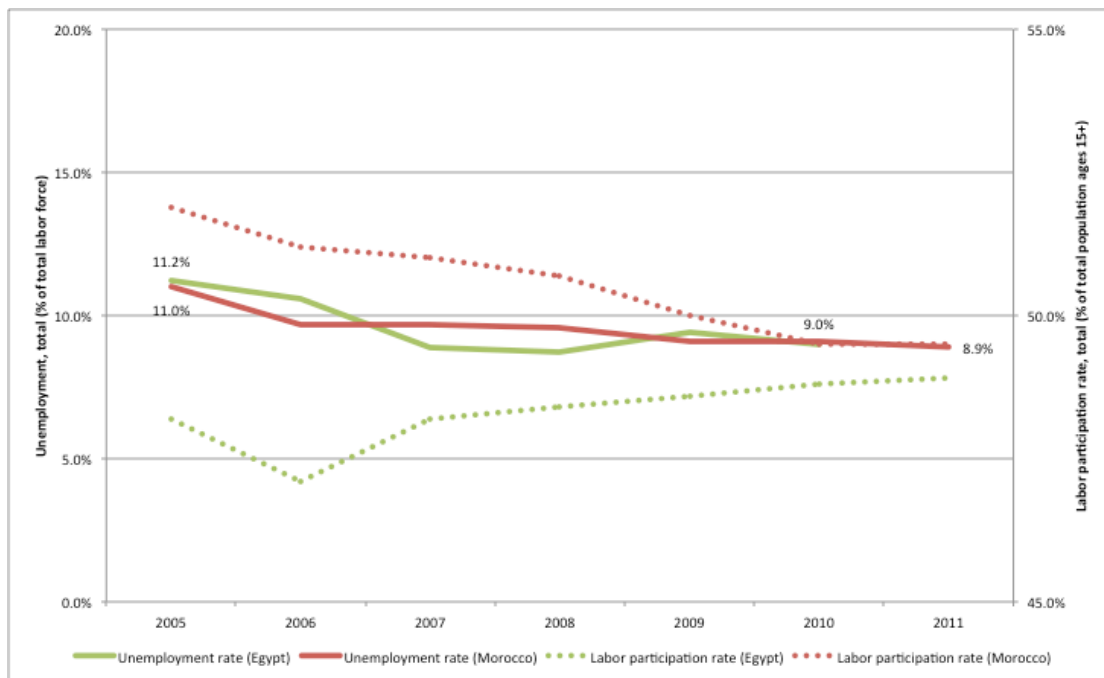


Source: Author, based on World Bank indicators

These positive results are confirmed by the unemployment rates, which present in both countries a common, positive trend (Figure 31).

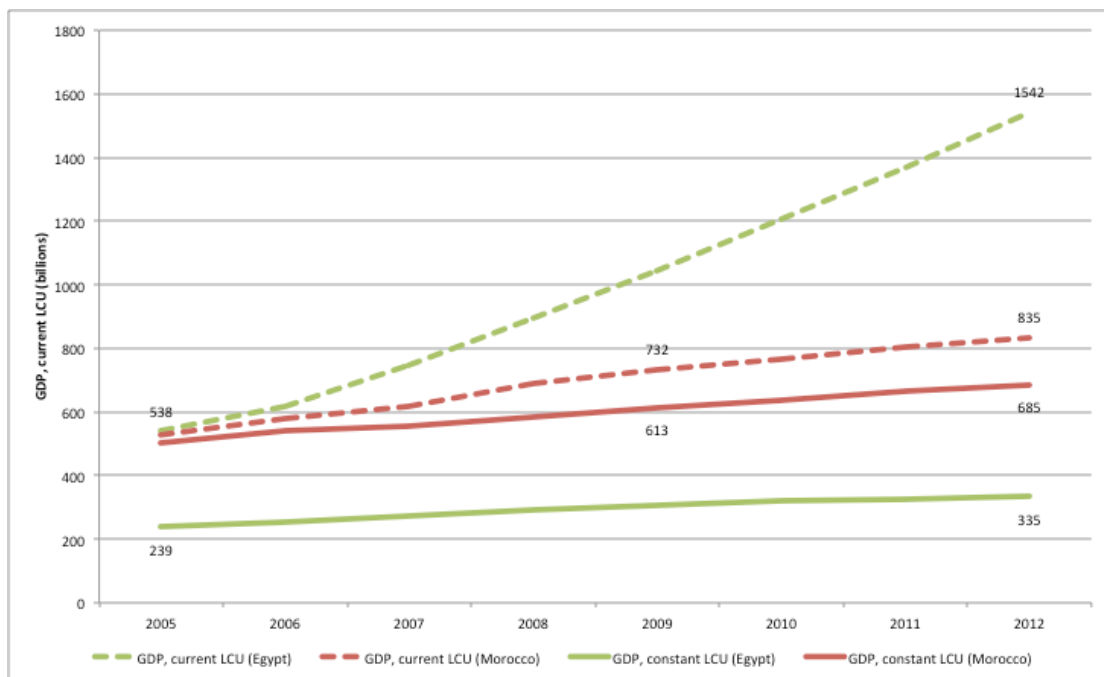
⁵³³ The comparison is likely to look less favourable to Egypt once data for the last two years become available because of the disorders that preceded and followed the fall of Mubarak's regime.

Figure 31: Labour participation and unemployment rates (%)



Source: Author, based on World Bank indicators

Figure 32: GDP (current and constant LCU billion)

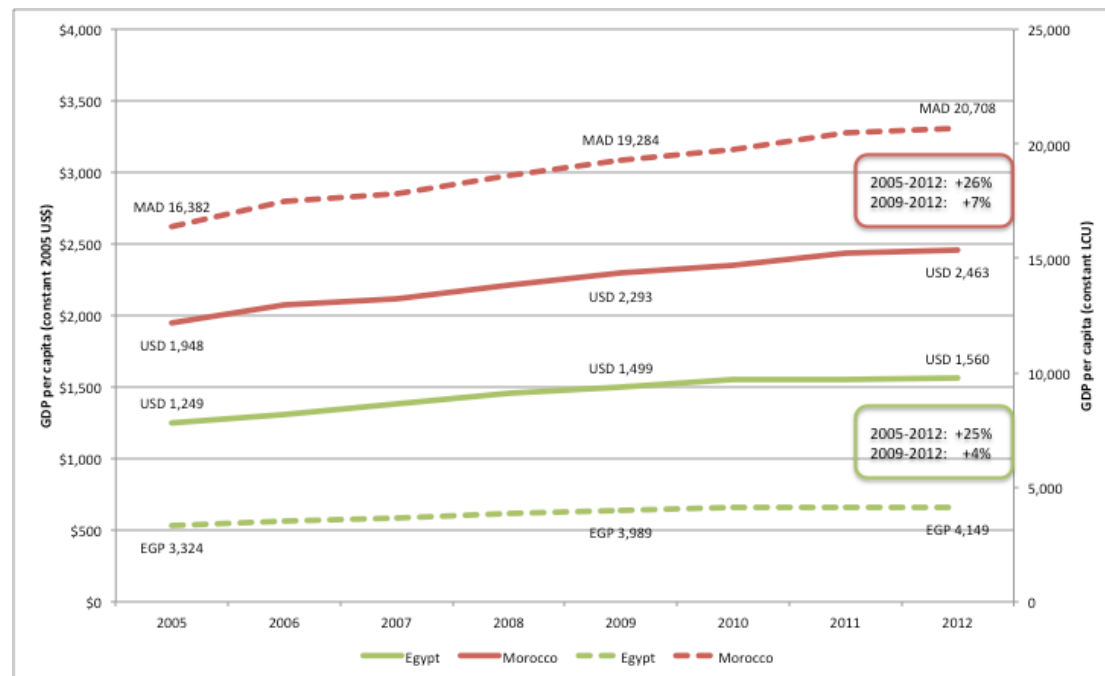


Source: Author, based on World Bank indicators

Furthermore, the NPIE sets targets for GDP growth (50 billion MAD), an objective which appears to be achieved both in nominal and in constant values (Figure 32). Figure 32 also indirectly provides an overview of the inflation rates (consumer prices) in the two countries: between 2005 and 2012, Egypt has experienced an average

inflation rate slightly over 10 per cent, five times higher than Morocco⁵³⁴. A further possibility to compare the relative performance of the two countries is offered by the analysis of the GDP per capita distribution (Figure 33).

Figure 33: GDP per capita (constant LCU)



Source: Author, based on World Bank indicators

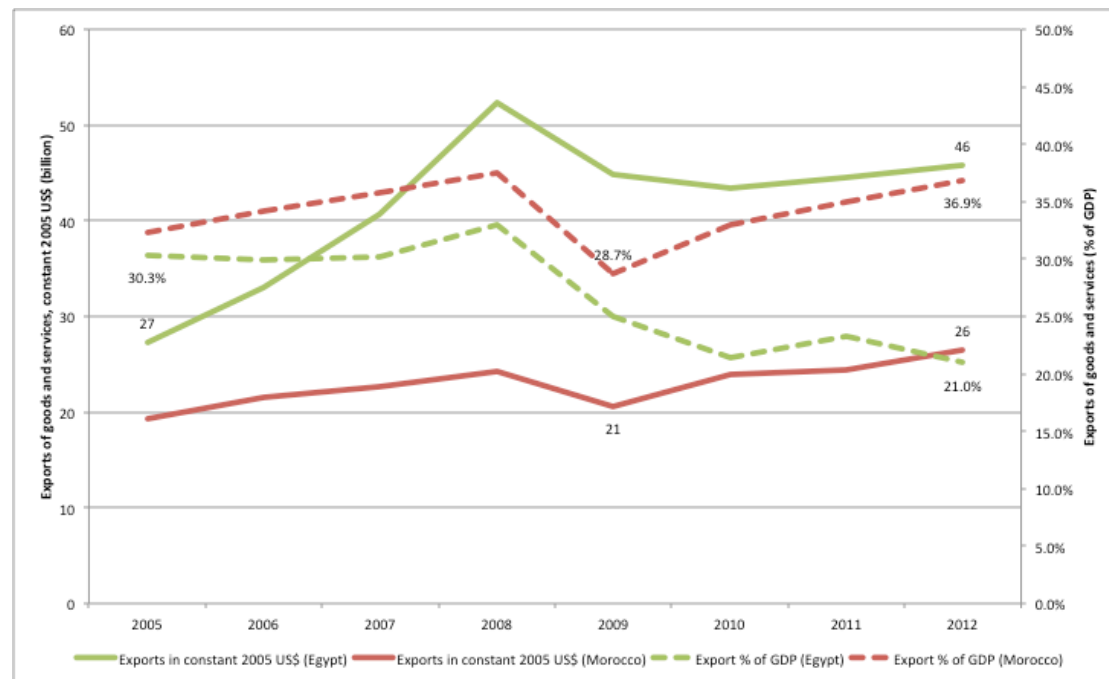
Since the definition of the IDS, in Egypt by 2012 GDP per capita had grown by 25 per cent, very much in line with what happened in Morocco during the same period. In the last four years, Morocco has outperformed Egypt. However, the distribution of income or consumption (Gini index) suggests that, in comparison to Morocco, a larger proportion of Egyptians may have benefitted from economic growth.

The next performance indicator considered in the NPIE is the volume of exports, expected to grow by 95 billion MAD by 2015. In nominal terms, the objective was already met by 2012 and, excluding inflation, exports had increased by almost 50 billion MAD in the period between 2009 and 2012. To facilitate the comparison,

⁵³⁴ An assessment of the consequences of higher inflation rates in Egypt is outside the scope of this research, nevertheless it is reasonable to assume that the deriving uncertainties have an ever-greater impact in these contexts, characterised by higher risk avoidance.

Figure 34 presents the export trends for both countries in constant 2005 US billion dollars and in percentage of GDP.

Figure 34: Exports of goods and services

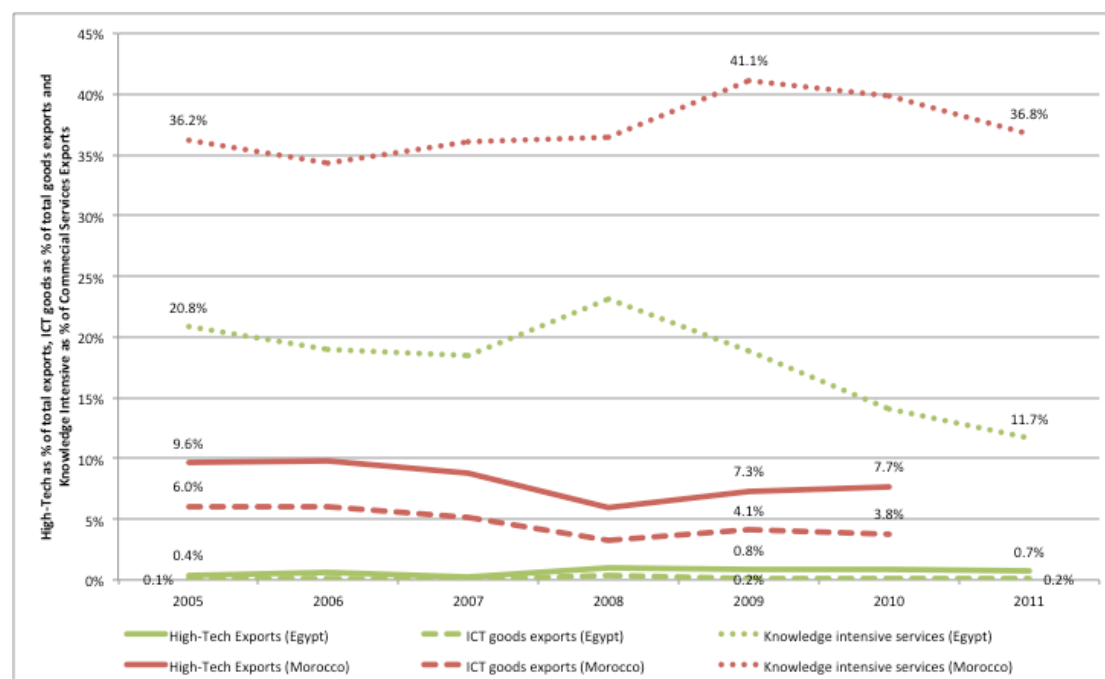


Source: Author, based on World Bank indicators

Since the introduction of the NPTE, the relevance of the export sector has significantly increased, signifying a higher dependence on it for the country's economic growth. The trend in Egypt is less positive, pointing to the difficulties of the country in achieving the strategic objective of "higher growth in industrial production through an aggressive utilization of export development and FDI attraction where both are vehicles for deepening Egypt's regional and global integration drive" (MTI, 2006, p.3).

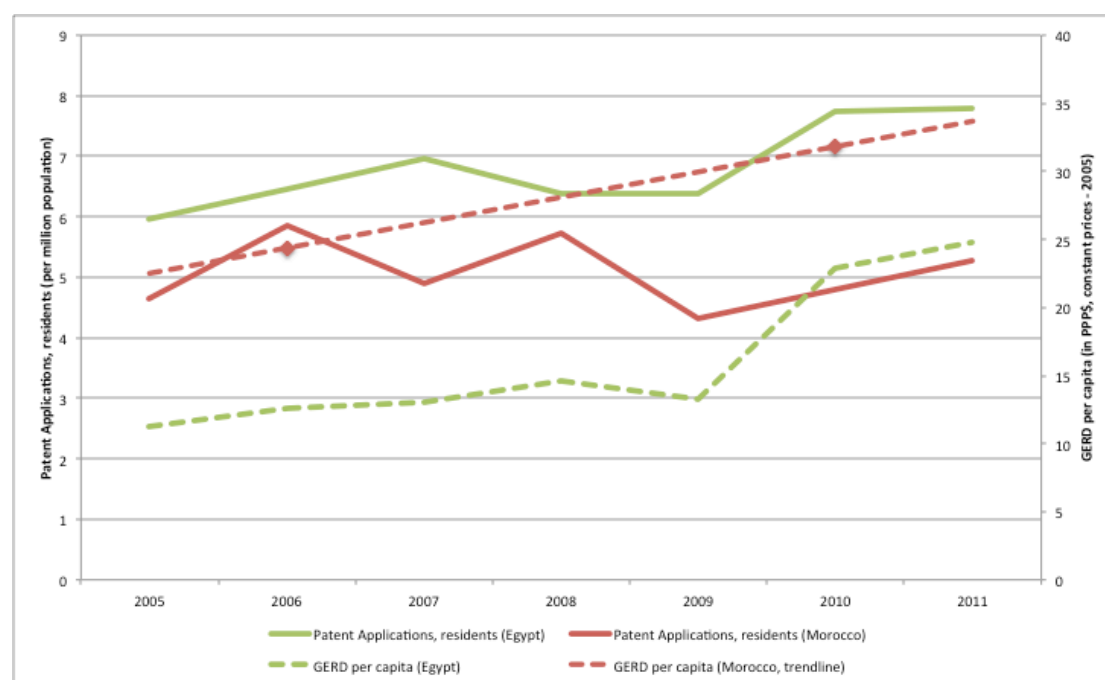
These results are confirmed when restricting the focus to goods and services in more "innovative" sectors. Figure 35 indicates that both countries struggle to improve or even maintain the ratio of high-technology goods and knowledge intensive services over the total exports value. This struggle reflects the difficulties less developed countries face when competing to acquire shares of the global market in high-tech sectors (see for example Perez and Soete, 1988; Freeman, 1989; Keefer and Knack, 1997).

Figure 35: High-tech, ICT and knowledge intensive exports



Source: Author, based on World Bank indicators

Figure 36: R&D investments and patent filings in Egypt and Morocco



Source: Author, based on World Bank and UNESCO data

On the basis of the results presented, the approach to strategy definition in Morocco has the advantage of foreseeing concrete ways to measure progress. Indeed, the country is on its way to meet the targets set, an achievement not to be underestimated in view of regional turmoil and global competition. According to the

same indicators, Egypt is comparatively performing worse. However, it is more effective when considering how R&D translates into inventions and ultimately patents (number of patents filed by residents per million population, see Figure 36).

Having reviewed the high level performance of the respective NIS, this research addresses in the following the quality of the support given by the PA in terms of AE. The reduction of administrative burdens for business facilitation (and hence indirect innovation and entrepreneurship support) is assessed here on the basis of the World Bank's Doing Business Reports (DBR), which measure the ease of doing business within 10 categories⁵³⁵. Looking at the overall performance of Egypt and Morocco within the DBR 2013, the countries score at a relatively similar level, with Egypt ranking 109th and Morocco 97th out of 185 countries (World Bank and IFC, 2013).

A more detailed account of Morocco's and Egypt's performance in the global DBR can be accessed in the World Bank's "Doing Business in the Arab World 2012" report, a regional version of DBR 2012 covering 20 Arab economies which helps understanding the discrepancies in the performance of the two countries. Morocco's exceptional performance is praised as follows:

"Morocco was the most active in implementing regulatory reforms in 2010/11. It launched a fully operational one-stop shop for obtaining construction permits. It eased the administrative burden of paying taxes for firms by enhancing electronic filing and payment of the corporate income tax and value added tax. And it adopted a new law modifying the rules of procedures governing commercial proceedings" (World Bank and IFC, 2012, p.2).

Egypt has not implemented any reforms related to the Doing Business categories in 2010/2011 (World Bank and IFC, 2012), which explains the diverging performance between Egypt and Morocco in the overall DBR 2013. Looking at the performance within the individual categories of the report allows for drawing more focused conclusions on the main deficiencies within the countries' regulatory systems in the area of business facilitation and the underlying reasons. The following sections

⁵³⁵ These are: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency (World Bank and IFC, 2013).

address these with particular focus on the categories ‘starting a business’, ‘getting credit’, ‘enforcing contracts’ and ‘resolving insolvency’.

Starting a business (Table 30) seems to be much easier in Egypt: it involves six procedures, which can be completed within seven days. No minimum capital is required to start a business and the cost of completing the necessary procedures equals 10.2 per cent of the per capita income. In Morocco, although the number of procedures to start a business is the same as in Egypt and no minimum capital is required as of 2011 to register a limited liability company, time and costs to complete the relevant procedures are higher (i.e. 12 days and 15.5 per cent of per capita income respectively) (World Bank and IFC, 2013).

Table 30: DBR 2013 - Starting a Business in Egypt and Morocco

	Rank	Procedures	Time	Cost (% of income per capita)	Paid-in minimum capital (% of income per capita)
Egypt	26	6	7	10.2	0.0
Morocco	56	6	12	15.5	0.0

Source: Adapted from World Bank and IFC (2013)

When looking at the evolution of this dimension of the DBR from 2012 to 2013, it is worth underlining that Morocco improved its ranking by 38 positions (i.e. from rank 94 to 56 out of 185 countries), while Egypt recorded a downward trend (i.e. from rank 23 to 26) (World Bank and IFC, 2013). Morocco’s significant result can be attributed in part to the inter-ministerial coordination effort for administrative simplification⁵³⁶ as well as to the abolishment of the minimum capital requirement for starting a business (World Bank and IFC, 2013).

When looking at other categories of the DBR that are most closely related to innovation, we can observe that in terms of access to finance/getting credit Egypt outperforms Morocco too, ranking 83rd and 104th respectively. Table 31 presents the composition of the indicator and the relevant sub-categories. The main reason for Morocco’s underperformance in this area is the absence of a public credit registry,

⁵³⁶ Achieved through the creation of the CNEA, see section 7.3.1.

which would keep track of the borrowing history of Moroccan nationals, as well as a slightly worse performance in terms of the depth of available credit information (World Bank and IFC, 2013).

Table 31: DBR 2013 - Getting Credit in Egypt and Morocco

	Rank	Strength of legal rights index (0-10)	Depth of credit information index (0-6)	Public registry coverage (% of adults)	Private bureau coverage (% of adults)
Egypt	83	3	6	4.3	16.4
Morocco	104	3	5	0.0	17.2

Source: Adapted from World Bank and IFC (2013)

According to their scoring in the Enforcing Contract indicator (Table 32), both countries seem to lack an adequate legal framework for the protection of creditors and debtors, signifying a low efficiency of the respective judicial systems. Even if the indicator does not measure the difficulties of enforcing IPRs⁵³⁷, there is no evidence from the desk research and the fieldwork conducted that such cases are managed differently.

The most evident disparity in the performances of the two countries is the time span between the filing of the case and the enforcement of the judgement (respectively 1010 and 510 days). Disputes on IP have a different impact according to the technical field: in case of relatively short technology and product life cycles, a time span of several months or even years (i.e. the case of Egypt) is clearly detrimental to innovation.

Table 32: DBR 2013 - Enforcing Contracts in Egypt and Morocco

	Rank	Time (days)	Cost (% of claim)	Procedures (number)
Egypt	152	1,010	26.2	42
Morocco	88	510	25.2	40

Source: Adapted from World Bank and IFC (2013)

⁵³⁷ It assesses the efficiency of the judicial system by following the evolution of a commercial sale dispute over the quality of goods (World Bank and IFC, 2013).

An important measure of a good business environment that encourages entrepreneurship is the time and effort required to solve issues around insolvency. The DBR 2013 ranks Egypt 139th and Morocco 86th out of 185 economies (World Bank and IFC, 2013) (Table 33). Several interviewees in both countries have complained about lengthy and bureaucratic procedures required⁵³⁸, though more in Egypt than in Morocco. An Egyptian CEO commented: “Closing my first company, which did not pay a single pound in or a single pound out, did not hire anybody, did not have a tax card or anything, took us six weeks of paperwork. This is ridiculous”⁵³⁹.

Table 33: DBR 2013 - Resolving Insolvency in Egypt and Morocco

	Rank	Time (years)	Cost (% of estate)	Outcome (0 as piecemeal sale and 1 as going concern)	Recovery rate (cents on the dollar)
Egypt	139	4.2	22	0	17.6
Morocco	86	1.8	18	0	35.1

Source: Adapted from World Bank and IFC (2013)

In 2012, a new absolute measure of business regulatory efficiency⁵⁴⁰ was added to the DBR, namely the so-called “distance to frontier” (World Bank and IFC, 2013, p.6). Both countries have made significant progress in terms of their overall business regulation covering 10 areas considered most relevant for business facilitation. Egypt thereby ranks sixth out of 50 countries that have managed to significantly reduce the distance between their own score and the frontier. The total improvement equals 16.3 percentage points (World Bank and IFC, 2013).

Unfortunately, the good performance of Egypt is mainly attributed to reforms conducted up to 2009. Thereafter no significant reduction in administrative burdens

⁵³⁸ See for example interviews EE-17 and ME-17.

⁵³⁹ Interview EE-17; see interview transcript, p.99.

⁵⁴⁰ This measure aids in assessing how much the regulatory environment for local entrepreneurs improves in absolute terms over time by showing the distance of each economy to the “frontier”, which represents the best performance observed on each of the Doing Business indicators across all economies and years included since 2005. The measure is normalised to range between zero and 100, with 100 representing the frontier. A higher score therefore indicates a more efficient business regulatory system [...]” (World Bank and IFC, 2013, p.6).

has taken place and no improvements in terms of the categories measured within the report were recorded (World Bank and IFC, 2013). Morocco has made vast improvements in its regulatory environment for businesses. Ranked 30th out of the 50 countries mentioned above, it improved its score by 10.1 percentage points between 2005 and 2012.

The combination of these results and the findings of Chapters 6 and 7 support the following preliminary conclusions: Egypt's NIS is characterised by a higher level of enablers in terms of human resources and quality of its research system, reflecting its longer history. Building on a clearer innovation strategy, Morocco is closing the gap and, in some aspects, is leading (GERD per capita, mostly relying on public funds, see Figure 36). The securitisation of IP assets is still more advanced in Egypt, however the higher levels of governance (reflected also in a better enforcement of the rule of law) seem to have achieved stronger economic effects of innovation in Morocco.

Before final conclusions can be drawn, it is important to exclude alternative explanations of the causal relationship investigated, i.e. between AE (in particular organisational schemes) and innovation performance. The next section presents the main obstacles to innovation according to the interviewees to assess their similarity. The results shed some light on the underlying reasons of underperformance, demonstrating how AE is functional to linking strategy definition and strategy implementation.

8.2 Obstacles to innovation

Several interviewees who interact with formal institutions at operational level made remarks relating to the quality of **governance** in their respective countries. Their perceptions are based on own, sometimes episodic experiences and may not fully reflect the quality of the strategy definition process in their respective countries. Nevertheless, the message conveyed is coherent with the findings of the previous section.

Interviewees in Egypt lamented the absence of clearly communicated priorities for the science and technology national plan as well as of a comprehensive innovation

strategy to address them, whereby public and private actors would be supported and their activities coordinated on a national level. Moreover, there seems to be discontinuity in the definition of national priorities and how they should be addressed:

“[...] each Minister of Scientific Research and Higher Education has a different plan, a different view and different priorities for the next decade. And then two years later another one comes and has other priorities for the next decade”⁵⁴¹.

Another participant, in charge of a TTO at a higher education institute, complained about the lack of a concrete list of national priorities and an action plan to address them. Having tried to obtain funding for the activities of the TTO, the respondent seemed very upset about the low level of responsiveness and transparency within public authorities: “Not only don’t they have a vision or concrete plans, but they are also not interested in supporting scientists and innovation”⁵⁴².

Initiatives are taken in isolation by individual stakeholders in PA and do not appear coherent to their potential recipients. Some public administrators recognise the need for a more coordinated effort at strategic level to more effectively steer the initiatives of individual actors, defining and applying concrete KPIs for evaluating the impact of initiatives⁵⁴³. Examples of relevant good practice are provided by IMC and RDI Programme⁵⁴⁴, the only entities in charge of direct innovation support which conduct some sort of quantitative impact assessment activities.

In particular, the successful implementation of RDI Programme, a joint initiative between the Egyptian government and the EU, as well as its continuation and increase in funding after the completion of the first phase⁵⁴⁵, demonstrate the willingness of Egyptian authorities to collaborate more closely with international partners and the potential such collaborations bear if implemented correctly.

⁵⁴¹ Interview EE-17; see interview transcript, p.102.

⁵⁴² Interview EO-05c; see interview transcript, p.129.

⁵⁴³ See interviews EO-07, EO-09 and EO-10a.

⁵⁴⁴ See sections 7.3.3.3 and 7.3.3.7.

⁵⁴⁵ See section 7.3.3.7.

As presented in the previous section, Morocco has developed a clearer innovation strategy. However, while acknowledging the general usefulness of the National Strategy for the Development of Scientific Research by 2025 as well as of the Moroccan Innovation Initiative, a senior official of R&D Maroc criticised the latter for being too focused on particular sectors. The respondent remarks, however, that the government was in the process of elaborating a cross-sectoral innovation strategy at the time the interview took place⁵⁴⁶.

The same participant notes that the private sector is not invited to participate in the formulation and implementation of the national innovation strategy (e.g. the inter-ministerial committee for research and innovation does not include any members from the private sector, but only ministerial employees⁵⁴⁷). The absence of contributions from the private sector in the definition of innovation policy and supporting initiatives (e.g. projects) is one of the major reasons for the very low level of university-industry collaboration⁵⁴⁸.

Like in Egypt, Moroccan authorities have sought advice from international consultancies, which was supported with benchmark exercises against other countries, in particular France. However, the choice of the reference countries appears controversial:

“[In the department of Technology, Innovation, Research and Development] we have conducted a study on the regulatory framework. [...] We used some reference countries for the regulatory framework, which, we judged, had achieved more acceleration in terms of progress in the area of innovation, notably South Korea, Singapore, Germany and Turkey”⁵⁴⁹.

“[...] We were interested in some experiences from Belgium, France and Canada, as we are trying to stay up to date and we developed an alert system in order to see what is happening in other countries”⁵⁵⁰.

⁵⁴⁶ Interview MO-04; see interview transcript, p.358.

⁵⁴⁷ As the interview took place, the relevant law was about to be amended to allow for private sector participation in the high-level definition of research and innovation policy.

⁵⁴⁸ Interview MO-04; see interview transcript, p.357.

⁵⁴⁹ Interview MO-14; see interview transcript, p.435.

⁵⁵⁰ Interview MO-06; see interview transcript, p.377.

“At policymaker level there must be some change and some shifts towards learning from more relevant examples from Turkey, Indonesia, Malaysia, these are by far more relevant examples than France”⁵⁵¹.

“[For] international benchmarking studies, we looked at Silicon Valley, and we looked at what is happening in Singapore, in the French and European competitiveness poles, we looked into clusters, we looked at what is happening in Korea, we looked at Chinese Smart Cities”⁵⁵².

“We cannot apply certain measures from Canada in a system that is very different from Canada. The financial management and the management of the administration in Anglo-Saxon countries are completely different from southern European countries like France, Italy or Spain. We cannot transfer things that are still very foreign. This is very difficult. So we try to look at the similar systems and figure out how to evaluate similar systems in the same way. This is much more appropriate”⁵⁵³.

The most interesting aspect is that such a debate is actually taking place among those in charge of designing or implementing innovation support policies, whereby existing habits are challenged and alternative approaches proposed.

In Egypt the interaction with PA to access government **funding** for R&D activities is perceived negatively as not adequately considering the nature of the innovation related tasks. According to a CEO, minor deviations from initial plans for a publicly funded project require several approval steps, time-consuming and complicated, despite delays in innovative projects can be fatal to their success⁵⁵⁴.

Similarly, several participants in Morocco complain about the lack of financial support. Some faced difficulties after the start-up stage in obtaining the necessary funding for the development of prototypes and proofs of concept⁵⁵⁵. A further issue for firms considering to apply for funding is that a clear definition of what actually constitutes innovation is missing: “funding is available, but firms often do not know

⁵⁵¹ Interview MO-08; see interview transcript, p.393.

⁵⁵² Interview MO-05a; see interview transcript, p.368.

⁵⁵³ Interview MO-04; see interview transcript, p.359.

⁵⁵⁴ See Interviews EE-04 and EE-08.

⁵⁵⁵ See interviews MO-08 and MO-09.

whether their product/service is an innovation, as they do not know whether it has been done somewhere else”⁵⁵⁶.

A further point of dissatisfaction relates to the ranking process of projects requesting financial support. These are jointly assessed without taking into consideration the specific aspects of the different sectors. An optimal approach would instead assess project proposals per sector⁵⁵⁷.

According to representatives from RMIE, the launch of CMI⁵⁵⁸ should increase the availability of public funding after the start-up stage⁵⁵⁹. New schemes, such as *Intelak*, *Tatwer* and *PTR*, represent an improvement, however, the excessive time needed for de-blocking funds constitutes a major weakness. In this case too, the information collected in the interviews underlines similar challenges in both countries, whereby, possibly due to a lower level of trust in PA in the perception of the researcher, Egypt has developed in the last years a stronger private offer of financial support to answer the existing demand for quicker and non-bureaucratic support.

In relation to the third thematic area, **infrastructure**, participants in Egypt mention bureaucracy as a major impediment to innovation: to cope with the burden of compliance the solution is either to hire a staff member dedicated to dealing with administrative procedures or to outsource the task to lawyers and external consultants. In both cases, heavy administrative burdens consume financial and human resources that could be invested in core activities: resources (staff) dealing with administrative procedures are not available for firm-internal innovation activities.

Furthermore, the inefficient handling of the interaction between PA and the private sector translates in an excessive size of the public sector, which according to a senior

⁵⁵⁶ Interview MO-04; see interview transcript, p.360.

⁵⁵⁷ Interview MO-04; see interview transcript, pp.362-363.

⁵⁵⁸ See section 7.3.3.2.

⁵⁵⁹ Interview MO-09; see interview transcript, p.401.

official from MSAD represents a great financial burden for the taxpayer. The digitalisation and administrative development efforts of MSAD did not yet lead to a reduction in PA workforce, still close to seven million civil servants. The official explained the underlying issue as follows: “when you develop services and processes, you cannot say to any of those employees to leave. You have to keep him and give him the salary, even if he doesn’t do anything”⁵⁶⁰. The majority of participants evaluate the introduction of the one-stop shop for enterprise creation by GAFI as having greatly reduced administrative burdens for companies in the early stages of their existence. Such efforts could be replicated in other problematic areas for enterprises at later stages of their existence, e.g. when it comes to paying taxes or access to finance. The efforts of the GAFI Bedaya Centre for SME support⁵⁶¹ are a positive step in this direction.

A large number of participants in Morocco, mostly from the private sector, consider administrative burdens a major obstacle to innovation⁵⁶². Despite acknowledging the simplification measures implemented to facilitate business creation, several difficulties remain for existing firms:

“[...] once the business is created, the administrative burdens have not changed. We are obliged to have some accountants that we have to pay for to do all the papers, the balance sheet and accounting. Also the status of a freelancer is not clearly defined. The administrative burdens are really high. Already the fact that nothing is computerised within the administration creates lots of work”⁵⁶³.

Transactions elsewhere relatively simple are in Morocco particularly time-consuming: moving financial means to and from abroad involves a lengthy, bureaucratic procedure requiring an excessive amount of paperwork. This is supplemented by restrictions with online payments to other countries: Moroccan credit or debit cards are not allowed for online purchases abroad⁵⁶⁴, limiting the

⁵⁶⁰ Interview EO-04; see interview transcript, pp.151-152.

⁵⁶¹ See section 6.3.3.4.

⁵⁶² See interviews ME-01, ME-03, ME-07, ME-12, ME-13, ME-16, ME-17 and MO-04.

⁵⁶³ Interview ME-07; see interview transcript, p.255.

⁵⁶⁴ See interviews ME-03 and ME-11.

access to external means that could stimulate in-house innovation (e.g. software downloadable via Internet).

Referring to innovation support programmes, several participants mention the lack of trust, transparency and reliability as well as problems with timeliness, responsiveness and confidentiality⁵⁶⁵. Other participants lament the insufficient PA engagement in the provision of IP related information, pointing to the need for more adequate channels supporting the evaluation of innovative products and services⁵⁶⁶.

The comparison of the input collected suggests some awareness in Morocco of the potentiality of PA for supporting innovation, even if expressed in terms of missed opportunities. In Egypt, the majority of contributions from the private sector underlined obstacles in the interaction with PA, seen in general as a limitation to the firms' activities.

In relation to **capacity building**, a similar gap between intents of PA and perceptions of the users of its services may explain the shortcomings in the education system in Egypt. Those reported by the interviewees are: overcrowded (lecture theatres at) universities, lack of tools and platforms for experimentation at all levels of education and lack of innovation and entrepreneurship modules in university curricula⁵⁶⁷.

Several participants in Egypt claim that the education system does not adequately support students in the development of the skills necessary to successfully engage in innovation. Education appears to focus on broad and theoretical themes⁵⁶⁸, paying minimal attention to applied research or the resolution of practical tasks. For example, students' graduate projects usually do not attempt to solve manufacturing problems or address market needs, but rather focus on basic research⁵⁶⁹.

⁵⁶⁵ See interviews ME-13, ME-01, ME-12, ME-16, ME-17 and MO-04.

⁵⁶⁶ See for examples interviews MO-04 or ME-16.

⁵⁶⁷ See interviews EE-02, EE-07, EE-10, EE-13, EO-11 and EO-05c.

⁵⁶⁸ See interviews EE-05, EE-10, EE-16 and EO-05c.

⁵⁶⁹ See interviews EE-03, EE-05, EO-05c and EO-06.

This is not limited to graduate projects: asked about obstacles to innovation, five participants explicitly mentioned the absence of market-oriented academic research and industry-academia partnerships⁵⁷⁰. The mild enthusiasm for industry-academia partnerships despite the increased support mechanisms is also due to the limited interest private enterprises have in such cooperation, not recognising the potentially high added value that could result from collaboration with academia⁵⁷¹.

Several participants in Morocco note that the provision of basic services for education is at best limited⁵⁷² and, in particular, the equipment available at schools and universities to conduct scientific research is inadequate⁵⁷³. Between those completing education, many are eventually employed in low-skilled jobs in large multi-national enterprises incentivised by the government to set up production facilities in Morocco, a clearly inadequate utilisation of human resources else available for innovation⁵⁷⁴.

On a more operational level, several participants in Morocco remark the reluctance of enterprises to engage in R&D projects with universities⁵⁷⁵. An interviewee from MHESRPT, which has designed a range of initiatives to strengthen industry-academia collaboration, claims that the corresponding financial support is available, however private enterprises are simply not interested in collaborating with academia⁵⁷⁶.

A different opinion is provided by an interviewee from R&D Maroc, who claims that public investment in R&D is not sufficiently high and the government has not implemented any incentive mechanisms to encourage enterprises to conduct R&D internally. The respondent mentions that once collaborative calls are published it is

⁵⁷⁰ See interviews EE-03, EE-05, EO-06 and EO-10a.

⁵⁷¹ Interview EO-09; see interview transcript, p.177.

⁵⁷² See interviews ME-03, ME-12, ME-18 and MO-08.

⁵⁷³ Interview ME-13; see interview transcript, p.284.

⁵⁷⁴ See Interviews ME-05 and ME-12.

⁵⁷⁵ See for example Interviews ME-07, MO-02, MO-04, MO-07 and MO-11.

⁵⁷⁶ Interview MO-07; see interview transcript, p.387.

too late for enterprises to engage: they need to be involved at a much earlier stage, for example in the selection of research topics relevant for the private sector⁵⁷⁷.

The current legal framework represents a further obstacle to industry-academia collaborations in R&D and innovation activities. When engaged in collaborative projects with the private sector, university researchers are not remunerated according to a transparent model, leading to confusion and delays in the process of releasing budgets and agreeing on concrete funding procedures⁵⁷⁸. Furthermore, the legal statute of university researchers does not provide for such cases, causing practical problems when conducting collaborative research activities, for example when addressing traveling costs or insurance coverage⁵⁷⁹.

A related issue is the limited awareness of the importance of IPRs within the academic world⁵⁸⁰. This may also be related to the inadequacy of a legal framework, which would encourage universities to protect their IPRs: university researchers are not allowed to file patents under their name, but need to file it on behalf of the institution they work for. Consequently, universities have hardly filed any patents, as informed researchers look for alternatives to retain ownership of their inventions⁵⁸¹.

There is very limited expertise within academia on financial incentives available to university researchers to conduct research and file patents and on the commercialisation of the corresponding IPRs, limiting the likelihood of university spin-offs and technology transfer⁵⁸². This lack of knowledge reinforces auto-referential behaviours, whereby careers in universities may develop without having to expose one's own results to the outside world: "Moroccan researchers can reach

⁵⁷⁷ Interview MO-04; see interview transcript, p.364.

⁵⁷⁸ See interviews MO-02, MO-04 and MO-11.

⁵⁷⁹ Interview MO-04; see interview transcript, p.358.

⁵⁸⁰ See interviews ME-13, MO-05a and MO-11.

⁵⁸¹ These deficiencies had been recognised and, at the time interviews took place, it was stated that the relevant law was soon to be amended (Interview MO-11; see interview transcript, p.418). The partnership agreements implemented by OMPIC have led to a substantial increase in the number of patents filed by universities (see section 7.3.3.1).

⁵⁸² See interviews MO-04, MO-05a and MO-08.

the level of a senior professor, which is a top post, [...] without necessarily having to publish”⁵⁸³.

The analysis of the major obstacles to innovation has confirmed the similarity of the challenges faced in both countries and the general awareness of the role the respective formal institutions need to play to address the deficiencies highlighted. The next section is dedicated to the comparison of selected organisational schemes set up to support innovation. The qualitative analysis of their performance on the basis of the 72 interviews and the author’s desk research are meant to verify whether similar schemes have produced similar results in comparable contexts.

8.3 Comparing Organisational schemes

In this section, institutional arrangements, one for each country for the four main thematic areas, are compared. The selection is made on the basis of their functional similarity according to the stated mission and objectives (Table 34). Their performance (e.g. support to the innovation process) is qualitatively evaluated on the basis of the participants’ feedback, whereby more relevance is given to the view of entrepreneurs and innovators. The comparisons reveal in some cases significant differences in the actual implementation, indicating potential for policy transfer.

Table 34: Organisational schemes compared per theme

Theme	Egypt	Morocco
Governance	EGYPO	OMPIC
Funding	RDI Programme	CMI
Infrastructure	TIEC	Technopark Casablanca
Capacity Building	IMC	ANPME

Source: Author

8.3.1 Governance

By granting IPRs, EGYPO and OMPIC have an operational role in supporting the innovation strategies of their respective governments. This task is complemented by

⁵⁸³ Interview MO-08; see interview transcript, p.394.

the diffusion of the corresponding legal and, particularly in the case of patents, technical information. These are the fundamental tasks of IP offices and, therefore, the starting point for comparing how both entities support entrepreneurs and innovators in facing their challenges.

Daily confronted with the requests of entrepreneurs and innovators, patent offices are in a privileged position to channel their concerns and needs to those in charge of the formulation of the national innovation strategy. A concrete example would be collecting suggestions to improve the legal system, such as the following:

“[...] What we should do is to review our IP law in Egypt. Our IP law has lots of flaws, it does not support innovation and it actually kills innovation. For example, if the government funds research, then the government owns the IP, [...] but will the government actually go and try to protect and commercialise that IP? No. I think the government for the coming 20 to 25 years should leave the IP within the institution, the industrial institution or public institution like universities”⁵⁸⁴.

A participant from Morocco raises a more general issue related to IPRs in developing countries:

“The question is: ‘Will it really protect your invention or not?’ For me at least, we are making these patents only to protect ourselves from the claims of the competition, but not to attack the competition. It is more to protect yourself, so that tomorrow you cannot have somebody coming to sue you. But nobody thinks about attacking others”⁵⁸⁵.

The risk is that IPRs obtained in their countries will offer insights into on-going research to companies in developed countries with more sophisticated IP portfolio management strategies. Accordingly, a participant states:

“I find it worthless to have a patent in Egypt. My patents are all international, not Egyptian. The idea is very simple: I'm developing products to compete in the international market. Egypt is not one of these markets for these bearings and

⁵⁸⁴ Interview EO-05b; see interview transcript, p.122.

⁵⁸⁵ Interview ME-13; see interview transcript, p.290.

*for this software. So I don't care about patenting in Egypt, I patent elsewhere where the market is. I do not need protection in Egypt*⁵⁸⁶.

In this context, both offices should have a pro-active role, building on their competences and using their resources to influence the design of innovation policies in their respective countries.

As presented in the previous chapters, capacity building to generate innovation is an objective of several organisational schemes. EGYPO and OMPIC focus on capacity building for managing the IPRs deriving from innovation and face a common challenge, namely raising general awareness on IPRs to harvest the potential of academic and private research:

*"We have a big issue here in Egypt in terms of innovation and research, particularly in the area of patenting. When we look at our publication rate here in Egypt, it is high [...] for a country with 80 million and the number of people in academia. But if we look at the patenting number, it doesn't match: [...] with a certain number of publications you would expect to have a certain number of patents [...]. Patenting activity is very weak [...] we have a structural issue with our education system in the entire MENA region. We don't really have patent lawyers per se [...] we really do not have anybody to write our patents here. The patent office will tell you how they encourage inventors to come directly to them and the patent office will write it for them or with them. But if I tell that to someone here in Egypt [...] 50 per cent of the people will ask 'How?'"*⁵⁸⁷.

*"The main issue is that these people are not prepared mentally, physically and financially to do real research. What you have in universities is more fundamental research and theoretical research; we do not have practical research, no business trying to come to the University. [...] OMPIC will tell you: 'we are encouraging people to submit patents and we did a lot of progress, but we are still not where we want to be'. Three years ago nobody in the University knew about patents. If you said 'patents', people would not understand or think it is something really difficult. Patents were really hard to attain in a University's mind three years ago"*⁵⁸⁸.

"You can be top level in science and have some results. The interesting thing is not to publish these results in scientific journals or reviews, but how to protect them and use them as patents for example. [...] We have created [...] an

⁵⁸⁶ Interview EE-10; see interview transcript, p.53.

⁵⁸⁷ Interview EO-01; see interview transcript, p.111.

⁵⁸⁸ Interview EE-13; see interview transcript, p.284.

*envelope in the budget of all the universities to help them pay for all the patents they can register within the patent office in Morocco or even abroad. This was just to help them to have an incentive to protect their assets and also for companies how to negotiate the use of these patents or how to sell and exploit these patents*⁵⁸⁹.

Thereby, they face similar deficits in the enforcement of the rule of law related to the cultural context underlying their legal systems:

*“The reason why we do not have high-tech innovation or serious businesses that are based on strong technical innovation, is simply because we don’t have a legal infrastructure or a legal mechanism that basically makes sure that if I make a drug for example, [...] my neighbour is not going to [...] reverse engineer it and ruin my one billion dollar investment in R&D. [...] why should I invest in R&D if the neighbour is going to profit from it for free [...] that is what the patent system was made for. Unfortunately, we do not have that mechanism and the culture is simply not there for that. [...] a very interesting perspective to talk about when you go to see the people from the patent office*⁵⁹⁰.

Participants note the lack of patent attorneys to support innovators in protecting their IPRs, compensated to some extent by EGYPO and OMPIC:

*“In the USA there are specialised lawyers [...] we badly need very efficient lawyers in Egypt, which have a very good background in the area of engineering, software and computer science. [...] It could increase the number of our patents a lot if we had trained people*⁵⁹¹.

*“In general we do not have many people here in Egypt who understand IP. I have maybe met five or six people who understand patenting very well or well enough. [...] The question is: people writing and examining that patent, how well are they actually trained? [...] the lawyers in the market, how are they trained? But unfortunately they do not exist. And then there is the judiciary, the judges, are they really trained to judge the things or not?*⁵⁹².

*“The people in Egypt have a lot of innovation, but they are not guided on one hand and, on the other hand, for the worldwide patent (PCT) a lot of funds and a lot of experience are needed*⁵⁹³.

⁵⁸⁹ Interview EO-12; see interview transcript, p.326.

⁵⁹⁰ Interview EO-01; see interview transcript, p.111.

⁵⁹¹ Interview EE-05; see interview transcript, p.34.

⁵⁹² Interview EO-01; see interview transcript, p.112.

⁵⁹³ Interview EE-05; see interview transcript, pp.34-35.

*"It needs [...] two things: first, trained and specialised lawyers and, second, investors who can study whether the patent makes sense or not. If it makes sense, they can invest. [...] This would work. If we had a [patent] office with lawyers and investors like that and they dig into the IT industry, we could file, instead of 40 to 50 patents per year, hundreds of patents"*⁵⁹⁴.

*"[Examiners at EGYPO] explain to you what it means to have IP and where the people's rights and where your rights begin, how to write the legal claims of the patent. It has been improved a lot since 2000"*⁵⁹⁵.

*"We had to wait one year until we found someone here who knows how to write a patent to write it for us. We just found him three months ago. [...] I know that OMPIC is doing a lot of advertising and that they can help. It is true that we should have gone to them and actually we did talk to them a little bit and they were very helpful [...]. We applied for the patent five or six months ago, it is in the process and not yet finished. We are doing it for Morocco, but then we are going to do it for the USA. [...] It is a long process and I don't think that you can do it yourself. You have to find someone to help you do it. And we found someone"*⁵⁹⁶.

Acting as judges in the examination process, patent offices need to draw a clear line between patent awareness activities and the drafting of patent applications. Understandably, in view of the deficiencies highlighted above, in both countries examiners offer their help to applicants in formulating their claims:

*"I was the person in charge of [the company's] patents. I was doing all the process. [...] the efficiency of the patent office has been increased to a great extent. The evaluators got training courses, they know how to search patent databases, and they can guide you. The paperwork was very complicated at the beginning and it's getting easier and easier. [...] they also give you a CD with all the instructions and how to write everything"*⁵⁹⁷.

"When you do it for the first time, it is not easy. I met the OMPIC person to correct several times what should be corrected to comply with the criteria they have. [...] when you go there for the first time, they will ask you many questions to make sure that you're doing something serious. [...] then you will come back

⁵⁹⁴ Interview EE-05; see interview transcript, p.35.

⁵⁹⁵ Interview EE-08; see interview transcript, p.45.

⁵⁹⁶ Interview ME-16; see interview transcript, p.310.

⁵⁹⁷ Interview EE-08; see interview transcript, p.45.

and then there will be some corrections that they will propose, you will correct it and submit it”⁵⁹⁸.

In the case of EGYPO, however, their competence and, more worryingly, their confidentiality was questioned by some participants:

[...] there is some training between the EPO, the USPTO and the Egyptian Patent Office, but I think it is not working. [...] We should think of educating people [...] [and choose] them carefully before they join the Egyptian patent office. This goes with the hiring process more than just capacity building [...]. We see a lot of patents going through the patent office and we hear stories that sometimes the information leaks before it gets patented by the patent office”⁵⁹⁹.

“We need to enforce the IP laws in Egypt. Many of the companies, even if they are working in R&D and produce a very brilliant idea or a very innovative product, they tend to stay away from the patent office. It is not expensive, but the way it works and the evaluation is not really effective. So the companies would rather keep it as a secret, an industrial secret or a copyright or start commercialising straight away, rather than going into patenting and licensing. They might find another company that can buy the invention or can implement it. It is much easier for them to go in this direction rather than to go to the patent office. [...] they do not trust the patent law in Egypt. They think it is not protected enough. They say: ‘even if I go and patent the thing, I’m not quite sure whether this will protect my invention and I might easily lose it in the future’. This is related to the patent office”⁶⁰⁰.

Evaluating its operational performance, several Egyptian participants from the private sector complained, either hinting at the (perceived) low competence of examiners or highlighting the insufficient support in terms of promoting the patent system:

“The support the Egyptian patent office [...] gives to the companies is not enough”⁶⁰¹.

“We need to raise the capacity of the examiners at the patent office, they are not that good”⁶⁰².

⁵⁹⁸ Interview ME-13; see interview transcript, p.290.

⁵⁹⁹ Interview EO-05b; see interview transcript, p.122.

⁶⁰⁰ Interview EO-10a; see interview transcript, p.189.

⁶⁰¹ Interview EE-04; see interview transcript, p.27.

*"I think the patent office is very cooperative. [...] In the beginning we had postponed the filing of our patents and we lost some ideas [...] When we went there and they see that we develop software, they say that you can have a copyright, but not the patent. [...] we have been delayed for maybe 10 years, because when we asked they told us that software is not patentable. [...] but it is an algorithm, it is a process and can be implemented as software, as hardware and it can be implemented in many things. To be able to understand this point, it took us around 10 years"*⁶⁰³.

In contrast, all the participants (CEOs) from companies which had dealt with OMPIC highly rated the services received, the timeliness of procedures and the responsiveness of staff:

*"We registered a copyright with OMPIC. At the time we did it, it was easy, because OMPIC was located here in Technopark. They had an office here, but have moved now. Since 2004 I find that the services of the regional centre for investment and OMPIC have very much improved [...] and we are happy with them"*⁶⁰⁴

*"We have several patents and it is very easy to file a patent at OMPIC. It only takes longer when you want to apply for a patent on international level. [...] anything we do with OMPIC directly usually happens very quickly, they are very efficient"*⁶⁰⁵.

*"Actually I was surprised: to register the brand name, you can do it on the website of OMPIC online"*⁶⁰⁶.

*"In terms of the patenting, it was quite easy, because the people [at the patent office] were responsive"*⁶⁰⁷.

*I had to go to OMPIC twice: I applied for [a trademark] in Morocco when I went there for the first time and the second time I filed the trademark in eight other countries (in Asia, Africa and Europe). You get a voucher from OMPIC and then you go to a bank and you pay it directly to WIPO to a Swiss bank account. I do not remember how long it took exactly, but it was easy"*⁶⁰⁸.

⁶⁰² Interview EO-05b; see interview transcript, p.122.

⁶⁰³ Interview EE-05; see interview transcript, p.34.

⁶⁰⁴ Interview ME-05; see interview transcript, p.248.

⁶⁰⁵ Interview ME-01; see interview transcript, p.229.

⁶⁰⁶ Interview ME-16; see interview transcript, p.310.

⁶⁰⁷ Interview ME-14; see interview transcript, p.299.

⁶⁰⁸ Interview ME-11; see interview transcript, p.271.

“We had no problem with OMPIC at all. We filled in a form, paid the fee and it took one week to verify whether the trademark already existed and they reply. They have improved their service offer and now I think that they even have online services”⁶⁰⁹.

“We protected the name of our company with a trademark. We did that at OMPIC and it took only one day to do it”⁶¹⁰.

One of these companies, having worked with a European national office, compared the experiences as follows:

“We have severable trademarks and recently also filed a patent. We have trademarks that have been filed on international level and in Morocco. And the patent has been filed in Morocco as well. I did not notice any difference in applying for patents in Morocco and in France. There are no particular problems for filing patents, it is easy”⁶¹¹.

The comparison of the two offices on the basis of the information collected during the desk research and the interviews with the participants has highlighted how they face common challenges. Their performance is however judged rather differently, possibly due to their different operational status:

“[OMPIC] is public and 100 per cent autonomous, that is we manage our office with our own income. There is no budget from the Ministry. We pay our staff with our revenues. We have a remarkable income, for example from patent fees and from the sale of databases”⁶¹².

Financially and organisationally independent, OMPIC enjoys significant autonomy in devising and implementing awareness initiatives and service improvements, whose appreciation is reflected in their customers’ contributions. Concrete examples are the convention for the digitalisation of the commercial register⁶¹³ and the recent move from “non-examining” to “examining” patent office⁶¹⁴.

⁶⁰⁹ Interview ME-17; see interview transcript, p.316.

⁶¹⁰ Interview ME-09; see interview transcript, p.266.

⁶¹¹ Interview ME-10; see interview transcript, p.268.

⁶¹² Interview MO-11; see interview transcript, p.414.

⁶¹³ Interview MO-13; see interview transcript, p.430.

⁶¹⁴ Interview ME-13; see interview transcript, p.290.

Despite its longer history, the services provided by EGYPO, do not seem to meet expectations of the interviewees from private sector and the office has not managed to be fully accepted as a reliable partner: the interventions highlight the need to further invest in its human resources, easier to do if it would be in control of the necessary financial means (as it is the case for OMPIC).

The comparison of the two schemes has highlighted a number of similarities in terms of purpose: both offices should contribute more to the strategic debate in view of their proximity to the private sector and, increasingly more, with academia; and both offices are meant to fulfill essential operational tasks in assessing and granting IPRs in countries with very similar challenges due to the low maturity of their respective NIS in managing innovation.

They are however significantly different in their implementation, the most evident element of differentiation being the availability of own financial means. As a consequence, the degree of liberty in defining and implementing initiatives to fulfill their respective mission varies significantly, which clearly reflects in the perception of their customers. Therefore, for the purpose of this research, these two schemes are not considered similar, indicating an opportunity for policy transfer.

8.3.2 Funding

CMI and RDI Programme are innovation-funding schemes targeting SMEs and facing similar challenges when communicating to a scattered audience to raise awareness on their programmes. RDI Programme communication efforts have been particularly effective and the scheme is now among the most visible and well-known innovation support programmes, seven participating companies were aware of RDI's funding mechanism and activities⁶¹⁵ and six had received financial support from it⁶¹⁶. This success is reflected in the high number of applications (719 between 2008 and 2011) as well as in comments made by participants:

⁶¹⁵ See interviews EE-04, EE-05, EE-08, EE-09, EE-10, EE-14 and EE-17.

⁶¹⁶ See interviews EE-04, EE-08, EE-09, EE-10, EE-14 and EE-17.

“Recently there have been a few initiatives related to innovation support, mainly through the RDI programme. We got a project through them. It is funded by the European Union within the EU Egypt science and technology agreement. This is one source of funding. [...] It is a competitive basis. You submit a proposal and then they select. They fund us with 800,000 Egyptian pounds”⁶¹⁷.

“There is also something called the RDI fund. This is a fund between Egypt and Europe and they encourage some sort of cooperation”⁶¹⁸.

“In 2009 we applied for another funding by the RDI program of the MHESR in Egypt, which is a program funded jointly with the European Union. We got the fund from August 2009 until January 2011 and the project was extended for three months until April 2011”⁶¹⁹.

“The main objective of the RDI on the other hand is that [research] is converted into products that you can sell”⁶²⁰.

“There is another organisation, which is the Academy of Scientific Research and Technology. They also provide grants through different funds. One of them is called RDI. The RDI is a fund provided by the EC to help SMEs in Egypt and it is targeted to enhance innovation in SMEs. We also received a grant through the RDI”⁶²¹.

Participants from Morocco offer a similar feedback on CMI’s visibility:

“In the past there were not many investors and there was only one venture capitalist. Now, starting from 2010, this has changed [...] [and] there are two venture capitalists in Morocco: there is Atlas Business Angels [...] and there is also the CMI, which is working with the funds, with admission tickets, which are quite interesting for the project proposers”⁶²².

“I’ve also heard that there is the CMI, however at this stage we do not need support”⁶²³.

⁶¹⁷ Interview ME-14; see interview transcript, p.72.

⁶¹⁸ Interview EE-05; see interview transcript, p.31.

⁶¹⁹ Interview EE-17; see interview transcript, p.88.

⁶²⁰ Interview EE-14; see interview transcript, p.72.

⁶²¹ Interview EE-04; see interview transcript, p.24.

⁶²² Interview MO-09; see interview transcript, p.400.

⁶²³ Interview ME-11; see interview transcript, p.270.

“There is also the CMI, which is based here in Technopark. So there are quite a few programs to aid enterprises in the area of innovation. However, we have never benefited from these aids”⁶²⁴.

“There are three programs for innovative companies launched by CMI, they are called Intilak, Tatwer and a third one for very small companies. Intilak is for beginners, start-ups at the very first step of their life. You have a project and you need funding, but do not know where to get it. So you present your project in a very documented manner. It is a big business case with your administrative documents. They give 100,000 Euro at once for one project”⁶²⁵.

“The only [innovation support measure] I actually know is the new one from the CMI. This is the only one really focused on innovation that I know about and that we benefited from actually. [...] This is the only one I know that actually gives you money, it gives you a no interest loan of maximum of one million Dirham for a start-up, but if you have existed for more than two years you can get up to four million Dirham”⁶²⁶.

Two participants cited above note that the scheme is not well known outside Technopark where it is located, pointing at the need to strengthen communication:

“We are in the Technopark and the CMI office is in Technopark as well. [...] They organised a meeting in Technopark and presented it. So we were lucky to be in Technopark to know about it, because actually some people that I talked to that are not in Technopark do not know about it. Even some people in Technopark do not know about it. [...] [The CMI director] will tell you that they don't have a lot of projects [applicants]. In the first round they had only 40 projects. This would mean that there are only 40 people having an idea in Morocco. [...] I'm sure that there are more people with ideas that need money to do it”⁶²⁷.

For the participant from CNRST, the relative low interest rather indicates the need of building the necessary capabilities:

“For Tatwer they did not receive many proposals from Moroccan industries. This shows also the problem of learning. You need to open up their eyes to show them how to look for information, how to screen ideas. When you launched Tatwer you launched it with the mind-set of something going on in France, because you have the perception that these people are able to come up

⁶²⁴ Interview ME-06; see interview transcript, p.250.

⁶²⁵ Interview ME-08; see interview transcript, p.259.

⁶²⁶ Interview ME-16; see interview transcript, p.305.

⁶²⁷ Interview ME-16; see interview transcript, p.305.

with a project, a sound project. [...] [Here] they don't even have the skills, [...] they have not developed the required routines yet”⁶²⁸.

These participants share the conviction that these programmes represent a necessary beginning:

“[...] When you look at the fund, the total is 450 million Dirham for innovation, it is a pretty good first step to show the people: ‘OK, innovate, this is the money, it is not a lot, but take at least this one and show us what you can do with it’ and once they show [results], I’m sure that then they can get more”⁶²⁹.

“For funding, I think with what the Ministry of Industry has done there [with CMI programmes] was a real change, because there was almost nothing. There was a huge financing gap, but now with Tatwer and Intelak it is enriching the scene a little bit more”⁶³⁰.

Participants in both countries who had applied for funding with the two schemes describe their interaction differently:

“In fact the system is very nice; [...] it is very understandable, the guide for applicants is very clear and the criteria are very transparent”⁶³¹.

“We tried to make use of the RDI fund, but we could not win. One of the reasons was that they are not tolerant enough. The RDI fund is applied for in phases. In the first phase our application was accepted and we submitted a full proposal thereafter. There was a condition that we should not increase the fund more than 20 per cent and it was 21 per cent and for this reason they rejected it. If they had communicated with us, we could have adjusted it. [...] it seems that there is a layer of employees who do not tolerate these simple small adjustments”⁶³².

“You fill in a form with your business plan, your idea, an explanation on why it is innovative, why is it new, how are you sure that it is new, what market do you address. [...] It is a typical business plan, it is very simple. It did not take a long time to do, although you need to do it carefully to make sure you

⁶²⁸ Interview MO-08; see interview transcript, p.393.

⁶²⁹ Interview ME-16; see interview transcript, p.306.

⁶³⁰ Interview MO-08; see interview transcript, p.395.

⁶³¹ Interview EE-08; see interview transcript, p.46.

⁶³² Interview EE-05; see interview transcript, p.31.

*understand their criteria and they published their criteria. If you follow strictly what is written, you can get the money*⁶³³.

*"It took me two months to prepare the necessary documentation and it took them around three to four months to take the decision. And we did not get it"*⁶³⁴.

*"[...] Tatwer is for companies that already exist and need more funds. [...] The condition is that you provide 55 per cent of the project cost by yourself. We wanted to do that. We went through the whole administrative process, which was very long, about one month. [...] you go to get one document and they [PA] ask you for another three documents to get that one: that is why it takes so long. At the end we were so discouraged that we did not take enough time to prepare a business case. We took everything we had prepared and presented previously and just put it together and submitted it. Of course we did not get the funding, but it gave us a better idea of how the administrative process works"*⁶³⁵.

The participant ME-08 refers to the experience made and recognises the company's responsibility in taking advantage of opportunities offered. The respondent's statement significantly echoes the CNRST participant's remark quoted above on local capabilities:

*"We wanted to participate in [Intilak] last year, but we were a bit late. [...] We made a big mistake. Here in Technopark, [there] is an association that links all the companies together, ASTEC. We did not pay attention to what they were saying for about one year. By coincidence, we read an e-mail from them about these programs. It was a bit too late. If we had been aware of it earlier we would have done things better. Right now they just launched the same programs for the second time and we think we are ahead now"*⁶³⁶.

None of the Egyptian companies who benefited from RDI support complains about decision-making and fund-releasing processes, while participants from Morocco

⁶³³ Interview ME-16; see interview transcript, p.306.

⁶³⁴ Interview ME-07; see interview transcript, p.256.

⁶³⁵ Interview ME-08; see interview transcript, p.260.

⁶³⁶ Interview ME-08; see interview transcript, pp.259-260.

draw a more varied picture, whereby positive aspects (e.g. schemes' staff readiness to help) are counterbalanced by unnecessary administrative burdens⁶³⁷:

*"[From applying to getting an answer, it took] two months. This is pretty fast for Morocco. I was very surprised. Now for three months we have been waiting for the money. This is a bit long for innovation. We still don't have the money, but supposing that we get it this week it will be five months or almost six months between application and getting the money. This is a limit. We could be faster, especially for the small amount of money, it is only €100,000"*⁶³⁸.

*"The issue is that we have to obtain the same documents again. They are only valid for six months. These documents are the same for all public offerings. Any project that is being launched by the PA needs the same documents and follows the same process. Luckily we know exactly what is ahead of us, what kind of documents and where to get them. Hopefully, we will not have to ask other people to help us again. Last time, three days before the application deadline, we had to call people and ask them to help. They helped us for things that usually take 10 days; they made it happen in two hours or so. This should not happen again"*⁶³⁹.

A senior executive of R&D Maroc relates the length of the process to the number of administrative bodies involved:

*"The CMI receives the project of the enterprise [...], does the evaluation with experts and it ranks projects into the more and the less innovative ones. [...] Once this ranking is done according to the available budget, they communicate the results to the MTINT, which communicates to the enterprises whether they have been accepted or not. For those who are accepted, it communicates to the ANPME for the release of the subsidy. So there is the CMI, there are the experts, there is the MTINT, there is ANPME, which is four organisms. [...] The first tender was announced in November 2011. Today in April 2012 the files are still at the MTINT"*⁶⁴⁰.

⁶³⁷ Whereby the responsible institutions appear to have recognised the problem: *"[The jury] decided in November about the allocations to the winners, but up to now, April, they still have not received the project money, already six months. [...] if you come to Morocco in one year and you see that the CMI takes six months for a decision, the best projects will not come to us. It is necessary that the administrators understand the facilitation of procedures [...], make sure that there is a number of mechanisms to ensure transparency and to speed up decision making and free resources very quickly once a decision has been taken. This is something we work on at the moment"* (Interview MO-01; see interview transcript, p.335).

⁶³⁸ Interview ME-16; see interview transcript, p.306.

⁶³⁹ Interview ME-08; see interview transcript, p.260.

⁶⁴⁰ Interview MO-04; see interview transcript, p.362.

The file processing time had taken six months and ANPME had still to release the funds. With four entities involved, these processes are not only too lengthy, but bear risks of compromising confidentiality. Transparency and trust are of paramount importance in these cultural contexts: a major achievement of RDI Programme is that it is perceived by its officials as well as its customers to have introduced a previously non-existent notion of transparency in the administration of public funds:

“Most of the people usually when they applied for any funding in the past had to know someone in the fund. [...] This has changed since we started. [...] So people trusted us and thought that we are really keen on introducing transparency and competitiveness and that we treat things in a professional and official way. This has allowed the EC to give us another grant to continue in another phase and hopefully we will succeed”⁶⁴¹.

“[...] They follow the rules, what is written is what you get. Not all the governmental mentality is like this. Sometimes something is written, but you get a different service, but with these funds I had a very good experience”⁶⁴².

The long excerpt below, extracted from an interview with a Moroccan participant in general very supportive of CMI, suggests that in this case the same level of reciprocal confidence is still to be achieved:

“Some people know about [the programme but] do not believe that they'll get money eventually. They doubt that the government is really helping in the area of innovation. [...] And then you go to get the money, they [public officers] ask you for a lot of paper until the last minute [...]. But you have to understand them somehow, because the government has been abused as well, when giving money to people that don't use it for the right thing. So it is both ways. They are very cautious, because they were tricked by some people. [...] To finally get the money from Intelak [...] you have to go to some departments to get stamps. In Morocco they have never done such contracts of giving money for innovation, so the guy has never seen such a contract and does not want to take responsibility to sign or stamp anything like that. [...] So he is like: ‘you wait, because it is a lot of work’. We are like: ‘we wait, because you don't know what to do with this paper’. So it was a week of running around and stress, because if you don't get it signed you don't get the money. For companies that are in Rabat it is better, because they are close to the government, so they are

⁶⁴¹ Interview EO-10a; see interview transcript, p.188.

⁶⁴² Interview EE-08; see interview transcript, p.46.

more professional, but here [Casablanca] it is like they are dealing only with people who are trying to steal from the government”⁶⁴³.

In both cases, when funds become available, the impact on the innovation capability of the applying companies is considered positive:

“If I had not received the funding [from RDI Programme], I could not be in business any more. To get some money from my organisation, I have to prove my idea. Sometimes you cannot prove the concept of your innovative idea unless you get some money first and prove the concept and practice. So with this fund the evaluation is completely scientific, because some scientist evaluates first and then they send the opinion to the fundraiser. The evaluators are neutral; they are not directing the fund, but just evaluating the science that is behind. This is the way I like and that's how you can get funding for a provisional idea, not for an idea which you have already proved in writing and in practice. Without this fund I could not be in business. It is one of the main pillars of our existence and that we can do innovation. So yes it was of great help”⁶⁴⁴.

“RDI [Programme] has helped us, because we developed our technology further”⁶⁴⁵.

“So this is a project, it is already running [...]. I am not really relying on them [CMI], but if they give us 100,000USD it can only help. [...] for 100,000USD we can develop the product further and get more advertising. All our clients are in France for now and we are trying to launch the project in Morocco as well”⁶⁴⁶.

As for the previous section, the comparison of the two schemes highlights common challenges and different perceptions of how these are answered. For the RDI Programme, the initial low number of applications filed could be explained by the limited interest in cooperation of academia and industry, a pre-condition for applying, and a general lack of trust in government funded projects, usually associated with high administrative burdens⁶⁴⁷.

⁶⁴³ Interview ME-16; see interview transcript, p.305-306.

⁶⁴⁴ Interview EE-08; see interview transcript, p.45.

⁶⁴⁵ Interview EE-10; see interview transcript, p.53.

⁶⁴⁶ Interview ME-02; see interview transcript, p.233.

⁶⁴⁷ Interview EO-10b; see interview transcript, p.192.

Building on the first experiences, the administrators have introduced improvements and successfully focused their communication: RDI Programme is now among the most visible and well-known innovation support programmes, as reflected in the high number of applications as well as in the statements of participants, who appreciate its transparency and its holistic approach⁶⁴⁸.

According to the sample of interviewees, the services provided by CMI do not yet satisfy its customers in a consistent way and its current deficiencies, in particular the complexity of the fund-releasing process, may discourage high value applicants and attract those more interested in funding than in innovation:

“And then there are the delays, the lack of confidentiality, the aberration of ranking [and] comparing projects at the CMI. We do not say to eliminate it, but to keep it making attention because it can only interest the ‘hunters of subsidies’. [...] They will create projects, come and look for subsidies, get them and then say the project did not work out so they cannot reimburse them, because they only need to reimburse if the project works out”⁶⁴⁹.

CMI, comparatively younger than RDI Programme, has been conceived as a one-stop shop managing “everything that is related to financial support for innovative projects”⁶⁵⁰. While offering a single point of contact to applicants for its three funding programs, the procedural simplification has not yet addressed the complexity of the relationships between the bodies sharing the responsibilities for managing its funds.

Once this is achieved, it will be able to process incoming applications more efficiently and, therefore, provide enhanced support to the innovative SMEs it targets. The analysis points to a need for a more extensive communication of its services (as in the case of RDI Programme), building on the recognised competitive advantage of its physical location within Technopark Casablanca:

⁶⁴⁸ For example through initiatives targeting future generations: “RDI is doing a very good job in publicising science and innovation for kids. For example they have a summer camp and a science and technology festival” (Interview EE-17; see interview transcript, p.101).

⁶⁴⁹ Interview MO-04; see interview transcript, p.363.

⁶⁵⁰ Interview MO-07; see interview transcript, p.383.

“I think the particularity [...] is that you have the private sector and the administration working together in terms of managing this fund. The other thing is that we are part of a bigger experience, which is the Technopark experience. Being located in Technopark helps us a lot in terms of connections, as you have a lot of associations or companies that we work together with. [...] When you are a few months old company and you are coming and say that there will be a state fund that is completely processed electronically, people looked at us with eyes wide open. The fact that we were a subsidiary of Technopark did allow us [to go] in that direction”⁶⁵¹.

The differences highlighted in the comparison of the two schemes appear to be mainly related to quality and extent of the respective communication and fund releasing processes. Otherwise, the nature and purpose of the two schemes are similar and, on the basis of the limited sample of interviewees with direct experience of their services, they have both achieved a comparable, positive impact. For the purpose of this research, these two schemes are considered similar and have produced similar results.

8.3.3 Infrastructure

The schemes selected are Technopark Casablanca⁶⁵² and TIEC at Pyramid Smart Village. The former, already established in 2001, is managed through a public-private partnership. TIEC, publicly funded by MCIT, began its activities only in 2010⁶⁵³, whereby its operations have been significantly affected by the turmoil during and after the revolution of 2011 (e.g. interruptions of activities and changes in staffing and management).

There was high awareness of TIEC activities among the interviewed companies⁶⁵⁴: all knew its support services, nine had made use of them, three had been incubated⁶⁵⁵. Similarly, Technopark was known among all Moroccan participants, with 11 out of

⁶⁵¹ Interview MO-02; see interview transcript, p.347.

⁶⁵² See sections 6.3.3.3 and 7.3.3.3 respectively.

⁶⁵³ Though incubation activities started already in 2006 at ITIDA in the framework of the TIP and were then transferred to TIEC in 2010.

⁶⁵⁴ See interviews EE-02, EE-03, EE-04, EE-05, EE-06, EE-13, EE-14, EE-17 and EE-18.

⁶⁵⁵ Other services used included financial support and training in the areas of R&D and management of innovation and IPRs.

the 19 interviewed companies based in its premises. Their comments emphasise the local appeal of both structures, whereby being incubated effects positively the image of the companies:

*"We were very lucky; we got the premises in Smart Village, a very nice and prestigious location, where we stayed for two years. [...] It helped us a lot"*⁶⁵⁶.

*"It has helped us at the beginning and it still helps us. For example, when we tell our clients that we are based in Technopark, it creates confidence and trust. This helps us a lot"*⁶⁵⁷.

*"When we have meetings at Technopark with our partners, for example from France, they are very impressed by Technopark and the size of the building. This psychological factor is very important"*⁶⁵⁸.

*"To sign a contract we had to tell the customer where we were based. When we said that we were in Technopark, it was very well received. It was very important for the "awareness" and for our branding. The facilities (e.g. phone, post, meeting rooms, contact with others companies) also helped us tremendously"*⁶⁵⁹.

*"The Technopark is always regarded with a certain prestige. It is a psychological aspect. [...] People think that in Technopark there are only good companies. It is privileged. [...] you have to submit a business plan and get accepted to enter Technopark [...]. It is a certain elite that is located here. Anyone can open an office somewhere without anybody having to verify the business plan. Here it is different. So it is an added value to have a place in Technopark and secondly, it is valuable for us to have an office in Casablanca, because all our clients are here. It is an industrial and economic zone. So it is double the advantage: it is interesting because of the city and because of the Technopark"*⁶⁶⁰.

In general, beneficiaries in both countries evaluate the incubation services very positively, underlining how the width of their scope enabled them to concentrate on developing and marketing their business idea:

⁶⁵⁶ Interview EE-13; see interview transcript, p.64.

⁶⁵⁷ Interview ME-06; see interview transcript, p.259.

⁶⁵⁸ Interview ME-10; see interview transcript, p.268.

⁶⁵⁹ Interview ME-04; see interview transcript, p.243.

⁶⁶⁰ Interview ME-08; see interview transcript, p.262.

“We received some training and exposure to markets outside Egypt. The 200,000 USD in cash was for salaries and computers and the premises and facilities, with Internet and lighting for free. [...] You have a place, you have the money for salaries, you have computers, you have the electricity and Internet paid, you have the cleaning for free, so you can just focus on your business. It is like a dream for any entrepreneur, especially in this part of the world”⁶⁶¹.

“The access to Technopark is very simple and being located here is very practical. In terms of security it is very good, guarded and there is a private parking. Everything related to cleaning is done for us. We have a very good Internet connection. It is really simple for an enterprise to start working here”⁶⁶².

In the case of TIEC, such services include the provision of training sessions specifically designed for innovative start-ups⁶⁶³:

“We attended the workshops on innovation and on how to evaluate your innovations, what is innovative about your products, how to develop them, how to manage them, how to protect your patents and business models, intellectual property rights in Egypt and outside Egypt”⁶⁶⁴.

“There was some training in the area of marketing and business. Basically [the former director of TIEC] [...] organised a number of training modules, [...] on project management, [...] on the finances of companies, [...] on legal issues that relate to companies. [...] It is called Entrepreneurship Qualification Program. It was about three months of very intensive training [...]”⁶⁶⁵.

A participant from an incubated company praises the quality of the trainers:

“When TIEC is doing a workshop, they are trying to get the best people they can get, even if they are international. So they got that lawyer from the USA to give a workshop on patent writing [...] For the other session on patents, they got [...] the person that has the largest number of patents at IBM, to give a session to

⁶⁶¹ Interview EE-13; see interview transcript, p.64.

⁶⁶² Interview ME-10; see interview transcript, p.268.

⁶⁶³ Technopark’s management is also planning to enrich its incubation services, with a focus on funding and capacity building: *“For a while now we have the MNF (Maroc Numérique Fund) and CMI (Centre Marocain d’Innovation). [...] the Réseau Maroc Entreprendre will move its headquarters here to Technopark next month. There is also the CJD Maroc (Centre des Jeunes Dirigents), which organises coaching for young entrepreneurs and they also will transfer their headquarters here to Technopark”* (Interview MO-01; see interview transcript, pp.330-331).

⁶⁶⁴ Interview EE-18; see interview transcript, p.105.

⁶⁶⁵ Interview EE-17; see interview transcript, p.95.

Egyptian entrepreneurs on ideas and how to transfer them into prototypes, into patents and then into products”⁶⁶⁶.

Clearly the availability of incubation services at subsidised rates represents a major advantage. The CEO of a company specialised in medical IT applications incubated by TIEC states⁶⁶⁷ that the firm would have had difficulties to establish itself without the support received in the form of incubation space, equipment, finance and training⁶⁶⁸. Participants from Morocco share similar views:

“Before we came here, we were based in the centre of Casablanca and it was very expensive: we paid three times as much as we are paying now in Technopark. [...] We have small offices, but they are sufficient for our work. The price is very low. [...] The Technopark is really a great aid for companies working in it. It has provided us oxygen by reducing drastically our costs since we joined Technopark”⁶⁶⁹.

“[...] our rent is subsidised, it is almost half the market price. In addition we have all the services here in Technopark, like a good Internet connection and it is a good working environment”⁶⁷⁰.

“We have benefitted [...] because they offer for new start-ups an office at a lower price as compared to the market price”⁶⁷¹.

“As we are installed here in Technopark we have many opportunities. The first opportunity that we have is that we don't pay the total amount of the monthly rent. We pay 50 per cent of the rent”⁶⁷².

However, a potentially more significant advantage for incubated companies is represented by the proximity of companies operating in the same sector, promoting

⁶⁶⁶ Interview EE-17; see interview transcript, p.96.

⁶⁶⁷ No transcript of the interview is available as the participant refused to be recorded.

⁶⁶⁸ Interview EE-06; see interview transcript, p.37.

⁶⁶⁹ Interview ME-07; see interview transcript, p.257.

⁶⁷⁰ Interview ME-05; see interview transcript, p.247.

⁶⁷¹ Interview ME-06; see interview transcript, p.250.

⁶⁷² Interview ME-09; see interview transcript, p.264.

collaborations and knowledge spill-overs. This aspect was particularly present in the contributions of several participants incubated at Technopark⁶⁷³:

“Furthermore, there are other enterprises here, which do the same like us and this can lead to collaboration either in terms of commercialisation or technical aspects. We can easily exchange information at Technopark. So within this building we have enterprises which all do the same thing is very important and helpful. [...] The level at which we operate now could not have been achieved without being here at Technopark”⁶⁷⁴.

“The best thing about Technopark is the environment. We have all the technological companies in Morocco installed in Technopark or in Near-Casa Shore, which is two kilometres from Technopark. [...] We have many of the companies that use our services installed here in Technopark. So our customers are very close”⁶⁷⁵.

“Here everything is close. It is a building reserved for our sectors, for new technologies. There are quite a lot of colleagues, we are up to date in terms of what is happening, we are not isolated. Sometimes you may consider moving out, getting more space, but the advantage we have here is that there is a synergy. The enterprises here are complementary in terms of competence. So if I need a competence that I do not have internally, I can ask a colleague from another enterprise in Technopark who masters it and we can work on the project together. But the most important is that we are up to date in terms of what is happening in the sector”⁶⁷⁶.

“We have the potential to evolve in the sense that there are people who are smart, who want to do projects. It is just that they need the environment in order to show what they can do and Technopark is an ideal environment to do that”⁶⁷⁷.

A CEO emphasises how collaboration, exchange and networking are actively promoted by the park’s management: “There are several activities that happen within Technopark, speakers are frequently invited to give a talk, there was the

⁶⁷³ The idea of an innovation ecosystem within Technopark is also echoed by a manager at CMI: “Being located in Technopark helps us a lot in terms of connections, as you have a lot of associations or companies that we work together with” (Interview MO-02; see interview transcript, p.347).

⁶⁷⁴ Interview ME-05; see interview transcript, p.247.

⁶⁷⁵ Interview ME-09; see interview transcript, p.265.

⁶⁷⁶ Interview ME-17; see interview transcript, p.314.

⁶⁷⁷ Interview ME-12; see interview transcript, p.275.

minister who came to visit us to inform us on government policies”⁶⁷⁸. However, while companies appear to be generally open to cooperation for achieving specific business goals, the introduction of a formal platform to facilitate such interactions has raised mixed feelings⁶⁷⁹:

*“Unfortunately everybody is fighting for himself and we don't have cooperation. Two years ago we established ASTEC, which is the Association for the companies in Technopark [...] [for] small companies here to do something together. However when we have a meeting for example, there are only two or three people who come”*⁶⁸⁰.

*“[...] in Technopark we have an association, which is called ASTEC. This association groups together all the companies from Technopark. They help us in the area of our financial audit; they give us some advice. If we have any problems with other companies or licences they would help us with litigation, too”*⁶⁸¹.

The above explanations are in line with Massey and Wield (1992) who find that tenants of science parks mainly value the reduced costs for renting office space and reputation enhancements (see section 3.2.1). Both TIEC and Technopark are not science parks according to the definitions of UKSPA and IASP and deviate from the popular conceptualisation of science parks: in both schemes R&D and production are co-located (relatively easy in the ICT sector) and Technopark has no formal link to a university or research institute⁶⁸². Technopark and TIEC are both multi-purpose schemes, which have successfully incubated a range of innovative companies, and extensively engaged in providing support in the area of finance, marketing and training, especially important for nurturing young firms (Pena, 2002; 2004).

⁶⁷⁸ Interview ME-17; see interview transcript, p.314.

⁶⁷⁹ Nevertheless, Technopark's management intends to strengthen the collaboration with ASTEC: *“What we aim to do much more in the future is to have more regular contact with [...] ASTEC. They come to us with particular needs, like access to market and access to finance or very specific and practical things related to the business environment inside Technopark, like for example the cafeteria, restaurant or insurance”* (Interview MO-01; see interview transcript, p.333).

⁶⁸⁰ Interview ME-03; see interview transcript, p.238.

⁶⁸¹ Interview ME-09; see interview transcript, p.264.

⁶⁸² Except of being member of the Moroccan Incubation and Spin-Off network, which also involves universities.

The Technopark model is being replicated in other cities of Morocco, an approach supported by those already participating:

“We have a big project that aims at creating a similar structure in other cities in Morocco. We will open a Technopark in Rabat next month. [...] we have asked for doing it in Meknes, Agadir and Uzda. [...] This would enable enterprises throughout the whole country to benefit from the services that we negotiate here”⁶⁸³.

“Technopark is a very helpful mean to aid innovation and could be replicated in other regions of Morocco”⁶⁸⁴.

The findings of this study support these plans for the ICT sector and, whenever applicable, a similar expansion in Egypt. The two schemes, very similar in their purpose and implementation, have met the expectations of the companies incubated. However, none has defined clear KPIs to monitor progress towards their objectives in terms of innovation produced (e.g. number and quality of patents) or economic results (e.g. turn-over or employment). Systematically conducting consistent impact assessments would allow a more precise evaluation of their performance and provide the possibility to adjust accordingly their action.

TIEC and Technopark incubation and innovation support services are very similar in nature and purpose. The review of their activities has shown a convergence in the portfolio of services offered (e.g. funding and capacity building) which shall improve the support to incubated companies⁶⁸⁵. Similar schemes which, on the basis of information obtained from the interviewed companies, have achieved similar results.

8.3.4 Capacity building

In the area of capacity building, the selected organisational schemes are IMC in Egypt and *Moussanada*, the programme administered by ANPME, in Morocco⁶⁸⁶.

⁶⁸³ Interview MO-01; see interview transcript, p.331.

⁶⁸⁴ Interview ME-10; see interview transcript, p.268.

⁶⁸⁵ TIEC is more advanced in offering capacity building and access to finance across its programmes, however its activities were stopped in 2011 and are now slowly restarting. With MNF and CMI both based in its premises, Technopark has moved towards offering integrated support services.

⁶⁸⁶ See sections 6.3.3.4 and 7.3.3.4 respectively.

They provide assistance in the area of modernisation and competitiveness of enterprises, linking enterprises to consultants on the basis of an assessment of their needs. The respective target groups are slightly different: IMC supports all enterprises employing more than 10 workers, while ANPME provides support to micro- and SMEs⁶⁸⁷ only.

Nine interviewed Egyptian companies were aware of IMC's activities⁶⁸⁸ and five had received financial, marketing or consultancy support⁶⁸⁹. While concurring on the blocking effect of the revolution, participants in Egypt rate quite differently the quality of IMC's services: some participants praise its work, however several comment that, before the revolution, funding was mainly offered to a limited number of big companies and the allocation process was not transparent, with references to corruption and favouritism:

*"They helped us a lot in marketing. [...] [They] are working in the following way: they have an overall structure for all services, like training, consultancy, management training, marketing support, quality services, etc. And when we approached them, we selected which services we need and then we benefit from it"*⁶⁹⁰.

*"[...] but now it [IMC] has some problems. We actually had some collaboration with them, but unfortunately after the revolution they are having problems, and they stopped funding anything"*⁶⁹¹.

"[...] Nowadays they [IMC] have some problems after the revolution. They used to offer some sort of assistance regarding R&D. They had some sort of fund for companies up to 80,000 Euros [...] but unfortunately it was only limited to people who know about it, which is usually big companies and they received all the grants. [...] I believe there was a lot of corruption inside and only people from the top benefited from the idea of the IMC to a great extent. But small and medium-size companies I think don't even know about the services offered. The IMC only has a budget of 250 million Euros from the EU. It is like a pie and everybody is trying to take the biggest chunk of the pie. And of course the

⁶⁸⁷ Defined in Morocco as an enterprise with a turnover of between three and 175 million MAD and less than 200 employees.

⁶⁸⁸ See interviews EE-03, EE-04, EE-08, EE-10, EE-11, EE-12, EE-14, EE-15 and EE-17.

⁶⁸⁹ See interviews EE-03, EE-04, EE-10, EE-11 and EE-15.

⁶⁹⁰ Interview EE-03; see interview transcript, p.18.

⁶⁹¹ Interview EE-15; see interview transcript, p.78.

biggest companies were the ones who were able to have knowledge and accessibility and they were on the board as well”⁶⁹².

“Some of them [IMC] are in jail right now. So they were offering a huge amount of money, but we don't know the way how to open the doors and to get funding from them. There is no manual of procedures, they are only putting some ads, but in fact you need to meet someone and he has to be convinced. For us it would be the best way to write a proposal and give it to them for evaluation. Why should I have to personally contact someone, if I can just send the proposal and he could evaluate it? But it was not like this, it was in a different manner. So you have to meet someone and he will decide whether you can submit a proposal or not. So it was not very nice, but I think the funding was around five to 10 million, so it was a huge funding”⁶⁹³.

“The major goal of any governmental agency in Egypt is to increase the exporting competitiveness of companies. They do what ever it takes, like training or travel, to support Egyptian companies to export better. If this requires a certificate, they will train you to get this certificate. If it requires the IMC to install an ERP solution in the company, they will finance this. If it requires funding for industry academia collaboration, they will finance it. The ICT industry innovation support [...] is completely focused on the outside market, the export market, rather than on the internal market”⁶⁹⁴.

Finally, two of the participants mention that the support activities previously provided by IMC for companies operating in the ICT sector had been taken over by ITIDA⁶⁹⁵.

“The role of the IMC has now shifted to ITIDA, because ITIDA has become the entity which is focusing on the ICT sector”⁶⁹⁶.

Before ITIDA there was the IMC, which was for everything across the board. Actually it focused mostly on traditional, existing industries, rather than emerging or novel ones”⁶⁹⁷.

⁶⁹² Interview EE-03; see interview transcript, p.57.

⁶⁹³ Interview EE-08; see interview transcript, p.44.

⁶⁹⁴ Interview EE-17; see interview transcript, p.95.

⁶⁹⁵ See interviews EE-03 and EE-04.

⁶⁹⁶ Interview EE-03; see interview transcript, p.18.

⁶⁹⁷ Interview EE-04; see interview transcript, p.26.

Between the participants of Morocco, awareness of ANPME appears to be somehow lower: only five of the interviewed enterprises were aware to a different extent of ANPME's role⁶⁹⁸. An executive manager filed a complaint with ANPME in relation to administrative "blockages", which, according to this respondent, explain the relatively low interest from SMEs in the programme:

*"We work with them [...] but there is a burden. [...] They saw the lack of results, the reduction of dossiers, so they are about to review their processes now. Nobody was interested any more in this programme, because we lose an enormous amount of time. For example, you submit a report, a report of an expert for information systems, with diplomas and certificates and they say: 'it is not like that, it should be a different style' for example. This blocks. And for low-cost projects, so to speak mini-projects. It is a waist of time"*⁶⁹⁹.

Other participants have different opinions about the role of ANPME in supporting innovation:

*"In terms of governmental aid, there is some support, provided by ANPME. It is probably the most well-known programme. They provide support for new innovative projects"*⁷⁰⁰.

*"The ANPME provides some support, but not necessarily related to innovation. It is related to the adoption of information technologies and the modernisation of the means of production and distribution. You have several programs. [...] At a certain time we thought that there were a lot of initiatives and then you do not know which one works for what exactly. There were many things launched at the same time"*⁷⁰¹.

Acknowledging the potential high impact of ANPME's support programmes, an executive manager of Technopark complains about their practical implementation, the lack of "transparency and good governance", the timeliness of administrative procedures and the deficiency of information and communication on the timing of decisions:

⁶⁹⁸ See Interviews with ME-05, ME-06, ME-10, ME-14, ME-16 and ME-17.

⁶⁹⁹ Interview ME-17; see interview transcript, p.315.

⁷⁰⁰ Interview ME-06; see interview transcript, p.250.

⁷⁰¹ Interview ME-14; see interview transcript, p.298.

“We still have the problem with transparency ... I do [ask] every time I meet them: ‘every time we want to benefit from a programme of ANPME and submit a file, why do you not tell us the date when you will make the decision?’ This is very problematic. You submit a file and then they contact you after a few days or a month to tell you that some part is missing. And this is where most entrepreneurs have a problem with all these governmental agencies. [...] The programs are good and could be evaluated, but the fact that they are not sufficiently transparent means that they do not work very well; the best companies are not included in their projects, they do not even ask for it”⁷⁰².

Both schemes help companies in building internal capabilities for improving internal processes and becoming more efficient, indirectly increasing their potential for innovation:

“[...] they [IMC] have a famous funding mechanism for implementing ERP solutions into the companies. Most of the companies in Egypt were paper-based. Everything related to HR, payrolls or customer relations was paper-based. For export controls and for the export certificate, especially for the EU, they require that the company that exports to Europe has to have an ERP solution. However the budget necessary for installing an ERP solution, especially if it is a Tier one ERP solution, a multi-national ERP solution, is high and it will be very costly for any company in Egypt. So to increase the competitive advantages of these companies, the IMC provides I think 90 per cent of the cost of the installation of the ERP system. They also provide training”⁷⁰³.

“We are adopting an ERP system. We are trying to unify the system in the six companies, whereby we can make better use of our resources. The IMC supported us with the instalment of that ERP system. So increasing productivity or efficiency depends on the activity we are doing. For example in research, it does not depend on them, but on the results, you can lose everything or gain. But in some other things like training, of course when you get training you are increasing your technical or other skills. Indirectly it can lead to increasing productivity and efficiency, but you cannot touch it. Processes like ERP - there you can touch the effect”⁷⁰⁴.

“[We have] made use of one type of innovation support, which came from ANPME. It was related to the implementation of the ISO certification. Three years ago we have implemented the ISO 9001 certificate, 40 per cent of which was financed by ANPME. [...] all the procedure is necessary prior to applying for

⁷⁰² Interview MO-01; see interview transcript, p.336.

⁷⁰³ Interview EE-17; see interview transcript, p.90.

⁷⁰⁴ Interview EE-15; see interview transcript, p.79.

the certification. And there are criteria, a big file with all the necessary requirements. It took us three to four months to get the certificate”⁷⁰⁵.

Both organisational schemes attempt to evaluate the impact of their activities. ANPME regularly compares the performance of supported companies with a control group of companies, which has not made use of their programmes, whereby the former significantly outperformed the latter particularly in terms of sales revenues and exports (ANPME, 2013).

IMC measures the impact of its Business Development Services by tracking the number of companies registered at IMC for support, their employed workforce (estimated) as well as the value of their exports and investments (IMC, 2010). The total number of companies supported by IMC up until September 2010 equals 14,936 enterprises. The distribution per industrial sector and the corresponding KPIs for the year 2010 (until September 2010) are listed in Table 35.

The ANPME keeps track of the number of companies supported by sector and region. Between 2010 and 2012, ANPME supported a total of 805 companies and another 649 in 2012 within the framework of *Moussanada*. In addition, it runs an annual satisfaction survey between companies that benefited from *Moussanada* and compares the results with the performance of a control group of companies.

In the seventh edition of the so-called ‘barometre’ published in 2011, ANPME evaluates the performance of enterprises that obtained support from *Moussanada* in the years 2008 and 2009. The survey comprises a sample of 230 enterprises out of which 150 belong to the experimental group and 80 to the control group (ANPME, 2013). The questionnaire used in the survey is presented in Table 36.

⁷⁰⁵ Interview ME-10; see interview transcript, p.267.

Table 35: KPI for IMC Business Development Services per sector

Industrial Sector	Number of IMC registered companies	Employed Workforce (estimated)	Value of Exports	Value of Investments
Textiles and Ready-Made Garments	1,145	N/A	10.334 million EGP	16 billion EGP
Building Materials, Construction and Metallurgical Industries	950	70,000	15 billion EGP	N/A
Chemicals Sector	1,167	83,000	14.4 billion EGP	35 billion EGP
Engineering Sector	1,300	120,000	7.8 billion EGP	28 billion EGP
Food Sector	1,458	N/A	8.3 billion EGP	26 billion EGP
Furniture and Wood Sector	1,315	N/A	438 million EGP	1,600 million EGP
Jewellery Sector	47	N/A	2,600 million EGP	800.872 million EGP
Agricultural Industries	450	N/A	8,949 billion EGP	6.2 billion EGP
Leather Sector	573	N/A	766 million EGP	1100 million EGP
Pharmaceutical Sector	145	36,000	826 million EGP (2009)	13.5 billion EGP (2009)
Printing and Packaging Sector	325	N/A	791 million EGP	4.8 billion EGP
Information Technology and Communication Sector	231	N/A	N/A	N/A

Source: Adapted from IMC (2010, pp.24-44)

Table 36: Questionnaire used for ANPME's satisfaction survey ('Le Barometre')

How do you evaluate the current situation of your company? Good / Medium / Bad
Compared to last year, your business activities have: Increased / Remained stable / Decreased
Compared to last year, the total number of employees in your enterprise has: Increased / Remained stable / Decreased
Compared to last year, the number of managerial staff in your enterprise has: Increased / Remained stable / Decreased
Compared to last year, the number of workers in your enterprise has: Increased / Remained stable / Decreased
Compared to last year, the volume of investment of your company in physical assets has: Increased / Remained stable / Decreased
Compared to last year, the volume of investment of your company in intangible assets has: Increased / Remained stable / Decreased
If your enterprise is involved in export activities, has the volume of exports in the course of this year [2011]: Increased / Remained stable / Decreased
How do you expect the national market within which you operate will evolve in the coming year? Increase / Remain stable / Decrease
How do you expect the international market within which you operate will evolve in the coming year? Increase / Remain stable / Decrease
How do you expect the sales of your product will evolve in the coming year within your national market? Better / Identical / Less well / Unsure
How do you expect the sales of your product will evolve in the coming year within your international market? Better / Identical / Less well / Unsure
How do you evaluate the evolution of your business activities during the coming year? Improvement / Remaining stable / Diminishing

Source: Author (elaborated on the basis of ANPME's 'Barometre 2011', ANPME, 2013)

The enterprises from the experimental group perform better in all 13 criteria, whereby in 11 the difference is statistically relevant. Companies, which have received support from *Moussanada* to modernise their enterprise or improve competitiveness, have increased sales turnover, employment, exports and have positive expectations in terms of expansion and success.

In addition, the experimental group is asked to evaluate the support received according to two broad sets of criteria: 'image criteria', assessing ANPME's services in terms of credibility, dynamism, efficacy, modernity, openness of communication and performance; and 'satisfaction criteria', covering the correspondence of the

programmes to the needs of the enterprises, the availability, efficacy and reactivity of ANPME staff, and the anticipation of future needs.

All the above criteria have significantly improved in 2011 compared to 2010 and, on a scale of one to five, the lowest score is attributed to ‘anticipation of future needs’ (3.71) and the highest score to ‘credibility’ (4.23) in 2011. Despite an improvement from 2010, the second lowest score in 2011 is achieved in the area of ‘efficacy’ (3.84). These assessments were validated by the participants, however, as outlined above, some concerns were expressed.

In the case of the business development services provided by the IMC, improvements are possibly easy to achieve: “[...] with some changes [...] this could be improved in terms of making them more transparent and accessible and also to cover most of the sectors”⁷⁰⁶. Similarly, bureaucratic burdens and delays in processing files were mentioned by participants in the case of *Moussanada*. Nevertheless, ANPME considers to have improved its trustworthiness:

*“Being a public entity, the enterprises did not really trust us in the beginning. However, today we can say that the ANPME has developed credibility towards the SMEs. If you talk to the enterprises about the ANPME today, you will hear the echo”*⁷⁰⁷.

The main conclusion that can be drawn from the comparison is that support in the area of capacity building has a positive impact on enterprises’ innovation activities when the public sector assumes an intermediary role rather than providing the support directly. The linking of enterprises with relevant consultants/experts in a particular ‘problem area’ on the basis of a comprehensive needs’ assessment helps enterprises to clearly identify their deficiencies and address them with targeted action.

The limited selection of quantitative indicators on increases in exports, employment and investment as well as ANPME’s satisfaction survey support this conclusion as

⁷⁰⁶ Interview EE-08; see interview transcript, p.46.

⁷⁰⁷ Interview MO-10b; see interview transcript, p.412.

does the qualitative input obtained from interviews. However, these entities are perceived as somewhat bureaucratic and insufficiently transparent, confirming the relevance of AE for innovation support.

The two organisational schemes are very similar in nature and objectives with a minor difference in scope (target population). On the basis of the limited sample of interviewees, they seem to face similar challenges in improving their internal processes and offering a more transparent and efficient experience to the recipients of their services.

The (perceived high) level of transaction costs mentioned on several occasions by the participants from the private sector is a clear outcome of this comparison. When training is delivered, the impact on the company-internal capabilities is evaluated positively. For the purpose of this research, these two schemes are therefore considered similar and have produced similar results.

8.4 Summary of comparison

The extensive reviews of the two NIS on the basis of desk research and the fieldwork conducted (see Chapters 6 and 7) indicate that the challenges faced by innovators in Egypt and Morocco when interacting with formal institutions and institutional arrangements are similar, confirming the initial assessment of the reciprocal relevance of the two NIS (Chapter 4). These can be related to the following major obstacles to innovation:

- failure to develop and implement a comprehensive innovation strategy for the country (theme Governance);
- difficulty in accessing innovation funding (theme Funding);
- excessive bureaucracy when dealing with governmental entities, leading to excessive transactional costs, direct and indirect (theme Infrastructure); and
- inadequacy of the education system and the lack of collaboration between academia and the private sector (theme Capacity Building).

These findings are echoed to a different extent in several contributions of the interviewees, albeit with some differences. In Egypt, an element behind the

insufficient strategic elaboration appears to be the scarce involvement of the private sector in the process, neither in the definition of the strategy (lack of consultation) nor in its implementation (lack of information).⁷⁰⁸

Moreover, the limited follow-up of implementation represents a missed opportunity: entities rarely conduct impact assessments of their initiatives so that direct feedback is not possible and lessons cannot be learned⁷⁰⁹. In Morocco, the selection of models for benchmarking which supports the definition of strategy does not take into consideration their relevance.

The difficulty in the access to funding is explained in both countries with the underlying lack of trust in and transparency of the relevant institutions and organisational schemes. Interestingly, an incubated company expressed concerns on the utilisation of public funds, pointing at the need to increase the success rate of incubated firms (i.e. the efficiency of the scheme), possibly through a more rigorous selection procedure:

“The point is how many companies out of those who received the money are successful and still running? Not many. If we are talking about 20 plus companies that were incubated, maybe five or six are considered successful companies now. If each one is taking around 150,000 or 200,000 USD, you have spent a good bunch of money and only five companies are making progress or are still running”⁷¹⁰.

In Egypt there has been an increase in the private offer of innovation support to compensate for the perceived lack of support from the PA. As stated above, Morocco does not have a public credit registry, which would facilitate the raise of a similar offer in the country.

Similarly, in terms of Infrastructure, incubation services are managed differently in the two countries: all Moroccan incubators are located within public or semi-public entities (mostly universities), linked through RMIE (section 7.3.3.3) and coordinated

⁷⁰⁸ Interviewees in Egypt indicate that the private sector is not sufficiently part of the process, neither in the definition of the strategy (lack of consultation) nor in its implementation (lack of information).

⁷⁰⁹ See interviews EE-05, EE-17, EO-10a and EO-10b.

⁷¹⁰ Interview EE-13; see interview transcript, p.65.

via a central unit based at CNRST, while in Egypt, public incubators coexist with private ones and are not centrally governed.

Regarding the excessive bureaucracy, conversations with government officials in Morocco remarkably indicate increased awareness among civil servants of the need for reform in the public sector, in particular in terms of reducing its size and creating a legal framework, including detailed manuals of procedures for public service provision⁷¹¹ as well as facilitating business. This is probably an essential element in explaining the country's success in implementing regulatory reforms, together with the inter-ministerial coordination effort for administrative simplification (see section 8.1).

The comparatively worse performance of Egypt is indeed largely due to the national political context. Still, starting if not closing a business seems to be much easier there. In both countries, lengthy and bureaucratic procedures still hinder the business life cycle and any difference in the performance of the respective legal framework may indicate opportunities for policy transfers.

In terms of Capacity Building, the two main issues appear to be common to both countries. The inadequacy of the education system is often associated with a lack of focus on applied sciences and innovation and the lack of collaboration between academia and the private sector is partially explained by the insufficiencies of the legal framework, particularly in terms of IPR management and protection. The latter is dramatically aggravated in Egypt by the already mentioned length of the judiciary process.

The findings of Chapters 6 and 7 have been confirmed in the comparative analysis and the higher levels of governance in Morocco are allowing the country to close the gap with Egypt, historically endowed with a higher level of enablers in terms of human resources and quality of its research system.

⁷¹¹ Interview MO-04; see interview transcript, p.152.

The review of the overall performance of the two NIS, the assessment of the similarity of the obstacles to innovation in the perception of those who operate in them and the comparison of the impact of similar organisational schemes have confirmed the relevance of AE for effectively supporting innovation. Moreover, it has been demonstrated that in similar contexts, similar schemes produce similar results with the corollary that, where alternative approaches are implemented, different performances may indicate opportunities for policy transfers.

The next chapter summarises the conclusions drawn from this study, stating its limitations and suggesting directions for future research in this area.

9 Conclusions

This chapter outlines the implications of this research for theory and policy making, the limitations of the study as well as directions for future research. It reiterates the research objectives and summarises the key findings reached in answering the three research questions. It also highlights how these can support theory development and policy making in the area of innovation policy transfer, in particular regarding organisational schemes dealing with innovation.

9.1 Implications for Theory

This thesis contributes to the debate on the means to achieve enhanced socio-economic conditions for the population of developing countries. It builds on the findings of other research, which has established a link between the innovation performance of a country (measured in terms of aggregate R&D expenditure as percentage of GDP) and its economic development (measured in terms of GDP per capita) (Lederman and Maloney, 2003).

Innovation is not only a major driver of economic growth: even if further work is needed to verify the relationship between innovation performance and human well-being in developing countries⁷¹², this research's analytical framework shows how the innovation process constantly influences the informal institutions of a society and, ultimately, creates the conditions for its evolution.

While generally accepting the role of innovation as enabler of socio-economic development, different schools of economic thought propose different roles for the stakeholders of the innovation process. The NPM paradigm recommends a very marginal role for the government, limited to ensure the necessary capabilities (e.g. skilled workforce or enforcement of rule of law), and leaving the rest to the market. In general, where applied, NPM has not led to the expected results (see for example Hood and Jackson, 1992; Denhardt and Denhardt, 2003; Dunleavy et al., 2006b). As

⁷¹² As presented in Figure 2 for European countries (Hollanders and Arundel, 2007, p.4).

far as developing countries are concerned, the impact has not even been properly reviewed (Manning, 2001).

Others, such as Mazzucato (2013), claim that only the State is able to lead innovation programmes in high-risk or high-capital intensive areas and, therefore, the current trend of cutting back the means available to the government to foster innovation should be reversed. This research shares this point of view. However, as far as developing countries are concerned, in most cases the State is involved in major infrastructure projects and only a few have the technical and financial means to engage in innovation activities in high-tech sectors (Lundvall et al., 2009).

Rather than focusing on who should lead the innovation process, this thesis argues that developing countries should focus on what enables and sustains the innovation process or, conversely, what obstacles prevent potential innovators, whether public or private, from translating ideas into new processes and marketable products.

Transaction costs are high in developed countries (Wallis and North, 1986; OECD, 1993) and this study's findings indicate they may be even higher in developing countries: without attempting to quantify the transaction costs of public innovation support schemes in Egypt and Morocco, participating entrepreneurs in both countries considered them particularly high⁷¹³. Examples given include: non-transparent and complicated procedures, unpredictable waiting times and high costs of compliance. In general, the results of the case studies indicate considerable information asymmetries between providers and recipients of innovation support, in line with the NIE perspective (see for example Williamson, 1985; Eisenhardt, 1989a; Dollery, 2001).

This leads to the background of the first research question, namely the need to verify whether good formal institutions represent a key environmental element to enable innovation in developing countries. The units of analysis are parts of the NIS of Egypt and Morocco as defined by Edquist (1997) and the embedded units of analysis are

⁷¹³ This supports Dollery and Wallis' (2001) assertion that high transaction costs may occur in "both market and hierarchical modes of governance" (p.128).

key organisations (i.e. institutional arrangements) implementing innovation policies and selected local enterprises (mainly SMEs from the ICT sector). This research makes use of an indicator of government effectiveness as proxy for the “generic” quality of the formal institutions (including organisational schemes supporting innovation) to test the relationship with innovation performance, building on an EC study on developed countries (Celikel-Esser, 2007) and an academic study conducted by Fagerberg and Srholec (2008)⁷¹⁴.

The results of the quantitative analysis performed in this research, presented in Chapter 5, are particularly significant: when grouping countries on the basis of their economic level (measured in terms of GDP per capita), the relationship is not confirmed; when grouping countries on the basis of cultural proximity (in the case of Egypt and Morocco by first choosing all Muslim countries and, thereafter, the MENA countries) the association is strong and statistically relevant.

This represents the first theoretical contribution to the current body of knowledge in this area: while these results need to be verified in other cultural contexts, this research demonstrates that, in order to confirm the relationship between government effectiveness as proxy of AE and innovation performance, it is necessary to control for the influence of cultural differences. For the MENA countries, which share a system of codified informal institutions, the enhanced quality of formal institutions translates in higher innovation. These results are coherent with the analysis of the relevance of culture for innovativeness of Sun (2009).

The assessment of the relevance of good practices is the theme underlying the second research question. The method employed to identify comparable contexts takes into consideration both informal institutions and the evaluation of the socio-economic situation based on data available from reliable sources for a relatively large number of countries. Its elements include: the scoring in the cultural

⁷¹⁴ The latter concluded that economic development is not significantly influenced by a country's political system or the openness of its economy, but is strongly influenced by “innovation systems” and “governance” (p.1427). The authors, however, do not attempt to explore further this link in their study.

dimensions model of Hofstede (however, other frameworks presented in Chapter 3 could be used); the socio-economic indicators used by the World Bank for the development diamonds (i.e. GNI per capita, life expectancy, gross primary enrolment and access to improved water sources); the size of the national economy, its composition per sector and the weight of the shadow economy; and the demographic structure (ratio of urban to rural population)⁷¹⁵.

The use of cultural models presented in Chapter 3 support the conceptualisation of how individuals in societies interact, that is how local informal institutions (culture, values and norms) condition their behaviours. For example, the willingness to accept the authority of the more powerful or the propensity to take risks are relevant traits to predict how “smoothly” transitions (of power) could take place in a given context.

Meant to facilitate cross-cultural communication, this thesis argues that these models offer a fundamental conceptual support for understanding the nature of organisations (e.g. societies or formal institutions), assessing their readiness for (“what” and “how much”) change and, ultimately, answer the question on how natural states can operate better. Natural states control or limit violence by managing rents: the more effective they are (i.e. higher and wider rents are available for distribution), the more unlikely is that a group will recur to violence to alter the status quo (North, Wallis and Weingast, 2009).

Therefore, a widely spread improvement of the socio-economic conditions of the population should be the general aim of all natural states. This is not the case: in far too many instances, even more at regional and local scale, elites ruthlessly oppose improvements of the life conditions of (part of) their subjects, fearing they would lead to alterations of those values and norms which legitimise their rule. The still on-going unrests in the MENA region offer several examples of the consequences.

⁷¹⁵ Depending on the topic researched, the framework can be extended to reflect specific aspects of interest. For example, in the scope of this research, the framework was expanded to include the Global Innovation Index to assess the similarity of Egypt and Morocco in terms of innovation performance.

According to North, Wallis and Weingast (2009), those considering their share of rents inferior to their share of power will eventually challenge the status quo and, if their requests are not satisfied, cause an outburst of violence. Therefore, it is so important to design and implement formal institutions (organisational schemes), which are “compatible” with the culture, values and norms of the society they are meant to serve. This research has confirmed for the case studies that policy makers can reasonably consider “relevant” practice what works in countries, which are sufficiently “close” according to the method proposed.

The third research question addressed the assessment of the quality (i.e. impact) of innovation support policies considered relevant, the last element necessary for the determination of a “relevant good practice” (Mishrif and Selmanovic, 2010). Despite the abundance of literature on possible indicators (see for example Coombs, Narandren and Richards, 1996; Kleinknecht, Van Montfort and Brouwer, 2002; Hagedoorn and Cloudt, 2003), the major issue is the fuzziness of the objectives of such policies, seldomly described in terms of KPIs and corresponding targets. Even high-level strategic statements often do not foresee metrics, which would allow monitoring achievements. To compare the performance of the two NIS, this thesis has pragmatically “extended” the objectives defined for the respective industrial strategies, taking into consideration the focus of the innovation support policies on the industrial sector.

This thesis provides an in-depth review of the NIS of Egypt and Morocco, clarifying the role of organisational schemes and qualitatively assessing their contribution in supporting innovation. The highly informative content collected in the interviews with competent representatives of the public and the private sector offers a vivid representation of the issues, challenges and potentialities of both innovation systems.

It is worth underlining that significant concerns on the overall validity of a particular type of institutional arrangement, namely the science park, emerged in the literature review were not confirmed. Those analyses were based on a definition of science parks, requiring a formal link to an academic or research institution and a strict separation between R&D and production. The technology parks analysed in this

research do not fall in this restrictive definition and, therefore, appear inconsistent with the popular conceptualisation of science parks as outlined by Wield and Massey (1992). The reasons for their success lie in a pragmatic approach, which focuses on the provision of capacity building and marketing support to the incubated companies. The latter operate in the ICT sector and are mainly specialised in software development, whereby R&D and production are conducted in the same premises.

Nevertheless, the findings reveal major difficulties in Egypt and Morocco in the cooperation between industry, academia and government⁷¹⁶, whereby cultural elements (i.e. long power distance, high uncertainty avoidance and a predominantly collectivistic society) influence the possibility to develop joint projects as well as negatively affect innovation (Sun, 2009).

By comparing four organisational schemes in the areas of Governance, Capacity Building, Infrastructure and Funding on the basis of the fieldwork results, the author has ascertained that comparable organisational schemes lead to comparable results, which represents the second theoretical contribution to the current body of knowledge.

9.2 Implications for Policy Making

The major policy implications resulting from this study can be grouped in five categories: governance of NIS; assessment of relevance in view of policy transfer; the importance of AE, especially organisational schemes, for innovation support in developing countries; involvement of the private sector in policy definition and

⁷¹⁶ Concrete examples are the slow take-up of TTOs or the attitude towards jointly managed IPRs. Several participants complained about the administrative burdens as well as inappropriate higher education and research institutions, confirming the findings of Cohen (2004), who finds that major impediments for technology transfer in developing countries include “ineffective bureaucracies” and “poor research facilities and academic institutions” (p.22). As IPR protection and technology transfer in developing countries are positively related (Park and Lippoldt, 2008), the foreseen improvements of the legal framework should address both points.

implementation; and the evaluation of innovation support initiatives. These are outlined in the following.

The comprehensive review of the NIS in Egypt and Morocco revealed innovation policies are centrally devised and implemented. Research has shown that decentralisation of decision-making can lead to more effective innovation systems (see for example Cooke, Gomez Uranga and Etxebarria, 1997) and the process does not necessarily challenge dominant positions⁷¹⁷. Therefore, this research recommends further building on current initiatives aiming at creating regional nodes for innovation support, such as the recently implemented regional investment centres in Morocco.

Secondly, the findings from this study indicate that similar organisational schemes set up to support innovation in Egypt and Morocco (in the four categories capacity building, governance, infrastructure and funding) led to similar results, confirming the working hypothesis. As they are more likely to benefit from experiences made in contexts socio-economically and culturally similar to theirs, policy makers in Egypt and Morocco should share their own experiences and compare outcomes rather than (accepting to) import solutions tested in very different contexts. Opportunities for policy transfer emerged from the fieldwork. A concrete example could be to verify the feasibility of a higher financial independence for EGYPO, similar to what has been implemented at OMPIC, in order to improve its contribution to the Egyptian NIS.

The method used for assessing relevance of good practices pays special attention to cultural proximity. The considered cultural dimensions include uncertainty avoidance, power distance, collectivism and masculinity⁷¹⁸. This research suggests

⁷¹⁷ In their work on the adoption of agricultural innovation in Central Africa, Pamuk, Bulte and Adekunle (2012) address the limitations of programmes assuming a 'linear process' in the diffusion of innovation and underline the increased importance of capacity building and user empowerment to build local, participative innovation platforms of stakeholders which can develop solutions to local bottlenecks. This approach is not *per se* destabilising in contexts characterised by long power distance as local hierarchies are not necessarily challenged.

⁷¹⁸ It is important to note that, in terms of cultural proximity, Morocco and France, having a strong relationship dating from the colonial experience, appear closer than Egypt and the United Kingdom

that policy makers in the MENA region and representatives of sponsor organisations should pay more attention to these aspects in the context of policy design and transfer.

Thirdly, the findings of this study support a clear recommendation to focus on AE, especially on organisational schemes supporting innovation. The close link between government effectiveness and innovation performance in the MENA region demonstrated in Chapter 5 was confirmed by the outcome of the 72 interviews in Egypt and Morocco: most participants underlined the (potential) positive impact of organisational schemes such as one-stop shops, technology parks (when not designed according to the popular conceptualisation of science parks, see sections 3.2.1 and 8.3.3), funding programmes or capacity building programmes.

Good examples of effective organisational schemes are RDI and TIEC in Egypt and CMI and Technopark in Morocco. In the area of IPRs securitisation, OMPIC's initiatives offer valuable lessons for IP offices of countries in similar cultural contexts (e.g. EGYPO could benefit from an in-depth review of OMPIC's practices). Particularly promising are PA schemes, which take full advantage of recent ICT developments, as these countries can profit from a relatively young population at ease with such technologies, which, at the same time, promote inclusiveness.

Funding innovation remains a major area of concern, both for those seeking support and for those in the PA designing and implementing corresponding organisational schemes. To overcome these difficulties, the private sector could complement the offer of public funding for innovative projects, allowing firms to obtain funding from banks or risk capital funds.

In Morocco, however, banks are bound by strict regulations, which do not allow investments in high-risk projects. In general, the unstructured and weak presence of business angels in Morocco reduces opportunities for innovation⁷¹⁹. The emerging of

or Egypt and the United States of America. This might explain why the design of many innovation support instruments (the PA structure in general) on the basis of French experiences has been relatively successful in Morocco.

⁷¹⁹ Interview MO-04; see interview transcript, pp.364-365.

a private offer in Egypt, a topic outside the scope of this research, should be therefore properly studied by Moroccan policy makers to understand how to promote a similar development in their country.

The fourth policy contribution, a clear outcome of this research study, is that the involvement of the business community is a prerequisite for the definition of successful innovation strategies and corresponding implementing policies: in the unfortunately few cases where a structured consultation with the business sector takes place (e.g. TIEC and Technopark), schemes tend to be effective and are well received. Therefore, this study advocates for a systematic consultation of business associations, such as CGEM in Morocco.

Finally, this research has pointed to a general lack of capabilities in setting clear targets for innovation support initiatives and monitoring benefits realisation. It is suggested here that policy makers reflect more on expected outcomes and, accordingly, set clear, measurable objectives for each initiative launched. Assessing the satisfaction of users of organisational schemes is a good first step, but proper follow-up on the basis of additionality would increase confidence about the actual success of such initiatives.

9.3 Contributions to knowledge, limitations and directions for future research

9.3.1 Contributions to knowledge

As mentioned in the introduction, limited attention has been given so far to the study of how AE and innovative performance relate in developing countries and how physical working structures and operational arrangements (i.e. organisational schemes) support local entrepreneurship in these contexts. The comparative study of the NIS of Egypt and Morocco, focusing on support to local entrepreneurship, represents an original contribution to knowledge and contributes to closing this gap. In particular, the conceptual and analytical frameworks developed by the author for the purpose of this research represent a major contribution to the current body of knowledge as explained in the following.

The hypothesis formulated suggests that similar capability levels are a pre-requisite to fully profit from successful policies implemented in other countries. However, before addressing how to assess the reciprocal relevance of two or several contexts, the first research question addressed the relevance of AE in general, and organisational schemes of the PA in particular, for supporting innovation in developing countries.

Chapter 5 has provided an in-depth overview of the main issues related to the measurement of innovation. Scoring models adopted to analyse the innovation performance of developed economies constitute the starting point for the definition of a composite index of innovation (CII) that takes into account the limited availability of data in less developed contexts.

This research has measured the impact of Government Effectiveness as a proxy for AE on the innovation performance of developing countries measured by the CII. The first finding is that there is not an apparent relationship when selecting countries on the basis of their income only (e.g. low-middle income for developing countries). This finding confirms the validity of the analytical framework adopted, whereby informal institutions strongly influence the interaction between individual actors and with formal institutions.

On the basis of the fundamental characteristics of the informal institutions in Egypt and Morocco, the relationship has been then successfully tested for Muslim countries, whose cultural proximity subtends similar informal institutions. These results are confirmed if income criteria are then added, analysing the relationship for low-middle income level countries in the MENA region.

The second research question concerned the assessment of the relevance of organisational schemes for innovation support designed elsewhere. To answer it, this research developed a method based on data largely available for developing countries to ascertain the reciprocal relevance of organisational schemes for innovation support designed in Egypt and Morocco according to the following criteria:

- cultural proximity according to Hofstede (1991) and Helmreich and Merritt (1998);
- similarity of achievements in socio-economic development assessed on the basis of the World Bank indicators GNI per capita, life expectancy at birth, gross primary enrolment and access to improved water source;
- relative size of the national economy, its composition per sector and the weight of the shadow economy; and the demographic structure (ratio urban to rural population); and
- similarity of the innovation environment and outputs according to the Global Innovation Index and the CII.

In this case too, the method used for assessing the relevance relies on the quality and availability of the underlying data series. The assessment of the reciprocal relevance of the two case studies is based on the punctual comparison of sets of data (i.e. in given years) rather than on a systematic analysis of historical trends.

The answer to the third question, namely how to evaluate the impact of organisational schemes on local innovation and entrepreneurship in developing countries, is not straightforward. Chapters 6 and 7 provided an extensive overview of the NIS of Egypt and Morocco, which enriches the existing literature on the topic by bringing together the official representations of the relevant formal institutions and the corresponding, insightful contributions of the participants.

The results indicate that most schemes are put in place without a clear statement of quantifiable objectives whose achievement can be (easily) measured. Therefore, for the two case studies, this research has opted for the comparison of the NIS and of relevant organisational schemes according to four themes identified on the basis of academic literature and confirmed in the thematic analysis of the field work results: Governance, Funding, Capacity Building and Infrastructure. Thereby, the comparative analysis of the NIS of Egypt and Morocco within the conceptual and analytical frameworks adopted has confirmed the relevance of informal institutions for the successful design and implementation of organisational schemes supporting innovation.

A number of recurrent themes emerged in the interviews, underlying that the presence of direct enablers of innovation (e.g. availability of highly skilled manpower) is not per se sufficient. Many contributions suggest that strategic objectives should be cascaded down to the hierarchical levels of PA, with clear responsibilities and processes, which need to include both the academic and the industrial world. It is not about generic involvement, it is about defined consultation processes, whereby formal institutions engage in a transparent communication about goals and means.

The discordances emerging from the contributions of the participants to this research, offering a living testimony of the dynamics underlying the current events in the region, provide depth to its narrative and enrich the quality of its conclusions. From their point of view, the interviewees have praised the on-going efforts to support innovation or criticised the pace of change, pointed out improvements of the PA or complained about its limits.

9.3.2 Limitations and directions for future research

As indicated in the methodological section, a limitation of this study is the use of a linear regression to assess the relationship between Government Effectiveness and innovation performance measured by the composite index proposed. Linear regression assumes a linear relationship between the two variables. The related risks of over-simplification of reality have been mitigated by the qualitative assessment of the relationship through interviews with stakeholders within the respective NISs of Egypt and Morocco.

Data availability has an ever greater impact when analysing the relative performance of single countries or focusing on inputs or outputs of the innovation process: in some cases results fluctuate significantly, as the limited availability translates in the higher relative relevance of the indicators for which figures are available.

The criteria for the selection of the participants, namely purposive and reputational sampling, have been presented in Chapter 4. Despite the relatively high number of participants, it is important to underline that they represent only a small portion of the stakeholders of the NIS of Egypt and Morocco. Furthermore, the interviews were

conducted in English and French and not in the native language of the interviewees, bearing the risk of possible misunderstandings.

All voices have echoed the fundamental belief that innovation is bringing and will continue to bring advantages to the society, offering new opportunities for those so far excluded. This is not a surprise: these were the voices of individuals that are committed to innovation, as entrepreneurs, academics or PA officers in institutions meant to support innovation. A critical analysis of this research must explicitly acknowledge this limitation: other voices, unheard in this research, would have expressed different opinions if given the opportunity. The author is all too aware that innovation and the impact it has on the equilibrium of society are legitimately considered evil by some.

The validity of the findings of the quantitative analysis should be confirmed in further research as it is based on relatively short time series due to limited data availability. This is particularly relevant once the scope of the regression is reduced to the MENA countries belonging to the low and low-middle income group, as the lower number of occurrences reduces validity. The method developed is considered sufficient for the purpose of this research, however the theoretical and practical implications of the adopted pragmatic approach should be further studied, for example extending the comparison to additional countries within the MENA region or testing the method in other contexts.

Furthermore, future research on the effectiveness of organisational schemes on regional level (e.g. regional investment centres) could be conducted within the theoretical realm of regional or local innovation systems (see the seminal work of Cooke, Gomez Uranga and Etxebarria (1997; 1998) on regional innovation systems) or with a sector-specific focus (Malerba, 2002).

Innovation is change and resistance to change is natural if the concerns of those who feel threatened by it are not properly addressed. Even more, if the surrounding conditions do not facilitate an open and frank debate on alternatives and consequences. Several participants mentioned limited (or lack of) democracy and the resulting restricted freedom of speech and information as a major obstacle to research and innovation. In the words of a private sector participant in Egypt:

“Innovation is about freedom and freedom of thinking. You think outside of the box. Here in Egypt we were not free as long as I lived and I'm 45 years old now. I do not recall that we were living under a freely thinking regime or a democratic regime. If you're talking about innovation, we need democracy, free thinking and talent management”^{720 721}.

These obstacles are difficult to overcome as their underlying causes are rooted in cultural specificities that may account for a large part of the weak innovation performance in the private sector and the related slow transformation of PA. As mentioned in section 4.4, these countries are characterised by a large power distance and a strong preference for uncertainty avoidance. The loyalty to the needs of the "group" could hinder the development of a culture that supports intellectual property rights, negatively affecting the motivation of innovators who could not legitimately profit from the result of their efforts.

Consequently, these countries miss a culture that favours long-term investments or risky undertakings, necessary for R&D and (product or process) innovation, in exchange of the possibility of high returns as society rather values “quick wins”, which can be obtained with “low skill entrepreneurship”⁷²². The following quote of a senior manager, who has dealt with numerous Egyptian enterprises within the framework of the RDI Programme, further illustrates this point:

“The problem in Egypt when we started in 2007 was that innovation was not one of the objectives of the companies. It was not really integrated in the companies’ core missions and activities. The reason was that it is much easier and quicker to make financial gains through manufacturing and through reverse engineering, which some companies call innovation”⁷²³.

⁷²⁰ Interview EE-11; see interview transcript, p.59.

⁷²¹ The consequences of a restriction of basic freedoms were implicitly shown by the behaviour and the answers provided by many participants in Egypt when asked for their agreement to record their interviews. A large share commented that they were only ready to accept it, because the Mubarak regime had fallen: if the dictator had still been in power, they would have been afraid to express their opinion, in particular in presence of a recording device.

⁷²² See interviews EE-11, EO-10a and EO-09.

⁷²³ Interview EO-10b; see interview transcript, p.191.

As society values security, most graduates upon completion of their studies seek employment in the public sector or large multi-national corporations, looking for a dependable source of income. Thereby, family members and friends, whose working life is equally geared along the same values, encourage them to follow the same path⁷²⁴. If these “shared mental maps” would deterministically define the behaviours of stakeholders, there would be limited opportunity for change. A static representation of the interactions is however misleading: in the conceptual model adopted, culture, norms and values of a society are influenced by technological development (Groenewegen and van der Steen, 2006).

Accordingly, exogenous (such as “imported” innovation) just like endogenous drivers (such as changes of the demographic structures) may shift the balance between what is “normally” accepted and what is seen as alternative, considered a deviation or even perceived dangerous. From this perspective, the role of formal institutions in protecting the old or formalising the new behaviours cannot be underestimated and, understandably, their control is sought both by those wishing to maintain the status quo and those aiming at a transformation of the society. These tensions, existing in Egypt and Morocco and, in general, in the MENA region, have become more apparent since the beginning of the Arab Spring.

In the struggle between old and new, North, Wallis and Weingast (2009) warn from the consequences of (en)forcing policies that presume “open access societies”, at risk of generating violence. If the pursue of (a weak version of the) Pareto principle is not possible in combination with “a principle reflecting liberal values even in a very mild form” (Sen, 1970, p.157), institutional changes that imply a (re-)distribution of power will cause resistance. Therefore, as far as possible, the declared objectives of the PA action should appear attractive and desirable to the vast majority of the population and the progress towards their achievement should be transparent⁷²⁵.

⁷²⁴ See interviews EO-05a and EE-17.

⁷²⁵ According to Sen (1970, pp.155-156): “The ultimate guarantee for individual liberty may rest not on rules for social choice but on developing individual values that respect each other's personal choices”.

To what extent the transition from limited to open assess societies is in all cases desirable or beneficial is a topic outside the scope of this research. The purpose was to provide a decision-support framework for taking advantage from experiences made in relevant contexts for policy makers looking for inspiration to improve the innovation performance of their (developing) country.

The method developed to assess relevance should be tested in alternative contexts. As new data series become progressively available for developing countries as well, some of the sub-indicators used to develop the CII could be refined and others added, increasing the validity of the results and possibly opening new opportunities for better predicting the evolution of NIS. Furthermore, where sufficient data is available, the approach developed could be used to assess relevance of experiences made in more limited spatial contexts (e.g. regional innovation systems).

Better instruments are clearly needed for the evaluation of the impact of organisational schemes in the context where they have been originally defined. For the two case studies, it is fair to say that awareness exists of the need to clearly define objectives and progress has been made in recent years. However, this conclusion cannot be generalised and the researcher's ability to evaluate impact will always be dependent on the existence of explicitly set targets.

Finally, this thesis has focused on facilitating the definition of organisational schemes supporting innovation on the basis of experiences made in relevant contexts. The underlying logic is that what works for similar informal institutions can be more easily replicated or adapted. Further research is needed on how to make use of change management methodologies for in-depth assessment of specific sources of resistance to change to ensure sustainability of a wider number of policies in a different context.

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Appendix I: Doctrinal components of New Public Management

No.	Doctrine	Meaning	Typical justification
1	'Hands-on professional management' in the public sector	Active, visible, discretionary control of organizations from named persons at the top, 'free to manage'	Accountability requires clear assignment of responsibility for action, not diffusion of power
2	Explicit standards and measures of performance	Definition of goals, targets, indicators of success, preferably expressed in quantitative terms, especially for professional services	Accountability requires clear statement of goals; efficiency requires 'hard look' at objectives
3	Greater emphasis on output controls	Resource allocation and rewards linked to measured performance; break-up of centralised bureaucracy-wide personnel management	Need to stress results rather than procedures.
4	Shift to disaggregation of units in the public sector.	Break up of formerly 'monolithic' units, unbundling of U-form management systems into corporatized units around products, operating on decentralised 'one-line' budgets and dealing with one another on an 'arm's-length' basis	Need to create 'manageable' units, separate provision and production interests, gain efficiency advantages of use of contract of franchise arrangements inside as well as outside the public sector
5	Shift to greater competition in public sector	Move to term contracts and public tendering procedures	Rivalry as the key to lower costs and better standards
6	Stress on private-sector styles of management practice	Move away from military-style 'public service ethic', greater flexibility in hiring and rewards; greater use of PR techniques	Need to use 'prove' private sector management tools in the public sector
7	Stress on greater discipline and parsimony in resource use	Cutting direct costs, raising labour discipline, resisting union demands, limiting 'compliance cost' to business	Need to check resource demands of public sector and 'do more with less'

Source: Adapted from Hood (1991, pp.4-5)

Appendix II: Differences between NPM and NPL

	New Public Management	New Public Leadership
PURPOSE	<ul style="list-style-type: none"> • High level aims and objectives through Public Service Agreements • Emphasis on economy, efficiency, effectiveness • Delivery focus through silos • Political and organisational management 	<ul style="list-style-type: none"> • High levels aim through Public Service Agreements and Local Area Agreements objectives • Delivery focus through networks • Political, community and organisational leadership
PROCESS	<ul style="list-style-type: none"> • Purchaser/Provider and Principal-Agent • Top down Management and Government • Control, Planning and Budgeting through 'top-down' implementation of policies • Performance regimes and centrally-driven targets 	<ul style="list-style-type: none"> • Shared and Distributed (360 degree) leadership through local governance • Setting Direction through combination of 'bottom up' and networked implementation of policies • Motivating and Inspiring • Public Value Test (encompassing community impact as well as regulator impact assessments)
PRAXIS	<ul style="list-style-type: none"> • Whitehall/Market-led emphasizing choice • Tame/Critical problem focused • Organisational capacity and capability through organizing and staffing • Engagement through consultation 	<ul style="list-style-type: none"> • Locally-led and influencing agenda through 'choice' and 'voice' • 'Wicked' problem focus • Collaborative capacity and capability through alignment and joint sourcing • Engagement through co-production
PUBLIC VALUE	<ul style="list-style-type: none"> • Identified by government through representative democracy based on 'mandated choice' • Primarily quantitative 	<ul style="list-style-type: none"> • Balance between national priorities and local priorities based on evidence-based 'choice' and 'voice' • Balance between quantitative and qualitative

Source: Brookes (2008, p.18)

Appendix III: Millennium Development Goals and Targets

These are a set of 8 goals and 21 targets, developed by the UN and signed by all its member countries, with the main focus to eradicate extreme poverty. The target date for the achievement of MDGs is 2015 (UN, 2011).

<p>Goal 1: Eradicate extreme poverty and hunger</p> <p>Target 1A: Halve, between 1990 and 2015, the proportion of people living on less than \$1 a day</p> <p>Target 1B: Achieve full and productive employment and decent work for all, including women and young people</p> <p>Target 1C: Halve, between 1990 and 2015 the proportion of people who suffer from hunger</p>
<p>Goal 2: Achieve universal primary education</p> <p>Target 2A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling</p>
<p>Goal 3: Promote gender equality and empower women</p> <p>Target 3A: Eliminate gender disparity in primary and secondary education preferably by 2005, and in all levels of education no later than 2015</p>
<p>Goal 4: Reduce child mortality rates</p> <p>Target 4A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate</p>
<p>Goal 5: Improve maternal health</p> <p>Target 5A: Reduce by three quarters the maternal mortality ratio</p> <p>Target 5B: Achieve universal access to reproductive health</p>
<p>Goal 6: Combat HIV/AIDS, malaria, and other diseases</p> <p>Target 6A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS</p> <p>Target 6B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it</p> <p>Target 6C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases</p>
<p>Goal 7: Ensure environmental sustainability</p> <p>Target 7A: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources</p> <p>Target 7B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss</p> <p>Target 7C: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation</p> <p>Target 7D: By 2020, to have achieved a significant improvement in the lives of at</p>

least 100 million slum-dwellers
Goal 8: Develop a global partnership for development Target 8A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Target 8B: Address the special needs of the least developed countries Target 8C: Address the special needs of landlocked developing countries and small island developing States Target 8D: Deal comprehensively with the debt problems of developing countries Target 8E: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries Target 8F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

Appendix IV: The (augmented) Washington Consensus

The economist John Williamson developed the term Washington Consensus in 1990 to label the 10 policy instruments “that most of official Washington thought would be good for Latin American countries” (Williamson, 1990 in Williamson, 2000, p.252):

1. Fiscal discipline
2. A redirection of public expenditure priorities toward fields offering both high economic returns and the potential to improve income distribution, such as primary health care, primary education, and infrastructure
3. Tax reform (to lower marginal rates and broaden the tax base)
4. Interest rate liberalization
5. A competitive exchange rate
6. Trade liberalization
7. Liberalization of inflows of foreign direct investment
8. Privatization
9. Deregulation (to abolish barriers to entry and exit)
10. Secure property rights

According to Rodrik (2001), “the failures in the former Soviet Union, and the Asian financial crisis of 1997-98 all contributed to the refashioning of the Washington Consensus around a number of institutional prerequisites. The resulting “augmented Washington Consensus” goes beyond liberalisation and privatisation to emphasise the need to create institutional underpinnings of market economies” Rodrik (2001, p.11). Thus, the “augmented Washington Consensus” adds the following reforms to the 10 listed above in the original Washington Consensus:

1. “Legal/political reform
2. Regulatory institutions
3. Corruption
4. Labour market flexibility
5. WTO agreements
6. Financial codes and standards
7. “Prudent” capital-account opening
8. Non-intermediate exchange rate regimes
9. Social safety nets
10. Poverty reduction” (Rodrik 2001, p.51)

Appendix V: Measuring Innovation in the GCR

Questions from the WEF's Executive Opinion Survey on the 12th pillar 'Innovation':

Sub-indicator	Survey question to be answered on the scale 1-7 (weighted average)
12.01 Capacity for innovation	In your country, how do companies obtain technology? [1 = exclusively from licensing or imitating foreign companies; 7 = by conducting formal research and pioneering their own new products and processes]
12.02 Quality of scientific research institutions	How would you assess the quality of scientific research institutions in your country? [1 = very poor; 7 = the best in their field internationally]
12.03 Company spending on R&D	To what extent do companies in your country spend on R&D? [1 = do not spend on R&D; 7 = spend heavily on R&D]
12.04 University-industry collaboration in R&D	To what extent do business and universities collaborate R&D in your country? [1 = do not collaborate at all; 7 = collaborate extensively]
12.05 Government procurement of advanced technology products	Do government procurement decisions foster technological innovation in your country? [1 = no, not at all; 7 = yes, extremely effectively]
12.06 Availability of scientists and engineers	To what extent are scientists and engineers available in your country? [1 = not at all; 7 = widely available]
12.07 Utility patents per million population	Number of utility patents (i.e. patents for invention) granted in 2009, per million population (data not based on survey, but taken from USPTO)
1.02 Intellectual property protection (indicator used in the 1st pillar of the GCR (i.e. Institutions) to measure the quality of public institutions	How would you rate intellectual property protection, including anti-counterfeiting measures, in your country? [1 = very weak; 7 = very strong]

Source: Adapted from WEF (2010, pp. 367, 488-494)

Appendix VI: Worldwide Governance Indicators - definitions of dimensions

<p>“Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media”.</p>
<p>“Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism”</p>
<p>“Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies”</p>
<p>“Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development”.</p>
<p>“Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence”.</p>
<p>“Control of Corruption” No definition provided</p>

Source: Adapted from World Bank World Governance Indicators (2013)

Appendix VII: Government Effectiveness - concepts and sources

Representative Sources	Concept Measured
Economist Intelligence Unit	Quality of bureaucracy / institutional effectiveness
	Excessive bureaucracy / red tape
Global Competitiveness Report	Infrastructure
	Quality of primary education
Gallup World Poll	Satisfaction with public transportation system
	Satisfaction with roads and highways
	Satisfaction with education system
Institutional Profiles Database	Coverage area: public school
	Coverage area: basic health services
	Coverage area: drinking water and sanitation
	Coverage area: electricity grid
	Coverage area: transport infrastructure
	Coverage area: maintenance and waste disposal
Political Risk Services International Country Risk Guide	Bureaucratic quality
Global Insight Business Condition and Risk Indicators	Bureaucracy: An assessment of the quality of the country's bureaucracy. The better the bureaucracy the quicker decisions are made and the more easily foreign investors can go about their business.
	Policy consistency and forward planning How confident businesses can be of the continuity of economic policy stance - whether a change of government will entail major policy disruption, and whether the current government has pursued a coherent strategy. This factor also looks at the extent to which policy-making is far-sighted, or conversely aimed at short-term economic advantage.

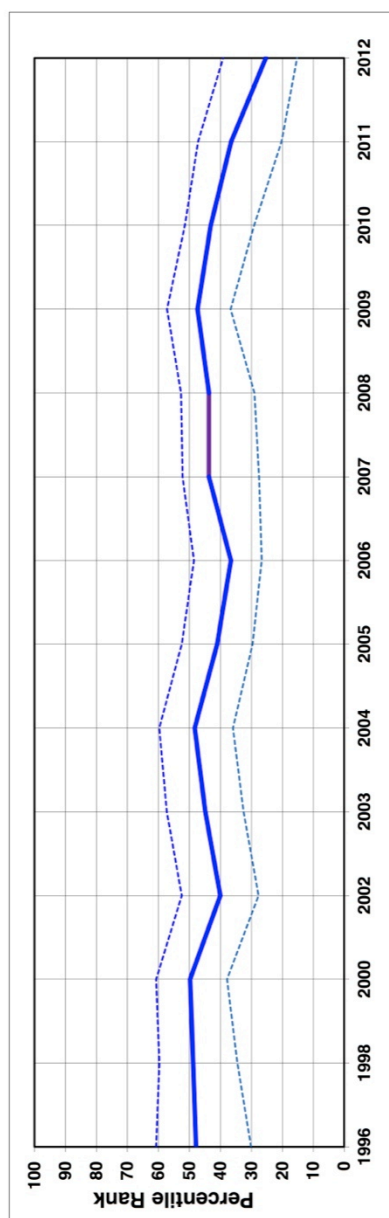
Non-representative Sources	Concept measured
African Development Bank Country Policy and	Quality of public administration
	Quality of budgetary and financial management

Institutional Assessments	Efficiency of revenue mobilization
	Quality of public administration
Afrobarometer	Government handling of public services
	Health
	Education
Asian Development Bank Country Policy and Institutional Assessments	Quality of public administration
	Efficiency of revenue mobilization
	Quality of budgetary & financial management
Business Enterprise Environment Survey	How problematic are telecommunications for the growth of your business?
	How problematic is electricity for the growth of your business?
	How problematic is transportation for the growth of your business?
Bertelsmann Transformation Index	Consensus Building (MI)
	Governance Capability (MI)
	Resource Efficiency (MI)
IFAD Rural Sector Performance Assessments	Allocation & management of public resources for rural development
Latinobarometro	Trust in Government
World Bank Country Policy and Institutional Assessments	Quality of public administration
	Quality of budgetary and financial management
	Efficiency of revenue mobilization
Institute for Management & Development World Competitiveness Yearbook	Government economic policies do not adapt quickly to changes in the economy
	The public service is not independent from political interference
	Government decisions are not effectively implemented
	Bureaucracy hinders business activity
	The distribution infrastructure of goods and services is generally inefficient
	Policy direction is not consistent

Source: Adapted from World Bank (2013) World Governance Indicators

Appendix VIII: Government Effectiveness – Egypt and Morocco

Egypt, Arab Rep., 1996-2012
Aggregate Indicator: Government Effectiveness

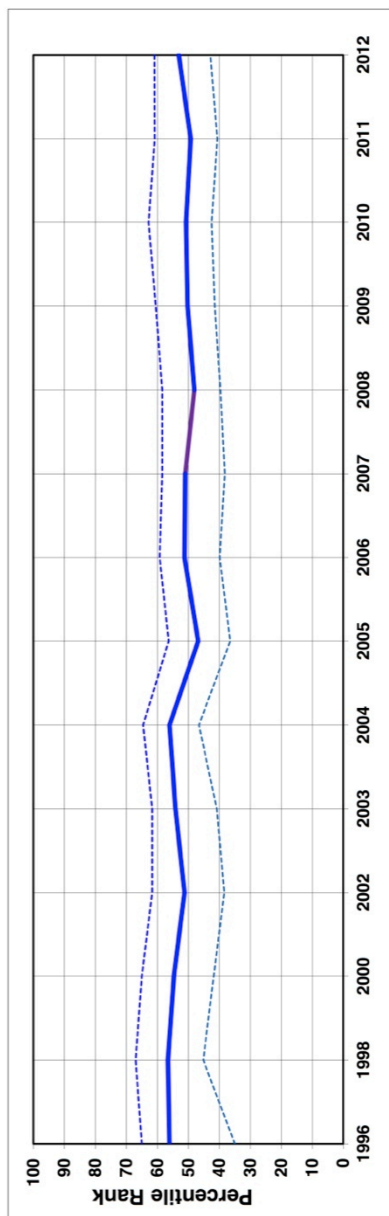


Individual Indicators used to construct Government Effectiveness

Code	Source	Website	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ADB	African Development Bank Country Policy and Institutional Assessments	http://cpia.afdb.org/	..	NP	NP	NP	NP	0.60	0.47	0.47	0.53	0.60	0.53	0.53	0.40	0.35
AFR	Afrobarometer	http://www.afrobarometer.org	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ASD	Asian Development Bank Country Policy and Institutional Assessments	http://www.adb.org/	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BPS	Business Enterprise Environment Survey	http://www.worldbank.org/eca/governance	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BTI	Bertelsmann Transformation Index	http://www.bertelsmann-transformation-index.de/	0.50	0.50	0.50	0.25	0.37	0.37	0.43	0.43	0.45	0.45	0.43	0.43	0.43	0.46
EIU	Economist Intelligence Unit	http://www.eiu.com	0.71	0.48	0.45	0.34	0.42	0.38	0.35	0.32	0.33	0.38	0.38	0.38	0.38	0.25
GCS	World Economic Forum Global Competitiveness Survey	http://www.weforum.org	..	..	..	..	..	..	..	..	0.52	0.56	0.60	0.68	0.53	0.43
GWP	Gallup World Poll	http://www.gallupworldpoll.com	..	..	..	..	..	..	..	0.57	0.58	0.60	0.65	0.73	0.78	0.78
IFD	IFAD Rural Sector Performance Assessments	http://www.ifad.org	..	..	..	..	..	0.60	0.57	0.57	0.00	0.00	0.00	0.56	0.56	0.50
IPD	Institutional Profiles Database	http://www.cepii.fr	..	..	..	..	..	..	..	0.00	0.00	0.00	0.00	0.56	0.56	0.50
LBO	Latinobarometro	http://www.latinobarometro.org	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PIA	World Bank Country Policy and Institutional Assessments	http://www.worldbank.org	..	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
PRS	Political Risk Services International Country Risk Guide	http://www.prsgroup.com	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
WCY	Institute for management & development World Competitiveness Yearbook	http://www.imd.ch	..	..	..	..	..	..	..	..	..	..	..	..	..	..
WMO	Global Insight Business Conditions and Risk Indicators	http://www.globalinsight.com	0.38	0.38	0.38	0.44	0.44	0.46	0.44	0.44	0.50	0.50	0.50	0.44	0.38	0.31

Morocco, 1996-2012

Aggregate Indicator: Government Effectiveness



Individual Indicators used to construct Government Effectiveness

Code	Source	Website	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ADB	African Development Bank Country Policy and Institutional Assessments	http://cpia.afdb.org/	..	NP	NP	NP	NP	0.63	0.70	0.67	0.70	0.70	0.70	0.70	0.70	0.73
AFR	Afrobarometer	http://www.afrobarometer.org	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ASD	Asian Development Bank Country Policy and Institutional Assessments	http://www.adb.org/	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BPS	Business Enterprise Environment Survey	http://www.worldbank.org/eca/governance	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BTI	Bertelsmann Transformation Index	http://www.bertelsmann-transformation-index.de/	..	..	..	..	..	..	..	..	..	..	..	..	..	..
EIU	Economist Intelligence Unit	http://www.eiu.com	0.50	0.50	0.50	0.37	0.49	0.49	0.49	0.49	0.42	0.42	0.44	0.44	0.44	0.45
GCS	World Economic Forum Global Competitiveness Survey	http://www.weforum.org	..	..	..	0.38	0.38	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
GWP	Gallup World Poll	http://www.gallupworldpoll.com	..	..	..	0.36	0.34	0.47	0.32	0.40	0.38	0.37	0.41	0.48	..	0.52
IPD	IFAD Rural Sector Performance Assessments	http://www.ifad.org	..	..	..	..	..	..	..	0.37	0.46	0.43	0.42	0.39	0.42	0.42
IPD	Institutional Profiles Database	http://www.cepii.fr/	..	..	..	..	..	0.57	0.60	0.60	0.67	0.68	0.68	0.68	0.65	0.65
LBO	Latinobarometro	http://www.latinobarometro.org	..	..	..	..	..	..	..	0.00	0.00	0.00	0.44	0.44	0.44	0.63
PIA	World Bank Country Policy and Institutional Assessments	http://www.worldbank.org	..	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
PRS	Political Risk Services International Country Risk Guide	http://www.prsgroup.com	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
WCY	Institute for management & development World Competitiveness Yearbook	http://www.imd.ch	..	..	..	..	..	..	..	..	..	..	..	..	..	..
WMO	Global Insight Business Conditions and Risk Indicators	http://www.globalinsight.com	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.63	0.63	0.63	0.63	0.63	0.63	0.63

Appendix IX: Interview Protocol

Interviews in Egypt (March 2012)

Company Code	Short Description (Sector)	Additional Info (Year Founded/ Employees/ Turnover 2011)	Position of interviewee	Date of Interview	Interview Location
EE-01	Agriculture, Chemicals	1996; 40; USD 5-6 million	CEO	19/03/2012	Cairo
EE-02	ICT company, software development, business intelligence	1994; 700; USD 17 million	Vice President of Total Quality Management Unit	19/03/2012	Cairo
EE-03	ICT company, digital marketing	2000; 34; USD 400.000	CEO	19/03/2012	Cairo
EE-04	ICT company, integrated circuits (very-large-scale integration & Micro-electric mechanical system)	2004; 70-75; N/A	CEO, CTO and MEMS division manager	20/03/2012	Cairo
EE-05	ICT company, digital systems, e-learning	1993; 35; USD 300.000	CEO	20/03/2012	Cairo
EE-06	ICT company, software applications, medical devices	2010; 12; N/A	CEO	20/03/2012	Cairo
EE-07	ICT company, project management, e-learning systems, automation	2008; 30; USD 560.000	CEO	21/03/2012	Cairo
EE-08	Pharmaceutical	privatised in 2000; 4000; N/A	Director of Innovation Development Unit	21/03/2012	Cairo
EE-09	ICT company, communication and automation systems, sensors	2007; 30; N/A	CEO	21/03/2012	Cairo
EE-10	Engineering, machinery condition monitoring	1998; 30; N/A	CEO	22/03/2012	Cairo
EE-11	Textiles	1990; 30; USD 1.5 million (2009)	CEO	24/03/2012	Cairo
EE-12	ICT company, Automation, Asset and Fleet Management Systems, Automotive technology	2005; 10; USD 290.000	CEO	24/03/2012	Cairo
EE-13	ICT company, software development (online recruitment)	2009; 10; USD 50.000	CEO	24/03/2012	Cairo
EE-14	Engineering, mechanical and electrical installations, consulting	2005; 13; USD 500.000	CEO	26/03/2012	Cairo
EE-15	Pharmaceutical	1987; 5.500; USD 1.5 million	Coordinator R&D Innovation Projects	27/03/2012	Alexandria
EE-16	Private ICT Incubator/ ICT company, web development mobile development	TahrirSquare: 2011; 4; N/A; eSpace: 2010; 30-35; N/A	Director/ former CEO	27/03/2012	Alexandria
EE-17	ICT company, hardware design	2008; 21; USD 300.000	CEO, CTO and General Manager	28/03/2012	Cairo
EE-18	ICT company, software applications, medical devices	2008; 10; N/A		29/03/2012	Cairo

Interviewee Code	Position of Interviewee	Institution	Date	Location
EO-01	Technology Transfer Director	American University Cairo School of Science & Engineering	12/3/12	Telephone Interview
EO-02a	Project Coordinator	Technology Innovation Entrepreneurship Centre (TIEC)	18/03/2012	Cairo
EO-02b	Director	E-Learning Competence Centre (TIEC)	18/03/2012	Cairo
EO-02c	IP commercialization administrator	TIEC	18/03/2012	Cairo
EO-02d	Entrepreneurship support administrator	TIEC	18/03/2012 and 21/03/2012	Cairo
EO-03	General Manager	Nokia Mobile Lab	18/03/2012	TIEC, Cairo
EO-04	Director Government Services	Ministry for Administrative Development	19/03/2012	Cairo
EO-05a	CEO and Professor	Innovatey and American University Cairo	22/03/2012	Cairo
EO-05b	Professor and technology transfer expert	American University Cairo	22/03/2012	Cairo
EO-05c	Director of Technology Transfer Centre	American University Cairo	22/03/2012	Cairo
EO-06	Former director	ITIDA/TIEC	25/03/2012	Cairo
EO-07	Director	Industrial Modernisation Centre	25/03/2012	Cairo
EO-08	Former Deputy Minister of Finance and Head of SME development Unit	Ministry of Finance	25/03/2012	Cairo
EO-09	Executive Director	Science Technology Development Fund (STDF)	26/03/2012	Cairo
EO-10a	Head of Innovation Management Unit	RDI Programme	26/03/2012	Cairo
EO-10b	Programme Coordinator	RDI Programme	26/03/2012	Cairo
EO-11	Chairman	Nahdet El Mahrousa (NGO)	28/03/2012	Cairo
EO-12	President	Academy of Scientific Research & Technology	28/03/2012	Cairo
EO-13	Researcher at General Authority for Investment (GAFI)	Bedaya Centre for SMEs and Entrepreneurship Development (GAFI)	29/03/2012	Cairo

Interviews in Morocco (April 2012)

Company Code	Short Description (Sector)	Additional Info (Year Founded/ Employees, Turnover 2011)	Position of Interviewee	Date of Interview	Interview Location
ME-01	ICT company, hybrid mail	1977; 55; USD 8 million	CEO and Project Manager	16/04/2012	Casablanca
ME-02	ICT company, web development, security	2007; 22; USD 600.000	CEO	16/04/2012	Casablanca
ME-03	ICT company, multimedia, logistics, security	2002; 3; USD 200.000	CEO	17/04/2012	Casablanca
ME-04	ICT company, software development	1999; 10; USD 275.000	CEO	17/04/2012	Casablanca
ME-05	ICT company, software development	2005; 5; USD 240.000	CEO	18/04/2012	Casablanca
ME-06	ICT company, information systems, e-learning	2008; 8; USD 250.000	CEO	18/04/2012	Casablanca
ME-07	ICT company, web development and consulting	2006; N/A; USD 250.000	CEO	18/04/2012	Casablanca
ME-08	ICT company, software development and consulting	2000; 10; USD 100.000	CEO & Business Project Manager	18/04/2012	Casablanca
ME-09	ICT company, web development and consulting	2010; 3; USD 180.000	CEO	19/04/2012	Casablanca
ME-10	ICT company, software development	2003; 15; USD 7 million	CEO	19/04/2012	Casablanca
ME-11	ICT company, software development	2008; 9; USD 200.000	CEO	19/04/2012	Casablanca
ME-12	ICT company, software development	2011; 8; N/A	CEO, CTO and Engineer	19/04/2012	Casablanca
ME-13	Mechanical Engineering	2010; 3; USD 70.000	CEO	20/04/2012	Casablanca
ME-14	ICT company, software development	2010; 2; USD 12.000	CEO	24/04/2012	Rabat
ME-15	ICT company, software development	2011; 3; N/A	CEO	24/04/2012	Rabat
ME-16	ICT company, software development	2010; 6; USD 500.000	CEO	25/04/2012	Casablanca
ME-17	ICT company, software development	2001; 11; USD 400.000	CEO	25/04/2012	Casablanca
ME-18	Work-safety equipment and electronic appliances	1997; 22; USD 5.5 million	CEO	26/04/2012	Casablanca
ME-19	ICT company, software development and consulting	2008; 5; USD 200.000	CEO	26/04/2012	Casablanca

Interviewee Code	Position of Interviewee	Institution	Date of Interview	Interview Location
MO-01	General Director	Technopark	16/04/2012	Casablanca
MO-02	Director	Moroccan Innovation Centre (Centre Marocain d'Innovation)	17/04/2012	Casablanca
MO-03	Director	Reseau Maroc Entreprendre	20/04/2012	Casablanca
MO-04	Director	R&D Maroc	20/04/2012	Casablanca
MO-05a & MO-05b	CEO and International Relations Administrator	<i>Mascir</i> – Moroccan Foundations for Advanced Science, Innovation and Research	23/04/2012	Rabat
MO-06	Director of Administrative Modernisation Department	Ministry of the Modernisation of Public Sectors	23/04/2012	Rabat
MO-07	Head of Department For Technological Invention and Innovation	Ministry of Higher Education, Scientific Research and Executive Training	23/04/2012	Rabat
MO-08	Head of FINCOME Programme	Centre National pour la Recherche Scientifique et Technique (CNRST)	24/04/2012	Rabat
MO-09	Programme Coordinators	Réseau Maroc Incubation et Essaimage (RMIE)	24/04/2012	Rabat
MO-10a	Head of Division for Communication and Information	L'Agence Nationale pour la promotion de la Petite et Moyenne Entreprise (ANPME)	24/04/2012	Rabat
MO-10b	Head of Department Innovation and R&D	ANPME	24/04/2012	Rabat
MO-11	Head of Innovation and Technology Unit	Office Marocain de la Propriété Industrielle et Commerciale (OMPIC)	25/04/2012	Casablanca
MO-12	Professor/ Incubation Expert	University Muhammad V	26/04/2012	Rabat
MO-13	Project manager	Commission nationale de l'environnement des affaires (CNEA)	27/04/2012	Rabat
MO-14	Head of Research and Innovation Unit	Ministry of Industry, Trade and New Technologies	27/04/2012	Rabat
MO-15	Director	Softcentre Casablanca	7/5/12	Telephone Interview

Appendix X: Interview questions for participants

March 2012 – Interview with Administration Egypt

Facilitating business through a transparent and efficient public administration is a major goal of many governments across the world. This study addresses business facilitation through administrative simplification, focusing on innovation support or, more specifically, on the support to innovation in local enterprises provided by governmental and non-governmental entities. Examining two countries as case studies, the research aims to establish the effectiveness of organisational schemes (= organisational structures and operational arrangements, for example one-stop shops, incubators, science parks, etc.) on innovation performance of local enterprises in Egypt and Morocco.

The interview is based on the following subject areas:

- Role of entity in the Government's administrative simplification/business facilitation programme
- Relevance of good practices designed elsewhere
- Implemented simplification measures, in particular organisational schemes
- Planned simplification measures, in particular organisational schemes
- Process to introduce new regulation
 - Role of business representation in the definition of objectives
 - Review of existing good practices
 - Impact assessment (is it done? ex ante? at which point? by whom?)
 - Cost/benefits calculation
 - Benefits implementation (how are they followed up? surveys? statistical analysis?)
 - Post implementation review (is it done? who is in charge?)
- Perception of change in the level of regulation
 - In areas perceived as burdensome (government needs as starting point)
 - In areas perceived as supportive (business needs as starting point)
- Overall evaluation of results of simplification measures, in particular organisational schemes

The corresponding concrete questions are the following:

- What is the role of your administrative entity in the area of administrative simplification/business facilitation/innovation support?
- Which public and/or private entities do you consider part of Egypt's National Innovation System?
- Which administrative simplification/business facilitation/innovation support measures have been implemented in the past 10 years, in particular organisational schemes?
- Which simplification measures are planned for the future? Is the implementation of new organisational schemes planned in the future?
- When designing/implementing new policies in the area of administrative simplification/business facilitation/innovation support, what is the relevance of practices designed/implemented in other countries?
- What is the process when introducing a new regulation/ organisational scheme in your area of responsibility?
 - How do business representatives participate in the definition of objectives?
 - How are existing good practices from other countries considered? How is their relevance assessed?
 - Is an impact assessment systematically done? If yes, when (ex ante/ex post), how and by whom?
 - Is cost-benefit analysis part of the decision making process?
 - How is the benefits realisation followed up? (e.g. through surveys, statistical analysis, etc.?)
 - Is a post implementation review conducted? If yes, who is in charge?
- Have the levels of regulative burdens changed significantly since the implementation of measures? In which areas?
- How would you evaluate the overall impact of simplification measures, in particular organisational schemes? What went well? What could be changed and/or improved?

April 2012 – Interview with Administration Morocco (In French)

Efficacité Administrative pour le soutien à l'innovation: la signification des modèles organisationnels pour les systèmes nationaux d'innovation en Egypte et au Maroc

La facilitation du commerce grâce à une administration publique transparente et efficace est un objectif majeur pour de nombreux gouvernements à travers le monde. Cette étude porte sur la facilitation du commerce grâce à la simplification administrative, en se concentrant sur le soutien à l'innovation ou, plus précisément, sur le soutien à l'innovation fourni par les entités gouvernementales et non gouvernementales aux entreprises locales. En prenant l'exemple de deux pays, la recherche vise à établir l'efficacité de schémas d'organisation tels que les structures organisationnelles et arrangements opérationnels (guichets uniques, incubateurs, parcs scientifiques etc.) sur la performance des entreprises d'Egypte et du Maroc en matière d'innovation.

L'interview est basée sur les sujets suivants:

- Le rôle de l'organisme dans le programme gouvernemental de facilitation du commerce/ simplification administrative / soutien à l'innovation
- L'influence des leçons et expériences d'autres pays sur le choix des activités de facilitation du commerce, simplification administrative et soutien à l'innovation
- La mise en oeuvre de mesures de simplification administrative/soutien à l'innovation, en particulier les schémas d'organisation
- Les mesures de simplification/ soutien à l'innovation prévues, en particulier les schémas d'organisation
- Le processus d'introduction de nouvelles réglementations et schémas organisationnels
 - Rôle de la participation des entreprises dans la définition des objectifs des nouvelles réglementations
 - Prise en compte et évaluation des expériences d'autres pays dans ce domaine
 - Évaluation de l'impact des nouvelles mesures (L'impact est-il analysé? À quel point? Par qui?)
 - Analyse Coûts-Bénéfices
 - Avantages de la mise en oeuvre du processus (comment sont-ils suivis? Enquêtes? Analyse statistique?)
 - Évaluation suivant l'application du processus (Une évaluation de sa mise en oeuvre a-t-elle lieu? Si oui, qui en est responsable?)
- Perception du changement dans le degré de réglementation
- L'évaluation globale du résultat des mesures de simplification, en particulier les schémas d'organisation.

Les questions suivantes vous seront posées:

- Quel est le rôle de votre organisme dans le domaine de la simplification administrative / facilitation du commerce / soutien à l'innovation?
- Quels organismes, privés et publics vous considèrent comme faisant partie du système national d'innovation du Maroc?
- Quelles mesures de simplification, facilitation du commerce et/ou de soutien à l'innovation ont été mises en oeuvre au cours des dix dernières années, et plus particulièrement en ce qui concerne les schémas d'organisation?
- Quelles mesures de simplification sont prévues pour l'avenir?
- La mise en oeuvre de nouveaux schémas d'organisation est-elle prévue?
- Lors de la conception et mise en oeuvre de nouvelles politiques pour la simplification administrative / facilitation du commerce / soutien à l'innovation, quelle importance attachez-vous aux pratiques d'autres pays?
- Quel est le processus d'introduction d'un nouveau règlement / schéma organisationnel dans votre domaine de responsabilité?
 - Comment les représentants des entreprises participent-ils à la définition des objectifs des nouvelles mesures?
 - Comment percevez-vous expériences et leçons d'autres pays dans ce domaine? Comment évaluez-vous la pertinence de ces leçons?
 - Effectuez-vous une étude d'impact systématiquement? Si oui, quand (ex ante / ex post), comment et qui l'effectue?
 - Prenez-vous l'analyse coût-bénéfice en compte?
 - Quelle est votre démarche à la suite de l'analyse coût-bénéfice? Quel type de suivi est-il en place? (par exemple au moyen d'enquêtes, l'analyse statistique, etc.?)
 - Menez-vous une évaluation suivant l'application du processus? Si oui, qui s'en charge?
- La lourdeur administrative relative à la conformité aux réglementations a-t-elle diminué depuis l'application des nouvelles mesures? Si oui, dans quels domaines?
- Comment évaluez-vous l'impact global des mesures de simplification, et de celles qui portent sur les schémas d'organisation en particulier? Qu'est-ce qui a bien fonctionné? Que pourriez-vous changer ou améliorer?

March 2012 – Interview with Enterprise Egypt

Facilitating business through a transparent and efficient public administration is a major goal of many governments across the world. This study addresses business facilitation through administrative simplification, focusing on innovation support or, more specifically, on the support to innovation in local enterprises provided by governmental and non-governmental entities. Examining two countries as case studies, the research aims to establish the effectiveness of organisational schemes (= organisational structures and operational arrangements, for example one-stop shops, incubators, science parks, etc.) on innovation performance of local enterprises in Egypt and Morocco.

Before engaging in an interview on the above-presented topic, the questionnaire attached to this document aims at establishing a general picture of your company with particular focus on its innovation activities (see questionnaire).

After filling in the questionnaire, the interview is based on the following subject areas:

- awareness of government administrative simplification/business facilitation programme
- awareness of implemented measures, in particular those supporting innovation
- awareness of planned measures, in particular those supporting innovation
- impact of measures on total cost of regulation (cost of compliance)
- perception of change in the level of regulation, in general and in relation to the company's innovation activities (e.g. IPR management, R&D activities)
 - in areas perceived as burdensome (government needs as starting point)
 - in areas perceived as supportive (business needs as starting point)
- overall evaluation of results of simplification measures, in particular organisational schemes

The corresponding concrete questions are:

- What are the measures related to administrative simplification and business facilitation introduced by the government in your sector?
- What are the innovation support measures that the government has introduced in your sector?
- Have you made use of any kind of innovation support from the government, in particular in relation to organisational schemes?
- Have you used any kind of innovation support from private entities?
- Are there any (new/planned) future measures by the government to support innovation in your sector?
- Has there been any impact of the government's measures on your company in terms of:
 - Innovation activity (= development of new products and processes)?
 - Labour force productivity?
 - Efficiency gains in the production process?
 - Organisational structure?
- Have you noticed a change in the level of regulation burdens in general? (For example, less time/money spent for complying with any regulations related to your business?)
- Have you noticed a change in the level of regulation/compliance burden in relation to your company's innovation activities (e.g. IPR management, R&D activities)?
- What is your overall assessment of the effectiveness of simplification measures introduced by the government? Have they helped you save time and money? Have they helped you increase your innovation performance?

April 2012 – Interview with Enterprise Morocco (In French)

Efficacité Administrative pour le soutien à l'innovation: la signification des modèles organisationnels pour les systèmes nationaux d'innovation en Egypte et au Maroc

La facilitation du commerce grâce à une administration publique transparente et efficace est un objectif majeur pour de nombreux gouvernements à travers le monde. Cette étude porte sur la facilitation du commerce grâce à la simplification administrative, en se concentrant sur le soutien à l'innovation ou, plus précisément, sur le soutien à l'innovation fourni par les entités gouvernementales et non gouvernementales aux entreprises locales. En prenant l'exemple de deux pays, la recherche vise à établir l'efficacité de schémas d'organisation tels que les structures organisationnelles et arrangements opérationnels (guichets uniques, incubateurs, parcs scientifiques etc.) sur la performance des entreprises d'Egypte et du Maroc en matière d'innovation.

Avant de procéder à une interview sur le sujet présenté ci-dessus, je vous invite à lire le questionnaire ci-joint, qui permettra d'esquisser un portrait général de votre entreprise, tout en se penchant plus particulièrement sur ses activités dans le domaine de l'innovation.

L'entretien est basé sur les sujets suivants:

- Familiarité avec le programme gouvernemental de facilitation de la simplification administrative et soutien à l'innovation
- Familiarité avec les mesures déjà mises en oeuvre ou envisagées par le gouvernement qui ont trait au soutien à l'innovation
- l'impact des mesures sur le coût total de la réglementation (coût de la conformité aux règlements en vigueur)
- la perception d'un allègement de la lourdeur administrative des réglementations, de manière générale et, plus particulièrement, en ce qui concerne les activités d'innovation de l'entreprise (par exemple la gestion des Droits de Propriété Industrielle (DPI), les activités de Recherche et Développement (R&D))
 - dans des zones perçues comme lourdes (les besoins du gouvernement en tant que point de départ)
 - dans des zones perçues comme favorables (entreprise a besoin comme point de départ) l'évaluation générale du résultat des mesures de simplification administrative et les schémas d'organisation plus spécifiquement.
- l'évaluation globale du résultat des mesures de simplification, en particulier les schémas d'organisation.

Les questions concrètes correspondantes sont les suivantes:

- Quelles mesures de simplification administrative et de facilitation du commerce ont-elles été introduites par le gouvernement dans votre secteur d'activité?
- Quelles mesures de soutien de l'innovation le gouvernement a-t-il introduit dans votre secteur?
- Avez-vous fait usage du soutien à l'innovation offert par le gouvernement, en particulier en ce qui concerne l'amélioration des schémas d'organisation?
- Avez-vous utilisé des formes de soutien à l'innovation proposées par des entités privées?
- Le gouvernement a-t-il prévu ou récemment mis en place des mesures pour soutenir l'innovation dans votre secteur d'activité?
- Les mesures du gouvernement ont-elles eu un impact sur votre entreprise en ce qui concerne:
 - Votre activité d'innovation (= développement de nouveaux produits et procédés)?
 - la productivité de vos employés?
 - Les gains d'efficacité dans le processus de production?
 - La structure organisationnelle de votre entreprise?
- Avez-vous remarqué un allègement de la lourdeur de vos obligations administratives? (Par exemple, moins de temps / argent dépensés pour se conformer aux règlements s'appliquant à votre entreprise?)
- Avez-vous remarqué un changement dans le degré de réglementation relatif aux activités d'innovation de votre entreprise (par exemple la gestion des DPI, les activités de R&D)?
- Quelle est votre évaluation globale de l'efficacité des mesures de simplification adoptées par le gouvernement? Ont-elles contribué à vous faire économiser temps et argent? Ont-elles contribué à augmenter votre capacité à innover?

Appendix XI: Technology Parks and Technopoles in MENA



Source: ANIMA

Name	Sector	City	Country	Date	Type
Cyberparc de Sidi Abdallah	ICT	Alger	Algeria	2009	Public
Technoparc de Sid AMAR	ICT	Annaba	Algeria	2011	Public
Mubarak City for Scientific Research and Technology Applications	ICT, Bio- and Nanotechnology	Alexandria	Egypt	2000	Public
Smart Village Cairo	ICT	Cairo	Egypt	2001	Public/ private
Cybercity	ICT	Irbid	Jordan	2001	Public/ private
El Hassan Science City	General	Amman	Jordan	2007	Public/ private
The Hashemite University Technology Park	ICT	Zarqa	Jordan	2001	Public/ private
Agrotechnopole d'Agadir	Food	Agadir	Morocco	2006	Public
Agrotechnopole de Berkane	Food	Berkane	Morocco	2011	Public
Agrotechnopole de Meknes	Food	Meknes	Morocco	2012	Public
Casablanca Technopark	ICT, Media, Energy, Environment	Casablanca	Morocco	2001	Public/ private

Oceanopole de Tan Tan	Marine resources	Tan Tan	Morocco	2010	Public
Parc Haliopolis	Food	Agadir	Morocco	2009	Public
Rabat Technopolis	ICT	Rabat	Morocco	2009	Public/ private
Technopole d'Oujda	Biotechnology	Oujda	Morocco	2011	Public
Technopole de Nouaceur	Aeronautics	Casablanca	Morocco	2005	Public
BiotechPole Sidi Thabet	Biotechnology	Sidi Thabet	Tunisia	2002	Public/ private
ECOPARK - Technopole de Borj Cedria	Renewable energy	Hammam Chatt	Tunisia	2008	Public
Elgazala Technopark	ICT	Ariana	Tunisia	1999	Public
Le Technopole de Bizerte	Food	Bizerte	Tunisia	2007	Private (85% private banks)
Pole technologique des telecommunications de la Manouba	ICT	Manouba	Tunisia	2011	
Technopole de Gabes		Gabes	Tunisia	2010	Public/ private
Technopole de Gafsa		Gafsa	Tunisia	2008	
Technopole de Monastir-El Fejja	Textile	Monastir	Tunisia	2006	Public/ private
Technopole de Sfax	ICT	Sfax	Tunisia	1999	
Technopole de Sousse	Electronics, Mechanics	Sousse	Tunisia	2006	Private (85% private banks)

Appendix XII: Codebook

Interview Topic	Question Number	Code Name	Brief Definition	Full Definition
Administrative Simplification and Business Facilitation (ASBF)				
Knowledge of government initiatives in the area of ASBF	Q1 enterprise, Q1, Q3 PA	ASBF_Know	Awareness/knowledge of AS and BF measures implemented by the government	Participants' knowledge on the government's measures to simplify administrative procedures and facilitate business in terms of starting, running and closing a business
One stop shop	Q1 enterprise, Q1, Q3 PA	ASBF_OSS	Awareness of the creation of One-Stop Shops	Participants' knowledge on the implementation of one-stop shops for procedures related to opening, running and closing a business
E-Government	Q1 enterprise, Q1, Q3 PA	ASBF_Egov	Awareness of E-Government initiatives	Participants' knowledge of initiatives related to E-government and the digitalisation of administrative procedures related to business facilitation (opening, running and closing a business)
Changes in the level of general regulatory burdens	Q7 enterprise, Q7 PA	ASBF_ChangeReg	Changes in level of regulatory burdens	Participant's perception of the changes in the level of regulatory burdens related to general business activities; for example less time/money spent to comply with business-related regulations
Changes in the level of innovation-related regulatory burdens	Q8 enterprise, Q7 PA	ASBF_ChangeRegInno	Changes in level of regulatory burdens related to innovation	Participant's perception of the changes in the level of regulatory burdens related to innovation activities, such as IPR registration and R&D activities
Impact Assessment	Q9 enterprise, Q8 PA	ASBS_Impact	Impact assessment of ASBF initiatives	Participant's view on the effectiveness of the public administration's administrative simplification measures in terms of time and monetary savings and impact on innovation activities
National Innovation System (NIS)				
Actors within the NIS	Q1-Q5 enterprise, Q2 PA	NIS_Actors	Knowledge on the main actors of the NIS	The participants knowledge/perception of the main actors with in the NIS
Ministries	Q1-Q5 enterprise, Q2 PA	NIS_Ministry	Ministries that are part of NIS	Participants' knowledge of ministries in charge of innovation policy development and implementation and innovation support
Industrial Entities	Q1-Q5 enterprise, Q2 PA	NIS_IndEnt	Industrial entities that are part of NIS	Participants' knowledge of industrial entities in charge of innovation policy development and implementation and innovation support
Education	Q1-Q5 enterprise, Q2 PA	NIS_Edu	Education provision and educational entities within NIS	Participants' knowledge of educational entities in charge of innovation policy co-development and quality of innovation provision
NGOs	Q1-Q5 enterprise, Q2 PA	NIS_NGO	NGOs forming part of the NIS	Participants' knowledge of NGOs providing innovation support
Venture Capital	Q1-Q5 enterprise, Q2 PA	NIS_VC	Public and private VC initiatives	Participants knowledge of public and private VC funds

Interview Topic	Question Number	Code Name	Brief Definition	Full Definition
Innovation Support (IS)				
Innovation Support knowledge	Q2 enterprise, Q1, Q3 PA	IS_Know	Current innovation support measures	Participants' knowledge on concrete measures to support innovation implemented by the government in the company's sector
Public Innovation support	Q3 enterprise, Q1 PA	IS_Use	Use of public innovation support mechanisms	Innovation support mechanisms provided by the government which the company has made use of with a particular focus on organisational schemes
Private Innovation support	Q4 enterprise; Q2 PA	IS_Private	Use of private innovation support mechanisms	Innovation support mechanisms provided by private entities which the company has made use of
Implementation of IS	Q5, Q6 PA	IS_Implement	Process of policy implementation and related	Details on the process of implementing innovation support initiatives (including OS): impact assessment, review, consideration of good practices from other countries
Impact of public innovation support	Q6, Q9 enterprise	IS_Impact	Impact of public innovation support	The participant's assessment of the impact of governmental innovation support measures provided (on innovation capacity, labour force productivity, production process efficiency and organisational structure)
Future innovation support	Q5 enterprise, Q4 PA	IS_Future	Future government plans for IS initiatives	Participant's knowledge of planned governmental innovation support initiatives
Public Private Partnerships	Q2 enterprise, Q1, Q3 PA	IS_PPP	Public-private partnerships in the area of innovation support	Participants' knowledge on public-private partnerships set up to support innovation
Organisational Schemes (OS)				
Organisational Schemes Knowledge	Q2, Q3 enterprise; Q1, Q3 PA	OS_Know	Current OS in the area of innovation	Knowledge about current public organisational schemes put in place to support innovation
One-Stop-Shop for innovation	Q2, Q3 enterprise; Q1, Q3 PA	OS_OneStop	One stop shops in the area of innovation	Participants' knowledge of OS serving as one stop shops and offering a range of innovation services to enterprises
Technology Transfer Office	Q2, Q3 enterprise; Q1, Q3 PA	OS_TechTrans	Technology Transfer offices supporting innovation	Participants' knowledge of OS serving as technology transfer offices supporting innovation
IPR information and registration	Q2, Q3 enterprise; Q1, Q3 PA	OS_IPR	IPR information and registration	Participants' knowledge of OS specifically dedicated to IPR information and registration
Incubators	Q2, Q3 enterprise; Q1, Q3 PA	OS_Incubation	Incubators specialised on supporting innovative start-ups	Participants' knowledge of OS specialised on the incubation of innovative start-ups

Appendix XIII: Participant information sheet

(ARU letterhead)

PARTICIPANT INFORMATION

Anglia Ruskin University Research Project:

Administrative Efficiency for Innovation Support: The Role of Organisational Schemes in the National Innovation Systems of Egypt and Morocco

Purpose and value of the study

The aim of the study is to extend our understanding about how administrative efficiency (AE), in particular organisational schemes, support innovation in developing countries. This takes into account national specificities, in particular the influence of cultural elements, to define a theoretical framework for assessing the relevance of other countries' experiences.

For this purpose, it proposes a framework for assessing the effectiveness of AE policies related to innovation support, focusing on how they produce their effect, so that it is possible to foresee their impact in a different context. This would allow policy makers to identify relevant good practices and define accordingly their AE policies for innovation support. The research aims at answering the following questions:

1. What relevance does AE in general, and organisational schemes of the PA in particular, have for supporting innovation in developing countries?
2. How can the impact of such organisational schemes on local innovation and entrepreneurship in developing countries be evaluated?
3. How should policy makers in developing countries assess the relevance of organisational schemes for innovation support designed elsewhere?

Hence, the major contribution of the research is two-fold: first, it establishes the link between an efficient PA and the innovativeness of local companies in developing countries by analysing the innovation systems of Egypt and Morocco and correlating relevant indicators. Second, it provides policy-makers with a decision-support framework to assess the suitability of administrative efficiency policies implemented elsewhere.

Who is funding and organising the research?

The study is funded by the Lord Ashcroft International Business School of Anglia Ruskin University in Cambridge, United Kingdom. Collaborating with institutional and corporate partners from Egypt and Morocco as well as UNCTAD and _____ (other international organisations – to be confirmed), the study is organised and conducted by Sandra Selmanovic and the Lord Ashcroft International Business School of Anglia Ruskin University in Cambridge, United Kingdom.

What will happen to the results of the study?

The study's findings will form part of the main investigator's dissertation, which will be submitted for the award of PhD by Anglia Ruskin University.

Contact for further information

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Your Participation in the Research Project

Invitation to participate

The recipient of this information sheet is invited to take part in the above-mentioned study on the role of administrative efficiency (AE), in particular organisational schemes, for innovation support in developing countries and the assessment of relevant policies developed elsewhere. _____ (name of organisation) has been selected to take part in the study and we look forward to your valuable contribution.

Why should you agree to take part and what will happen if you do?

Your active participation can help contributing towards social and cultural awareness in relation to the design of AE policies for innovation support in developing countries. This is an important step towards the achievement of the Millennium Development Goals in your country, as increasing the efficiency of public administrations in developing countries and supporting innovation contributes to business facilitation and economic development in general.

Participants may be asked to take part in an initial pre-survey by phone, which will take up to ten minutes. You may also be asked at a later stage to participate in different kinds of interviews of up to thirty minutes each. These may be complemented by questionnaires as well as observation of relevant meetings of public officials and local enterprises.

Your legal rights

The agreement to participate in this research will not compromise participants' legal rights should something go wrong. All arrangements in relation to this study will be in accordance with the respective legal framework of your country, for example in relation to intellectual property and confidentiality.

As the study will focus on the 'big picture' rather than on individuals, there are no other risks involved (e.g. side effects from taking part). Should you still feel that this is the case, your wellbeing/safety will be our first priority. Please contact us and we will confidentially resolve any issue in relation to the research.

Opting out

Individuals invited to take part in the study can refuse to do so in the beginning or withdraw at any time later on and without giving reasons by submitting a signed 'Notification of Withdrawal' (see back side of the attached 'Consent Form').

YOU WILL BE GIVEN A COPY OF THIS TO KEEP,
TOGETHER WITH A COPY OF YOUR CONSENT FORM

Appendix XIV: Confidentiality agreement (consent form)

(ARU letterhead)

Participant Consent Form

Name of participant: _____

Title of the project: Administrative Efficiency for Innovation Support: the Role of Organisational Schemes in the National Innovation Systems of Egypt and Morocco

Main investigator and contact details:

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1. I agree to take part in the above research. I have read the Participant Information Sheet, which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3. I have been informed that the confidentiality of the information I provide will be safeguarded.
4. I am free to ask any questions at any time before and during the study.
5. I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection: I agree to the University¹ processing personal data, which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project in accordance with the relevant data protection legislation in my country.

Name of participant (print).....Signed.....Date.....

YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP

If you wish to withdraw from the research, please complete the form overleaf and return to the main investigator named above.

¹ The University includes Anglia Ruskin University and its partner colleges

Notification of withdrawal

I wish to withdraw from the Anglia Ruskin University research project *Administrative Efficiency for Innovation Support: the Role of Organisational Schemes in the National Innovation Systems of Egypt and Morocco*

Name: _____

Organisation: _____

Signed: _____

Date: _____

Appendix XV: Initiatives within the Egyptian Technology Innovation and Entrepreneurship Strategy 2011-2014

1. Innovation assessment and certification: “to assist companies to develop their innovation management capabilities, to increase their competitiveness and to grow more effectively” (TIEC, 2011, p.61).
2. Egypt’s ICT innovation and entrepreneurship platform: “to connect nodes in the national innovation ecosystem and to be a single point of access for businesses and entrepreneurs, whereby they can learn about innovation-related best practices, and find practical support” (TIEC, 2011, p.44).
3. Capacity building through education and training: “to provide education and training to academics and researchers in the areas of innovation and entrepreneurship” (TIEC, 2011, p.47).
4. Policy acceleration and advocacy: “to influence and advocate for significant policy changes that would boost innovation and entrepreneurship in Egypt” (TIEC, 2011, p.51).
5. Start-up support: “to promote and empower entrepreneurship in the ICT sector by providing services such as incubating innovative and commercially promising start-ups, training, coaching, and incentives to attract entrepreneurs abroad to establish businesses in Egypt” (TIEC, 2011, p.53).
6. Innovation support for businesses: “to stimulate innovation within Egyptian ICT firms to enhance their competitiveness level and develop their competences through capitalizing on technological, non-technological capacities” (TIEC, 2011, p.55).
7. Public-private funding: “to attract foreign investors and potential partners to invest in Egypt’s ICT sector in order to minimize the equity gap” (TIEC, 2011, p.57).
8. Technology-specific clusters and technology observatory: “to identify forward-looking ICT trends and assess their potential economic impact” (TIEC, 2011, p.61).
9. Intellectual property exchange: “to serve as a unique clearinghouse and facilitator, reducing the costs of registering and exchanging intellectual property (IP). Also it seeks to provide practical guidance to technology companies on IP issues” (TIEC, 2011, p.64).
10. Multinational companies: Attraction and encouraging collaboration: “to attract high value foreign direct investment and provide a range of incentives to those considering FDI in Egypt” (TIEC, 2011, p.67).

11. Branding: “to firmly establish Egypt as a ‘innovation destination’ by developing an ‘Egypt equity brand’” (TIEC, 2011, p.67).
12. Celebration of innovation and entrepreneurship: “to create a culture that celebrates innovation and recognizes key achievements” (TIEC, 2011, p.71).
13. Awareness: “to promote and raise awareness of innovation and entrepreneurship within universities and the ICT sector in Egypt” (TIEC, 2011, p.73).

Appendix XVI: MSAD Egypt – Administrative Development Framework 2010-2012

The MSAD's vision, objectives and programmes are coherently presented in its Administrative Development Framework 2010-2012. The agenda for administrative reform is clustered around two main axes, each with an overall objective and several related action points:

- “Institutional development: Reassessing the role of the administrative body to be efficient, effective, agile, and capable of coping with change and wisely manage resources” (MSAD, n.d.).
 - **Objective:** “To set effective and viable guidelines for better administrative body by appraising, reviewing and reforming the current government institutions structure and management practices in Egypt” (MSAD, n.d.).
 - **Action Points:**
 - “Better regulation for better administration
 - Restructuring government institutions
 - Building government human capacity
 - Optimizing resource utilization in government bodies” (MSAD, n.d.).
- “Government services development: Providing distinguished, integrated services to citizens and continuously interacting with them” (MSAD, n.d.).
 - **Objective:** “To introduce competitiveness to service provision system, increase citizenry power, enhance productivity, accuracy, and performance in the administrative body, fight corruption and contribute to better social and economic prosperity in Egypt” (MSAD, n.d.).
 - **Action Points:**
 - “Ensuring citizens and business satisfaction through offering high quality (easy to use/access, sustained, interactive) services via various integrated delivery channels
 - Ensuring active participation and innovation
 - Enhancing organizational performance through the use of ICT
 - Addressing citizens’ trust through applying transparency and accountability measures in government” (MSAD, n.d.).

Appendix XVII: Summary of findings of Academy Hassan II scientific research and development study

The comprehensive study examining the situation of national R&D and innovation activities identifies a range of weaknesses of the Moroccan research system and recommends corresponding policy initiatives to strengthen the country's NIS (Academy Hassan II, 2009). These are arranged around five axes, each proposing a set of measures to strengthen and advance Morocco's NIS: strengthening and mobilising research staff (including evaluation of research and promotion of researchers); financing and management of research activities; priorities, coherence and coordination of the national research system; partnerships with enterprise and science education; and development of a scientific culture (Academy Hassan II, 2009).

The first axis focuses on nurturing **human resources for research** (15,000 additional researchers by 2020) through an incentive system that includes: raising the number of bursaries for higher education; encouraging doctoral studies locally and abroad with research grants; enhancing research-training opportunities (i.e. fixed-term contracts for post-doctoral researchers); and promoting the recruitment of researchers in the private and public sectors (Academy Hassan II, 2009).

Furthermore, the Academy recommends implementing an evaluation and promotion system for research, thereby honing the mobility of researchers internally (between universities and between universities and enterprises) and externally (between national and international research structures). Further objectives are: a system for research sabbaticals, welcoming foreign researchers, a statute for emeritus professors, and a contracting system for researchers with defined performance indicators (Academy Hassan II, 2009).

Finally, the recommendations in axis one include mobilising the Moroccan scientific diaspora, rewarding and encouraging researchers demonstrating high productivity levels and creating research chairs around priority themes for research.

The second axis relates to **research funding**. The Academy recommends to increase the share of GDP dedicated to research (i.e. one per cent in 2010, 1.5 per cent by 2015 and three per cent by 2020), precisely identifying the budgets allocated to research by the different ministerial departments, substantially increasing funds dedicated to scientific research and technological development and mobilising private funds, in particular through fiscal incentives (e.g. research tax credits) (Academy Hassan II, 2009).

As Moroccan researchers need to participate more actively in international research programmes, procedures to allocate funds to universities and other research centres or structures need to be simplified. Full autonomy should be granted to universities in their budget management, introducing a posteriori instead of a priori controls, which are time-consuming and cause delays (Academy Hassan II, 2009).

The Academy has identified **priority themes**⁷²⁶, encouraging R&D in sectors considered strategic⁷²⁷ or where Morocco has a competitive advantage⁷²⁸: the development of appropriate technologies would improve the living conditions of the population as well as aid the promotion of “global professions of Morocco”, defined in the National Plan for Industrial Emergence⁷²⁹.

The Academy foresees three concrete measures to ensure more coherence and a better coordination of the national research system (Academy Hassan II, 2009):

⁷²⁶ i.e. to ensure food security, better health, reduced dependence on fossil fuels, preservation and commercialisation of natural resources, the development of science and information technologies as well as mathematics and better apprehension of demographic and socio-economic issues to promote sustainable development

⁷²⁷ i.e. climatology, energy, rural development, fisheries and oceanography, hydrology, pharmaceutical industry, geosciences

⁷²⁸ i.e. natural resources, mining, agriculture, fisheries, natural resources, solar energy, tourism and biodiversity

⁷²⁹ e.g. ICT, offshoring, aeronautics, aerospace, automobile, electronics, micro-electronics, chemistry, textiles

- regroup academic researchers according to competencies and participation to internationally relevant projects, overcoming the boundaries of their faculties or universities;
- establish and strengthen regional centres for scientific research and launch technological platforms;
- create in the medium-term quality research structures in two or three strategic domains where Morocco is potentially competitive on an international level (e.g. biotechnology, nanotechnology and ICT).

To strengthen **industry-academia collaboration**, the Academy lists five action points: incentivise mobility of researchers between the university and the enterprise within strategic public-private partnerships; favour in public tenders partnerships between universities and enterprises, promoting enterprises which engage in innovation activities and make related investments; encourage the creation of risk capital funds to support technological innovation and enterprises investing in R&D through fiscal measures (e.g. research tax credits); reorganise (pre-)incubators for innovative enterprises, linking them to doctoral research centres and providing sufficient means to contribute to innovation and commercialisation of research; enhance information dissemination on and awareness of IPRs among researchers (Academy Hassan II, 2009).

Thereafter, the Academy proposes to establish an external authority, composed of Moroccan and foreign experts, in charge of evaluating research activities conducted by higher education and research institutions on the basis of clear criteria and norms. This authority should be supported by an internal evaluation system adopted by all higher education and research entities to prepare for the external evaluation and to ensure the follow up of the recommendations.

The last axis focuses on the **development of a scientific culture** in Morocco. The creation of a conducive cultural environment requires reinforcing the science jargon

within schools, strongly involving the media in the dissemination of science-related information and increasing the number science events for youth. These activities should be complemented by the creation of science museums, an active promotion of scientific publications and the instalment of science clubs within schools. Moreover, the access to science and technology related information requires investments to hone the mastering of foreign languages (Academy Hassan II, 2009).