Investigating the Institutional Interplay of Research and Innovation Cooperation between Egypt and the EU

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Summary:

In 2005 Egypt and the EU signed a Science and Technology Agreement with the aim of intensifying their research collaboration and to facilitate Egypt's integration into the European Research Area. Today, there is widespread awareness that issue-areas of international interest - such as research and innovation - are frequently co-governed by several international and local institutions, and that successful governance involves effective cooperation with public, private, and non governmental organizations. Under European-Egyptian cooperation, formal national entities translate European guidelines highlighted in the cooperation agreement of research and innovation into administrative practice, and institutional arrangements taking into account their major differences with EU governance.

This paper aims to develop an analytical framework for the institutional interaction based on the causal pathway between EU and Egyptian public institutions. Based on empirical findings, it explores the causal mechanisms driving institutional change and their governance implications. This analysis will help answer the questions: "How and in which effects do the EU institutions influence Egyptian public management of research and innovation? Does the causal pathway affect the outcome in any way?"

The investigated interaction is estimated by the change in the institutional performance from centralized to decentralized approach, from unfair funding to transparent competitive schemes, and from broken communication channels to effective feed back loops. To reach this, the paper determines the relevant decisions from which influence originates. By doing so, the existing interplay will be explored and the spill over effects can be examined.

The paper is divided into four parts; the first is the conceptual frame of the European-Egyptian cooperation in research. The second part highlights the institutional change through the use of the institutional interplay theoretical frame. The third illustrates two major examples of the vertical and horizontal interaction between international and local institutional settings as equal partners in joint capacity building projects (FPs). The fourth and final part is a concluding remarks and a recommendation about future cooperation.

The study concludes that (1) The vertical and the horizontal institutional cooperation have been working effectively in changing the Egyptian public management to the European model; (2) the institutional interplay does not yet have clear and direct spill over effects on other local-based initiatives and administrative practices.

Egypt's progressive integration into the ERA will pave the way for better institutional learning process. Despite institutional heterogeneous conditions such as bureaucracy and unaccountable decision making mechanisms; interaction opens an outstanding set of opportunities to realize skilful governance. The diverse public management within the two shores of the Mediterranean encourages for more research to examine how national authorities act as "drivers or brakes" to the realization of European-Mediterranean Research Area.

Key Words:
EU-Egypt scientific cooperation, Framework Programmes with Egypt (FPs), institutional interplay, Vertical and horizontal institutional interaction, Euro-Med Research Area

The Conceptual Frame of the European-Egyptian Cooperation in Research

Egypt and the European Community first established contractual relations in 1976 by the signing of a Cooperation Agreement. Later, a framework for overarching regional co-operation "the Euro-Mediterranean Partnership" was launched in 1995 and reinforced in 2008 with the creation of the Union for the Mediterranean (UfM). This frame establishes a policy with more detailed and specific areas that can be developed bilaterally with ambitious long-term objectives.

Cooperation in Science and Technology as stated in Barcelona Declaration focused on promoting research and innovation to tackle the problem of the widening gap in scientific achievement, and to exchange experiences in research and innovation policies. As a result, Mediterranean countries may be able to reduce the gap between them and their European neighbours and to promote the transfer of technology. The cooperation also emphasized the need to train scientific and technical staff.

An EU-Egypt Association Agreement entered into force in June 2004 and constitutes the legal basis for EU-Egypt relations. On 21 June 2005[1], Egypt and the EU signed a Science and Technology Agreement with the aim of extending and intensifying the research collaboration and to facilitate Egypt's integration into the European Research Area (ERA). The endorsement of the agreement and the appointment of a Science Counsellor for the EC Delegation in Cairo in 2006 have put the science and technology dialogue on a stronger institutional footing to increase Egyptian participation in current and future joint research projects.

On the framework of the European Neighbourhood Policy (ENP), the EU-Egypt ENP Action Plan was approved in March 2007 for a period of three to five years. During the same year, Egypt commits itself for more fruitful international cooperation in R&D with the EU. On 18 June 2007, European and Mediterranean Countries confirmed their commitment to create - for the first time - an area for higher education and research[2]. As a result, the EU, national governments, local authorities, civil society, private business, and the universities should have an active participation in the process[3]. The Cairo Declaration focuses on five key areas for future joint-cooperation efforts:1) The first area highlights the integration of the Mediterranean Partner Countries in ERA; 2) The second area highlights the creation of a Euro-Med Scientific Research Area with specific objectives; 3) The third area highlights the Promotion of innovation, knowledge-sharing and its return on the Industry and economy; 4) The fourth area highlights the enhancement of effective mobility in the

[1] According to the Council Decision of 25 February 2008 (2008/180/EC).The agreement was initiated on 4 March 2004 but signed almost one year later.
[2] In some documents, they refer to the new initiative as the Euro-Mediterranean Innovation Space (EMIS)
[3] An inter-ministerial agreement known as Cairo Declaration: Towards A Euro-Mediterranean Higher Education and Research Area

Euro-Med region through facilitating exit and entry measures; 5) The last area highlights the brain circulation and knowledge dissemination dimension.

In Egypt, because of its former strong political relations with USSR in the fifties and sixties, the model of research governance was based on the "Central State Academy". Whatever the scheme, scientific co-operations have usually been managed at the State level in a very centralized, hierarchical and rigid manner. Practically, international scientific collaborations rely widely on the public performing institutions (universities, labs, public research authorities, or public research centers)[4].

Starting 2007 Egypt has worked so hard to design comprehensive reform initiatives to develop its R&D governance system. Concrete guidelines were set for the first time to help the country move towards a knowledge-based economy. A higher Council for Science and Technology was created in July 2007 and headed by the prime minister to develop a strategic plan for scientific research, to set vision and priorities for R&D, and to ensure the implementation. Egypt also launched a decade of science and technology (2007-2016) with a set of specific national research priorities.

Moreover, in order to ensure the implementation of such enthusiastic plans, a competitive-based funding scheme (the Science and Technology Development Fund-STDF) was established in 2007 under the management of the Ministry of Higher Education and Scientific Research (MHESR) to help finance the national research priorities through competitive transparent calls[5]. Finally, for the first time in Egypt, a set of indicators for monitoring and evaluating research and innovation activities and for evaluating the performance of the research institutions have been initiated by the ministry to help adjust the research strategic plan.

An EC joint staff working paper issued in 2011 reports on the progress made in the implementation of the EU-Egypt ENP Action Plan between 1 January and 31 December 2010. It states that in the area of research and innovation, the Egyptian

[4] Adding a filtering layer imposed by the ministry of international cooperation, an interview with top ranking official 21 May 2011.
[5] The fund launched its first call in April 2008 and received total number of 1098 proposals constitute 802 national research grants and 296 international research grants with USA, Germany, France, and Japan.

Ministry of Higher Education and Scientific Research continued to implement its reform strategy and succeeded to significantly increase the participation of Egyptian researchers in the Seventh European Framework Programme for Research (FP7).

As it was only recently, since 2007, that the research and innovation system has really been revamped, Egypt experienced low participation in previous FPs for various administrative, cultural, and legal reasons. However, it has succeeded to gradually change this situation during FP7 through serious efforts with the EU. According to the latest statistics, "*Egypt is the Mediterranean country with the highest number of applicants, 790, of which 109 were successful in submitting a proposal, receiving a total contribution of about EUR 10 million*". The thematic areas which provoke the main interest are Health, Environment, Food, Agriculture, Biotechnologies and ICT (Sec (2010) 517).

The EU through its accumulated knowledge and experience in conducting Framework Programmes (FPs) with Egypt has better negotiation mechanisms using money, soft power, as well as information at its disposal to influence the Egyptian research and innovation structure. Till the end of the Sixth Framework Programme, the European Commission was mostly dealing with completely asymmetric conditions[6] in Egypt. The Landscape of R&D, the institutional arrangements, and the governance mode were completely divergent to those of the European Union.

Faced with centrally planed R&D policy, with uncompetitive rigid funding schemes introduced through the ministry and its executive arm (ASRT)[7], and with broken communication channels and lack of effective feed back loops, the European Commission has to transfers its R&D governance for effective future cooperation with Egypt. To facilitate the achievement of desired adaptation of traditional hierarchical structure to the new governance mode[8], Institutions on the national and

[6] The linkages between the academic and industrial sector were almost null.
[7] The Academy of Scientific Research (ASRT): was recently empowered under the new reform plans to deliberate through 13 specialized councils assistance in setting scientific policies. Managing national and international research programmes and promoting international cooperation in R&D.
[8] The R&D governance of the European Union is characterized by a multi-level multi-actor structure where all governmental and non-governmental actors are interacting horizontally and vertically for better R&D outputs and outcomes. The policy-transfer here is governed through trans-national self-organized networks.

supranational levels had to be linked in special institutional arrangements forming a new pressure mechanism to foster the change and encourage a policy learning process.

It is hypothesized that the EU R&D policy instruments such as FPs (the independent variable) have promoted multi-level governance structure in Egypt (the dependant variable). The convergence is identified as a dynamic process of policy transfer. In that manner, the Egyptian public institutions (the intervening variable) may affect, constrain, or facilitate the adaptation to the European Model (Rezk, 2011).

In other words, the capacity of the Egyptian R&D system to adapt to the European mode of governance includes the redefinition of state's role, the development of new administrative arrangements, and the improvement of communication and coordination among all local and European stakeholders. Therefore, fostering more institutional coordination between EC and Egypt's public authorities became an unavoidable necessity.

Investigating the Institutional Change Through the Use of the Institutional Interplay Theoretical Frame

Policy-areas of international interest are frequently co-governed by several international and local institutions. In order to successfully deliver policy objectives, effective cooperation among public, private, and non governmental institutions become a cornerstone. Various disciplines of social sciences identified and isolated individual institutions to study carefully their dynamics and assess their impact. Real world situations report that each institution cannot work in isolation but has to interact in some way with the others. Interactions between institutions can occur as unintended consequences of their mission and operation or through intended links which are purposely included in their institutional design.

The Institutional interaction literature argues that the effectiveness of specific institutions often depends not only on their own features but also on their interaction with other institutions "*the Institutional Interplay*". Studying institutional interplay is a very useful tool from policy-transfer perspective. Institutional interaction requires

the examination of the influence taking place as a result of certain interaction situation. In that sense, researchers tend to extend the analysis to investigate the co-governed administrative arrangements that help to understand the development of more effective governance of certain policy area. Skilful R&D governance in the shadow of institutional interplay required careful examination of the extent the new administrative arrangements - established through the institutional interaction - help in realising policy objectives.

Instead of analysing the interactions of different actors in international arena, "New Institutionalism" focuses on the interaction among different horizontal and vertical institutions. It incorporates a variety of approaches and meanings to Institutions as "*the rules of the game in a society*". Douglass C. North (1990) writings on new institutionalism focused not on the individual organizations, rather on factors that influence and guide the actions of those organizations. Institutions in different levels may conflict, reinforce, overlap, or influence each others. This process is incremental as institutional change has a self-transforming nature (Ostrum, 1991).

Institutionalism advocates explain the choices in designing and creating those "rules of the game". *"Rational individuals must know the rules of the game in which choices are made and how to participate in the crafting of rules to constitute better games*" (Ostrum, 1991). Researchers of this school of thought analyse the dynamics of institutions and the way in which they influence actors. In fact, international and national institutions either public, private, or NGO's are frequently depending on each other rather than existing in isolated words (Ostrum, 1990). There is a growing theoretical trend in which researchers recognize the existence of different institutional links that cause an effect among them. This effect varies widely from one institutional setting to the other.

The search for a reliable conceptual foundation of institutional interplay started in the mid 90's by Oran Young in assessing the interaction between two international institutions (Gehring and Oberthür, 2004). It moved towards the search for more general propositions about the driving forces of institutional interaction *"to generated model of causal mechanisms"* affecting a) the pathways through which influence can travel from the source institution; b) and the consequences of such interaction for the

target institution. Institutional Interaction model defines the casual relationship between two institutions with the source institution exerting influence on the target institution. This interaction will exist if one institution affects the institutional development or the performance effectiveness of another institution.

Oran R. Young and Arlid Underdal (1997) defined institutional interplay as "*The relationship of an institution to and interactions with one or more other institutions*". Interplay - as drawn and understood from this definition - can also be applied to analyse the interactions occurring between or among institutional arrangements operating at the local, national, societal, and international levels. It may include a variety of linkages and interactions among and between institutions at the same horizontal level, or vertical linkages between different actors in different local levels, or between local and international institutions[9].

By late 90's, the IDGEC[10] science plan proposed to distinguish between horizontal and vertical interaction to the on-going analysis (Young, et al., 1999; Young, 2002). The literature on the institutional interplay focused mostly on the horizontal dimension. However, the vertical interaction found its way in European Union studies where supranational institutional arrangements influence member states. Meanwhile, the concept of multi-level governance with vertical and horizontal interaction dimension - raised during the implementation of transferred governance - examines the increasing phenomenon of vertical institutional interaction between the EU and the asymmetric and divergent systems of each member state (Hooghe and Marks, 2003).

Lisa Martin (1994) contributed to the argument through raising the issue of the conditions under which these institutions interact and how heterogeneity may affect the interaction. Over time the borrowing institution start gradually to learn from the other. This is the role of institutional interplay in institutional learning. "*All institutions are capable of becoming effective overtime as a result of learning*". The policy choice may be as Keohane (1984) explains that "*States may choose to*

[9] All linkages, either vertical or horizontal, which involve political connections, may lead to new institutional arrangements totally distinct from the duties and tasks of each of them separately.
[10] The Institutional Dimension of Global Change (IDGC) for International Human Dimension Programme on Global Environmental Change (IHDP)

construct institutions to help themselves cooperate more reliably". It is hypothesized that institutional interplay – which affect institutional structure or functioning - promotes institutional flexibility, learning, and effectiveness. In that manner, we can consider institutional interplay a vivid mechanism for institutional learning.

Various approaches exist in the field of institutional interplay. Some researchers adopt the integrationist approach where they examine that broader setting emerging from the institutional interaction. Others adopt a systemic approach which focuses on the institutional aspects of the interplay phenomenon. For the sake of the analysis adopted in this paper, the researcher follows the analytical approach which focuses on the specific effects of single interaction case. Studying the interaction analytically raises the issue of causal effects i.e. the causal mechanisms through which influence travel among institutions either vertically or horizontally.

For any study regarding the institutional interplay, researchers have to make decisions regarding the unit of analysis and the degree of broadness of their subject of inquiry. Their research questions and hypothesis should lead to one approach of analyzing the interaction they intend to evaluate. For this study, the author chooses the Systemic Analytical Approach and locates the research question as illustrated by the highlighted cell in the following figure:

Table (1) Different Approaches of investigating Institutional Interplay

		Analytical Approach	Holistic Approach
Systemic Analysis	Research Question	How, and with which effects, does EC influence the Egyptian Public Management in R&D?	How, and with which effects, is the institutional structure of the EU R&D governance affected by the institutional interaction?
	Variables	The Independent and dependant variables are the institutions (Macro-Level)	
	Description	The analysis targets the nature, forms and consequences of the involved institutions. It examines a particular case of interaction in which one institution affects the normative development or performance of another institution.	The analysis adopts a bird's perspective to assess the inherent dynamics of the overall picture of the interaction. (An Integrationist approach)

Actor-Cantered Analysis	Research Question	How do actors trigger a particular cause of interaction, or avoid an undesired interaction effect, or develop policies to enhance synergies and avoid disruption?	How, and with which effect, do the efforts of actors to employ institutional interaction change the institutional structure of the EU R&D Governance?
	Variables	One of the variable is the institution (Macro-level) and the other is the actors (Micro-level)	
	Description	The analysis starts from a given interest of relevant actor(s) and explores the opportunities to exploit institutional interaction as an additional instrument to effectively pursue this interest.	The analysis assesses the complex phenomenon and its impact on the behaviour of relevant state and non-state actors

Source: Modified and elaborated from (Gehring and Oberthür, 2006)

Following the approach of systemic analytical institutional interplay, it is important to distinguish the direction of the interaction by giving more consideration to the types of investigated linkages. In his writing about institutional interplay, Young (1992) defined the positional or structural linkages between international institutions and distinguished between four different types of these linkages. For the purpose of this study, the author borrows two types which are closely related to the empirical examples given in the following section:

1) The first is the "*Nested Institutions*" which are described as institutional linkages in which specific arrangements (restricted in terms of functional scope and geographic area) are folded into broader institutional frames that deal with the same general issue area but that are less detailed in terms of their application to specific problems. There are partial hierarchy between particular issues, with other rules of the two institutions neither in common nor in conflict (Jungcurt, 2006);
2) The second is the "*Clustered Institutions*" which are described as several institutions (which engaged in formation or operation of differentiable governance systems) combine into certain institutional packages. Those arrangement packages become focal points around which can be clustered any number of institutions dealing with the same policy area.

Nested and clustered institutions are two major forms of interaction which are not good or bad in themselves. They can have positive, negative, or even neutral impact. Moreover, new institutional arrangements either nested or clustered do not work in reality as in abstract models. A wide range of internal and external factors contributes to make the new rules work successfully on real world.

Regarding the causal mechanisms which are driving the institutional change, literature suggests up to four different types of mechanisms that may drive the interaction[11]. In the type of causal mechanisms utilized in this study "*Institutional interaction through commitment*" there are two major steps. In the first step, the target institution's actors become committed to an obligation within the source institution. In the second step, the transferred obligation mobilizes an additional governance instrument or particular form of arrangements that provides an additional incentive to implement this obligation. This administrative arrangement will support the effectiveness of the target institution in achieving the target objectives (whereas it is hypothetically believed that the obligation is in line with the target institution's own objectives and interests). Meanwhile, this will lead to activating an additional mean that automatically contributes to a more effective implementation regarding the targeted policy area.

In this situation, if the two groups of actors address the same policy area within the two institutions that pursue similar policy objectives, but dispose of different means of governance, the interaction will virtually create synergy. Due to matching objectives, the interaction initiated by the source institution will automatically serve the ends and objectives of the target institution. In the light of institutional interplay, the source institution in that regard, may request the target institution to adopt particular measures to support its policy implementation under its jurisdictions.

Causal mechanisms can be defined as the processes or pathways through which an outcome is brought into being. The model this study applies assumes that the relation

[11] As developed by Oberthur & Gehring, the four types of causal mechanisms are: (Cognitive Interaction, Interaction through Commitment, Behavioral Interaction, and Impact-Level Interaction)

is just one way from the source to the target (unidirectional)[12] in this case both dependent and independent variables that explains observed effects are measurable (Gehring and Oberthür, 2004). To reach this we should determine the relevant rules or decisions from which influence originates[13] where the interaction is intentionally triggered from the source to the target. The following six questions are essential to draw clear picture about the nature and impact of the interplay:

1- The casual Pathway: "Does it affect the output/outcome in any way?"
2- The causes: "Does it affect the objectives, or just the means to achieve the same objectives?"
3- The intentionality: "Does the impact intended or not intended?"
4- The strength: "Does the influence considered high, medium, or low?"
5- The quality: "Does the influence clear for observation or not?"
6- The Type: "Does the source act as a model, or the influence needs additional means of interaction?"

Reflecting on the analysis adopted in this study, there is a clear shift in public policy literature from polycentric governance to governance by networks. The new concept of governance allows for a larger set of actors to have an influence on the outcome of the strategy formulation processes and the allocation of tasks and budgets (Pollitt and Bouckaert, 2004). It focuses on the interplay between the various autonomous actors that together determine the priorities, strategies, activities and outcomes in certain policy field. Multi-level governance model came later to emphasize the fade of the unitary government concept in public policy domains (Marks and Hooghe, 2003).

The study of institutional interaction between EC - as the source institution - and the Ministry of Higher Education and Scientific Research (MHESR) - as the target institution - can provide a starting point for developing a suitable conceptual framework. It suggests a reorganization of the landscape of R&D governance within the target institution jurisdiction.

[12] The literature suggests another type of interaction (two-way) or (mutual) where two or more institutions are designed to work together to reach certain purposes that neither can accomplish on its own. The affect is here causing mutual adjustments in all international institutions involved and is taking place quite often horizontally than vertically.
[13] The concepts and analysis discussed in this part are highly driven from recent discussions utilized in the analysis of the global environmental governance Oberthur & Gehring, 2006:43

The EU normally features generic rules applicable to all. But the implementation of these rules is actually carried out by various local actors. Therefore, the actual impact is sensitive to the vertical interplay between the EU and local institutions (Young, 1999). This explains why the outcome varies from one member state to the other. Local institutions act as drivers or brakes to the effective implementation of EU rules and guidelines causing sometimes diminishing or offsetting expected gains from the cooperation. The same applies for the Euro-Med region where such policy guidelines and norms are transferred from the EU to not only member states, but also the Mediterranean Countries in a perfectly voluntary process of policy transfer (Bulmer, Simon, et al., 2007).

This study has a broad objective. It seeks to demonstrate that R&D cooperation between EU and the Mediterranean Countries is affected in significant ways not only by the institutional arrangements at the local level, but also by the institutional interplay between EC and Local public research authorities in charge. Applying institutional interplay in R&D policy domain enhances our understanding about the opportunities as well as the limitations for future EU-Egypt research and innovation cooperation. The Egyptian institutions may act as drivers or brakes to the travelling influence. The vertical and horizontal institutional interplay analysis used in the following section vividly traces the consequences of the interaction.

Vertical and Horizontal Interaction: The Case of RDI and MIRA

Scientific cooperation between EU and Egypt is supported by both EC and national institutions where all agencies are working together to design, fund, and sustain such cooperation. The role of the EC has taken a new shape after realizing that despite the previous bilateral efforts; the results are still much lower than anticipated. By the end of FP6, two important institutional arrangements (RDI & MIRA) have taken place to represent vertical and horizontal institutional interplay between EC and MHESR.

Framework Programmes are considered the main European financial instrument to realize the ERA. Calls are opened to various Egyptian institutions to participant in joint research projects. The ministry realized the importance of such outstanding chance in light of insufficient financial resources directed towards research and

innovation in Egypt[14]. The ministry appointed a National Information Point to raise awareness about FPs; however, the task was very big and needs more concrete institutional arrangement to be carried out through. The Research, Development, and Innovation Agreement (RDI) was signed in June 2007 between the (EC) and (MHESR). By that time, the dissemination of information about the programme was not sufficient. Egypt was not satisfied with its participation rate and realized that it is time to take serious steps to change the situation in the following FPs.

At that time, RDI Project Implementation Office (PIO) was nested inside MHESR with a European fund of 11 million euro for three years[15] that should be fully devoted to improve Egypt's R&D through: a) Strengthening the link between R&D sector and the industry while enhancing the innovation and technology transfer culture; b) Facilitating the Egyptian participation in the European Research Area. The RDI office designed a specific strategy to reach those objectives:

1- Support the development of collaborative research projects between participants from the academic sector and the industrial sector which has been witnessing a very low degree of previous cooperation.
2- Provide capacity building for Egyptian researchers especially regarding skilful proposal writing to engage effectively and compete for more FP projects
3- Promote the culture of innovation and assess the current status of Egypt's R&D and recommend best practices to improve such vital sector.

The RDI initiated three major mechanisms to reach those objectives: a) A network of focal points and assistant focal points to be the main tool for disseminating the information about European research cooperation opportunities especially under FPs; b) A competitive-based funding scheme (The EU-Egyptian Innovation Fund) EEIF; and c) A set of indicators for monitoring and evaluating R&D projects, plans, and institutions.

[14] According to the country's Central Agency for Public Mobilization and Statistics (CAPMAS), the scientific research budget for 2011 is around US$89 million. This has not increased since 2007, and represents just 0.23 % of Egypt's gross domestic product**.**
[15] The second phase of the project "DRI-II" was signed in June 2011 for five years with a total European contribution of 20 million euro according to an interview with high ranking official 7 September 2011.

The nested vertical institutional arrangements succeeded to have sound changes in the institutional performance of MHESR from centralized to decentralized approach, from unfair funding to equal and fair practices, and from broken communication channels to effective feed back loops as shown in Annex one.

The First Important component of the RDI shows clearly how the nested institutional arrangement helped in changing the centralized approach applied by MHESR to fully decentralized approach and also helped in initiating effective feed back channels which can directly bypass the national boarders to Brussels. The RDI network of focal points was the first and most powerful component of the vertical initiative. The main objective of this network[16] is to promote, enhance and facilitate the participation in ERA through almost 45 representatives in public and private universities and various research centres. Through their direct interaction with their colleagues they initiate and maintain direct contact between the Egyptian researchers and the EC through RDI office. The network works hard to increase Egyptian researchers' awareness and to offer capacity building training – by the EC - to enhance their participation in FP7 (2007-2013).

The network succeeded so far in raising the awareness about framework programmes with Egypt through a number of workshops and information days and helped in promoting linkages with European researchers to form trans-national consortia. The members of the network received professional capacity building training from the EC to help them carry out their role successfully. They also help in reporting all problems and obstacles facing Egyptian participants to be put as a high priority in the agenda of the EC to enhance the design of future FPs and in the agenda of EC-Egyptian dialogue to overcome internal bureaucratic procedures.

The RDI office also enhanced the collaboration between Egypt and the European researchers and promoted innovation culture through several events such as the Euro-Mediterranean Innovation Marketplace held in Cairo on January 2010. ICT and pharmaceutical companies started to compete internationally for outsourcing contracts

[16] The focal points are mainly nominated through their institutions

and many companies were encouraged to spend on R&D. Egyptian companies are coming more involved in the demand-driven research especially in international projects that serve the national industrial needs and interests. The brokerage event helped identifying potential innovation networks inside Egypt. The RDI also supports the Thematic National Contact Points[17] to participate in meetings and information days in Brussels and supports regional thematic workshops for priority setting under the MIRA project[18].

The second component of the RDI shows clearly how the nested institutional arrangement helped in creating competitive and transparent medium and small grants[19]. The EEIF opportunities serve the establishment of academic-industrial links which MHESR had failed to establish previously through its traditional funding mechanisms. The RDI fund aims at supporting Egyptian European research partnerships to enhance technology transfer as well as supporting cross-cutting projects initiated in collaboration between the academic and industrial sectors. It is considered the main component of the RDI programme aiming at supporting the new vision of innovation cycle developed by the Academy of Scientific Research and Technology. The cycle mainly encourage researchers to develop their publications, to patents, to prototypes, and then finally to products and novel business applications.

Firstly, the fund succeeded to reach a higher number of applicants from the industrial sector unlike previous FPs[20]. Secondly, it succeeded to attract funded application from various geographical areas in Egypt beside the capital unlike previous FPs[21]. Finally, it succeeded to attract more participants carrying out research projects in harmony with Egyptian national research priorities and interests[22].

[17] The NCPs are directly nominated by the Minister
[18] Creating synergies between the local role of RDI with the regional role of MIRA. MIRA Work Package 4 and RDI Component II- national priority setting, regional brokerage events for health and energy, and joint organization for MIRA thematic workshops
[19] Total amount for the medium grant (Scheme 1) is 6 million euros, and for the small grant (Scheme 2) 800.000 euros.
[20] Although both instruments are European and are designed similarly, previous FPs attracted very few industrial participant and no SMEs at all.
[21] One from Aswan governorate, one from South Sinai, One from El-Menia, One from Suez, and one from New Vally. However, previous FPs did not have any participation from Sinai and Upper Egypt and a very small number from different areas outside the Capital.
[22] The highest number of projects is under ICT and Innovation support and health sectors.

Through analysing the nested vertical institutional interplay, we can conclude that the causal mechanisms from the source to the target institution helped to achieve the following:

1. Improving the link between research and industry & research and society
2. Improving the links between private and public local actors
3. Improving intra-organizational collaboration (combat fragmentation)
4. Improve public-institutional governance (combat public-sector domination)

As the causal mechanisms have been investigated, the spill over effects can be also traced. One of the very successful initiatives in Alexandria University[23] took place in 2009. The University had witnessed positive and smooth international research cooperation after the establishment of its new GITTC (Grants, Innovation and Technology Transfer Centre) including the Grants and Outreach Unit[24]. In such autonomous dynamic centre nested in the rigid hierarchical structure, all bureaucratic and inflexible rules required by the administrative and financial departments are taking care of without hindering the key researchers[25]. This unit assists researchers, students, staff, and industry partners in getting grant funding to sponsor their research and mobility not only from the EU available programmes, but also from other international and local stakeholders.

Moving towards the clustered horizontal institutional arrangements, it is essential to emphasize that the EU plays a horizontal role as a catalyst and mediator between different actors in different member states. The same role is exercised within the Euro-Med region especially in the absence of other experienced bodies with adequate legitimate authority to carry out this task satisfactory.

The Mediterranean Innovation and Research Coordination Action (MIRA) is an INCO-Net type project[26] funded by FP7[27] and supported by the Monitoring

[23] This successful pilot initiative should have been duplicated in all public universities few years ago, but unfortunately it was faced with unjustified delay. The decision to establish similar units in three other universities is currently under preparation.
[24] The students are invited to become focal points in their faculties to disseminate the information about the international research opportunities and report any problems, or research interests.
[25] Interview with GITTC team, 6 March 2011
[26] International Cooperation
[27] MIRA started on January 2008 for 60 months with total funding of 3.99 million euro

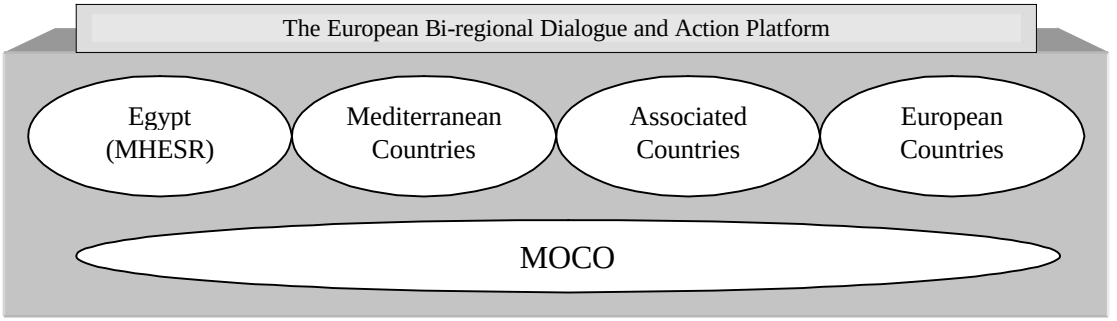
Committee for the Euro-Mediterranean S&T Cooperation in RTD (MOCO)[28]. Bringing together senior official representatives from the Mediterranean Partner Countries, EU Member states and Associated Countries, The MOCO Forum acts as a Steering Committee for MIRA and enhances its ability to access expert communities. With a Network involving 30 partners in 20 countries, the MIRA platform gathers experts leading scientific communities as well as policy makers and stakeholders, bridging policy and research in the region.

MIRA project aims at: 1) Creating a regional R&D dialogue platform in the Mediterranean region. The main purpose is to help identifying shared research interests for future joint cooperation projects; 2) Setting up research and innovation priorities and supporting the capacity building activities across the region; Creating synergies among the two shores of the Mediterranean in R&D programmes. It acts as the suitable platform for such synergy-building providing a strong and effective horizontal institutional arrangement to foster the participation of Mediterranean Countries in current and following FPs; 4) Working as an observatory base for all EU-Med research cooperation activities to help establish a standard set of indicators to be used by MOCO for monitoring this cooperation. The recommendations are used to guide the European Union to enhance the patterns and conditions of the bi-regional research projects. It is hoped that in the future the existing indicators will be consolidated at the national level in Mediterranean Partner countries including Egypt.

In this example of the clustered horizontal institutional arrangement, MHESR engaged in "Institutional Arrangement Package" with similar institutions horizontally across the region for better governance of the research and innovation cooperation. The ministry coordinates its efforts with similar political agencies and has the chance to benefit directly from experts' advice through MOCO as shown in the following figure. The European Union succeeded to apply the same horizontal institutional arrangements – Clustering MHESR – with various countries not only through MIRA, but also through similar packages for the Gulf Area, and Africa as illustrated in Annex one.

[28] The Monitoring Committee for EURO-MED Cooperation in RTD (MoCo) has been set up by the European Council in the framework of the Euro-Mediterranean Cooperation.

Figure (1) Clustered Institutional Arrangement- The horizontal Interplay



Source: The Author

The causal mechanisms influenced the institutional change in an obvious way. MHESR was able to reflect Egypt's research interests and priorities through a formal channel to the EU. Lately the EC launched a call specially designed for Egypt under FP7. The spill over effect can be also traced, MHESR succeeded for the first time to participate in setting monitoring indicators with international experts for its R&D.

Concluding Remarks and a Recommendation about Future Cooperation

In a nutshell, the European Source institution influenced the Egyptian public management in research and innovation through nested and clustered institutional arrangements. The causal pathway affects the outcome in three areas (Decentralization, fairness, and effective communication and coordination). It also had various spill over effects. The paper concludes that:

(1) The vertical and the horizontal institutional interactions have been working effectively in changing the Egyptian public management to the European model. Major indicators of the new governance that can be summarized from the previous analysis are: a) The source Institution delivered "*focused restructuring*" to drive the institutional change; b) The target Institution came closer to the end users; c) The target institution adopted less bureaucratic practices; and d) The target institution designed solid and sustainable plan to work in vertical and horizontal networks[29]

[29] The ASRT started recently to apply the same structure of focal points network for its patent office.

The institutional interplay - among other factors - succeeded to increase the number of participants in FP7 to reach a satisfactory standard among other Mediterranean countries due to the intensified efforts made by RDI and MIRA.

(2) The institutional interplay does not yet have clear and direct spill over effects on other local-based initiatives. MHESR is applying rigid, hierarchical, fragmented governance outside the frontier of Egypt-EU research cooperation. The institutional interplay yields an incremental institutional learning process that will be reflected in other issue-areas in the future.

It is worth mentioning that inside the Mediterranean region a more intense activity needs to be developed between all international actors involving in research cooperation. The need to coordinate all European cooperation programmes with the Mediterranean Countries is highly needed. Moreover, Mediterranean research projects either with EU or with ALECSO, UNESCO and ESCWA should be coordinated.

EU R&D instruments offered new opportunities for state and non-state actors across the Euro-Med region. Research institutions, universities, NGOs, and the industry intensified and coordinated their activities shaping a new movement of independent strategic alliance free from research ministries and the narrow and rigid financial schemes they offer. Also formal national entities were offered the opportunity to discuss how to translate European guidelines into national policies taking into account their major differences, interests, potentials, and institutional design to better tailor the methodological approaches, orientation, and practices in their R&D policy making (CREST, 2007).

Egypt's progressive integration into the ERA will pave the way for policy-transfer and better institutional learning process. Despite institutional heterogeneous conditions with the European Union, Vertical and horizontal interaction opens an outstanding set of opportunities to realize skilful RTD governance. The diverse public management within the two shores of the Mediterranean encourages for more research to examine how can national authorities act as "drivers" to effective participation to ERA, and more comprehensively, to the realization of the Euro-Mediterranean Innovation Space.

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