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North-South Cooperation in Medical Education and Research: The European Union and South Mediterranean Economies

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Abstract

The objective of this paper is to show the need for further cooperation around medical education and research through the mobility of medical doctors. Three important implicit players are identified and include medical schools, public authorities and the business related to health-care. These players from North and South are assumed to engage in cooperation around medical education, medical research and health development. The triple helix approach and the support of Information and Communication Technologies (ICTs) are the foundations of the model. The empirical part introduces the on-going international cooperative frameworks between the European Union and South Mediterranean countries and identifies possibilities of expansion. The paper shows how such a framework could be expanded to generate further benefits with win-win outcomes to both Northern and Southern economies. The emphasis placed on the European Union and Arab countries provides further evidence for the pursuit and expansions of collaborations and dialogues on health and mobility of medical doctors.

Keywords: Existing Collaborations, Triple Helix Framework, Medical Doctors, Medical Education and Research.

Introduction

A more theoretical contribution to the role of cooperation between two countries or regions is developed by Naiditch & Vranceanu (2013) with an original model of skilled migration, with education provided by country of origin of emigration in a game theoretical framework. Such a framework captures the migration of those with high cross-border mobility and transferable skills. These include medical doctors and others. The model suggests in general, that the cooperative framework between the two players can provide superior solutions to each of the two sets of countries. A game theoretical model between North and South is also developed in Fakhar (2014) to support further mobility of medical doctors in a cooperative manner with win-win outcomes to the two engaged parties. On the economic foundation of the provision of health care, Westhoff, Cohen, Cooper, Corvin and McDermott (2012) explore the game theoretic nature of the decision making process. Nash's equilibrium and the prisoner's dilemma models are attempted to show that the understanding of game theory allows all players to make efficient decisions including collaboration or competition depending on how health is viewed as quasi-public good. Gerjo and Gurabardhi (2015) use stakeholder theory to help health promoters make changes at the organizational and policy level to promote health. A stakeholder is any individual, group, or organization that can influence an organization. The organization that is the focus for influence attempts is called the focal organization. The more salient a stakeholder is and the more central in the network, the stronger the influence.

This paper is a follow-up to the research and efforts already shown about the mobility of medical doctors and the necessary gains for further cooperative frameworks between North and South (Driouchi, 2014). In fact, there are series of arguments playing in favor of further cooperation in healthcare through the exchanges and mobility of medical doctors between developed and developing economies. Besides private reasons related to financial incentives, series of other factors could be cited. They could be related to the humanistic nature of medical professions and the general willingness of the health workforce to intervene wherever needed. Among the other reasons, there is the trend of the global health system that is increasing internationally and at the level of different regions of the world. This on-going trend is led by international organizations such as the World Health Organization (WHO) and several other international institutions. Other reasons may relate to the continuous need of knowledge from various environments and the need for formal exchange of knowledge between North and South through medical education and research.

An overall framework for analyzing production and diffusion of knowledge in relation to the three major players that are universities, industries and governments, is provided by the triple helix approach and

ICTs. These are used to account for the new requirements of knowledge for development but also the interests of series of stakeholders. The objective of the current paper is to underline the potential frameworks that can be used to accelerate further North-South cooperation around the mobility of medical doctors. A particular emphasis is placed on Europe with MENA and Arab countries. This paper is composed of a literature review followed with a theoretical model with a discussion of the empirical gathering of evidence about collaboration between Europe and Arab economies.

I. Literature Review

As recently suggested by the participants to the Global Health Interest Group of the Institute of Medicine (IOM), the strengthening of mechanisms to prioritize, coordinate, finance, and execute R&D to meet health needs in developing countries, is seen as a priority (Hotez, Cohen, Mimura, Yamada and Hoffman, 2013). This is a follow-up to the WHO affiliated consultative group on R&D. The IOM group recognizes the necessity of accounting for market failures when addressing the issues related to many diseases and health issues. They also recognize that targeted R&D is the response to advancing global health issues. The WHO Executive Board (2013) has also urged member states to strengthen R&D in health, to promote capacity building and monitoring of health research and development.

This is introduced first as an overview followed by series of applications before focusing on its use for both global and local development in some MENA countries.

[Andersson & Djeflat](#) (2013) capture the opportunities of technologies and ICTs for growth and development with applications to the Arab economies. Innovative approaches to organizational issues and the role of human capital are used. The fundamental aspects of research and innovation policy are addressed before focusing on country-specific considerations and drawing lessons from best practices.

Hossain, et al. (2012) use the triple helix (TH) collaborative framework involving university, industry and government providing a networked infrastructure to shape the dynamics of innovations. The study maps the dynamics of innovations of Research & Development (R&D). It explores the longitudinal trend within the networked research relations in Bangladesh on the TH model. The findings reveal that the R&D system of Bangladesh is still undergoing a process of institutionalizing and has failed to boost its research capacity for building.

But other authors such as Lindberg, Inger, and Torstensson (2011) suggest the inclusion of other players and advocate a quadruple helix approach to better comprehend the challenges underlying the promotion of R&D for economic development. To these authors, the suggested framework could apply better to the area of health where large numbers

of stakeholders exist. The authors underline also the existence of some examples of EU-funded projects being pursued based on the Organizational logic of Quadruple Helix.

Bhargava, Docquier & Moullan (2011) analyze the effects of physician emigration on human development indicators in developing countries for the period 1991-2004. They find that reducing medical brain drain is likely to induce small benefits for child mortality and vaccination rates using the millennium development framework (MDGs). The authors recognize that the MDGs constitutes a package that could help ensure the identification of means and incentives to accelerate R&D for health and its related goals. Furthermore, Moullan, Y. (2013) when analyzing the impact of foreign health aid on the emigration rates of physicians based on a dataset of physician emigration rates from 50 source countries between 1998 and 2004, finds interesting results. The direct impact of health assistance has significantly negative impact on the medical brain drain and that this impact is mainly related to technical assistance than to financial aid.

The results attained in Driouchi (2013) show clearly the extent and magnitude of the levels of interdependencies between different series of socio-economic variables at both regional and country levels.

The Millennium Development Goals (MDG) and the Human Development Programs are the most important frameworks that have been developed during the last years and that are still benefiting from further improvements (United Nations, 2003).

As clearly emphasized in WHO (2013), only a short time remains before the end of 2015, and it is clear that, despite the progress made, much needs to be done if the health-related Millennium Development Goals. Much is also expected to be done beyond 2015 with the making of the university a transforming engine in global health.

Other authors have been placing emphasis on the international cooperation in medical research and education. Burdick (2014) informs about the activities of the Foundation for Advancement of International Medical Education and Research (FAIMER) with faculty development programs have operated since 2001 and are designed to overcome many of the challenges inherent in global health collaborations, including alignment with local needs, avoiding persistent dependency, and development of trust. FAIMER fellowship programs, developed for midcareer faculty members in all health professions from around the world, share goals of strengthening knowledge and skills in education leadership, education methods, and project management and evaluation.

In fact, FAIMER (2014) aims to better understanding of international medical education through its study of the educational experiences of medical school students and physician trainees around the world with focus on variations in these experiences. FAIMER also collects descriptive and curricular information from medical schools throughout the world. In addition, surveys are mailed periodically to ministries of

health and education and to medical councils to validate the information gathered from these medical schools.

Regional cases of cooperation have been also discussed in the literature. There are several reports related to different countries and regions involved in collaborations in health. The European Union (European Union, 2014) aims at helping with the provision of better health services in needy countries through health infrastructure, policies and programs that vary greatly from country to country. This is an example of EU initiative set out to reduce gaps in health inequalities between and within different world regions through cooperation and knowledge transfer.

This EU approach complements the Strategy for EU Cooperation on Health Technology Assessment Adopted in Rome and that concerns all EU countries.

Buse and Gwin (1998) analyzed the change in health cooperation. They refer to the facilities provided to world countries to access to financing through the World Bank. The scope of the Bank's involvement, and the nature of its policy and investment strategy in the sector, are illustrated with specific reference to Bangladesh. To the authors, this move serves to raise issues and enable to explore access to global health cooperation in the 21st century.

Bongyoung, (2015) provides evidence about on-going cooperation programs in South Korea with dispatches of Korean nationals to partner developing countries as an Official Development Assistance (ODA) project through the Korea International Cooperation Agency (KOICA). In the health sector, KOICA dispatches international cooperation doctors (ICDs), nurses, physical therapists, radiologic technologists, nutritionists, medical laboratory technologists, occupational therapists, and dental hygienists. But, also other health professionals work in governmental organizations and schools.

II. The Theoretical Framework

Knowledge diffusion models have evolved through time to account for both production-transfer processes and the related agents or institutions. These models are useful frameworks that ensure strategies and means for the enhancement and acceleration of knowledge for development through its production and transfers. They are useful for countries and localities besides the sectors that are behind these processes. As such, they account for the interferences between sectors and different players. These include policy, knowledge and applications. As the focus of this book is on health, education and socioeconomic outcomes, these can really benefit from the framework provided by the triple helix.

Viale & Etzkowitz (2005) provide an excellent historical background about single, double and triple helices as they have been used to describe

and analyze knowledge related processes. To these authors, the single helix relates to the insulated individual inventor, during the first industrial revolution where the knowledge is mainly tacit. With more explicit knowledge, this previous stage is replaced during the second industrial revolution by the double helix as a representation of the weak relationships between the industry and the university where the first one is not fully following a scientific path, while the second not completely adhering to an industrialization process. As in Carayol (2003), cognitive integration between science and technology contribute to the generation of major needs of societies. Governments and public organizations have to intervene to facilitate knowledge production, diffusion and financial support. Three institutional spheres are then involved under the triple helix framework. Besides, ICTs play a major role in the enhancement of the general coordination system. In fact, the Internet use is very effective in facilitating and enhancing a new paradigm in development, Knowledge Networks. These networks gather institutions and people from all around the world and from all the categories of the society for the sake of the discovery of new knowledge and its use for the improvement of nations (McKnight & Cukor, 2001). The quadruple helix accounts also for the roles played by civil society as the fourth institutional player in the creation and diffusion of knowledge for development (Carayannis & Campbell, 2012). With the inclusion of other institutions and key actors in this process, the game becomes larger and some authors talk about Nth-Helix (Leydesdorff, 2012). But, major theoretical and empirical debates are still occurring at this level.

Etzkowitz & Zhou (2006) have discussed this matter already. They consider that the debate over the Triple Helix model has focused on the question of whether there is a fourth helix. Various candidates have been suggested, such as labor, venture capital, the informal sector and civil society. However, introduction of a fourth helix might cause a triadic model to lose its creative dynamic. Nevertheless, an expanded model is required to incorporate a critical dimension. To resolve this paradox, we propose a Sustainability Triple Helix of university-public-government as a complement to the Innovation Triple Helix of university-industry-government. This introduces a missing element into the model, while retaining its dynamic properties.

Carayannis & Campbell (2012) discuss the diversity of models that could be mobilized. The traditional Triple Helix innovation model focuses on university-industry-government relations. The Quadruple Helix innovation systems bring in the perspectives of the media-based and culture-based public, as well as that of civil society. The Quintuple Helix emphasizes the natural environments of society, also for knowledge production and innovation. Therefore, the quadruple helix contextualizes the triple helix, and the quintuple helix the quadruple helix. Features of the quadruple helix are: culture (cultures) and innovation culture

(innovation cultures); the knowledge of culture and the culture of knowledge; values and lifestyles; multiculturalism, and creativity; media; arts and arts universities; and multi-level innovation systems (local, national, global), with universities of the sciences, but also universities of the arts.

The Triple Helix concept is comprised of three basic elements. These include (1) a more prominent role for the university in innovation with industry and government in a knowledge-based society, (2) a movement toward collaborative relationships among the three major institutional spheres, in which innovation policy is increasingly an outcome of interaction rather than a prescription from government and (3) in addition to fulfilling their traditional functions, each institutional sphere also “takes the role of the other” performing new roles as well as their traditional function.

Institutions taking non-traditional roles are viewed as a major potential source of innovation in “innovation”. Industry operates in the Triple Helix as the locus of production with government as the source of contractual relations that guarantee stable interactions and exchange, the university as a source of new knowledge and technology and the generative principle of knowledge-based economies.

Consequently, the most dominant approach is focusing on the triple helix model and its variations as it has been applied to series of situations in both developed and developing economies. Arvantis et al. (2010) have provided a promising analysis of scientific cooperation in the Mediterranean region.

The triple Helix framework provides also the opportunity to ensure sustainability of programs. The new framework provided by Shell et al. (2013) investigates public program sustainability over time. They find the existence of a broad set of literature on the subject but with high level of fragmentation and absence of consensus. The authors are consequently suggesting a new conceptual framework for program sustainability in public health. This is using a comprehensive literature review, inputs from an expert panel and the results of concept-mapping to introduce the new concept based on three types of participants from several public health domains. The results show nine core domains: Political Support, Funding Stability, Partnerships, Organizational Capacity, Program Evaluation, Program Adaptation, Communications, Public Health Impacts, and Strategic Planning as necessary for sustainability.

III. Empirical Evidence

This part shows the evidence about on-going collaborations and cooperation in healthcare through the roles of information and communication technologies and real initiatives.

1. The roles of information and communication technologies (ICTs)

The most important signals are given by the mobilization of ICTs that provides useful coordinating functions in the case of health care and mainly the provision of coordinating means around medical research and development with links to education.

Countries in the MENA region are not benefiting from a quick growth in ICTs, when it comes to using those technologies in healthcare. People mostly use them for social, academic or business purposes, and less likely for healthcare purposes. In 2010, the MENA ICT Forum that took place for the first time in Jordan with the gathering of scientists, and policy-makers to analyze the existing visions and put together strategies for future growth of ICTs. However, by consulting the agenda of the forum, the health sector is not covered, or is not given much of an importance. There was also a workshop in Casablanca, Morocco with the theme “Innovation in HealthCare Technology Workshop” organized by the Arab Administrative Development Organization to discuss the hospitals information systems (HIS), the performance management including the key performance indicators, the policies & procedures, the emergency management, and the staff training as well as the remote monitoring and the interactive services. Though these efforts and others, the concept of using ICTs in health in the MENA region is still more a topic of discussion than of application.

In the United States of America, the Knowledge for Health Organization (K4Health) developed the K4Health e-Toolkits. They are, actually, electronic libraries of resources on a particular health topic developed by technical experts. These e-Toolkits are designed especially for health program managers, service providers, and policy makers in the health sector. Recently, they have developed one on the Adolescents Living with HIV (ALHIV) according to the organization’s website (www.k4health.org).

In South Africa, a National Health Care Management Information System (NHC/MIS) was designed to cover medical records, patient registration, billing and scheduling modules in select hospitals in all 9 provinces (Littlejohns, et al, 2003). They also developed patient’s smart cards which includes ID Verification; blood group; allergies; donor

status; last 10 diagnoses, treatment, prescriptions; and medical aid. Back in 1998, the South African District Health Information System (DHIS) was launched in all provinces. It was the first systematic data-gathering tool used to identify public health issues. In fact, it enabled all the 4153 public clinics in the country to collect information on 10 national health indicators. Since the model was effective, it has been exported to other countries, including Mozambique and Cuba. Another successful project in South Africa is the Cell-Life project backed by Vodacom which consists of software and data management systems that allow clinic workers to use their mobile phones to monitor patients' HIV treatment and spot health problems before they become life-threatening (Kahn, 2004). From the previous trials and experience with ICTS in health in South Africa, there seems to be a need to involve users in the planning and design of the system, build information cultures, strengthen capacity of users, and focus on the benefits of the system, rather than the technology (Littlejohns, Wyatt & Garvican, 2003).

In Australia and in 2011, Hewlet-Packard won a contract to supply and maintain ICT services to a portion of South Australia's new \$2.1 billion digital Royal Adelaide Hospital (RAH). The main objective is to design, build and maintain the hospital's ICT infrastructure for the facility throughout its construction, and it is scheduled to be completed by 2016. It will also operate and maintain the ICT systems for the following 30 years (Herrick, 2011). Besides, there is a project of a new 800-bed hospital that would be the first recipient of HP's "version 2.0 digital hospital solutions" and would include software applications that link conventional building engineering systems to the communications systems and their mobile devices.

According to the Center for Strategic & International Studies (Halamka, 2011), after the disasters of the great earthquake, Tsunami, and Fukushima nuclear plant crisis, the healthcare IT program in Japan will take some drastic measures to improve the health care using highly developed technologies. To name some of these projects, the country encourages the adoption of electronic health records (EHR) in hospitals and provider offices, the use of public Internet to transmit and share electronic records safely and following the security standards and patient privacy, and the adoption of some international standards such as clinical document architecture (CDA), continuity of care document (CCD), and continuity of case record (CCR). Another positive alternative suggested by the United States of America is to create a national healthcare identifier to link records and to create easily a national emergency care database and to decentralize the implementation programs at the prefecture levels to help staff & providers to easily plan, install and use electronic health records successfully.

ICT strategic intent can be measured by three main factors: the published strategy documentation, the actual progress in the implementation of ICT strategies, and the presence of technology-building initiatives and research and development (R&D) institutes (Dutta & Coury, 2002).

According to the World Markets Research Centre in 2002, in many Arab countries, the speed of the introduction of Internet access devices is increasing rapidly. Individually, Arabian Gulf states display ICT and Internet penetration levels comparable to the West. The United Arab Emirates penetration rate of almost 30 percent at the end of 2001 is higher than the European average. The European IP association ranked the United Arab Emirates as the 20th in the global Internet host penetration, with a population-to-host ratio of 37, placing it above Israel and six places below the United Kingdom (Dutta & Coury, 2002).

In Jordan, the Information Technology Association of Jordan (int@j) was founded in the year 2000 (www.intaj.com) with the mission to advance and promote the constituents it represents in both, the local and global markets. The key challenges of the ICT sector in the country consist of the low Internet penetration levels due to the supply and the demand for Internet access that remain low as well as the minimal level of R&D by global standards. In fact, Jordanian ICT companies, the academic sector, and the Government do not invest in R&D at a consistent level with a mature internationally competitive industry. Another stumbling block is the gap between academia and industry as Jordanian universities do not produce enough ICT graduates with the competencies required to sustain growth in the industry while the industry actually needs to communicate its skill needs, better cultivate talent, and facilitate a smooth labor market for ICT professionals. One more challenge would be the difficulty to attract and retain ICT experts in Jordan. It needs to be more competitive to sustain high-value industry productivity and growth.

A survey entitled “Media Access and Use in Southern Sudan” conducted in 2007 showed that in Southern Sudan, the radio was the main source of information for the population as a whole with 59% of respondents citing the radio as a source of information more than all other forms of media. On the other hand, mobile phones don’t have such high rates of usage as radio because of 30% coverage rates. Nonetheless, the mobile phone network has expanded considerably since 2005 and is predicted to keep expanding in the years to come.

The Government of Yemen according to (GOPA, 2005) has not yet reached the stage of harmonizing or standardizing IT infrastructure and IT systems. One of the major targets tackled by the government is an IT-based unified and standardized Human Resource (HR) procedure.

The development of ICT solutions in Morocco has achieved great significance as both the public and private sector have understood its importance in building a strong economic infrastructure. It has a modern phone system; with the national network nearly 100% digital using fiber-optic links, and Internet access is readily available but still expensive.

In Qatar, ICT QATAR is working in collaboration with other government agencies, telecommunications providers, content providers, property developers and consumers to build a high-speed broadband network in the country (www.ictqatar.qa). The Qatar National Broadband Network (QNBN) is planning to connect all individuals and businesses to a fiber broadband network by 2015. As a result, Qatar now ranks among the top three in the Arab world in basic ICT indicators such as the numbers of computer users, Internet users, mobile telephone, fixed telephone lines, and broadband Internet subscribers.

As far as Egypt is concerned, the country takes the digital age seriously and its Ministry of Communications and Information Technology, MCIT, was formed specifically to facilitate Egypt's transition into the global information society. With a relatively modern and large phone system (over 10 million fixed and 10 million mobile phone lines), the government has been launching initiatives around e-Government, e-Learning, e-Business, e-Health, e-Culture and has been promoting investments in the sector. Internet access is readily available and cheap.

According to www.grace-network.com, Africa's top performer in ICTs is Tunisia. While its ICT sector is poorly performing in comparison to second placed South Africa, Tunisia has come through leaps and bounds in the last twenty years. The government has given ICT the priority by encouraging the improvement of technologies and turning them into the major vectors of Tunisia's social and economic development. Along with this, Tunisia has implemented a multidimensional strategy centered on modernizing its physical infrastructure by setting up a complimentary legal and statutory framework bearing in mind that the requirements for new ICT in higher education is closely related to innovating and creative scientific research.

After these few examples from different, we can come up with few prescriptions to improve ICTs in the MENA region (Dutta & Coury, 2002). The actions to be taken can be to create a common Arab ICT strategy aligned with national ambitions, to proceed towards technological sovereignty (autonomy in choices, control of national destiny, and technological development), to increase the competitiveness of the telecommunications industry, to recognize, attract, and build human capital, to reduce the digital divide and attenuate its effects offers

benefits beyond ICT penetration, such as fostering social cohesion and producing a new generation of national leaders, and last but not least to stimulate Arabic content for more user-friendly applications.

A critical mass of professional and community users of ICTs in health has not yet been reached in developing countries. Many of the approaches being used are still at a relatively new stage of implementation, with insufficient studies to establish their relevance, applicability or cost effectiveness (Martínez, Rodrigues & Infante, 2001).

2. Initiatives of collaboration

2.1 The World Health Organization (WHO) and the Institute for Triple Helix Innovation Initiative

WHO and the Triple Helix Innovation Initiative have partnered for the development and completion of the WHO 2008 Global eHealth (GOe) survey. The collaboration will utilize the Institute's 3Helix.net colleague network platform and Institute collaboration methodologies to facilitate survey review and support successful completion across the 193 Member Nation states this autumn. The survey is being developed with an interdisciplinary, geographically diverse group of contributors comprising over 30 eHealth professionals representing key stakeholders and subject matter experts from across the globe. Group Members include the Organization for Economic Cooperation and Development (OECD), the European Commission (EC), International Medical Informatics Association (IMIA); International Society for Telemedicine and eHealth (ISfTeH), Healthcare Information Management Systems Society (HIMSS), as well as academic and research and government bodies. The goal of the survey is to assess national, regional and global capacity and need related to eHealth policy, funding and infrastructure. Key eHealth topics to be queried include electronic health information systems, norms and standards, mobile health and eLearning.

Beyond the GOe task at hand, the Institute is working with WHO to validate emergent tools and strategies that are most able to provide positive impact for eHealth goals and activities. The anticipated benefits of utilizing the 3Helix.org platform and Institute collaboration methodologies are varied and represent critical advances regarding how online communities optimally work together. Benefits include an increase in the groups' capacity to share knowledge across distributed areas and diverse points of reference; more effective virtual engagement for efficient and productive co-creation; and, the development of enduring network of cross-sector partnerships to promote new markets,

knowledge flows, and products for innovation, economic development and the social good.

WHO is the directing and coordinating authority for health within the United Nations System. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends. WHO operates in an increasingly complex and rapidly changing landscape. The boundaries of public health action have become blurred, extending into other sectors that influence health opportunities and outcomes.

2.2. Towards a new effective ICT-based Care Model for chronic diseases in Europe

The RICHARD project intends (2010-2013) to define and implement innovative models for the management of chronic conditions based on Information and Communication Technology (ICT) in four different European Regions.

The scope of RICHARD is the definition of new scenarios of care and the design of innovative ICT based territorial clinical pathways that, through the use of technology and the integration of resources and capabilities of the territory, enable patients to be supported outside the hospital, guaranteeing a better quality of life.

RICHARD clusters are built on the Triple Helix concept. An intensive cooperation between industry, research and public sector is targeted through this project. The authors of this framework consider that it is necessary to tear down the borders both within and between the different actors to identify and select clusters for intensifying the cooperation with the European Union, its institutions, programs and regions. This innovative concept RICHARD is intended for the integration of the technology through a step-by step approach to territorial based sustainable clinical models and where resources are considered including those related to the mobility of medical doctors.

3. The promotion of existing medical cooperative frameworks

Each country has already established medical cooperative frameworks. These include those set with series of countries but also with international organizations. The World Health Organization (WHO) through its mission but also through the development of its global health approach is the most prominent institutions that are pushing for further improvement of the components related to the attainment of health

objectives in each country. This includes research and education in medical and health sciences. Other cooperative frameworks account for the regional models similar to those provided by the European Union (EU) and where medical research and education constitute an important component. The EU cooperative framework includes the South Mediterranean countries.

3.1. The WHO framework

There are country strategy reports linking WHO to each economy. These reports have the merit of indicating all the cooperative models pursued by the country.

For example, in Egypt, a reform initiative has been undertaken between WHO (2012a) and the Faculty of Medicine at Alexandria for the production of high quality doctors through the support of further medical research and education. Besides that, the Ministry of Health is engaged in promoting the training of skilled staff and technicians.

For Tunisia, there are enough medical training institutions that cover most components of the health components. The main problem identified is related to the quality of training that needs to be enhanced and that will allow also for exports of medical doctors and technicians. Cooperation with WHO is consequently allowing to promote the needed standards and to enhance the competitiveness of Tunisian medical doctors.

The cooperation with WHO in Syria (WHO, 2012 b) involves functions that include support for research and development. It also includes qualification and continuing education. The School of Public Health and School of Health Management are selected for that. The current budget of the Ministry of Health is being increased to provide improved teaching and staff development with importance given to training of trainers. WHO will strengthen its role in assisting the government formulate these plans and provide expertise in the areas of training and design of the curricula of some courses.

The increase of the number of medical doctors in Morocco with the focus on investing more in human resource development is supported under the WHO (2012 c) strategic plan. But, there are still quantitative and qualitative issues related to these resources. They include also the uneven spatial distribution of the health workforce. Continuing education besides basic training in health is consequently supported under the WHO strategic plan in coordination with both Ministries of Health and Higher education.

The cooperation of WHO with Palestine focuses mainly on the quantitative and qualitative aspects of the health workforce. The supporting staff as well as medical doctors are also included in the on-going plan. Such is not the case of Lebanon where the major deficit is in nurses.

For Jordan, The Ministry of Health (MoH), with assistance from WHO assessed the status of human resources development in 1998. The assessment highlighted the need for a long-term policy and plan for the production of a balanced human resource. Despite the existence of procedures for HR management issues such as recruitment, hiring, firing, transfer and promotion, they were not used consistently. There were major gaps in relation to performance management. Job descriptions may have existed but were not up-to-date and were very general. There was no formal continuing education system. Accreditation or re-licensing had not been introduced. In addition, the relationship between health service provision and pre-service training institutions (medical and other health professional schools) was loose.

The MoH has recently established the Academy of Health to respond to the above challenges. A one-year diploma course in community medicine, supported by WHO, has been in operation for about 10 years. More than 120 physicians have graduated, most of who are still working in MoH institutions. A similar, WHO-supported program in family medicine has been established. A new M.Sc course on health management has been established in collaboration with WHO. But, the cooperative efforts include also the accreditation of medical schools (WHO, 2004).

The WHO Regional Office for the Eastern Mediterranean (EMRO) has advocated the development of global standards for accreditation of medical schools, from which regional standards (stressing the use of local languages and establishing unified certifying examinations, for example) were derived and national standards were agreed upon and adopted. The process for bringing such standards into use started with the governing bodies of WHO, proceeded to national governments, then to educational institutions and finally to medical professionals.

3.2. The EU framework

As clearly stated on the websites of the European Union and its related commissions

http://ec.europa.eu/europeaid/where/neighbourhood/regional-cooperation/enpi-cross-border/programmes/index_en.htm, large sets of programs of cooperation between EU and the other partners are introduced.

As part of the Barcelona Process launched in 1995 as the framework for relations between the EU and its Mediterranean partners, a Monitoring Committee (MoCo) for Euro-Mediterranean cooperation was created in 1995 to promote cooperation in research, technology and development. This cooperation was given new impetus at the Paris summit in 2008, at which the Union for the Mediterranean (UfM) was launched.

In terms of bilateral relations, the current EU policy dialogue with the Mediterranean countries is framed within the European Neighborhood

Policy (ENP), which was established in 2004 with the objective of strengthening relations with southern and eastern neighbors. The ENP was reviewed in 2011 to adapt it to the changes in the southern Mediterranean region. In May 2011, the High Representative of the European Union for Foreign Affairs and Security Policy and the European Commission published a joint communication presenting a new approach to strengthen the partnership between the EU and the neighborhood countries.

Programs and initiatives such as the Mediterranean Initiative for Research Actions (MIRA) project aim at creating regional platforms in the Mediterranean Region. MIRA seeks to identify common interests in research areas, help set-up priorities and support the capacity building activities. It promotes synergies among the different cooperative programs between the Mediterranean Partner Countries (MPCs) and the member states of the EU, and fosters the participation of the MPC in the Framework Program. Increasing need to gather high-level basic scientific competencies within applied technologies, in all new and emerging scientific fields such as biotechnology, nanotechnology, materials science and information sciences among others. Topics of mutual interests include also health sciences and medicine.

Based on the above existing frameworks, closer cooperation in the area of medical research and education needs to be fine-tuned such that medical doctors and other health workers can have the incentives and possibilities of moving freely between North and South. But, further tasks need to be realized in order to make the incentives more visible. Different instruments can then be mobilized to ensure the creation of packages that are attractive mainly for the medical doctors and health staff from the North.

3.3. The UN framework

According to a new report focusing on the renewal of the global partnership for development (UN, 2013), partnerships are considered to have successfully steered resources towards their set purposes.

The report considers for example, that the Partnership on Maternal, Newborn and Child Health has played a major advocacy role to turn the world's attention to this issue and it is anticipated that the initiative will mobilize around \$40 billion dollars. Over \$30 billion have been accumulated through the Global Fund for AIDS, Tuberculosis and Malaria. While the vast majority of resources raised through these partnerships come from bilateral donors' aid budgets, they have been able to make efficiency gains in the delivery of health services for specific diseases. For example, the Global Alliance for Vaccination and Immunization has contributed to greatly expanding access to vaccines at reduced prices. The roles of medical doctors in these partnerships are obviously important.

The same report emphasizes that access to science, technology and innovation facilitates progress in all development dimensions. This concerns economic growth, environmental protection, the containment of health epidemics and decreasing maternal mortality and much more. To the extent that knowledge and technology exhibits several properties of a public good, there is a persistent danger of underinvestment however. The United Nations Framework Convention on Climate Change, the new Technology Mechanism established by the Cancun Agreements in December 2010 represents a move towards a more dynamic arrangement through fostering public-private partnerships. These promote innovation, ease the use of technology, and mobilize national, regional and international technology centers and networks. Scaling up and extending this approach should be a central part of the post-2015 global partnership. Medical doctors and health research are consequently invited to play major roles in these developments.

The private sector and non-governmental organizations (NGOs) have also significantly increased their contribution to development. Here again, medical workforce is likely to have critical roles, mainly through creating incentives for their mobility.

Conclusion

Promising avenues for the enforcement of further global cooperation around medical education and research are identified. They can benefit from the series of collaborative frameworks already developed with the EU and within the Mediterranean context. These cooperative models are of bilateral and global types. These could lead to negotiations that can place emphasis on medical doctors and their North-South movements. This is also facilitated by the global trend in health care and in movements of medical doctors under globalization of health under the support of World Health Organization (WHO) and other international organizations. The other facilitating element relate to the promotion of trade in services where health care besides education are important components.

These results imply that medical education, as this is the area in the framework of the new economics of skilled labor migration that is the key factor in the mobility of medical doctors. Medical education and research are then considered to be the center of attraction of students but also of medical doctors from both North and South. The trained medical doctors are then free to ensure permanent, temporal and circular migration depending on their perceptions of the opportunities offered in the North and South.

This framework is consistent with the global health systems that have been encouraged by international and regional organizations including World Health Organization (WHO). It is expected that under the processes of open mobility, strengthened North-South cooperation in medical research and education within the framework of globalized health systems, each economy can overcome shortages and can ensure the attainment of the millennium development goals. This is expected also to ensure continuous and updated health knowledge that can further be an important driver for this collaborative framework.

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