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EGYPT LABOR MARKET ASSESSMENT

Final Report

September 29, 2015

This report was independently produced for review for the United States Agency for International Development by International Business & Technical Consultants, Inc. (IBTCI) under Task Order AID-263-TO-15-00001of the HICDpro for Non-CPC IDIQ. The authors are Dr. Edward Allan, Project Director; Dr. Joseph Anderson, Senior Economist, Mr. Hossam Badawy, Consultant; Ms. Hanan Kwinana, Senior Consultant, Dr. Arwa Morsi, Senior Consultant; Mr. AbdelRaham Nagy, Egyptian Consultant; Dr. Vicki Roberts, Senior Education Expert; Mr. Richard Rousseau, Team Leader; Mr. Erik Spurgin, Human and Institutional Capacity Development (HICD) Expert. The authors' views expressed in this report do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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Prepared by

Dr. Edward Allan, Project Director
Mr. Richard Rousseau, Team Leader
Dr. Joseph Anderson, Senior Economist – Labor Expert
Mr. Hassam Badawy, Consultant
Ms. Hanan Youssef Kwinana, Senior Consultant
Dr. Arwa Morsi, Senior Consultant
Mr. AbdelRaham Nagy, Consultant
Dr. Vicki Roberts, Senior Education Advisor
Mr. Erik Spurgin, Human and Institutional Capacity Development (HICD) Expert
Ms. Mai Abdalla, Research Assistant
Ms. Durra Elmaki, Program Associate

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ACRONYMS

CAPMAS	Central Agency for Public Mobilization and Statistics
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
EG	Economic Growth
GoE	Government of Egypt
HED	Higher Education for Development
HEI	Higher Educational Institution(s)
HEPP	Higher Education Partnership Program
HICD	Human and Institutional Capacity Development
IBTCI	International Business & Technical Consultants, Inc.
ILO	International Labour Organization
IMF	International Monetary Fund
KII	Key Informant Interview
LMA	Labor Market Assessment
MBA	Master of Business Administration
MOHE	Ministry of Higher Education
MOMM	Ministry of Manpower & Migration
MTC	Management and Training Cooperation
NAS	National Academy of Sciences
NSF	National Science Foundation
OECD	Organization for Economic Cooperation and Development
OET	USAID/Egypt Office of Education and Training
PEER	NAS Partnerships for Enhanced Engagement in Research
R&D	Research and Development
RDI	Research, Development and Innovation
RFA	Request for Application
RFTOP	Request for Task Order Proposal
SCU	Supreme Council of Universities
SOW	Scope of Work
STTA	Short Term Technical Assistance
TBD	To Be Determined
TIMSS	Trends in International Mathematics and Science Study
UAB	University of Alabama at Birmingham
USAID	United States Agency for International Development
USG	United States Government

1. EXECUTIVE SUMMARY

1.1 Introduction

USAID/Egypt contracted IBTCI through the HICDpro for Non-CPC IDIQ to assist its Office of Education and Training in quickly implementing its new $57 million Higher Education Partnership Program (HEPP). The objectives of the Labor Market Assessment (LMA) are:

1. Assess sectors and sub-sectors of the economy and identify occupations limited by a lack of human capital, technical innovation or knowledge transfer, that otherwise demonstrate high-growth potential;
2. Provide a list of academic disciplines in public universities and technical colleges capable of training students in high-growth potential labor sectors and, conversely, a list of academic disciplines that USAID should not support;
3. Recommend public universities capable of conducting applied research activities resulting in commercialization of research leading to job growth, and conversely identify applied research activities that will be difficult to commercialize and USAID should not support;
4. Summarize observations of any cross-cutting findings between Egyptian and U.S. higher education institutions.

Methodology. The Team reviewed key documents, conducted structured Key Informant Interviews (KII) and site visits to businesses and educational institutions, and administered structured surveys. The Team frequently combined a KII with the administration of a structured survey instrument and a site visit.

Strategic Document Review: The Team conducted a thorough review of: existing assessments; surveys; data-records; annual reports and national trends about Egypt's labor market and higher education sector, focusing on literature written between 2011 and 2015.

Key Informant Interviews (KIIs): Over 100 KIIs were conducted with government officials, business leaders, economic and education experts, and business men and women.

Structured Surveys: Five structured survey instruments were designed and used to collect data on: 1) the views of economic experts and business associations regarding potential high growth sectors, constraints, and occupations, skills, and disciplines in high demand; 2) the needs of business owners and managers; 3) academic disciplines and programs offered by universities and technical colleges; 4) research, development, and innovation services needed by businesses and provided by universities; 5) human and institutional capacity requirements of highly ranked universities and technical colleges. Survey instruments reached an estimated 1,000 individuals and organizations.

Constraints in Undertaking the Assessment: The Team faced two major constraints. First, the majority of the period for data collection coincided with the holy month of Ramadan, which began on June18 and ended on July 17, followed by the three day Eid Al-Fitr holiday and a national holiday on July 23. Second, authorization from the Ministry of Higher Education to collect data and visit public university campuses was only received on June 25, 24 days after the complete Assessment Team arrived in Cairo, and the day before the Egyptian two-day weekend.

1.2 Background

"…to work together…in the area of higher education to create an educated workforce that responds to labor market needs".

This is what the Governments of Egypt and the United States agreed to do in September 2014 when they signed The Higher Education Initiative Assistance Agreement, a $214 million assistance grant agreement that focuses on improving the quality and relevance of higher education in Egypt. The Initiative is an integral part of a broader Government of Egypt plan, announced at the March 2015 Egypt Economic Development Conference in Sharm El-Sheikh, Egypt to raise the quality of all aspects of higher education, including curriculum, teaching, and research and development, to international standards.

The Higher Education Initiative, which has total funding of $250 million, is composed of: 1) U.S. - Egyptian Higher Education Partnerships; 2) Scholarships to U.S. Colleges and Universities; and 3) National Scholarships Program. The majority of HEI funding, almost 60 percent, is reserved for the two scholarship programs that support Egypt's efforts to increase the access to high quality education for well-qualified, but economically disadvantaged students from rural and urban areas, with a special focus on increasing the number of women graduates. However, it is the first area of HEI, higher education partnerships that offers the most promise for helping Egypt improve the quality and relevance of Egyptian higher education and achieve the goals laid out in 'Egypt's Vision 2030".

The Higher Education Partnership Program (HEPP), a $57 million, five-year project includes six major activities, which effectively define the meaning of the term 'partnership':

1. Establish quality degree programs, including dual degrees;
2. Modernize curricula and instruction;
3. Strengthen research and catalyze innovation and entrepreneurship through centers of excellence, design labs, and joint research;
4. Encourage the formation of innovation hubs;
5. Fund Master's and PhD scholarships for faculty members to strengthen capacity to deliver cutting edge curricula using active learning and to perform innovative research;
6. Provide technical and managerial assistance to MOHE, SCU, universities, and others on key policy matters in higher education.

At the time of drafting the LMA report, it was anticipated that an award would be made by the end of July 2015 and would be officially announced during the expected visit to Egypt by the U.S. Secretary of State.

1.3 Sector and Labor Market Profiles

Growth Potential by Sector. The LMA Team examined past growth trends in terms of growth rates by sector as well as contributions to growth by different sectors. The fastest growing sectors over the five-year period from 2007/8 to 2012/13 were communications (almost nine percent per year) and transportation (7.4 percent). Electricity and water also grew relatively fast. Agriculture, mining, and manufacturing grew more slowly than GDP as a whole. Output of the oil and the gas subsectors actually declined during several years, bringing

down the overall average rate of growth of output of the mining sector to less than one percent per year.

The largest contribution to GDP growth from 2011to 2013 was made by the Agriculture and Fishery sector, accounting for 21 percent of GDP growth during the period. This is because of the size of the sector, accounting for 14.5 percent of GDP in 2012-2013. Agriculture also exhibited more steady growth than more volatile sectors such as Oil and Gas Mining, and more steady growth than GDP as a whole. Because of its size, steady growth, and large contribution to overall GDP growth, Agriculture can be considered a strategic sector of the Egyptian economy.

The second largest contribution to total GDP growth was from the Manufacturing sector, 17 percent of total growth. Almost all of that contribution was from Other Manufacturing excluding Oil and Gas Refining. Wholesale & Retail Trade and General Government followed, each contributing about 15 percent of total GDP growth. Construction & Building contributed about 13 percent and Restaurants and Hotels about 10 percent. Mining, especially Oil and Gas production, declined during this period, so its contribution to total GDP growth was negative.

To identify strategic sectors that are important for the future economic growth of Egypt, we surveyed a large number of experts knowledgeable about the Egyptian economy and a large number of business owners and managers. One survey focused on the sectors that experts expect will contribute significantly and lead Egypt's economic growth in the near future. A second survey questionnaire was administered to business owners, managers, and human resource professionals and asked about the skills needed for their businesses.

According to the economic 'experts' surveyed for this assessment, tourism, manufacturing, other than oil refining, Suez Canal, agriculture, transportation, construction, communication, and electricity were at the top of the list of sectors highly likely to contribute to Egypt economic growth.

Based on the macroeconomic data and responses to the two surveys, the Team selected 11 strategic sectors for additional focus on their future prospects and skills needs: 1) Agriculture, Irrigation & Fishing; 2) Oil & Gas Production (Mining); 3) Building Materials (Mfg.); 4) Engineered Products (Mfg.); 5) Food Processing (Mfg.); 6) Textiles and Apparel (Mfg.); 7) Electricity; 8) Construction & Building; 9) Transportation & Storage; 10) Communications (telephone and ICT); and 11) Tourism.

Economic leaders and experts were asked to assess the severity of potential obstacles to growth of a business in Egypt. *Lack of sufficient skilled labor* was virtually tied for first place with government "red tape" – licensing, reporting, permit requirements, etc. *Lack of production sophistication and innovation* was also considered to be a relatively important obstacle to business expansion in Egypt. *Labor laws* were assessed to be an important obstacle by some respondents, but were not at the top of the list. *Lack of appropriate technology* was given a relative low ranking as an obstacle.

To focus on one of the key concerns of this study, we asked experts, "Of the sectors with the MOST potential to affect economic growth, which are constrained by a lack of professional/ technical skills?" Manufacturing was identified most frequently as constrained by lack of appropriate skills. Agriculture and Tourism were second in frequency of identification.

Business owners and managers were also asked about the severity of obstacles to growth of their businesses. Those firms which planned to increase the size of their work force rated *Lack of suitable skills in the labor force* relatively highly, and also rated *Lack of available labor force* relatively highly. Apparently, this obstacle did not deter these firms from planning to hire more workers.

Occupations and Skills in Demand by High Growth Sectors: The most frequent academic background or degree of the employees in all firms was engineering. The second most frequent academic/technical background was business, which included commerce, finance, banking, marketing, accounting, and management. The next most common fields are computer science, arts & letters, and natural science. Of particularly interest for this assessment were the skills and academic backgrounds sought by high-growth firms. Natural science, engineering, computer science, and business are heavily represented among firms which experienced an increase in revenues. Business is also well represented among firms that had a decrease in revenues in the most recent two-year period.

For those firms that said they will be expanding their workforce, engineering, business, and computer science are the fields most sought by firms that have experienced increasing revenues and are recruiting new workers. In the existing workforces of firms that plan to increase their workforce, Natural science (physics, chemistry, biology, zoology, botany, and astronomy), engineering, computer science, and business degrees are most prevalent. Those firms which are increasing their workforce (and presumably recruiting the most workers) indicated that the fields they are recruiting most heavily are business (83 percent), engineering (65 percent), computer science (44 percent), and natural science (22 percent).

Sectors with Low Growth Potential and/or Low Labor Constraints: General government, social solidarity, sanitation, education, health care, and insurance and social insurance. Many respondents offered the view that some of these sectors, particularly education and health care, should contribute to economic growth, but on the whole they did not expect them to do so in the near future.

Gender Dynamics of Sectors with High Growth Potential and Skill Requirements: The gender ratio in the HEIs interviewed for this study is much more equal than that in most industry sectors currently, although this may change over time. Among the sectors identified as highly likely to contribute to economic growth are several that currently have a relatively low representation of female workers. However, four sectors expected to contribute significantly to future growth are agriculture, tourism, food processing, and textiles and apparel, in which women are present in relatively greater numbers.

1.4 Egyptian Higher Education Programs and Relationship to Perceived Industry Needs

Overview: The universe of Higher Education Institutions (HEI) addressed for this assessment comprises public universities, private universities, and regional technical colleges. Desk research identified 41 potentially eligible universities and eight technical colleges dispersed over five major geographic areas: Upper Egypt, Delta, Suez Canal Cities, Alexandra, and Greater Cairo. Due to the severe time constraints that resulted from delays in receiving Ministry of Higher Education authorization to visit HEIs or interview personnel, only 20 HEIs (16 universities and four technical colleges) were selected as interview candidates. This selection

was based on industry reputation, the opinions of industry experts and analysts, and geographic dispersion.

Academic and Technical Programs and Skills Needed for Economic Growth: Businesses interviewed by the assessment team identified business administration, engineering, and computer science as the three academic fields most important for economic growth. Many of the most desirable academic fields are currently being offered by priority HEIs, although changes to content and a more practical orientation may be needed in order for HEI to provide graduates that are job ready and meet the current and future needs of industry.

Industry experts and businesses expressed the most confidence in Ain Shams University, Cairo University, the American University in Cairo (AUC), Alexandria University, and the German University in Cairo (GUC). Helwan University followed closely behind, while Assiut, which declined to provide any data on its programs within the assessment period, appears to be well-regarded by experts and businesses. Many of the same institutions were cited as the best qualified to provide research and development support to Egyptian businesses.

Businesses were also asked to rate the importance of the characteristics they look for when hiring new employees. In addition to technical skills, communication, team work, and time management, often called "soft skills," were also found to be highly desirable by employers, and in some cases, for less technical firms, were considered more important than technical skills.

To answer the question of which faculties and programs should be strengthened, HEI officials were asked to list majors that show the *most potential* to meet Egyptian labor market needs and those of *greatest interest* to the private sector. In response to the first question, engineering, ICT, energy, and pharmaceutics/pharmaceutical technology received the highest number of mentions. Engineering and IT also received the highest number of responses to the second question, in addition to business disciplines.

Technical certifications can be an important means of aligning curricula with industry needs. However, more than half of HEI respondents were not sure of the need for certifications, 30 percent believed them to be useful, while 19 percent considered certifications unnecessary. Nominations for certifications included textile, fashion, automotive, autotronics and mechatronics, electrical and electronics. When asked about the need for alignment of Egyptian certifications with international norms, 63 percent of HEIs were not sure, 22 percent stated they should be, while 15 percent considered it unnecessary. When asked if more certifications should exist, 81 percent of HEI respondents did not know while 15 percent considered certification not applicable in the Egyptian workplace and 4 percent stated no extra certifications were necessary. The results of the survey were that few if any skills certifications existed or were deemed of any importance by HEI in the Egyptian workplace.

1.5 Institutional Capacity of HEI

Alignment of Industry Needs and Current Programs: Thirty-nine percent of HEI respondents indicated that the majority of new academic programs were developed in response to business need (or labor market demand). This plurality was significant considering that industry had perceived that there is a gap between graduate skills and labor requirements. Twenty-eight percent of the survey respondents stated that programs were developed through an individual professor recognizing an industry need. Eighty-seven percent of respondents

agreed that a documented process for program development should be based on Egyptian labor market demands.

The road to launching new degree programs (or modifying existing ones) appears challenging, given the uncertain state of communication between HEI and the MOHE, CAPMAS, MOMM, and the room for improvement regarding the engagement and cooperation with the private sector. Quantitative, qualitative, and anecdotal evidence collected by the LMA Team suggests that industry could be doing significantly more to reach out to HEI.

Forty-five percent of respondents indicated that HEI could complete the full lifecycle from identifying need for a new program to its implementation within one-year; whereas 55 percent reported that the implementation process took more than one year, with 13 percent of the total indicating more than two years. The wide distribution of data points suggests that the process for new program implementation is not fully documented, clearly articulated, or universally applied throughout Egyptian HEI.

The centralization of authority over HEI within the MOHE, with nearly all HEI falling under MOHE oversight, provides an opportunity for the MOHE to ensure that there exists a clear, standard approach to implementing new programs and/or modifying existing ones. However, the centralization of authority within the MOHE was raised almost universally by HEI respondents as a constraint to more effectively managing the institution and the curricula of programs.

In discussing program modifications respondents almost unanimously cited "aligning curricula with industry competencies" as the top choice for improving HEI performances. Mirroring academic programs – to either leading U.S. or non-U.S. HEI – is tied for second position, and provides another clear indicator of the desire (and institutional commitment) of individual Egyptian HEI to partner with U.S. HEI.

Promoting Professional Development: The required qualifications and experience of the faculty members in Egyptian public HEI are standard throughout the nation and across faculties. The LMA Team was advised that these same standard qualifications were also applied to private HEI. When asked about the most important qualifications for faculty members, HEI respondents gave the highest importance to academic degrees followed by research and teaching qualifications. Of lower importance were industry experience, professional certifications, and industry awards.

Capacity building requirements of faculties and programs: Respondents were requested to identify opportunities for improvements in faculty performance at their respective HEI. Consistent with the previous discussion regarding program modifications that would most significantly improve HEIs, the most frequently cited response to this question was 'collaborating with industry'. Respondents also mentioned other improvements that would require closer links with the private sector, such as 'Producing Applied Research Development, and Innovation (RDI) that benefits the Egyptian economy'.

Industry–Academic Linkages and Job Placement: Seventy-six percent of HEI respondents noted that their respective HEI offered job placement services to students. However, just 33 percent identified those services as being more than basic and informal. Eighty-six percent of respondents indicated that their respective HEI offered career guidance services to students. Respondents from Ain Shams University were the only ones from a public

HEI to identify their service as being formal and offering more than basic services. As with job placement services, more than half of all respondents indicated that they had no formal career guidance service offerings. Despite the apparent incongruences in the response data, it is evident that Egyptian HEI have tremendous opportunity that can be seized specifically in the area of job placement services. This effort would be significantly enhanced via increased cooperation, coordinated communication, and engagement with the private sector and organizations such as MOMM and CAPMAS.

Equipment/infrastructure requirements: Thirty-three percent of respondents indicated that their HEI is able to efficiently and easily procure the needed equipment and materials. A further 29 percent stated that procurement processes are transparent and that funding is generally available. This would suggest that nearly 2/3 (62 percent) of respondents feel that both adequate funding and procurement procedures exists to facilitate the execution of academic programming at their HEI. Eighty-nine percent of respondents noted there was no difficulty with maintenance once equipment and materials had been procured.

Qualitatively speaking the LMA Team repeatedly heard that equipment, particularly in laboratories and workshops where students can gain valuable hands-on experience, is out-of-date and/or cannot be properly maintained due to lack of resources. The qualitative themes emerging from KIIs, particularly from faculty members, appear disconnected from the quantitative indications from University Administrators in positions such as President, Vice President, and Provost.

Collaboration between Public HEI and Local Communities and the Private Sector: The vast majority of HEI respondents (81 percent) were aware of collaborative efforts by their respective HEI. Not a single respondent indicated that his/her HEI did not collaborate, but nearly 1 in 5 (19 percent) were not sure; which suggests that HEI could be doing more to promote these collaborations – especially considering that the target respondents, as aforementioned, were those holding positions such as university presidents, faculty deans, and other top HEI leadership who would ordinarily be aware of HEI operations and public relations.

Academia, Gender and Other Constraints:

Gender Disparities and Perspectives: The ratio of females to males in Egyptian HEI interviewed for this study appears to be .89:1.0. Although this does not appear to be grossly disproportionate, Egypt seems to be lagging when compared to what UNESCO classifies as the 'Arab World' (1.05 female: 1.0 male) and the 'World' as a whole (1.10 female: 1.0 male). According to respondents in this study, there are some disciplines which remain predominantly male or female. More than half of respondents indicated that certain disciplines attracted gender disproportionate enrollments.

Female enrollment tends to exceed male enrollment most notably in the areas of Nursing, Language Arts, Liberal Arts, and Architecture. Social Sciences and Humanities as well as Literature and Journalism also received mention. Fields related to health (e.g., Pharmacy, biomedicine) were mentioned on a handful of occasions as being predominantly female, yet there were several mentions of male predominance with respect to those enrolled to become Doctors and Surgeons.

According to respondents, disproportionate male enrollments characterize Engineering and its sub-disciplines (e.g., petroleum, civil, structural). Other so-called "industrial" disciplines and

sectors such as automotive technology were cited by multiple respondents as being a mostly male demographic.

When probed for the probable reasons behind gender disparities, respondents overwhelmingly (64 percent) cited cultural beliefs, traditions, and/or the nature of work being better suited for people of one gender rather than the other. One respondent noted "Architects work inside. Construction Managers and Petroleum Engineers work outside. Otherwise, the gender imbalance is not too bad".

Gender Aspects of Leadership and Research: Respondents indicated there is near parity in the ratio of female-to-male teaching and research staff. Respondents were then asked if they believed that the HEI promoted gender equity specifically amongst research staff. The majority (83 percent) indicated to the affirmative.

There appears to be greater gender equity across Egyptian HEI faculty than in many other occupations in Egypt. However, more actions can be taken in order to ensure that female University personnel have the requisite time and resources to develop leadership skill sets that will better position them to be top candidates for promotional opportunities when leadership roles become vacant.

1.6 University Research, Development, and Innovation (RDI) in Sectors for Potential Growth

Potential of Egyptian Higher Education Institutions to Address the Needs of Egyptian Businesses HEIs interviewed for this assessment cited 30 different areas of research which they felt are needed by the private sector to improve consumer product development. At the top of the list were energy, including renewable energy, and 'environmental and health concerns'. However, based on the qualitative and quantitative data gathered for this assessment, businesses generally shared the view that applied research is not commonly undertaken by universities.

Research activities and programs were identified at Ain Shams, Alexandria University, American University in Cairo, Cairo University, Deraya University, Egypt-Japan University of Science and Technology, Helwan University, Higher Technology Institute, Nile University and Suez Canal University. Most frequently cited topics were ICT, health, materials and nanotechnology, and business-related areas like marketing, finance, and human resources. Clients included a very broad spectrum from both the public and private sectors.

Patterns of Collaborative Activity: Seventy-two percent of universities had experience in collaborating with other Egyptian HEI. While the remaining 28 percent, who were either not sure or did not have collaborative HEI experience, did not provide information on constraints, a number of statements showed the existence of current collaborative experience. Eighty-nine percent of responses had international collaborative experience while only 11 percent were not sure or did not have experience.

One indicator of "partnering capability" could be the experience of Egyptian HEI which have previously affiliated with international HEI. Respondent data suggests that more than three-fourths of the Egyptian HEI surveyed have MOUs with other universities.

Representatives of a number of HEIs noted their 'Commitment to a broad range of exchanges with U.S. partners', one of the evaluative factors mentioned in the HEPP RFA. Qualitatively, the

LMA Team heard statements such as "We have many supportive measures to maintain sustainability." Examples include: 1) previous collaborations and success stories (e.g., one collaboration between an Egyptian HEI and the University of Alabama-Birmingham (UAB) which started in 2009 as a planning project and has resulted in a successful application for a joint cooperative partnership this year); 2) many alumni who are graduates of U.S. universities and who are still in good contact; 3) "supportive bodies in university [such] as grants and international offices who support any partnership".

Across all HEI the LMA team asked respondents whether their institution was confident in its capacity to partner with U.S. HEI and sustain the relationship. Nearly every respondent answered to the affirmative. The LMA Team used qualitative data to substantiate this confidence – in some cases it was possible to locate evidence to support the respondent's assertion, and in others it could not be verified or seemed implausible.

2. INTRODUCTION

2.1 Purpose and Scope

Through the HICDpro for Non-CPC IDIQ, USAID/Egypt contracted IBTCI to assist its Office of Education and Training in quickly implementing its new $57 million Higher Education Partnership Program (HEPP). As detailed in the Scope of Work, IBTCI provided a Labor Market Assessment (LMA) team responsible for identifying: potential high growth economic sectors; skilled labor and research and development needs in these sectors; local universities, technical colleges, and faculties that are best qualified to respond to these needs; and U.S. universities and colleges with which local institutions could partner to enrich their offerings to local businesses.

The objectives of the assessment are:

1. Assess sectors and sub-sectors of the economy and identify occupations limited by a lack of human capital, technical innovation or knowledge transfer, that otherwise demonstrate high-growth;
2. Provide a list academic disciplines in public universities and technical colleges capable of training students in high-growth potential labor sectors and conversely a list of academic disciplines that USAID should not support; and
3. Recommend public universities capable of conducting applied research activities resulting in commercialization of research leading to job growth and conversely identify applied research activities that will be difficult to commercialize and USAID should not support;
4. Summarize observations of any cross-cutting findings between Egyptian and U.S. higher education institutions.

The complete Scope of Work is provided in Annex 1.

2.2 The Team

IBTCI assembled a team of international and Egyptian experts with the requisite skills in economics, business, higher education, technical education, Human and Institutional Capacity Development (HICD), survey methodology, statistical analysis, and economic development in order to conduct this assessment. Overall project direction, and analysis of U.S. higher

education institutions, was provided by Dr. Edward Allan from IBTCI's home office, while the in-country field work was led by Team Leader, Richard Rousseau. Assessments of potential growth sectors and their constraints were carried out by Dr. Joseph Anderson, Senior Economist, and Dr. Arwa Morsy, Senior Consultant. The evaluation of potential local universities and technical colleges was implemented by Dr. Vicki Roberts, Senior Education Advisor; Erik Spurgin, HICD Specialist; and Ms. Hanan Youssef Kwinana, Senior Consultant. Consultants Mr. Hossam Badawy and Mr. AbdelRahman Nagy supported data collection and analysis efforts for both businesses and HEI, while Ms. Mai Abdalla, Research Assistant, supported all aspects of the assessment, including data collection.

2.3 Methodology

The Team employed a mixed-methods approach to collect and analyze data. This included review of key documents both prior to and after arrival of the expatriate consultants in Egypt, structured Key Informant Interviews (KII), site visits to businesses and educational institutions, and structured surveys. The Team frequently combined a KII with the administration of a structured survey instrument and a site visit.

Strategic Document Review: The Team conducted a thorough review and indexing of all the documents provided by USAID/Egypt and the GOE, those related to this assessment and a variety of materials on the implementation of university partnerships that might inform the work of the team (see Annex 5). These documents and data sources included: existing assessments; surveys; data-records; annual reports and national trends about Egypt's labor market and higher education sector; procurement solicitations (RFA and RFI); higher education organizational charts; Egypt's HEI budget numbers since 2011; general examples of existing HEI curricula; project and evaluation reports; and recommendations on implementation.

The Team focused its strategic document review on literature written between 2011 and 2015, although data and documents published prior to 2011 were also drawn upon for historical or comparative context.

Key Informant Interviews (KIIs): The Team conducted over 100 KIIs with government officials, business leaders, economic and education experts, business men and women, and faculty members and administrators of higher education institutions (HEI). These interviews were concentrated during the first three weeks of arrival in Egypt and helped to inform the Team's selection of high growth sectors and high priority HEI. Key informants included:

- Public sector stakeholders: Ministries of Higher Education (MOHE), Industry and Foreign Trade, Manpower, the Supreme Council of Universities (SCU), and the Supreme Council for Technical Colleges; and
- Private sector stakeholders included the Federation of Egyptian Industries, the American Chamber of Commerce in Egypt, Chambers of Industry representing high growth sectors, the Assiut Businessmen's Association, the Assiut Businesswomen's Association, the Alexandria Business Association, business consultants, business owners, and business managers.

To promote candor and per 22 CFR 225.101(b)(2) and associated USAID "Common Rule" policies, data have not been reported in a way that would allow feasible identification of individuals.

Structured Surveys: Within the first week of arrival in Egypt the Team developed five structured survey instruments using Survey Monkey, widely available web-based software that greatly facilitated remote data collection. Initially this approach was selected for two reasons: 1) to maximize the amount of data collected for analysis, especially data from potential high growth businesses spread around the country; and 2) to collect data in a uniform database format that could be more easily and quickly tabulated and analyzed. However, as more fully explained below, the use of the web-based survey instruments for HEI became absolutely critical due to the long delay in obtaining authorization from the Ministry of Higher Education to collect information from public universities and technical colleges.

After developing the survey instruments, the Team tested them with selected business leaders, economic experts, and academics, and made revisions before administering the surveys on a wider scale.

Survey instruments were distributed to over 1,000 individuals and organizations, including businesses and HEI. An exact count is not available because in some cases links to the survey instruments were passed on to others. In total over 200 responses, from about 180 separate organizations or individuals were received for the five questionnaires.

2.4 Constraints in Undertaking the Assessment

The Team faced two major constraints in conducting this assessment; the first of which was anticipated, and the second of which came as a surprise, given the Government of Egypt's commitment to improving its higher education institutions. The first constraint relates to having to conduct most of the data collection during the holy month of Ramadan, which began on June18, about two weeks after the arrival of all consultants in country, and ended on July 17. This was followed by the three day Eid Al-Fitr holiday and a national holiday on July 23. This affected data collection for all five survey instruments. While this constraint was recognized prior to the start of the assessment, it nevertheless had a significant negative impact on the Team's ability to conduct KIIs and surveys.

The second constraint involved the delay in receiving authorization from the Ministry of Higher Education to collect data from public HEI. It was only on Thursday, June 25, 24 days after the complete Assessment Team arrived in Cairo, and the day before the Egyptian two-day weekend, that the Ministry verbally informed USAID that the Team was allowed to visit campuses and collect data from university and technical college officials. Also, some employers, notably in Upper Egypt, were unwilling to meet with the team absent a formal, written authorization from the GOE.

At the request of the Ministry, the LMA Assessment Team immediately, i.e. on June 25, sent by e-mail a cover letter in Arabic to all 20 universities and technical colleges on our priority list. The letter included internet links to the three survey instruments for HEI. In spite of the MOHE authorization, six of twenty HEI on the priority list failed to submit any of the three survey questionnaires designed for HEI. Losing about half the days planned for data collection sharply reduced not only the time available to collect data and conduct follow-ups as needed, but also the time available to analyze the data.

An additional constraint, although of lesser importance than the first two, were the close to three days of work time lost to two of the expatriate staff while they obtained visa renewals at

the Mogamma in downtown Cairo, a procedure which requires the applicants to physically present themselves.

Finally, the absence of an official endorsement in writing of the assessment from the Ministry of Higher Education made it more difficult to obtain meetings with other key ministries, notably the Ministry of Manpower and Migration (MOMM). In fact, it was only on July 16, the final week of in-country work that a meeting with MOMM took place.

2.5 Acknowledgements

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3. BACKGROUND

"…to work together…in the area of higher education to create an educated workforce that responds to labor market needs".

This is what the Governments of Egypt and the United States agreed to do in September 2014 when they signed a $214 million assistance grant agreement that focuses on improving the quality and relevance of higher education in Egypt. The Higher Education Initiative (HEI) aspires to achieve: 1) strengthened institutional capacity of Egyptian higher education institutions through partnerships; 2) increased employability of tertiary education graduates; and 3) increased access to quality tertiary education through scholarships.

The Initiative is an integral part of a broader Government of Egypt plan to raise the quality of all aspects of higher education, including curriculum, teaching, and research and development, to international standards. According to 'Egypt's Vision 2030: Sustainable Development Strategy and Medium Term Investment Outlook', released by the Government of Egypt, in connection with the March 2015 Egypt Economic Development Conference in Sharm El-Sheikh, Egypt has set very high, but achievable, goals for its higher education system. The report mentions three key performance indicators that should be achieved by 2030:

- At least ten Egyptian universities are among the top 500 universities in the world;
- Egyptian universities [are] among the best 20 higher education institutions publishing in international periodicals;
- Egypt to become one of the top 10 countries in the Trends in International Mathematics and Science Study (TIMSS).[1]

HEI, which has total funding of $250 million, is composed of three major programs: 1) U.S. Egyptian Higher Education Partnerships; 2) Scholarships to U.S. Colleges and Universities; and 3) National Scholarships Program. The lion's share of HEI funding, almost 60 percent, is reserved for the two scholarship programs that support Egypt's efforts to increase the access of high quality education to well-qualified, but economically disadvantaged students from rural and urban areas, with a special focus on increasing the number of women graduates. As important as these two scholarship programs are, it is the first area of HEI, higher education partnerships, that offers the most promise for helping Egypt improve the quality and relevance of Egyptian higher education, and achieve the goals laid out in 'Egypt's Vision 2030".

On December 4, 2014, USAID issued a Request for Applications for the services needed to implement the partnerships envisioned in the High Education Initiative. Referred to as the Higher Education Partnership Program (HEPP), this $57 million, five-year project includes six major activities, which for the purposes of this assessment define the meaning of the term 'partnership':

1. Establish quality degree programs, including dual degrees;
2. Modernize curricula and instruction;
3. Strengthen research and catalyze innovation and entrepreneurship through centers of excellence, design labs, and joint research;

[1] TIMSS is a standardized test of mathematics and science administered to 4th grade and 8th grade students in the U.S. and over 60 other countries every four years.

4. Encourage the formation of innovation hubs;
5. Fund Master's degree and PhD scholarships for faculty members to strengthen capacity to deliver cutting edge curricula using active learning, and perform innovative research;
6. Provide technical and managerial assistance to MOHE, SCU, universities, and others to analyze, develop, and implement recommendations on key policy matters in higher education.

At the time of drafting the LMA report, it was anticipated that an award would be made by the end of July 2015 and would be officially announced during the visit to Egypt by Secretary of State John Kerry.

4. SECTOR AND LABOR MARKET PROFILES

4.1 Introduction

This chapter provides an assessment of the growth potential of the Egyptian economy and industrial sectors and labor market skills needed, to serve as background for the discussion in Chapters 5 and 6 of higher education programs and institutions and academic/technical fields and disciplines that should be promoted to support economic growth. The chapter first presents information about the Egypt labor market, labor force participation, employment, and unemployment. Labor force participation of females is low in Egypt by international standards. The unemployment rate is high, and unemployment of graduates of post-secondary institutions is disproportionately high, especially of women.

The chapter then provides an analysis of macroeconomic data on the recent growth of the economy and industrial sectors, and the contribution of various sectors to overall economic and employment growth. It then analyzes employment by sector and by gender and growth in employment over two recent years. Finally, it reviews the appraisals of Egyptian business leaders and experts concerning the economic sectors that will contribute to economic growth in the future and the potential constraints to the growth of those sectors, including the need for labor with particular skills and education.

4.2 The Egyptian Labor Force and Employment

Table 4.1 presents data on the Egyptian population, labor force, employment, and unemployment over the period 2004-2013. The formal labor force was 27.6 million in 2013, 21.2 million males (77 percent) and 6.5 million females (23 percent). The labor force grew at an average rate of 3.2 percent per year from 2004 to 2013. The male labor force grew 3.3 percent per year and the female labor force grew 2.9 percent per year. Real GDP grew at an average annual rate of about 4.6 percent during this period, so real GDP per worker grew on average about 1.4 percent per year, although the growth rate fluctuated significantly during this turbulent period.

The population age 15-64 grew about 2.0 percent per year during this ten-year period. The labor force participation rate increased over the period, especially for women. Nevertheless, Egypt has one of the lowest labor force participation rates of women in the world, 24 percent in 2013. Of the 249 countries in the World Bank database, only 10 are lower than Egypt – nine of those are also Muslim countries, and four, Syria, Iraq, West Bank and Gaza, and Afghanistan, have experience considerable instability and conflict. The female labor force participation rate was higher in the early 1990s – almost 26 percent in 1990 and 22 percent in 1991-1994. It then fell to 18.3 percent in 2002 and has increased slowly since then to 23.7 percent in 2013. The labor force participation rate of men in 2013 was 75 percent.

Unemployment has been high over this decade, and the difference in unemployment rates between males and females is significant. In 2013 the overall unemployment rate was 13 percent. The unemployment rate of males was about 10 percent, while that of females was over 24 percent. Eighty percent of employed workers were male, but only 57 percent of the unemployed were male. Forty-three percent of the unemployed were female, but only 20 percent of employed workers were female.

Table 4.2 shows the labor force and the number unemployed for workers with various levels of education. Workers with a university degree or higher accounted for about 19 percent of the total formal work force, but they accounted for 31 percent of the unemployed. Women with a university degree or higher accounted for 29 percent of all female workers in the formal labor force but 40 percent of all unemployed women. Men with a university education or higher accounted for 16 percent of all male workers but 24 percent of all unemployed men. The unemployment rate among highly educated women was 34 percent, vs. 24 percent for all women. Among highly educated men it was 15 percent vs. 10 percent for all men. These very high rates of unemployment among highly educated Egyptian workers represent a significant waste of human resources, as well as creating potential social and political problems. They suggest that there is a serious mismatch between the skills that university graduates have and the skills needed in the marketplace.

Unemployment rates of less educated workers are much smaller. Among workers who did not complete primary school and could only read and write, 5.2 percent were unemployed, and among the illiterate, 5.4 percent. Among illiterate female workers, 4.5 percent were unemployed. Workers with lower levels of education more easily move into the informal sector and engage in subsistence, casual, or household economic activities.

Table 4.1
ANNUAL ESTIMATES OF LABOR FORCE STATUS , BY SEX (2004-2013)

Unit 1000s

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Population ages 15-64										
Total	43,471	44,522	45,521	46,476	47,394	48,293	49,183	50,067	50,941	51,767
Males	21,972	22,497	22,994	23,468	23,923	24,370	24,815	25,260	25,703	26,144
Females	21,499	22,025	22,527	23,008	23,471	23,922	24,368	24,806	25,238	25,666
Labor Force										
Total	20,871	22,104	23,206	24,250	24,652	25,353	26,180	26,529	27,021	27,623
Males	15,879	17,076	18,081	18,511	19,120	19,410	20,140	20,541	20,874	21,167
Females	4,992	5,028	5,125	5,739	5,532	5,943	6,040	5,988	6,147	6,456
Annual Growth of Labor Force (percent per year)										
Total		5.9	5.0	4.5	1.7	2.8	3.3	1.3	1.9	2.2
Males		7.5	5.9	2.4	3.3	1.5	3.8	2.0	1.6	1.4
Females		0.7	1.9	12.0	(3.6)	7.4	1.6	(0.9)	2.6	5.0
Labor force participation rate (% of total population ages 15+)										
Total	46.9	47.7	46.7	47.8	48.1	48.3	48.6	48.8	49.0	49.1
Male	74.4	75.5	73.2	73.4	73.6	73.9	74.1	74.3	74.6	74.8
Female	19.5	20.2	20.4	22.5	22.7	23.0	23.3	23.4	23.6	23.7
Employed										
Total	18,718	19,654	20,771	22,115	22,508	22,975	23,829	23,346	23,596	23,974
Males	14,937	15,882	16,873	17,433	18,042	18,397	19,153	18,719	18,932	19,082
Females	3,781	3,772	3,898	4,682	4,466	4,578	4,676	4,627	4,664	4,891
Unemployed										
Total	2,154	2,450	2,435	2,135	2,144	2,378	2,351	3,183	3,425	3,649
Males	943	1,194	1,208	1,078	1,078	1,013	987	1,822	1,942	2,084
Females	1,211	1,256	1,227	1,057	1,066	1,365	1,364	1,361	1,483	1,565
Unemployment Rate										
Total	10.3%	11.1%	10.5%	8.8%	8.7%	9.4%	9.0%	12.0%	12.7%	13.2%
Males	5.9%	7.0%	6.7%	5.8%	5.6%	5.2%	4.9%	8.9%	9.3%	9.8%
Females	24.3%	25.0%	23.9%	18.4%	19.3%	23.0%	22.6%	22.7%	24.1%	24.2%

Source: World Bank and CAPMAS

TABLE 4.2

UNEMPLOYMENT RATE & ANNUAL ESTIMATES OF LABOR STATUS, BY EDUCATIONAL STATUS AND SEX IN 2013

Unit: 1,000s

Educational Status / Labor Force	Total	% of total	University & Above University	% of total	Higher than Intermediate & Lower than University	% of total	Subtotal Higher than Intermediate	% of total	Intermediate	% of total	Lower Than Intermediate	% of total	Read & Write	% of total	Illiterate	% of total
Total	27,623	100.0	5,167	18.7	1,158	4.2	6,325	22.9	9,199	33.3	3,135	11.4	2,403	8.7	6,561	23.8
Males	21,167	100.0	3,319	15.7	872	4.1	4,191	19.8	7,188	34.0	2,831	13.4	2,217	10.5	4,740	22.4
Females	6,456	100.0	1,848	28.6	286	4.4	2,134	33.0	2,011	31.2	304	4.7	186	2.9	1,821	28.2
Unemployed																
Total	3,650	100.0	1,136	31.1	163	4.5	1,299	35.6	1,557	42.7	313	8.6	124	3.4	357	9.8
Males	2,084	100.0	508	24.4	97	4.6	605	29.0	828	39.7	265	12.7	113	5.4	274	13.2
Females	1,565	100.0	628	40.1	66	4.2	695	44.4	729	46.6	48	3.1	11	0.7	83	5.3
Unemployment Rate																
Total	13.2		22.0		14.1		20.5		16.9		10.0		5.2		5.4	
Males	9.8		15.3		11.1		14.4		11.5		9.4		5.1		5.8	
Females	24.2		34.0		23.1		32.5		36.3		15.8		5.8		4.5	

Source: CAPMAS

4.3 GDP Growth and Employment by Industrial Sector

4.3.1 Analysis of Egypt GDP by Economic Sector (Macroeconomic data analysis)

4.3.1.1 Structure of GDP and Growth Rates of Economic Sectors 2007-2013

Egypt has a well-diversified economy. Table 4.3 shows the structure of the GDP of Egypt in 2012/2013. The table highlights the largest sectors and sub-sectors. The largest sector was mining (17.3 percent), which included oil and gas production. Natural gas alone accounted for 9.5 percent of GDP, and oil accounted for 7.4 percent. The second largest sector was manufacturing, which accounted for 15.6 percent of GDP. The third largest sector was agriculture, irrigation, and fishing (14.5 percent). These three sectors accounted for about half of GDP. Wholesale and retail trade accounted for 11 percent of GDP, followed closely by general government (10.4 percent).

Table 4.4 shows growth in real GDP (adjusted for inflation) each year and on average over the period 2007-2013. The real economy grew at an average rate of 3.2 percent per year over this period. This was a period of great turbulence, both for the world economy and for Egypt. Private GDP growth fell from 6.4 percent in 2009-2010 to 1.3 percent in 2010-2011 and 2.4 percent in 2011-2012.

The top ten fastest growing sectors over the five-year period for private, public, and total output are highlighted. The fastest growing sectors over the five-year period were Communications (almost nine percent per year) and Transportation (7.4 percent). Electricity and Water also grew relatively fast. Agriculture, Mining, and Manufacturing grew more slowly than GDP as a whole. Output of the Oil and the Gas subsectors actually declined during several years, bringing down the overall average rate of growth of output of the mining sector over the entire period to less than one percent per year.

Table 4.3

Structure of GDP: 2012/2013

GDP at Factor Cost - By Economic Sectors at Current Prices

	Public		Private		Total	
	Million LE	Percent	Million LE	Percent	Million LE	Percent
Total GDP	657,995	100.00	1,019,357	100.0	1,677,352	100.0
Agriculture, Irrigation & Fishing	45	0.01	243,311	23.9	243,356	14.5
Mining, of which:	238,733	36.28	52,006	5.1	290,739	17.3
Oil	105,800	16.08	18,948	1.9	124,748	7.4
Gas	132,159	20.09	27,185	2.7	159,344	9.5
Others	774	0.12	5,873	0.6	6,647	0.4
Manufacturing Industries, of which	43,296	6.58	219,209	21.5	262,505	15.6
Oil refining	9,977	1.52	9,635	0.9	19,612	1.2
Others	33,319	5.06	209,574	20.6	242,893	14.5
Electricity	18,184	2.76	3,053	0.3	21,237	1.3
Water	4,667	0.71	-	0.0	4,667	0.3
Sanitation	1,159	0.18	-	0.0	1,159	0.1
Construction & Building	8,900	1.35	67,847	6.7	76,747	4.6
Transportation & Storage	16,839	2.56	50,373	4.9	67,212	4.0
Communications	13,671	2.08	27,489	2.7	41,160	2.5
Information	1,173	0.18	2,174	0.2	3,347	0.2
Suez Canal	32,396	4.92	-	0.0	32,396	1.9
Wholesale & Retail Trade	5,759	0.88	178,072	17.5	183,831	11.0
Financial Intermediation & Subsidiary Activities	36,889	5.61	17,925	1.8	54,814	3.3
Insurance & Social Insurance	3,481	0.53	1,806	0.2	5,287	0.3
Social Solidarity	54,226	8.24	-	0.0	54,226	3.2
Restaurants & Hotels	586	0.09	52,175	5.1	52,761	3.1
Real Estate Activities	1,807	0.27	41,667	4.1	43,474	2.6
Real Property	688	0.10	22,174	2.2	22,862	1.4
Business Services	1,119	0.17	19,493	1.9	20,612	1.2
General Government	174,713	26.55	-	0.0	174,713	10.4
Education, Health and Personal Activities, of which:	1,471	0.22	62,250	6.1	63,721	3.8
Education	-	0.00	17,950	1.8	17,950	1.1
Health	1,402	0.21	19,208	1.9	20,610	1.2
Others	69	0.01	25,092	2.5	25,161	1.5

Source: Ministry of Planning

Table 4.4
Annual Rate of Growth of GDP and Sectors

Sectors	Single years															Average annual rate over 5 year period*		
	2007/2008- 2008/2009			2008/2009 -2009/2010			2009/2010 - 2010/2011			2010/2011 - 2011/2012			2011/2012 - 2012/2013			2007/2008 - 2012/2013		
	Pub.	Priv.	Tot.	Pub.	Priv.	Tot.	Pub.	Priv.	Tot.	Pub.	Priv.	Tot.	Pub.	Priv.	Tot.	Pub.	Priv.	Tot.
Total GDP	5.56	4.11	4.65	3.08	6.38	5.13	3.03	1.29	1.94	1.95	2.40	2.23	0.56	3.03	2.06	2.82	3.43	3.19
Agriculture, Irrigation & Fishery	3.06	3.17	3.17	4.46	3.47	3.47	3.79	2.72	2.72	4.11	2.92	2.92	5.37	3.02	3.02	4.15	3.06	3.06
Mining	4.72	11.68	5.90	0.38	3.11	0.87	0.24	2.08	0.58	(0.03)	0.66	0.10	(2.62)	(2.87)	(2.66)	0.51	2.82	0.92
Oil	4.46	7.30	4.88	(0.54)	(1.63)	(0.70)	2.44	2.52	2.45	0.90	1.78	1.03	(1.24)	(0.81)	(1.18)	1.18	1.79	1.27
Gas	4.92	17.27	6.79	1.05	5.70	1.82	(1.42)	1.89	(0.85)	(0.78)	(0.46)	(0.72)	(3.73)	(5.47)	(4.03)	(0.03)	3.51	0.54
Others	3.81	4.02	4.00	4.82	5.26	5.21	1.00	1.78	1.69	3.22	2.17	2.29	2.75	2.93	2.91	3.11	3.22	3.21
Manufacturing Industries	27.35	0.22	3.72	3.93	5.28	5.06	(0.56)	(1.02)	(0.95)	0.01	0.87	0.74	1.91	2.32	2.25	6.05	1.51	2.14
Oil refining	(7.05)	(0.40)	(4.20)	(0.53)	0.22	(0.20)	(2.23)	1.68	(0.48)	(5.31)	(3.93)	(4.68)	1.19	4.33	2.73	(2.83)	0.34	(1.40)
Others	37.53	0.24	4.15	4.82	5.41	5.33	(0.24)	(1.09)	(0.97)	1.01	0.99	0.99	2.11	2.23	2.22	8.20	1.53	2.32
Electricity	6.12	(0.19)	5.21	7.63	(1.82)	6.33	6.31	(8.14)	4.48	6.85	(1.31)	5.95	5.23	0.92	4.60	6.42	(2.16)	5.31
Water	6.97		6.97	6.84		6.84	4.44		4.44	4.65		4.65	4.10		4.10	5.39		5.39
Sanitation	NA		NA	6.36		6.36	4.24		4.24	4.51		4.51	3.81		3.81	4.73		4.73
Construction & Building	11.04	11.46	11.42	11.61	13.35	13.16	4.10	3.62	3.68	3.18	3.32	3.30	4.29	6.13	5.91	6.78	7.50	7.42
Transportation & Storage	23.35	1.64	6.39	6.19	7.05	6.83	3.00	1.67	2.00	2.03	3.04	2.78	2.71	2.92	2.87	7.17	3.25	4.16
Communications	12.03	15.75	14.56	7.30	16.07	13.33	6.04	6.91	6.65	1.00	6.88	5.16	1.70	6.57	4.94	5.54	10.35	8.85
Information				6.89	6.41	6.58	2.46	3.05	2.84	3.53	4.41	4.10	3.32	3.39	3.37			
Suez Canal	(7.18)		(7.18)	(2.86)		(2.86)	11.47		11.47	3.87		3.87	(3.83)		(3.83)	0.08		0.08
Wholesale & Retail Trade	5.46	6.14	6.11	5.97	6.07	6.06	2.64	1.53	1.57	2.88	1.98	2.01	2.62	2.77	2.77	3.90	3.68	3.69
Brokerage & Subsidiary Activities	4.70	4.49	4.63	5.39	4.98	5.25	1.54	1.83	1.64	2.42	1.82	2.21	2.58	2.92	2.69	3.32	3.20	3.27
Insurance & Social Insurance	4.42	3.34	4.18	5.03	5.27	5.08	2.78	2.28	2.67	2.07	1.43	1.93	2.87	3.00	2.91	3.43	3.06	3.35
Social Solidarity	5.35		5.35	6.18		6.18	4.27		4.27	2.59		2.59	3.13		3.13	4.30		4.30
Restaurants & Hotels	6.21	1.22	1.27	7.60	12.03	11.99	3.75	(5.94)	(5.86)	3.92	2.26	2.28	3.67	6.65	6.62	5.02	3.07	3.09
Real Estate Activities	3.35	3.77	3.75	3.54	4.27	4.24	2.77	3.29	3.27	4.09	3.20	3.24	3.39	4.26	4.22	3.43	3.76	3.74
Real Estate Property	3.51	3.64	3.63	3.13	4.28	4.24	3.54	3.81	3.80	4.16	3.99	3.99	4.55	5.66	5.63	3.78	4.27	4.26
Business Services	3.23	3.91	3.88	3.81	4.25	4.23	2.24	2.72	2.70	4.05	2.34	2.43	2.68	2.75	2.75	3.20	3.19	3.19

Table 4.4
Annual Rate of Growth of GDP and Sectors

	Single years															Average annual rate over 5 year period*		
	2007/2008- 2008/2009			2008/2009 -2009/2010			2009/2010 - 2010/2011			2010/2011 - 2011/2012			2011/2012 - 2012/2013			2007/2008 - 2012/2013		
General Government	3.13		3.13	4.24		4.24	3.66		3.66	2.93		2.93	2.97		2.97	3.38		3.38
Education, Health & Personal Services	(39.58)	(0.96)	(2.41)	4.89	4.97	4.96	3.47	2.74	2.76	3.40	2.80	2.81	2.79	2.83	2.83	(6.97)	2.46	2.16
Education		3.98	3.98		4.66	4.66		2.72	2.72		2.48	2.48		2.79	2.79		3.32	3.32
Health	3.28	4.54	4.45	4.84	5.02	5.01	3.44	2.58	2.64	3.20	2.95	2.97	2.68	3.11	3.08	3.48	3.64	3.63
Others	(94.30)	(7.90)	(11.20)	6.09	5.15	5.15	4.23	2.89	2.89	8.12	2.91	2.92	5.17	2.64	2.65	(40.96)	1.03	0.30

**Fastest growing sectors are highlighted.*

Source: Ministry of Planning

4.3.1.2 Contributions to total GDP growth

Table 4.5 shows GDP in 2011/2012 and 2012/2013 and the contribution to GDP growth of each sector and some major subsectors, highlighting the sectors with the greatest contribution. Table 4.6 ranks the sectors by the size of their contribution to GDP growth. Sectors contributing most to GDP growth are *highlighted*. The largest contribution to growth in the 2011-2013 period was made by the Agriculture and Fishery sector, accounting for 21 percent of GDP growth during the period. This is because of the size of the sector, accounting for 14.5 percent of GDP in 2012-2013. In fact, as reported earlier, the growth rate of Agriculture was slightly less than that of overall GDP during the five-year period 2008-2013, as shown in Table 4.4 Agriculture also exhibited more steady growth than more volatile sectors such as Oil and Gas Mining, and more steady growth than GDP as a whole. Because of its size, steady growth, and large contribution to overall GDP growth, Agriculture can be considered a strategic sector of the Egyptian economy.

The second largest contribution to total GDP growth was from the Manufacturing sector, contributing 17 percent of total growth. Almost all of that contribution was from Other Manufacturing, excluding Oil and Gas Refining. Wholesale & Retail Trade and General Government followed, each contributing about 15 percent of total GDP growth. Construction & Building contributed about 13 percent and Restaurants & Hotels about 10 percent. Mining, especially Oil and Gas production, declined during this period, so its contribution to total GDP growth was negative. (The sum of the positive contributions is greater than 100 percent, because declining sectors, such as oil and gas, offset some of the contributions of positive sectors.)

Table 4.6 also highlights the sectors that were selected, based on this review of the macroeconomic data and interviews with key experts in business and the economy, for focus on the particular skills those sectors need and the ability of the Egyptian educational system to provide workers with the needed skills.

Table 4.5
Real GDP and Contribution to GDP Growth By Economic Sectors
(Million LE, Factor Cost, 2011/2012 prices)

	GDP 2011/2012			GDP 2012/2013			Annual Change in GDP and Components: 2011/2012 to 2012/2013			Percent Contribution to Change in GDP: 2011/2012 to 2012/2013		
Sectors	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Total GDP	591,639	916,888	1,508,527	594,940	944,654	1,539,594	3,301	27,766	31,067	100.0	100.0	100.0
Agriculture, Irrigation & Fishery	39	218,177	218,216	41	224,769	224,810	2	6,592	6,594	0.1	23.7	21.2
Mining	214,565	47,106	261,671	208,945	45,755	254,701	(5,620)	(1,351)	(6,970)	(170.2)	(4.9)	(22.4)
Oil	93,893	16,726	110,619	92,725	16,591	109,316	(1,168)	(135)	(1,303)	(35.4)	(0.5)	(4.2)
Gas	119,969	25,071	145,040	115,498	23,700	139,198	(4,471)	(1,371)	(5,842)	(135.4)	(4.9)	(18.8)
Other Mining	703	5,309	6,012	722	5,464	6,187	19	155	175	0.6	0.6	0.6
Manufacturing Industries	39,109	199,174	238,283	39,855	203,793	243,647	746	4,619	5,364	22.6	16.6	17.3
Oil refining	8,594	8,243	16,837	8,697	8,600	17,296	103	357	459	3.1	1.3	1.5
Others	30,515	190,931	221,446	31,158	195,193	226,351	643	4,262	4,905	19.5	15.3	15.8
Electricity	16,322	2,758	19,080	17,175	2,784	19,959	853	26	879	25.8	0.1	2.8
Water	4,239	-	4,239	4,413	-	4,413	174	-	174	5.3	-	0.6
Sanitation	1,054	-	1,054	1,094	-	1,094	40	-	40	1.2	-	0.1
Construction & Building	7,883	59,499	67,382	8,221	63,145	71,366	338	3,646	3,984	10.2	13.1	12.8
Transportation & Storage	15,149	45,364	60,513	15,559	46,690	62,249	410	1,326	1,736	12.4	4.8	5.6
Communications	12,871	25,799	38,670	13,089	27,493	40,582	218	1,694	1,912	6.6	6.1	6.2
Information	1,072	1,980	3,052	1,108	2,047	3,155	36	67	103	1.1	0.2	0.3
Suez Canal	31,203	-	31,203	30,008	-	30,008	(1,195)	-	(1,195)	(36.2)	-	(3.8)
Wholesale & Retail Trade	5,221	161,109	166,330	5,358	165,577	170,935	137	4,468	4,605	4.1	16.1	14.8
Brokerage & Subsidiary Activities	33,441	16,300	49,741	34,304	16,776	51,080	863	476	1,339	26.1	1.7	4.3
Insurance & Social Insurance	3,155	1,637	4,792	3,245	1,686	4,932	90	49	140	2.7	0.2	0.4
Social Solidarity	48,871	-	48,871	50,402	-	50,402	1,531	-	1,531	46.4	-	4.9
Restaurants & Hotels	518	45,265	45,783	537	48,277	48,814	19	3,012	3,031	0.6	10.8	9.8
Real Estate Activities	1,624	36,411	38,035	1,679	37,962	39,641	55	1,551	1,606	1.7	5.6	5.2
Real Estate Property	618	18,831	19,449	646	19,898	20,544	28	1,067	1,095	0.9	3.8	3.5
Business Services	1,006	17,580	18,586	1,033	18,064	19,097	27	484	511	0.8	1.7	1.6

Table 4.5
Real GDP and Contribution to GDP Growth By Economic Sectors
(Million LE, Factor Cost, 2011/2012 prices)

	GDP 2011/2012			GDP 2012/2013			Annual Change in GDP and Components: 2011/2012 to 2012/2013			Percent Contribution to Change in GDP: 2011/2012 to 2012/2013		
Sectors	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
General Government	153,984	-	153,984	158,552	-	158,552	4,568	-	4,568	138.4	-	14.7
Education, Health & Personal Services	1,319	56,309	57,628	1,356	57,901	59,257	37	1,592	1,629	1.1	5.7	5.2
Education	-	16,229	16,229	-	16,682	16,682	-	453	453	-	1.6	1.5
Health	1,259	17,301	18,560	1,293	17,839	19,131	34	538	571	1.0	1.9	1.8
Other Personal Services	60	22,779	22,839	63	23,381	23,444	3	602	605	0.1	2.2	1.9

**Sectors contributing most to total GDP growth are highlighted.*

Source: The Ministry of Planning.

Table 4.6
Real GDP By Economic Sectors, Ranked by Percent Contribution to Change in GDP
(Million LE, Factor Cost, 2011/2012 prices)

	GDP 2011/2012			GDP 2012/2013			Annual Change in GDP and Components:[b] 2011/2012 to 2012/2013			Percent Contribution to Change in GDP:[b] 2011/2012 to 2012/2013		
Sectors[a]	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Total GDP	91,639	916,888	1,508,527	594,940	944,654	1,539,594	3,301	27,766	31,067	100.0	100.0	100.0
Agriculture, Irrigation & Fishery	39	218,177	218,216	41	224,769	224,810	2	6,592	6,594	0.1	23.7	21.2
Manufacturing Industries		199,174	238,283	39,855	203,793	243,647	746	4,619	5,364	22.6	16.6	17.3
Other Manufacturing		190,931	221,446	31,158	195,193	226,351	643	4,262	4,905	19.5	15.3	15.8
Wholesale & Retail Trade		161,109	166,330	5,358	165,577	170,935	137	4,468	4,605	4.1	16.1	14.8
General Government	53,984	-	153,984	158,552	-	158,552	4,568	-	4,568	138.4	-	14.7
Construction & Building		59,499	67,382	8,221	63,145	71,366	338	3,646	3,984	10.2	13.1	12.8
Restaurants & Hotels	518	45,265	45,783	537	48,277	48,814	19	3,012	3,031	0.6	10.8	9.8

Table 4.6
Real GDP By Economic Sectors, Ranked by Percent Contribution to Change in GDP
(Million LE, Factor Cost, 2011/2012 prices)

	GDP 2011/2012			GDP 2012/2013			Annual Change in GDP and Components:[b] 2011/2012 to 2012/2013			Percent Contribution to Change in GDP:[b] 2011/2012 to 2012/2013		
Sectors[a]	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Communications	12,871	25,799	38,670	13,089	27,493	40,582	218	1,694	1,912	6.6	6.1	6.2
Transportation & Storage	15,149	45,364	60,513	15,559	46,690	62,249	410	1,326	1,736	12.4	4.8	5.6
Education, Health & Personal Services		56,309	57,628	1,356	57,901	59,257	37	1,592	1,629	1.1	5.7	5.2
Real Estate Activities		36,411	38,035	1,679	37,962	39,641	55	1,551	1,606	1.7	5.6	5.2
Social Solidarity	48,871	-	48,871	50,402	-	50,402	1,531	-	1,531	46.4	-	4.9
Brokerage & Subsidiary Activities	33,441	16,300	49,741	34,304	16,776	51,080	863	476	1,339	26.1	1.7	4.3
Real Estate Property	618	18,831	19,449	646	19,898	20,544	28	1,067	1,095	0.9	3.8	3.5
Electricity	16,322	2,758	19,080	17,175	2,784	19,959	853	26	879	25.8	0.1	2.8
Other Personal Services	60	22,779	22,839	63	23,381	23,444	3	602	605	0.1	2.2	1.9
Health	1,259	17,301	18,560	1,293	17,839	19,131	34	538	571	1.0	1.9	1.8
Business Services	1,006	17,580	18,586	1,033	18,064	19,097	27	484	511	0.8	1.7	1.6
Oil refining (Manufacturing)	8,594	8,243	16,837	8,697	8,600	17,296	103	357	459	3.1	1.3	1.5
Education	-	16,229	16,229	-	16,682	16,682	-	453	453	-	1.6	1.5
Other Mining (Mining)	703	5,309	6,012	722	5,464	6,187	19	155	175	0.6	0.6	0.6
Water	4,239	-	4,239	4,413	-	4,413	174	-	174	5.3	-	0.6
Insurance & Social Insurance	3,155	1,637	4,792	3,245	1,686	4,932	90	49	140	2.7	0.2	0.4
Information	1,072	1,980	3,052	1,108	2,047	3,155	36	67	103	1.1	0.2	0.3
Sanitation	1,054	-	1,054	1,094	-	1,094	40	-	40	1.2	-	0.1
Suez Canal	31,203	-	31,203	30,008	-	30,008	(1,195)	-	(1,195)	(36.2)	-	(3.8)
Oil (Mining)	93,893	16,726	110,619	92,725	16,591	109,316	(1,168)	(135)	(1,303)	(35.4)	(0.5)	(4.2)
Gas (Mining)	119,969	25,071	145,040	115,498	23,700	139,198	(4,471)	(1,371)	(5,842)	(135.4)	(4.9)	(18.8)
Total Mining	214,565	47,106	261,671	208,945	45,755	254,701	(5,620)	(1,351)	(6,970)	(170.2)	(4.9)	(22.4)

a Strategic sectors selected for analysis are highlighted. b Sectors contributing most to total GDP growth are highlighted.

Source: The Ministry of Planning.

4.3.2 Employment by Industrial Sector and Gender

Table 4.7 presents data on formal employment in Egypt by industry and gender in 2013. The largest sectors in terms of total formal employment (highlighted in Table 4.7) were agriculture (28 percent), manufacturing (11 percent), construction (11 percent), wholesale and retail trade (11 percent), and education (10 percent). Those same sectors had the greatest male employment, except for education. The largest sectors for female formal employment were agriculture (43 percent of female workers), and education (22 percent).

Eighty percent of the total formal employed workforce was male and 20 percent female. The sectors with a larger than average share of women (20 percent) were agriculture (31 percent), insurance and finance (25 percent), public administration (24 percent), education (48 percent), health and social work (59 percent), amusement and arts (22 percent), private household services (33 percent), international and regional organizations (36 percent). These are highlighted in Table 4.7.

Table 4.8 shows the distribution of employed workers by industry and gender in 2012 and 2013 and the changes in employment over the two-year period. Many factors can affect employment by industry over a two-year period, and this period is too short to draw firm conclusions about trends. It would be useful for the USAID/Egypt Mission to develop and maintain a table like this one each year after CAPMAS releases employment data for the previous year and develop a time series of employment by gender by industry. (2014 data were not available in August 2015 at the time this report was written.) Total employment increased by 391 thousand between 2012 and 2013. Employment in agriculture increased by 317 thousand, accounting for 81percent of the total increase. Employment of females in agriculture increase by 345 thousand, more than the total increase, since male employment decreased by 28 thousand. In all, increased employment of women in agriculture was equal to 88 percent of the total increase in employment in 2013. The increased employment of women in agriculture was greater than the total increase in female employment (229,000), since on net female employment in all the other sectors together decreased. The sectors with the largest percent share of the total increase in employment are highlighted in Table 4.8.

Total employment in manufacturing decreased by 48 thousand; male employment in manufacturing fell by 51 thousand. Total, male, and female employment also declined in electricity and gas supply, construction, information and telecommunications, insurance and financial services, and health and social work. In education, employment of men increased by 80 thousand and total employment increased by 63 thousand. The increase in male employment in education was equal to fifty percent of the total increase in male employment; the increase of males in wholesale and retail trade equaled 65 percent of the total increase in male employment. (Industry increases in employment as a percent of the total increase sum to more than 100 percent, because some of the increases are offset by decreases in other sectors.) The only major growth sector for women was agriculture.

As Table 4.1 showed, between 2012 and 2013 the size of the labor force increased more than the number employed, so unemployment increased by 224 thousand, and the unemployment rate increased by 0.5 percentage point, to 13.2 percent.

Table 4.7

Distribution of Employed Persons (15 Years and Over) by Sex, Industry, 2013

	Employment			% Distribution over Sectors			% Distribution by Gender	
	1000s			Percent[a]			Percent[b]	
	Total	Males	Females	Total	Males	Females	Males	Females
Total	23,986	19,094	4,892	100%	100%	100%	79.6%	20.4%
Agriculture, Hunting, Forestry	6,702	4,605	2,097	27.9	24.1	42.9	68.7	31.3
Mining & quarrying	41	41	0	0.2	0.2	0.0	99.3	0.7
Manufacturing	2,571	2,368	203	10.7	12.4	4.1	92.1	7.9
Electric, gas, steam, air condition supply	226	214	12	0.9	1.1	0.3	94.6	5.4
Water support, sewage, recycling	214	195	19	0.9	1.0	0.4	91.0	9.0
Construction	2,728	2,717	11	11.4	14.2	0.2	99.6	0.4
Wholesale and retail trade, vehicles , motorcycles repair	2,698	2,368	330	11.2	12.4	6.7	87.8	12.2
Transportation & storage	1,699	1,663	36	7.1	8.7	0.7	97.9	2.1
Food, residence services	526	508	18	2.2	2.7	0.4	96.6	3.4
Information, Telecommunications	189	157	33	0.8	0.8	0.7	82.8	17.2
Insurance & Financial Intermediation	167	125	42	0.7	0.7	0.9	74.7	25.3
Real estate, Renting	26	25	1	0.1	0.1	0.0	96.1	3.9
Specialized technical, scientific activities	373	318	55	1.6	1.7	1.1	85.3	14.7
Administrative Activities & Support Services	148	133	15	0.6	0.7	0.3	89.7	10.3
Public Administration, defense, social solidarity	1,886	1,430	456	7.9	7.5	9.3	75.8	24.2
Education	2,299	1,205	1,094	9.6	6.3	22.4	52.4	47.6
Health and Social Work	646	267	379	2.7	1.4	7.7	41.4	58.6
Amusement, Creative, & Arts Activities	113	88	25	0.5	0.5	0.5	77.8	22.2
Other Service Activities	597	576	21	2.5	3.0	0.4	96.5	3.5
Private household Services	133	89	44	0.6	0.5	0.9	66.7	33.3
International and Regional Agencies & Organizations	3	2	1	0.	0.0	0.0	64.0	36.0

a Sectors with largest shares of employment (over 10 percent) are highlighted.
b Sectors with female share of employment greater than female share of total employment are highlighted.

Source: CAPMAS

Table 4.8

Estimates of Employed Persons (15 Years and Over) by Sex, Industry, 2012-2013

							Change in Employment			Percent of Total Change		
	1,000s						1,000s			Percent		
	2012			2013			2012-2013			2012-2013		
	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females
Total	23,595	18,932	4,664	23,986	19,094	4,892	391	162	229	100%	100%	100%
Agriculture, Hunting, Forestry	6,386	4,633	1,752	6,702	4,605	2,097	317	(28)	345	81.0	(17.4)	150.7
Mining & quarrying	40	40	1	41	41	0	1	1	(0)	0.3	0.9	(0.1)
Manufacturing	2,619	2,419	200	2,571	2,368	203	(48)	(51)	3	(12.4)	(31.6)	1.2
Electric, gas, steam, air condition supply	253	232	22	226	214	12	(27)	(18)	(9)	(6.9)	(11.1)	(4.0)
Water support, sewage, recycling	159	143	16	214	195	19	55	53	3	14.2	32.4	1.2
Construction	2,795	2,777	18	2,728	2,717	11	(67)	(59)	(8)	(17.2)	(36.6)	(3.4)
Wholesale and retail trade, vehicles , motorcycles repair	2,585	2,262	323	2,698	2,368	330	113	106	7	29.0	65.4	3.1
Transportation & storage	1,648	1,613	35	1,699	1,663	36	52	51	1	13.2	31.4	0.4
Food, residence services	520	504	16	526	508	18	6	3	2	1.4	2.0	1.0
Information, Telecommunications	202	163	39	189	157	33	(12)	(6)	(6)	(3.2)	(4.0)	(2.6)
Insurance & Financial Intermediation	195	138	57	167	125	42	(28)	(13)	(15)	(7.2)	(8.3)	(6.5)
Real estate, Renting	17	15	2	26	25	1	9	10	(1)	2.3	5.9	(0.2)
Specialized technical, scientific activities	378	321	57	373	318	55	(5)	(3)	(2)	(1.3)	(1.7)	(1.0)
Adminstrative Activities & Support Services	149	134	15	148	133	15	(1)	(2)	1	(0.2)	(0.9)	0.3
Public Administration, defense, social solidarity	1,888	1,413	475	1,886	1,430	456	(2)	17	(19)	(0.5)	10.4	(8.1)
Education	2,237	1,125	1,111	2,299	1,205	1,094	63	80	(18)	16.0	49.5	(7.7)
Health and Social Work	667	284	384	646	267	379	(21)	(17)	(5)	(5.4)	(10.2)	(2.0)
Amusement, Creative, & Arts Activities	120	98	23	113	88	25	(7)	(9)	2	(1.8)	(5.7)	1.0
Other Service Activities	550	530	20	597	576	21	48	47	1	12.2	28.8	0.4
Private household Services	184	85	99	133	89	44	(51)	4	(55)	(13.1)	2.2	(23.9)
International and Regional Agencies & Organizations	3	2	1	3	2	1	(0)	(1)	0	(0.1)	(0.4)	0.2
Activities not classified	2	2	0	-	-	-	(2)	(2)	(0)	(0.6)	(1.2)	(0.1)

** Sectors with greatest percent share of total increase in employment are highlighted.*

4.4 Potential Growth Sectors in the Future

4.4.1 Surveys of Leaders and Experts on the Egyptian Economy and Business

4.4.1.1 Description of the Surveys

Sections 4.2 and 4.3 analyzed recent growth in output and employment of industrial sectors. To identify strategic sectors that may be important for the future economic growth of Egypt, we surveyed a large number of experts knowledgeable about the Egyptian economy and a large number of business owners and managers. One survey focused on the sectors that experts expect will contribute significantly and lead Egypt's economic growth in the near future. This survey questionnaire is provided in Annex 3. Survey questionnaires were received from about 60 experts and business leaders. Of those, 47 were sufficiently complete and provided information about sectors that experts expect to lead or contribute significantly to Egypt's economic growth over the next five to ten years, the skill and education requirements of those sectors, and the universities and technical colleges that are believed to be qualified to provide those skills.

A second survey questionnaire was administered to business owners, managers, and human resource professionals. This survey asked about characteristics of the businesses, including size, revenues, number of employees, occupations, skills and academic background of current employees, and expectations about future growth, employment, recruitment and skill requirements. This questionnaire also asked the opinions of business leaders about the higher education institutions that could best provide the required education and training. The business survey is shown in Annex 3.

The survey of business leaders was distributed directly to over 200 representatives of various businesses and business-related organizations, some of whom, like ACDI/VOCA, sent the survey to their own mailing lists of businesses. About 160 survey questionnaires were returned, and of those a total of 135 questionnaires were complete and provided information about Egyptian businesses and skill requirements.

Economic Sectors

Based on responses to the survey of experts on the economy and business and the macroeconomic data reported in section 4.2 and 4.3, we selected 11 strategic sectors for focus on their future prospects and skills needs. Those sectors were the following:

1. Agriculture, Irrigation & Fishing
2. Oil & Gas Production (Mining)

Within the Manufacturing Sector

3. Building Materials
4. Engineered Products
5. Food Processing
6. Textiles and Apparel
7. Electricity
8. Construction & Building
9. Transportation & Storage
10. Communications (telephone and ICT)
11. Tourism

Table 4.9 shows the distribution of the respondents to the business survey over the major business sectors and subsectors. The sector numbers in Table 4.9 are those used in the Egypt National Income Accounts. "Tourism" is not identified as a separate sector in the

Table 4.9

Distribution of Organizations in Business Survey by Economic Sector of the Egypt National Income Accounts	
Economic Sector	**Number of Responses**
1. Agriculture, Irrigation & Fishing	7
2. Mining	
2.1 Oil & Gas	6
2.2 Other mining	0
3. Manufacturing Industries	
3.1 Oil refining	0
3.2 Other Manufacturing	
Building Materials	8
Engineered Products	8
Food Processing	13
Textiles and Apparel	10
Automotive and Agricultural Equipment	2
Other Manufacturing	9
4. Electricity	2
5. Water	0
6. Sanitation	0
7. Construction & Building	8
8. Transportation & Storage	7
9. Communications (telephone and ICT)	25
10. Information	0
11. Suez Canal	0
12. Wholesale & Retail Trade	3
13. Financial Intermediation & Subsidiary Activities	1
14. Insurance & Social Insurance	0
15. Tourism	12
17. Real Estate Activities	1
18. Education, Health and Personal activities	
18.1 Education	2
18.2 Health	1
18.3 Others	2
19. Non-Profit Association	2
Other (Consulting)	1
UNKNOWN	5
TOTAL	**135**

National Income Accounts. Tourism involves activity in hotels and restaurants, internal and international transportation, retail trade, crafts manufacturing, and other services. We identified Tourism as a separate "sector" because many survey respondents identified Tourism as a potential growth sector, because of its importance to the Egyptian economy, and because it has its own particular set of determining factors, including economic conditions in foreign countries and perceptions of domestic political stability and security.

4.4.1.2 Survey Results – Characteristics of Firms

Revenues

Table 4.10 shows the distribution of businesses of survey respondents according to their gross revenues in the most recent year available. There was a broad distribution over a wide range of revenues. Twenty four percent were small businesses with revenue of LE 1,000,000 ($130,000) or less. Twenty-one percent were large businesses with revenue greater than LE 100 million (about $13 million).

Table 4.10

Gross Revenues of the Organization in 2014	
Revenue Ranges (LE 1,000)	**Response Percent**
1 - 250 L.E.	13.8%
250 - 1,000 L.E.	11.0%
1,000 - 5,000 L.E.	15.6%
5,000 - 10,000L.E.	11.9%
10,000 - 100,000 L.E.	26.6%
More than 100,000 L.E.	21.1%

Number of Employees

Another measure of size of the businesses is the number of employees. We tried to select a wide range of sizes in terms of number of workers. This is shown in Table 4.11. There is a broad distribution of businesses by number of employees. About 35 percent were small businesses with 50 employees or fewer. About 38 percent had 51 to 500 workers, and about 28 percent were large businesses with more than 500 employees.

Table 4.11

Distribution of Surveyed Firms by Number of Employees	
Number of Employees	**Percent of Firms in Survey**
1-10	11.0%
11-20	11.0%
21-50	12.6%
51-100	7.1%
101-200	14.2%
201-500	16.5%
501-1000	7.9%
More than 1000	19.7%

Revenue Growth in 2014

A key aspect of the sample of businesses was their growth experiences – both past growth and expected future growth. Table 4.12 shows the distribution of firms in the survey over sectors according to the change in their revenues over the past two years. 55 percent of the firms reported that gross revenues had increased. 19 percent reported that revenues had decreased. Among large economic sectors, agriculture had the largest proportion of firms experiencing moderate growth or revenue decline. The communication and ICT sector had the largest proportion of firms with relatively large revenue growth.

Expected Changes in Employment

A second measure of firm growth is their expectation about future changes in their workforces. This is a key measure for this study, since it focuses on future employment and the skills that will be required by growing businesses.

Table 4.13 shows how expectations for future employment growth are related to firms' ***current*** level of revenues. It shows the expected *change* in size of each firm's labor force for firms with various ranges of *actual revenue* in 2014. Firms with greater current revenue were more likely to expect to increase their workforces in the near future (next one to two years).

Table 4.14 shows how hiring plans are affected by recent ***changes*** in revenue. This table shows the expected *change* in the size of the firm's labor force for firms with various *changes* of revenue in 2014 compared to 2012. Recent change in revenue is a good predictor of firms' expected future hiring. Firms that experienced an increase in revenue over the past two years expect to increase their number of employees over the near future.

Table 4.12

Economic Sectors of Firms Surveyed Distributed by Change in Revenue: 2012-2014					
	Change in gross revenues over the period 2013-2014 compared with 2012 (number of firms in each category)				
Economic Sectors[1]	**Increase more than 10%**	**Increase 1% - 10%**	**Stay about the same**	**Decrease 1% - 10%**	**Decrease more than 10%**
1. Agriculture, Irrigation & Fishing	0	3	0	2	2
2. Mining	0	1	0	2	2
2.1 Oil & Gas	0	1	0	2	2
2.2 Others	0	0	0	0	0
3. Manufacturing Industries	16	14	8	4	4
4. Electricity	0	0	2	0	0
5. Water	0	0	0	0	0
6. Sanitation	0	0	0	0	0
7. Construction & Building	3	1	1	0	1
8. Transportation & Storage	0	2	2	0	2
9. Communications (telephone and ICT)	11	7	1	3	2
10. Information (print media, radio, television)	0	0	0	0	0
11. Suez Canal (operations)	0	0	0	0	0
12. Wholesale & Retail Trade	2	0	0	0	0
13. Financial Intermediation & Subsidiary Activities	1	0	0	0	0
14. Insurance & Social Insurance	0	0	0	0	0
15. Social Solidarity	0	0	0	0	0
16. Tourism	2	7	0	0	2
17. Real Estate Activities	0	0	1	0	0
18. General Government	0	0	0	0	0
19. Education, Health and Personal activities	0	0	0	0	0
19.1 Education	1	1	0	0	0
19.2 Health	0	1	0	0	0
19.3 Others	0	0	1	0	0
20. Business Association	0	0	0	0	0
21. Non-Profit Association	0	0	1	0	0
Other (please specify)	0	0	1	0	0

1 Economic sector designations and numbering are from the Egypt National Income Accounts

Table 4.13
Expected Change in Size of Firm's Labor Force
for firms with various ranges of revenue in 2014

	Expected Change In Labor Force Over the Next 12-24 Months of Firms by Level of Revenue in 2014					
Gross revenues in 2014	Increase the size of workforce	Reduce the size of workforce	Maintain the size of the workforce	Unknown	Response Percent	Response Count
1 - 250,000 L.E.	3	2	2	5	13.6%	12
250,001 - 1,000,000 L.E.	4	0	1	4	10.2%	9
1,000,001 - 5,000,000 L.E.	7	0	4	4	17.0%	15
5,000,001 - 10,000,000 L.E.	4	1	3	2	11.4%	10
10,000,001 - 100,000,000 L.E.	14	1	4	3	25.0%	22
More than 100,000,000 L.E.	13	0	4	3	22.7%	20
					answered question	88
					skipped question	25

Table 4.14
Expected Change in Size of Firm's Labor Force
for Firms with Various Changes of Revenue in 2014 Compared to 2012

Change in gross revenue 2012 to 2014	Expected change in labor force over the next 12-24 months (number of firms in each category)				Response Percent	Response Count
	Increase the size of the workforce	Reduce the size of the workforce	Maintain the size of the workforce	Unknown		
Increase more than 10%	16	2	4	8	26.8%	30
Increase 1% - 10%	17	0	6	6	25.9%	29
Stay about the same	10	2	4	2	16.1%	18
Decrease 1% - 10%	3	0	2	3	7.1%	8
Decrease more than 10%	5	3	2	2	10.7%	12
Unknown	2	0	6	7	13.4%	15
					answered question	112
					skipped question	1

4.4.1.3 Sectors expected to contribute to Egypt GDP growth

We asked the sample of experts on the economy and leaders of businesses to assess each sector of the Egypt National Income Accounts concerning whether the sector is likely to contribute significantly to Egypt's economic growth over the intermediate future (5-10 years). Table 4.15 shows a ranking of Egypt economic sectors, according to the assessment of Egyptian business leaders and experts of which major sectors will contribute to economic growth over the intermediate future. The sectors selected for special focus in this study are highlighted. (The number shown for each industrial sector is its number in the Egypt National Income Accounts.)

Table 4.15

Economic and Business Experts' Evaluations of Growth Sectors in Egyptian Economy – Counts of Evaluation Responses

Sectors of Economy[1]	Highly likely to contribute to growth	May contribute to growth	Unlikely to contribute to growth[2]	Response Count	Weighted Average High=10 May=5
16. Tourism	31	9	0	40	8.88
3.2 Manufacturing Industries – Other than Oil Refining	31	6	2	39	8.72
11. Suez Canal (operations)	30	7	3	40	8.38
1. Agriculture, Irrigation & Fishing	30	6	5	41	8.05
8. Transportation & Storage	29	7	3	39	8.33
7. Construction & Building	28	11	1	40	8.38
9. Communications (telephone and IT services)	28	10	2	40	8.25
4. Electricity	27	10	3	40	8.00
19.1 Education	24	7	9	40	6.88
19.2 Health	24	7	8	39	7.05
12. Wholesale & Retail Trade	22	15	1	38	7.76
2.1 Mining - Oil & Gas	20	16	4	40	7.00
16.1 Restaurants & Hotels (other than direct Tourism)	19	20	1	40	7.25
17. Real Estate Activities	19	16	4	39	6.92
3.1 Manufacturing Industries - Oil refining	17	16	6	39	6.41
6. Water	16	15	7	38	6.18
15. Social Solidarity	16	11	10	37	5.81
5. Sanitation	15	15	10	40	5.63
13. Financial Intermediation & Subsidiary Activities	14	21	5	40	6.13
19.3 Education, Health, Personal activities – Others	13	18	7	38	5.79
18. General Government	13	13	12	38	5.13
2.2 Mining – Others	11	21	7	39	5.51
14. Insurance & Social Insurance	11	21	8	40	5.38
10. Information (print media, radio, television...but not IT)	10	23	6	39	5.51

1. Egypt National Income Accounts economic sector categories. Strategic sectors selected for particular attention are highlighted.

2. Sectors highlighted in grey are assessed to be least likely to contribute to growth.

Source: IBTCI interviews with Egyptian experts

Tourism, Manufacturing other than Oil refining, Suez Canal operations, Agriculture, Transportation, Construction, Communication, and Electricity were at the top of the list of sectors considered highly likely to contribute to Egypt economic growth. For this study we focused on the top ten sectors in terms of experts' assessments that they are highly likely to contribute to future economic growth, with the exception that we did not include Suez Canal operations. Within manufacturing, we focused on four sub-sectors – Food Processing, Textiles & Apparel, Engineered Products, and Building Materials. We also included Oil & Gas Production because of its size and potential to be a strategic sector. The sectors chosen for special focus are highlighted in Table 4.15.

4.4.1.4 Obstacles to Growth of Economic Sectors

Economic leaders and experts were asked to assess the severity of a list of potential obstacles to growth of a business in Egypt. Table 4.16 presents a tabulation of these assessments, ranking the potential obstacles to growth according to how frequently each was assessed to be of High Severity. The table also shows a weighted average of the three assessments for each obstacle, which ranks the obstacles in virtually the same order.

Table 4.16

Experts Ranking of Severity of Potential Obstacles to Economic Growth					
Potential Obstacles to Growth	**High Severity**	**Medium Severity**	**Low Severity**	**Response Count**	**Rating Weighted Average***
Government "red tape", licensing, reporting, permit requirements	33	7	1	41	8.90
Lack of Skilled labor	**32**	**7**	**1**	**40**	**8.88**
Law & Order (e.g., trust in contracts and institutions, governance, civic engagement, anti-corruption)	27	9	2	38	8.29
Availability and cost of finance	25	11	4	40	7.63
Lack of production sophistication and innovation	**25**	**10**	**5**	**40**	**7.50**
Poor transport	21	13	6	40	6.88
Security	18	17	5	40	6.63
Labor laws	**17**	**15**	**8**	**40**	**6.13**
Subsidies	15	19	6	40	6.13
Knowledge of market opportunities	15	14	11	40	5.50
Irregular power supply	14	20	5	39	6.15
Lack of appropriate technology	**12**	**19**	**9**	**40**	**5.38**
Trade barriers	10	18	12	40	4.75
High taxes	10	17	13	40	4.63
Unreliable Communications (e.g., telecom, internet)	10	12	18	40	4.00
* *High = 10, Medium = 5, Low = 0*					

Source: IBTCI interviews with Egyptian experts

The table highlights in red four potential obstacles which were of particular interest to USAID. *Lack of sufficient skilled labor* was virtually tied for first place in the assessments of Potential Obstacles to Growth, with Government "red tape" – licensing, reporting, permit requirements, etc. *Lack of production sophistication and innovation* was also considered to be a relatively important obstacle to business expansion in Egypt. *Labor laws* were assessed to be an important obstacle by some respondents, but were not at the top of the list. *Lack of appropriate technology* was given a relative low ranking as an obstacle and was given a grade of medium severity to low severity by about three-quarters of the respondents.

To focus on one of the key concerns of this study, we specifically asked the experts, "Of the sectors with the MOST potential to affect economic growth [which they had identified earlier in the survey], which are constrained by a lack of professional/technical skills?" Table 4.17 tabulates the responses to that question. It shows the number of times each sector was identified as one with high potential to affect economic growth, but was constrained by lack of professional or technical skills (N.B. Not all sectors listed by respondents to this question were included in our selected growth sectors). Manufacturing was identified most frequently as constrained by lack of appropriate skills. Agriculture and Tourism were second in frequency of identification.

Table 4.17
Sectors with the most potential to affect economic growth, which are constrained by a lack of professional/technical skills

	Number of times cited by respondents					
Sector	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Manufacturing	11	3	4	2	2	22
Agriculture	3	5	2	0	1	11
Tourism	4		2	4	1	11
Construction	2	6	1			9
Health	1	1	1	3		6
Communication & IT	3	1				4
Education	1		2	1		4
Oil & gas	1		2			3
Energy		2		1		3
Engineering	1	1				2
Transportation	1				1	2
Sanitation	1	1				2
Total	29	20	14	11	5	79

A similar question concerning the severity of obstacles to growth of their businesses was asked of the panel of business owners and managers. Table 4.18 shows their responses, ranked according to the frequency that each obstacle was assessed as being of "high" severity. (The rank order is almost identical to the ranking according to a weighted average of the "high", "medium", "low" assessments.) Table 4.18 shows that the obstacle found most frequently to be of high severity was *Lack of suitable skills in the labor force.* The next three, *Political instability,*

Lack of available labor force, and *Government regulations* were virtually tied for second place. *Lack of appropriate technology* was by far the least severe of the obstacles identified.

Table 4.18
Severity of Factors Limiting the Growth of Businesses

Factors	High	Medium	Low	Rating Average	Response Count
Lack of suitable skills in the labor force	65	27	9	2.55	101
Political instability	52	36	14	2.37	102
Lack of available labor force	50	32	19	2.31	101
Government regulations	49	32	22	2.26	103
Access to capital	41	34	29	2.12	104
Government fees and taxes	40	42	19	2.21	101
Foreign competition	40	38	24	2.16	102
Cost of capital	39	44	15	2.24	98
Government license requirements, inspections, reporting requirements	39	40	22	2.17	101
Access to markets	39	36	27	2.12	102
Domestic competition	33	42	25	2.08	100
Size of markets	32	38	31	2.01	101
Lack of appropriate technology	24	43	34	1.90	101

The responses of business owners and managers to the question concerning the severity of obstacles to growth of their businesses were also cross-classified with their responses to the question concerning their plans to expand or reduce the size of their workforce. In this way we hoped to get an indication of how the perceived obstacles affected their employment plans. Table 4.19 shows the cross-tabulation of the responses to these questions. No clear pattern appears to emerge from this tabulation. For example, those firms which planned to increase the size of their work force rated *Lack of suitable skills in the labor force* relatively highly, and also rated *Lack of available labor force* relatively highly (highlighted in yellow). Apparently, this obstacle did not deter these firms from planning to hire more workers. Perhaps this indicates that rapidly expanding firms feel lack of labor skills as a constraint most acutely precisely because they are in need of more workers, including highly skilled workers.

Table 4.19
Severity of factors that limit the economic growth of respondent organization/business, classified by expectations of change in workforce

	Over the next 12-24 months do you expect to:					
Factor and Severity Rating	Increase the size of your workforce	Reduce the size of your workforce	Maintain the size of the workforce	Unknown	Rating Average	Response Count
Access to capital						
High	24	2	7	5		
Medium	14	3	10	4		
Low	14	1	5	7		
Weighted average	2.19	2.17	2.09	1.88	2.11	96
Cost of capital						
High	19	2	9	4		
Medium	22	3	10	7		
Low	9	1	3	1		
Weighted average	2.20	2.17	2.27	2.25	2.22	90
Access to markets						
High	19	1	5	8		
Medium	20	3	7	4		
Low	15	2	9	1		
Weighted average	2.07	1.83	1.81	2.54	2.06	94
Size of markets						
High	13	1	7	6		
Medium	22	2	8	5		
Low	18	2	7	2		
Weighted average	1.91	1.80	2.00	2.31	1.98	93
Domestic competition						
High	16	1	8	6		
Medium	25	2	8	4		
Low	11	2	6	3		
Weighted average	2.10	1.80	2.09	2.23	2.10	92
Foreign competition						
High	25	1	8	5		
Medium	19	1	8	5		
Low	10	2	7	3		
Weighted average	2.28	1.75	2.04	2.15	2.18	94

Government regulations						
High	29	3	11	5		
Medium	15	1	10	4		
Low	10	1	2	4		
Weighted average	2.35	2.40	2.39	2.08	2.33	95
Government fees and taxes						
High	23	1	10	1		
Medium	21	2	11	6		
Low	9	2	2	4		
Weighted average	2.26	1.80	2.35	1.73	2.20	92
Government license requirements, inspections, reporting requirements						
High	25	1	8	5		
Medium	18	1	11	4		
Low	10	2	4	4		
Weighted average	2.28	1.75	2.17	2.08	2.20	93
Political instability						
High	21	2	17	9		
Medium	26	3	2	3		
Low	7	0	3	1		
Weighted average	2.26	2.40	2.64	2.62	2.40	94
Lack of available labor force						
High	27	1	10	7		
Medium	17	1	7	5		
Low	10	1	6	1		
Weighted average	2.31	2.00	2.17	2.46	2.29	93
Lack of suitable skills in the labor force						
High	36	0	13	10		
Medium	14	2	7	3		
Low	3	2	3	0		
Weighted average	2.62	1.50	2.43	2.77	2.55	93
Lack of appropriate technology						
High	18	0	1	4		
Medium	19	0	14	8		
Low	17	4	7	1		
Weighted average	2.02	1.00	1.73	2.23	1.94	93
					answered question	**113**
					skipped question	**0**

4.5 Occupations and Skills in Demand by High Growth Sectors

4.5.1 Distribution of Occupations of All Organizations in the Survey

Both surveys provided considerable information about occupations and skills demanded by high growth sectors. Table 4.20 provides a tabulation of the frequency of various occupations among the firms in the survey of employers. These Occupation Groups are the major categories of the Arab Standard Classification of Occupations (ASCO), used by Egypt and many other countries. It is very similar to the International Labour Organization (ILO) occupation classification system. Brief definitions and examples of the categories are given in the footnotes to the table. In general, Codes 1-3 require a University/Technical College degree. Code 4 may or may not require a degree. Codes 5-9 do not generally require a degree to perform the job. The respondent entered a percentage for each applicable occupation code that corresponds to his/her firm. The table shows the averages of the percentages over all the respondents.

The largest occupation group among the firms in the survey was Professionals, which includes scientists, engineers, doctors, nurses, professors, teachers, ICT professionals, lawyers, cultural professionals. This category accounted for 23 percent of all workers in the firms in the survey. The second largest category was Elementary Occupations, generally filled by low-skilled or unskilled workers, which were 16 percent of all workers in these firms. The third group was Technicians and Associate Professionals, which accounted for 14 percent.

4.5.2 Skills in Demand by All Economic Sectors

Table 4.21 shows the distribution of fields of study or training at universities or technical colleges of the current workforces of the firms in the study. It shows the averages of the responses of each of the business owners/managers surveyed. The most frequent academic background or degree of the employees in these firms was Engineering. Sixty percent of the firms in the study employed engineers. Of those firms who did employee engineers, on average 29 percent of their employees had an engineering background. The second most frequent academic/technical background was Business, which included commerce, finance, banking, marketing, accounting, and management. Seventy-two percent of the firms employed Business graduates. Of those firms with Business graduates, 24 percent of their employees had a business degree or academic background. Engineering and Business are the dominant academic fields represented. The next most common fields are Computer Science, "Arts & Letters" (liberal arts fields that include languages, literature, art history, visual arts, music, dance, drama, performing arts, photography, etc.) and Natural Science (which includes physics, chemistry, biology, zoology, botany, astronomy, and other pure sciences).

Table 4.20

Proportion of Firms' Employees in Major Occupation Categories		
Occupation Groups[2]	Percent of Firms with Employees in this Occupation	Average Percent of Firms' Employees that Are in this Occupation[1]
Code 1: SENIOR OFFICIALS AND MANAGERS	99%	11%
Code 2: PROFESSIONALS	86%	27%
Code 3: TECHNICIANS AND ASSOCIATE PROFESSIONALS	82%	17%
Code 4: CLERKS	74%	13%
Code 5: SERVICE WORKERS AND SHOP AND MARKET SALES WORKERS	51%	12%
Code 6: AGRICULTURAL AND FISHERY WORKERS	29%	6%
Code 7: CRAFT AND RELATED TRADES WORKERS	32%	18%
Code 8: PLANT AND MACHINE OPERATORS AND ASSEMBLERS	40%	33%
Code 9: ELEMENTARY OCCUPATIONS	51%	31%

1 For firms with any employees in that occupation

2 Arab Standard Classification of Occupations (ASCO) categories:

Code 1: SENIOR OFFICIALS AND MANAGERS (Admin., Commercial, Production, General)

Code 2: PROFESSIONALS (Sciences, Engineering, Health, Teaching, Business, ICT, Legal, Cultural)

Code 3: TECHNICIANS AND ASSOCIATE PROFESSIONALS (Sciences, Engineering, Health, Social Work, Sports, Entertainment, Teaching)

Code 4: CLERKS (General, Keyboard, Customer Service, Financial, Accounting, Statistical)

Code 5: SERVICE WORKERS AND SHOP AND MARKET SALES WORKERS (Personal Services and Care, Salespersons, Protective Services)

Code 6: AGRICULTURAL AND FISHERY WORKERS (Market-oriented or Subsistence farmers)

Code 7: CRAFT AND RELATED TRADES WORKERS (Extraction, Building, Metal Fabrication, Machinery Workers, Handicraft, Printing)

Code 8: PLANT AND MACHINE OPERATORS AND ASSEMBLERS (Miners, Plant Operators, Machine Operators, Drivers)

Code 9: ELEMENTARY OCCUPATIONS (Sales, Service, Agricultural, Fishery, Mining, Construction, Manufacturing, Transport Laborers)

Note: Codes 1-3 generally require a University/Technical College degree. Code 4 may or may not require a degree. Codes 5-9 do not generally require degrees to perform the job. Respondent entered a percentage for each applicable code (Sum to 100%).

Table 4.21

Average Percent of Staff with University/Technical College Degrees in Various Subjects

University and Technical College Fields	Average Percent of Firms' Employees	Percent of Firms with Employees in this Field
Engineering	29.1	60
Business[1]	24.1	72
Computer Science	14.6	42
Arts & Letters[2]	11.4	26
Natural science[3]	11.4	33
Law	8.9	30
Health (medicine, public health, health sciences)	6.8	19
Social science[4]	5.3	22
Mathematics, statistics, or actuarial science	3.6	21
Education (teaching)	2.2	17
History, Egyptology, archaeology	2.1	17
Religion (theology, religious studies)	.3	15
Other	13.3	5
Staff with no degree	46.2	40

1 Commerce, finance, banking, marketing, accounting, management

2 Languages, literature, art history, visual arts, music, dance, drama, performing arts, photography

3 Physics, chemistry, biology, zoology, botany, astronomy

4 Economics, political science, government, sociology, anthropology

4.5.3 Skills in Demand by High-Growth Sectors

We are particularly interested in the skills and academic backgrounds sought by high-growth firms. Growth in this study is indicated both by increase in revenues and by increase in the size of the workforce. Table 4.22 shows the average percent of firms' *current* employees with University/Technical College degrees in various subjects for firms classified by their change in revenues over the period 2012-2014. This table shows that Natural Science, Engineering, Computer Science, and Business are heavily represented among firms which experienced an increase in revenues. Business is also well represented among firms that had a decrease in revenues in the most recent two-year period.

Table 4.22

Average percent of current employees with University/Technical College degrees in various subjects for firms by change in revenues 2012-2014						
	Change in gross revenues 2012 to 2014					
Fields of study	**Increase more than 10%**	**Increase 1% - 10%**	**Stay about the same**	**Decrease 1% - 10%**	**Decrease more than 10%**	**Response Average**
Natural science[1]	13	8	6	2	5	12
Engineering	18	21	13	6	6	28
Computer Science	12	14	9	3	5	16
Mathematics, statistics, or actuarial science	6	9	5	1	2	3
Social [2]	6	9	3	3	3	6
Business[3]	21	25	15	5	10	24
History, Egyptology, archaeology	6	8	1	1	2	2
Religion (theology, religious studies)	6	7	1	1	2	0.3
Arts & Letters[4]	7	14	2	1	4	12
Education (teaching)	6	7	2	1	2	2
Health (medicine, public health, health sciences)	6	9	1	1	3	7
Law	7	12	6	2	4	9
Other	2	2	0	0	2	13
Staff with no degree	11	13	8	3	7	48

1 Physics, chemistry, biology, zoology, botany, astronomy

2 Economics, political science, government, sociology, anthropology

3 Commerce, finance, banking, marketing, accounting, management

4 Languages, literature, art history, visual arts, music, dance, drama, performing arts, photography

Of equal or greater interest are the skills and academic backgrounds reported by employers in firms that indicate that they *will be recruiting more workers* over the coming one to two years. Table 4.23 shows the academic backgrounds desired by firms hiring or recruiting new employees in 2015, classified by *change in revenue* over 2012-2014. That is, this table shows, for those firms that indicated that they will be expanding their workforce, what skills and disciplines they are recruiting, classified by their change in gross revenue over the most recent period. Engineering, Business, and Computer science are the fields most sought by firms that have experienced increasing revenues and are recruiting new workers.

The other indicator of growth in the survey was whether firms indicated they were planning to increase or reduce their workforce in the coming 12-24 months. We first analyzed the distribution of degrees and technical backgrounds of the ***current staff*** of firms, classified by whether they planned to increase or reduce their workforce. The results are shown in Table 4.24. In the **existing workforces** of firms that plan to increase their workforce, Natural Science (physics, chemistry, biology, zoology, botany, astronomy), Engineering, Computer Science, and Business degrees are most prevalent (highlighted in yellow).

Table 4.25 indicates the academic/technical fields in demand for ***new workers*** by firms that indicated they will be increasing or reducing their workforce. It shows the academic backgrounds sought when hiring or recruiting new employees, by recruiting firms classified by their expectations about future labor force change. Those firms which are increasing their workforce (and presumably recruiting the most workers) indicated that the fields they are recruiting most heavily are Business (83 percent), Engineering (65 percent), Computer Science (44 percent), Natural Science (22 percent).

Table 4.23

Academic backgrounds desired by firms hiring or recruiting new employees in 2015 classified by change in revenue 2012-2014						
	Change in gross revenues over the period 2013-2014 compared with 2012					
Academic field	**Increase more than 10%**	**Increase 1% - 10%**	**Stay about the same**	**Decrease 1% - 10%**	**Decrease more than 10%**	**Response Percent**
Engineering	16	15	10	6	5	52.5%
Business	14	23	12	6	8	63.6%
Computer science	9	13	6	3	5	36.4%
Natural science	4	6	2	4	2	18.2%
Arts, letters, languages	4	4	0	0	2	10.1%
Law	3	4	4	1	2	14.1%
Mathematics, statistics, or actuarial science	3	3	1	3	0	10.1%
Medicine, public health, health sciences	2	3	0	0	1	6.1%
Teaching or education	1	2	1	0	0	4.0%
History, Egyptology, archaeology	1	1	0	0	1	3.0%
Religion, theology, religious studies	1	0	0	0	0	1.0%
Social science	0	0	2	2	1	5.1%
Other (please specify)	7	10	6	3	5	31.3%
Unknown	9	4	2	1	2	18.2%

Table 4.24
Proportion of firm's total *current staff* with University/Technical College degrees in various subjects for firms with various expected changes in size of labor force

Academic/Technical college fields	Expected change in firm's labor force over the next 12-24 months: Increase the size of the workforce	Reduce the size of the workforce	Maintain the size of the workforce	Unknown	Response Average	Response Total	Response Count
Natural science (physics, chemistry, biology, zoology, botany, astronomy)	26	3	6	0	12.00	420	35
Engineering	41	4	17	4	29.06	1918	66
Computer Science	30	5	9	1	15.16	682	45
Mathematics, statistics, or actuarial science	16	1	5	0	3.95	87	22
Social science (economics, political science, government, sociology, anthropology)	14	1	7	1	5.61	129	23
Business (commerce, banking, marketing, accounting, management)	46	7	22	4	24.54	1939	79
History, Egyptology, archaeology	11	1	5	0	2.35	40	17
Religion (theology, religious studies)	10	1	4	0	.33	5	15
Arts & Letters (languages, literature, music, dance, drama, performing arts, photography)	15	4	7	1	12.26	331	27
Education (teaching)	11	1	5	0	2.47	42	17
Health (medicine, public health, health sciences)	14	0	5	0	7.21	137	19
Law	19	2	10	1	9.41	301	32
Other	4	0	2	0	13.33	80	6
Staff with no degree	24	1	18	0	45.74	1967	43
Unknown	8	0	4	23	86.34	3022	35
						answered question	**111**
						skipped question	**2**

Table 4.25
Academic backgrounds sought when hiring or recruiting *new employees*,
by recruiting firms with various expectations about future labor force change

	Expected change in size of firm's labor force over the next 12-24 months					
Fields Being Recruited	**Increase the size of the workforce**	**Reduce the size of the workforce**	**Maintain the size of the workforce**	**Unknown**	**Response Percent**	**Response Count**
Business, commerce, banking, marketing, accounting, management	**45**	**5**	**17**	**3**	**62.0%**	**70**
Engineering	**35**	**2**	**15**	**3**	**48.7%**	**55**
Computer science	**24**	**4**	**10**	**1**	**34.5%**	**39**
Natural science (physics, chemistry, biology, zoology, botany, astronomy)	12	2	3	1	15.9%	18
Law	8	1	8	0	15.0%	17
Mathematics, statistics, or actuarial science	8	0	2	0	8.8%	10
Agriculture	6	0	2	0	7.1%	8
Arts, letters, languages, literature, music, dance, drama, performing arts, photography	5	2	3	1	9.7%	11
Medicine, public health, health sciences	4	0	3	0	6.2%	7
Teaching or education	4	0	0	0	3.5%	4
Social science (economics, political science, government, sociology, anthropology)	3	0	1	0	3.5%	4
Tourism	2	0	2	0	3.50%	4
History, Egyptology, archaeology	1	1	0	1	2.7%	3
Religion, theology, religious studies	1	0	0	0	0.9%	1
Other (Logistics, Geography, Applied Arts, Tech & Voc, Industrial Science)	11	0	3	6	15.1%	20
answered question						***1***
skipped question						

4.6 Sectors with Low Growth Potential and/or Low Labor Constraints

USAID is also interested in what economic sectors appear to have low growth potential or low labor constraints in the near future. Table 4.15 provided information about what sectors the respondents to the survey of economic and business experts indicated were unlikely to lead or contribute significantly to Egypt's economic growth in the near future. The sectors most commonly cited as unlikely to contribute to growth included General Government, Social Solidarity, Sanitation, Education, Health Care, and Insurance and social Insurance. (Those sectors are highlighted in grey in Table 4.15) Many respondents offered the view that some of these sectors, particularly Education and Health Care, should contribute to economic growth, but on the whole they did not expect them to do so in the near future.

4.7 Gender Dynamics of Sectors with High Growth Potential and Skill Requirements

There are potential challenges to the objective of promoting greater gender equity and equality of opportunities. To begin with, as Table 4.1 shows, in Egypt the labor force participation of females (24 percent in 2013) is much lower than that of males (75 percent), and the unemployment rate of females is much higher (24 percent) than that of males (10 percent). Unequal opportunities in higher education *per se* do not appear to be the problem. As Table 4.2 shows, the unemployment rate of females with a higher education degree (34 percent) is much higher than that of males (15 percent). This suggests either that employers discriminate against female workers, or there is a greater mismatch between the skills and academic fields of highly educated women and the needs of employers than for males.

Among the sectors identified as highly likely to contribute to economic growth are several that have a relatively low representation of female workers, according to the data in Table 4.7 and survey data on numbers of employees by gender in the firms in the study sample, shown in Table 4.26. These include:

- Oil & Gas Production (Mining) (less than one percent female in the national data, Table 4.7)
- Manufacturing (less than 8 percent female – national data)
- Within Manufacturing Industries
  - Building Materials
  - Engineered Products
- Electricity (5 percent female – national data)
- Construction & Building (less than one percent – national data)
- Transportation & Storage (2 percent female – national data)
- Communications (telephone and ICT) (17 percent female – national data)

Table 4.26

Gender Distribution of Firms in Survey Sample		
Industrial Sector	Gender	
	Male	Female
1. Agriculture, Irrigation & Fishing	62	38
2.1 Oil & Gas	83	17
3. Manufacturing Industries	70	30
Building Materials	85	15
Engineered Products	77	23
Food Processing	68	32
Textiles and Apparel	59	41
4. Electricity	58	43
7. Construction & Building	88	12
8. Transportation & Storage	98	2
9. Communications (telephone and ICT)	71	29
12. Wholesale & Retail Trade	65	35
13. Financial Intermediation & Subsidiary Activities	75	25
15. Tourism	80	20
17. Real Estate Activities	96	4
18. Education, Health and Personal activities	70	30
18.1 Education	65	35
18.2 Health	20	80
18.3 Others	60	40
All	68	32
Author's Tabulation of Survey 2.2		

On the other hand, four of the sectors expected to contribute significantly to future growth are Agriculture (31 percent female in 2013 in national data, 38 percent female in the sample), Tourism, Food Processing, and Textiles and Apparel, in which women are present in relatively greater numbers. Expansion of these sectors offers immediate prospects for greater opportunities for women.

The skills and academic fields that were identified as of great importance but often constraining business growth include fields in which women have historically been underrepresented – e.g., engineering, natural sciences, business. Women are now entering business school programs in greater numbers, and efforts are being made to increase the proportion of women in engineering, mathematics, and sciences.

4.8 Conclusions

This Chapter reviewed both macroeconomic data on the employment, output and growth of industrial sectors in the Egypt National Income Accounts, and information obtained through two surveys of key informants among economic and business experts and among owners and managers of businesses. A pattern emerged from both sources of information.

The sectors that have made the largest percentage contribution to the growth of Egypt's GDP over the period 2011/2012 to 2012/2013 are the following:

- Agriculture, Irrigation & Fishery
- Manufacturing Industries
    - Primarily Other Manufacturing
- Wholesale & Retail Trade
- General Government
- Construction & Building
- Restaurants & Hotels (related to Tourism)
- Communications
- Transportation & Storage
- Education, Health & Personal Services
- Real Estate Activities
- Social Solidarity
- Brokerage & Subsidiary Activities
- Real Estate Property
- Electricity

Sectors expected by the panel of Egyptians knowledgeable about the economy as highly likely to make a significant contribution to growth of Egypt's economy in the intermediate future include the following:

- Tourism
- Manufacturing Industries – Others
- Suez Canal (operations)
- Agriculture, Irrigation & Fishing
- Transportation & Storage
- Construction & Building
- Communications (telephone and IT services)
- Electricity

Based on these sources of information, and reviews of Government of Egypt priorities, we selected 11 sectors and subsectors as the focus of the study and further information gathering. These are:

1. Agriculture, Irrigation & Fishing
2. Oil & Gas Production (Mining)

Within Manufacturing Industries

3. Building Materials
4. Engineered Products
5. Food Processing
6. Textiles and Apparel
7. Electricity
8. Construction & Building
9. Transportation & Storage
10. Communications (telephone and ICT)
11. Tourism

Sectors named by respondents to the surveys as sectors with the most potential to affect economic growth, which are constrained by a lack of professional/technical skills, included:

- Manufacturing
- Agriculture
- Tourism
- Construction
- Health
- Communication & IT
- Education
- Oil & gas
- Energy
- Engineering
- Transportation

Four fields of university or technical college education appeared in numerous responses to different survey questions. For example the fields identified most frequently by business owners/managers who planned to expand their workforce in the next 12-24 months were:

- Business (commerce, banking, marketing, accounting, management)
- Engineering
- Computer science
- Natural science (physics, chemistry, biology, zoology, botany, astronomy)

These same fields appeared on virtually every inquiry about the skills required by businesses that have the potential to contribute to the growth of the Egyptian economy. The following chapters investigate institutions of the Egyptian higher education system to ascertain if those institutions have the capacity to meet this expressed need, and what they believe they are doing to meet that need.

5. EGYPTIAN HIGHER EDUCATION PROGRAMS AND RELATIONSHIP TO PERCEIVED NEEDS

5.1 Overview

5.1.1 Presentation

The Statement of Work sets forth a series of tasks (Tasks 3 (Academic Disciplines and Skills in Labor Sectors for Potential Growth), 4 (Tertiary Institutional Capacity), and 5 (University Research, Development, and Innovation in Sectors for Potential Growth)), each with a series of questions, to be addressed sequentially, like a flow chart, such that the responses to the questions in one task would guide the questions to be asked in the next task and/or subsequent questions to be asked in the same task. While this structure of "if > then" is very helpful in guiding the quest for data, given inherent overlap and duplication following this structure strictly can be a challenge for presenting data in a readily manageable form. We have, therefore, rearranged and in some cases combined responses in order to promote greater readability.

5.1.2 The "Universe" of Targeted HEI

The universe of Higher Education Institutions (HEI) addressed for this Labor Market Assessment (LMA) is comprised of Public Universities, Private Universities, and Regional Technical Colleges. This reflects the fact that the LMA has been commissioned primarily to provide guidance to implementation of USAID's Higher Education Partnership Program (HEPP), which will support 15-20 partnerships between U.S. HEI and Egyptian HEI under the supervision of the Ministry of Higher Education (MOHE).

Desk research undertaken by the LMA team identified a list of 41 potentially eligible universities and eight technical colleges dispersed over five major geographic areas: Upper Egypt, Delta, Suez Canal Cities, Alexandra, and Greater Cairo. From the population of 49 HEI, 20 were selected as interview candidates. The selection was based on industry reputation, the opinions of industry experts and analysts, and geographic dispersion.

Repeated attempts were made to gather specific data from respondents at the selected HEI. Following is a summary of the 20 HEI on the original priority list, and the additional five HEI who were either contacted by the Team and submitted data or who had heard about the Assessment and then submitted data on their own. The Ministry of Higher Education responded on behalf of the four technical colleges, one of which (Port Said) provided additional data on its own. Of the 25 HEIs on the list, six are private, as noted in parentheses.

Table 5.1 Responsiveness of Selected HEI to LMA Surveys			
	HEI	On Original Priority List of 20	Submitted Data
1	Ain Shams University	V	V
2	Alexandria University	V	V
3	American University in Cairo (private)*	V	V
4	Arab Academy for Science, Technology and Maritime Transport (AAST)**	V	V
5	Assiut University	V	
6	Cairo University	V	V
7	Helwan University	V	V
8	Mansoura University	V	
9	Menoufia University	V	V
10	Minia University	V	
11	Pharos University (private)	V	V
12	Port Said University	V	V
13	South Valley University	V	
14	Suez Canal University	V	V
15	Tanta University	V	
16	Zagazig University	V	
17	Alexandria Technical College	V	
18	El-Sahafa Technical College	V	
19	Mataria Technical College	V	
20	Port Said Technical College	V	
21	British University in Egypt (private)		V
22	Deraya University (private)		V
23	Future University (private)		V
24	Higher Technical Colleges in Al Obour, 10th of Ramadan and Menya		V
25	Tiba Technical Institute (private)		V

* The LMA Assessment Team recommends that AUC be included as an eligible participant under the HEPP. Whether as an Egyptian HEI that could benefit from affiliation with a U.S. university, or as a U.S. HEI that could provide valuable support to Egyptian HEIs, or both, AUC has the potential of being a highly valuable third partner in an appropriate partnership that also links an Egyptian and a U.S. HEI.

** AAST belongs to the Arab League.

Interview data were gathered from the following officials:

- Office of the President;
- Office of Academic Affairs;
- Office of Research, Development, and Innovation (RDI);
- Office of Finance and Administration; and

- Faculty Deans in key disciplines that most likely will contribute to occupations in potential high growth sectors

5.1.3 Data Collection

The Scope of Work called for IBTCI to evaluate the ability of Egypt's HEI to address the needs of employers for skilled labor and research, and their capacity to establish partnerships with U.S. HEI. The Team designed, developed, and vetted versatile assessment instruments in English and Arabic (see ANNEX 2) capable of being administered during in-person Key Informant Interviews (KIIs), by telephone or Skype, or via an internet link sent to appropriate stakeholders by e-mail. These assessment instruments were specifically designed to directly target each of the SOW Task 3, 4 and 5 questions of particular interest to USAID as well as gather relevant data required for meaningful analysis.

Data collection and subsequent data analysis was significantly hampered by a very extended delay in receiving approval from the Ministry of Higher Education to collect information from public Universities and Technical Colleges. While some informal contacts took place earlier, official interviews in either Arabic or English were conducted between June 28 and July 16, 2015. Interview dates and times were scheduled to accommodate interviewees' needs during the holy month of Ramadan. All of the information collected from interviewees was uploaded into an online database. While some responses were gathered at face-to-face interviews, other responses were self-generated by respondents. On July 17, 2015, the data collection closed and the survey records were analyzed.

5.1.4 Data Analysis

Using face-to-face interviews and online survey instruments, the analyzed data informed the LMA team on a variety of perspectives, structures, mechanisms, practices and constraints that affected the academic operations of the HEI. The quality of HEI programs and their outcomes in the form of labor market ready graduates are discussed under Section 5.2, below. Questions from Tasks 3 and 5 that relate to Research and Development are addressed in Chapter 6. The basic approaches to analyzing the data for Tasks 3, 4, and 5 are the same.

While each respondent's survey was recorded as an individual item, aggregate data could also be drawn from the database. In order to respond to each of the questions on academic disciplines and institutional capacity, data were viewed through a number of lenses including:

- Program development practices
- Academic and technical program strengthening
- Industry input into programs
- HEI skills gaps and the alignment of programs with industry needs
- Applied research
- Skills certifications

and

- HEI disciplines that show little to no potential of meeting labor demands.

To respond to the questions on research capacity, data were considered from slightly different perspectives. These questions required reflection on 'recognized universities' and the 'academic sectors that are renowned for research and development' while also reviewing:

- Activities and programs effectively addressing the interests and needs of clients or stakeholders
- Profiles of "customers" served by the existing program(s)
- Prior work experience with other institutions of higher education (research, collaborative teaching), within Egypt or internationally together with any factors that may facilitate or constrain a collaboration
- Egyptian institutions most capable of successfully forming a sector-suited collaborative partnership with U.S. universities as well as identification of suitable U.S. institution partners
- Leadership and research staff gender-related issues, constraints and opportunities
- Gender equity participation and access constraints and opportunities related to economic growth sectors and academic programs.

5.2 The Academic Offerings of Egypt's HEI and Economic Growth

5.2.1 Business Needs, Available HEI Programs, and the HEI Considered Most Capable of Providing Graduates with the Necessary Skills

Describe the extent to which the academic and technical programs needed for economic growth currently exist in Egypt's universities and technical colleges[1].

The LMA assessment Team asked businesses to identify the academic backgrounds of current staff, future employees and those they seek for leadership and senior management roles. The list of academic disciplines shown in **Table 5.2** below was provided to respondents. As highlighted, the respondent feedback demonstrated the academic fields of Business (72 percent, 61 percent, and 69 percent) and Engineering (60 percent, 49 percent, 57 percent) were strongly sought by industry, while Computer Science (42 percent, 35 percent, and 27 percent) was also high on the list of academic fields considered important for private sector growth.

[1] Unless otherwise noted, all tasks and questions that are listed in this assessment report (noted in bold, black letters) are taken verbatim from the Scope of Work, which is included as Annex 1.

Table 5.2 Academic Backgrounds of Current Employees, New Employees, or Those Sought for Leadership Positions (% of respondents)			
Academic Discipline	Current staff	New employees	Leaders/Managers
Arts & Letters (languages, literature, music, dance, drama, performing arts, photography)	26%	10%	10%
Business (commerce, banking, marketing, accounting, management)	72%	61%	69%
Computer Science	41%	37%	27%
Education (teaching)	18%	4%	5%
Engineering	61%	49%	56%
Health (medicine, public health, health sciences)	19%	7%	3%
History, Egyptology, archaeology	18%	3%	2%
Law	30%	16%	13%
Mathematics, statistics, or actuarial science	21%	9%	9%
Natural science (physics, chemistry, biology, zoology, botany, astronomy)	33%	17%	10%
Other (mentioned agriculture and tourism)	6%	21%	22%
Religion (theology, religious studies)	16%	1%	0%
Social science (economics, political science, government, sociology, anthropology)	22%	5%	7%
Staff with no degree	40%	0%	0%

As shown in Table 5.3 below, many of the most desirable academic fields are currently being offered by the HEI that provided information to the LMA Assessment Team. However, some changes or adjustments to content and practical activities may be needed in order for HEI to provide graduates that are job ready and meet the current and future needs of industry.

Table 5.3 Degree Programs Offered by Responding HEIs

Program	Ain Shams University	Alexandria University	American University	Arab Academy	British University	Cairo University	Deraya University	Helwan University	Higher Technolgy stitute at 10th	Menofya University	Misr University for S&T	Pharos University	Suez Canal University	Technology College in Port Said	Tiba Technical nstitute (TTI)	Total
Accounting	1	1	1	1	1	1		1	1	1	1	1	1			12
Actuarial Science	1	1	1			1		1								5
Agriculture						1							1			2
Anthropology	1	1	1			1		1					1			6
Arabic Literature	1	1	1			1		1		1	1	1	1			9
Archaeology	1	1	1			1		1		1	1					7
Astronomy	1	1				1		1						1		5
Banking	1	1	1	1	1	1		1			1		1			9
Biology	1	1	1			1		1		1	1		1			8
Biomedical Engineering									1							1
Botany	1	1				1				1			1	1		6
Chemical Engineering	1	1	1		1	1		1	1			1				8
Chemistry	1	1	1			1	1	1		1			1			8
Civil Engineering	1	1	1	1	1	1		1	1	1	1	1	1		1	13
Communication and Media Studies					1	1										2
Computer Science	1	1	1	1	1	1		1	1	1	1		1	1		12
Dentistry					1								1			2
Economics	1	1	1	1	1	1		1		1	1	1				10
Education - Primary & Secondary	1	1	1					1		1			1			6
Education - Technical/Vocational	1	1	1					1								4
Education - University	1	1	1			1		1		1						6
Educational Administration	1	1	1					1								4
Egyptology	1	1	1			1		1			1					6
Electrical Engineering	1	1	1	1	1	1		1	1	1	1	1	1			12
Electronics										1						1
Finance	1	1	1	1	1	1		1	1	1	1	1	1			12
Foreign Languages & Literature	1	1	1	1		1		1		1	1	1	1			10
Geography	1	1				1		1		1			1			6
Government		1	1			1		1			1					5
Health Sciences	1	1				1	1	1			1	1	1	1		9
History	1	1	1			1		1		1			1			7
Hotel or Restaurant Management		1		1				1				1	1			5
Human Resources	1	1	1	1	1			1			1	1	1			9
Law - Domestic	1	1	1			1		1		1		1				7
Law - International	1	1	1			1		1		1		1				7
Life Sciences	1	1				1		1					1	1		6
Management	1	1	1	1	1	1		1	1	1	1	1	1			12
Marketing	1	1	1	1	1	1		1	1	1	1	1	1			12
Mass Communication - Arts and Design												1				1
Mathematics	1	1	1			1		1		1			1	1		8
Mechanical Engineering	1	1	1	1	1	1		1	1	1	1	1	1			12
Medicine	1	1				1		1		1	1		1			7
Music, Dance, Drama, Performing Arts	1	1	1			1		1		1						6
Networking									1							1
Nursing					1											1
Petroleum Engineering	1	1	1		1							1				5
Pharmacy					1								1			2
Physics	1	1	1			1		1		1			1			7
Political Science		1	1	1	1	1		1			1					7
Psychology	1	1	1			1		1		1			1			7
Public Health	1	1				1		1					1			5
Religious Studies		1	1			1		1								4
Sociology	1	1	1			1		1		1			1			7
Special Education	1										1					2
Statistics	1	1	1			1		1		1			1	1		8
Systems Engineering	1	1	1					1					1			5
Tourism		1		1				1			1	1	1			6
Veterinary Medicine													1			1
Zoology	1	1				1				1			1			5
Totals	44	48	38	15	18	42	2	45	11	30	22	19	36	7	1	378

Are these programs currently producing graduates with these skills?

In order to answer this question, both industry experts and businesses were asked their opinions about which universities are best qualified to train the professionals needed by business. HEI receiving at least three mentions are shown in **Table 5.4**

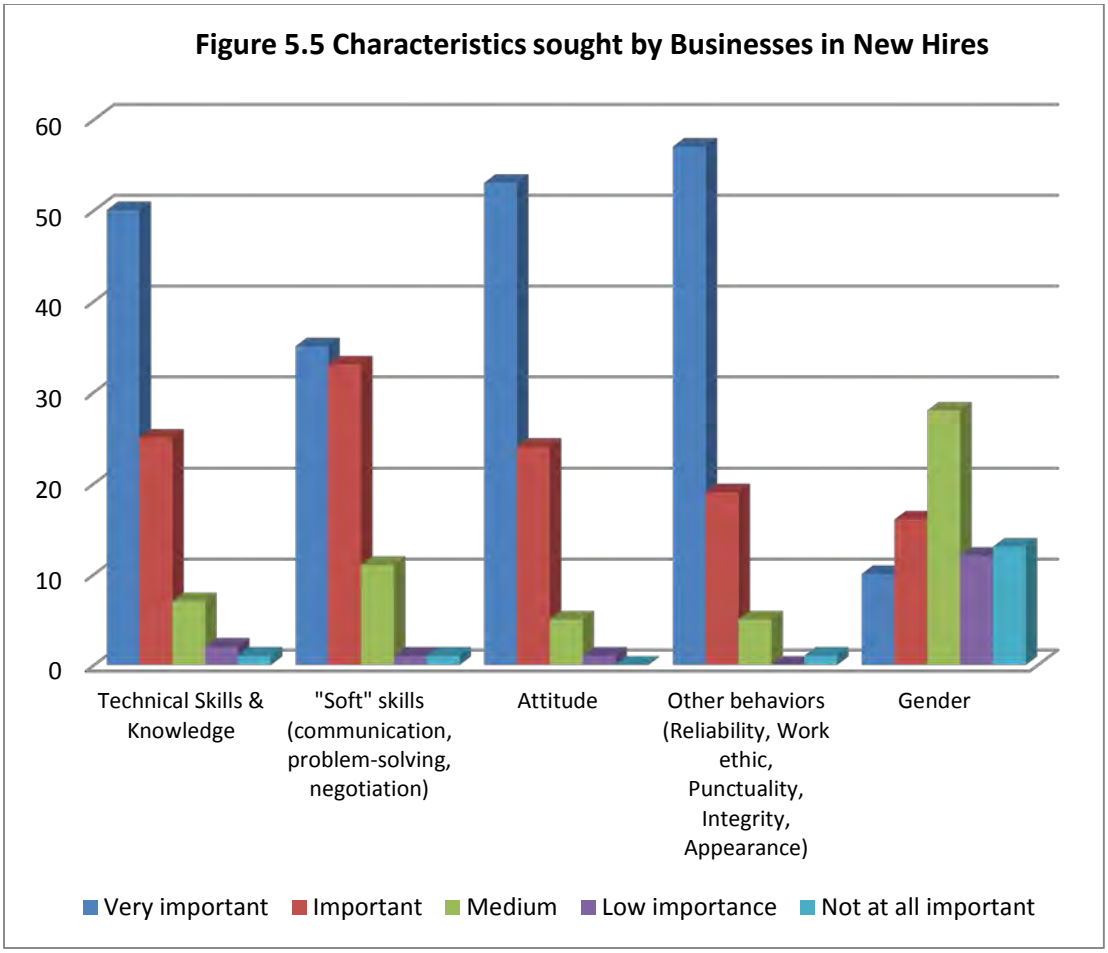
Table 5.4 Universities Best Qualified for Training

University	# of times mentioned by experts	# of times mentioned by businesses	Total Mentions
Ain Shams University	19	16	35
Cairo University	17	17	34
American University in Cairo (AUC)	11	15	26
Alexandria University	12	11	23
German University in Cairo (GUC)	9	9	18
Helwan University	7	4	11
Assiut University	5	4	9
Arab Academy for Science, Technology and Maritime Transport (AAST)	6	1	7
Mansoura University	3	1	4
Higher Technical Institute at 10th of Ramadan	2	1	3
Higher Technical Institute at Al Obor	1	2	3

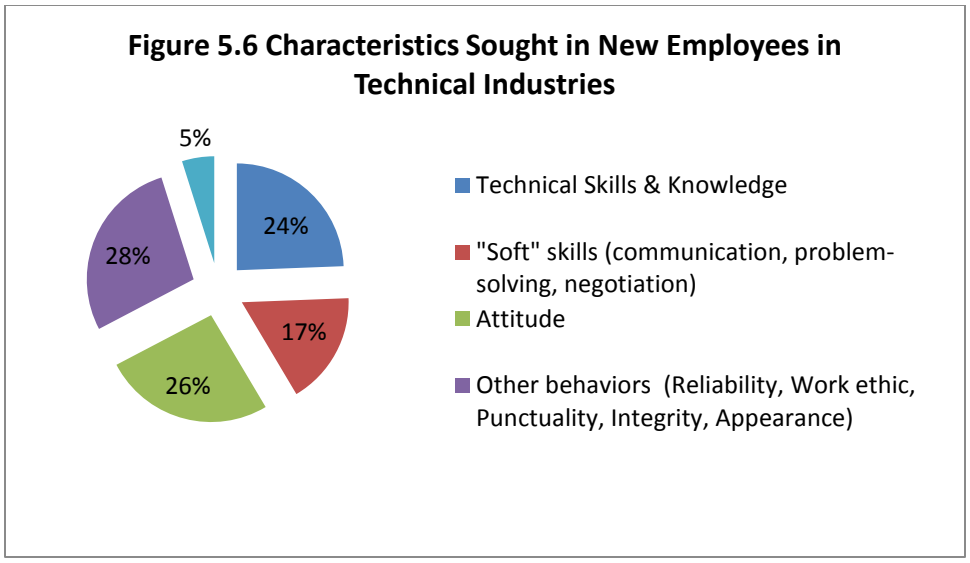
The table indicates that industry leaders and experts have the highest regard for Ain Shams University, Cairo University, AUC, Alexandria University, and GUC. Helwan University followed closely, while Assiut, which declined to provide any data on its programs within the assessment period, also appears to be well-considered by experts and businesses.

5.2.2 The Characteristics that Employers Seek from New Employees

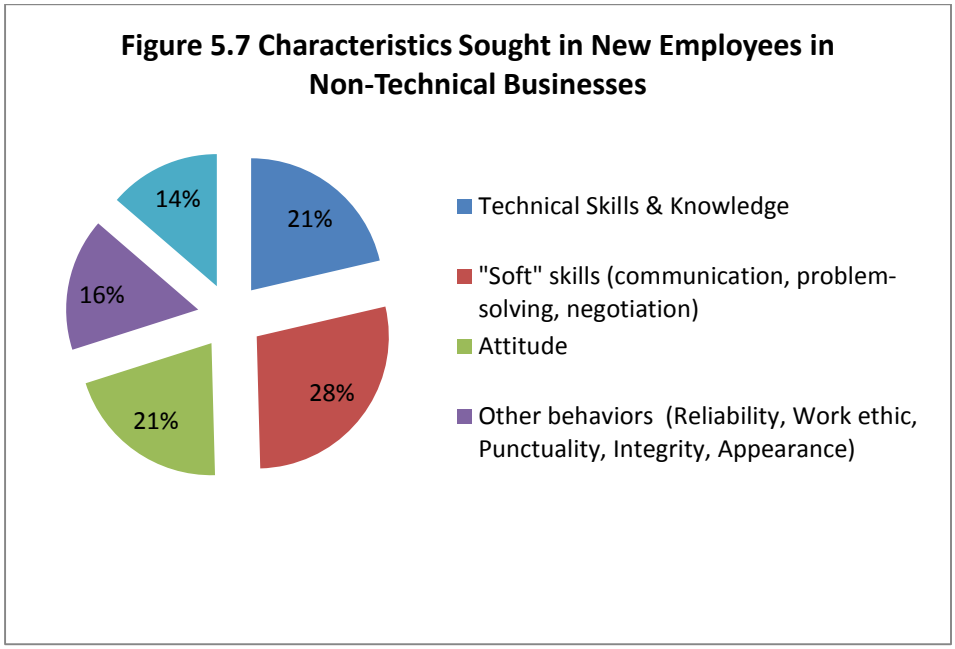
Businesses were also asked to rate the importance of the characteristics they look for when hiring new employees. Respondents mentioned that technical skills provided in HEI programs did not meet all the skill requirements for job ready graduates. Other skills such as communication, team work, time management, often called "soft skills," were also found to be important for employers, as shown in Figure 5.5 below.



When responses were broken down by the technical intensity of the responding businesses, non-technical skills remained very important, as shown by the figures below. As shown in Figure 5.6 for technically intense industries, like engineered products under the manufacturing sector, behavior (28 percent) and attitude (26 percent) were rated above technical skills (24 percent), while soft skills (17 percent) followed. On the other hand, in industries such as garment manufacturing and weaving where lower technical skills were required, communication and other soft skills (28 percent) were of greater importance than technical skills (21 percent). However, behavior and attitude remained as highly sought characteristics with all industries surveyed irrespective of their technical level.



Likewise, in less technically intense firms, non-technical skills were highly rated, as shown in Figure 5.7.



5.2.3 Prioritization of Programs for Strengthening

Based on existing capacity as well as potential, which of Egypt's faculties and programs at public technical colleges and universities should be strengthened (provide names of programs/faculties and location)?

To answer this question, three queries were posed to HEI officials: 1) "List the academic/technical fields and majors that show the *most potential* to meet Egyptian labor market needs"; 2) "Which academic programs are of *greatest interest* to the private sector"?; and 3) "Which academic disciplines show little to no potential for contribution to future market needs"?. Table 5.8 below shows 17 fields, highlighted,

that were mentioned by at least two respondents as having the most potential (shaded fields/majors represent ones that were mentioned as having both the most potential and being of greatest interest to businesses.).

Table 5.8 HEI views of academic/technical fields/majors that show the *most potential* to meet Egyptian labor market needs

	Fields/Majors	Ain Shams	Alexandria	Arab Academy	AUC	BUE	Cairo	Deraya	Future	Helwan	Technical Colleges	Nile	Pharos	Suez Canal	Tiba	Other Private	Total
1	Engineering		1	1	1								1	1			5
2	ICT				1	1				1	1	1					5
3	Energy Resources (Renewable and nuclear energy)	1	1			1	1										4
4	Pharmaceutics and Pharmaceutical Technology						1	1	1				1				4
5	Banks & Finance				1						1		1				3
6	Business Management & Marketing			1	1							1					3
7	Petroleum Engineering				1	1	1										3
8	Teaching -General & IT & TVET				1		1			1							3
9	Banking								1	1							2
10	Civil engineering						1				1						2
11	Economics & Treasury				1									1			2
12	Engineering Technicians and Technologists						1			1							2
13	Health care		1					1									2
14	Mechanical design & engineering				1		1										2
15	Nano & microscopic electronics		1					1									2
16	Software programming & engineering			1							1						2
17	Tourism			1			1										2

Table 5.9 below shows the 12 programs that were mentioned by at least two respondents as having the greatest interest to the private sector (shaded fields/majors represent ones that were both mentioned as having the most potential and being of greatest interest to businesses).

Table 5.9 HEI views of academic programs of greatest *interest* to the private sector

	Academic Program	Ain Shams	Alexandria	Arab Academy	AUC	BUE	Cairo	Deraya	Future	Helwan	Nile	Pharos	Suez Canal	Technical Colleges	Tiba	Other Private	Total
1	Engineering & Engineering products		1		1	1	1	1		1		1		1			8
2	Business, marketing, accounting, management			1	1	1	1							1			5
3	Computer Science and IT				1	1	1	1	1	1	1			1			8
4	Petroleum engineering		1		1		1							1			4
5	Economics & finance				1	1						1					3
6	Energy - Renewable & Conservation		1				1			1							3
7	Pharmaceutics and Pharmaceutical Technology							1	1			1	1				4
8	Automotive								1					1			2
9	Electrical & electronics						1							1			2
10	Mechanical Power / Design						1							1			2
11	Medicine & Medical Informatics		1							1							2
12	Ready Made Garments (RMG)		1											1			2

In order to identify the programs and HEI to strengthen, the LMA Team also considered the responses from HEIs to the question of which disciplines showed little or no potential to meet labor market needs (see following section). Based on this analysis, Table 5.10 shows a list of 19 programs recommended by HEIs for strengthening (private universities are not shown since the question focuses on public universities).

Table 5.10 Programs Recommended by HEIs for Strengthening									
	Programs	Ain Shams	Alexandria	Arab Academy	Cairo	Helwan	Suez Canal	Technical Colleges	**Total**
1	ICT, computer science, software development			V	V	V		V	4
2	Petroleum Engineering		V		V			V	3
3	Agriculture		V		V				2
4	Energy (Renewable, Conservation, Nuclear)	V	V		V	V			4
5	Fashion and Ready-made garments		V					V	2
6	Tourism			V	V				2
7	Automotive technology							V	1
8	Economics, Banking, & Treasury					V	V		2
9	Business Management & Marketing			V					1
10	Civil engineering				V				1
11	Control engineering				V				1
12	Electric power				V				1
13	Electrical, Electronics, & Communication				V			V	2
14	Engineering & Engineering products		V			V		V	3
15	Food Processing		V						1
16	Mechanical power, design & engineering				V			V	2
17	Medical technology & Medical Informatics		V			V			2
18	Mega Electronics		V						1
19	Pharmaceutics and Pharmaceutical Technology				V				1
	Total	1	8	3	11	5	1	7	36

Conversely, provide a list of academic and technical disciplines that show little to no potential for contribution to future labor market needs.

As mentioned above, HEI were also asked to list the disciplines that show the least potential to meet labor market needs. In response, HEI mentioned 40 disciplines, some of which were oddly enough cited by other HEI as being important for the growth of Egyptian companies. Table 5.11 below lists those programs mentioned by public and private HEI and shows which public technical college or university identified the program. The disciplines that are highlighted are ones that other HEI identified as being beneficial to industry.

The list may not be fully inclusive of all HEI academic and technical disciplines that should be reviewed.

Table 5.11 Disciplines with the Least Potential to Meet Labor Market Needs													
	Discipline	Ain Shams	Alexandria	Arab Academy	AUC	BUE	Cairo	Deraya	Helwan	Nile	Suez Canal	Technical Colleges	**Total**
1	Engineering			1		1						1	3
2	Law		1				1		1				3
3	Accounting		1									1	2
4	Commerce						1		1				2
5	Medicine									1	1		2
6	Aeronautical						1						1
7	Arabic language							1					1
8	Arabic studies		1										1
9	Banks								1				1
10	Basic science- physics, biology				1								1
11	Biomedical						1						1
12	Business Administration											1	1
13	Computer Science											1	1
14	History				1								1
15	Human history							1					1
16	Industrial engineering						1						1
17	Information System											1	1
18	Literature						1						1
19	Logistic and transport			1									1
20	Management			1									1
21	Maritime			1									1
22	Mechatronics	1											1
23	Medical engineering	1											1
24	Metallurgy						1						1
25	Mining						1						1
26	Pharmaceutical Manufacturing							1					1
27	Pharmacy									1			1
28	Philosophy							1					1
29	Political Science				1								1
30	Project Management	1											1
31	Pure Math				1								1
32	Social Agriculture		1										1
33	Teaching Arabic-Foreign language						1						1
34	Teaching-General & TVET						1						1
35	Teaching-IT						1						1
36	Textile specialization											1	1
37	Tourism			1									1
38	Veterinary Medicine										1		1
	Total	3	4	5	4	1	11	4	3	2	2	6	45

With which university faculties and technical college programs is the private sector most interested in engaging (provide names of programs/faculties and location)?

Interest in specific universities and technical colleges was measured through several questions. As mentioned above, industry demonstrated the highest confidence in the academic programs offered by Ain Shams, Cairo University, AUC, Alexandria University, and the German

University in Cairo (GUC) (see **Table 5.4**). This confidence in HEI training may indicate strong potential for future cooperative arrangements between these HEI and the private sector.

Businesses and business experts were also asked to list the universities and technical colleges best qualified to provide the research and development support to Egyptian businesses. Many of the same institutions received the highest number of mentions. HEI located in Egypt which received at least three mentions are shown in **Table 5.12** below.

Table 5.12 Universities Best Qualified for Research and Development

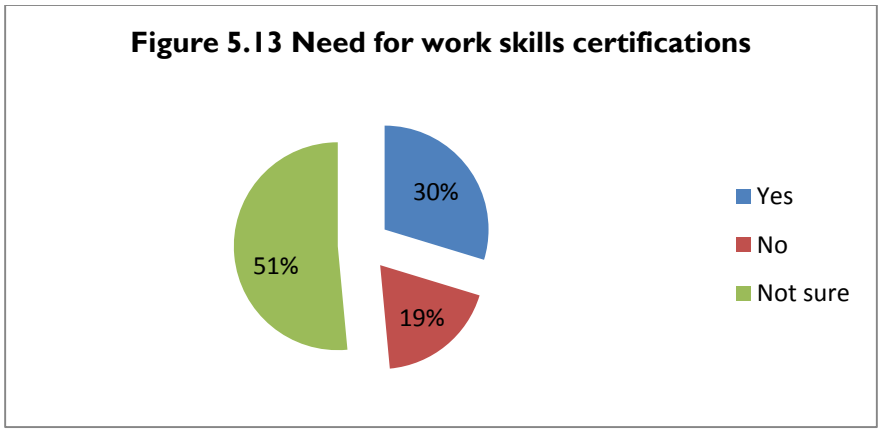
University	# of times mentioned by 'experts'	# of times mentioned by businesses	Total Mentions
Cairo University	18	12	30
Ain Shams University	13	10	23
Alexandria University	12	7	19
American University in Cairo (AUC)	6	3	9
Assiut University	5	1	6
German University in Cairo (GUC)	2	3	5
Egypt-Japan University for Science and Technology(E-JUST)	3	1	4
Helwan University	3	1	4
Arab Academy for Science, Technology and Maritime Transport (AAST)	2	1	3
Nile University	3		3
Zaweil University	3		3

5.2.4 Technical College Certifications

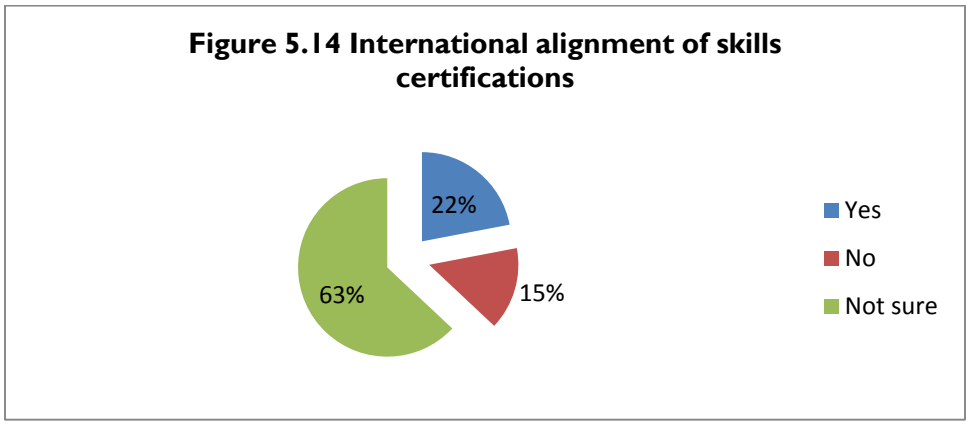
With respect to technical colleges, what certifications of workforce skills exist in Egypt, and how widely are they used and recognized? Are any aligned with international or regional standards? Are any additional certifications required?

No distinction separated technical colleges and universities when the LMA Team distributed this question to HEI. The purpose of gathering all HEI respondents' feedback was to ensure that data on any existing or potential workforce skill certifications were collected.

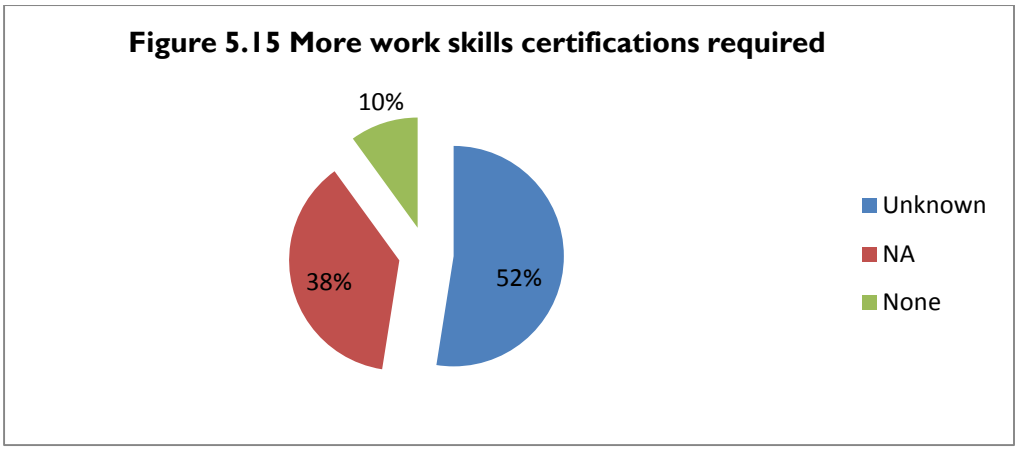
The results of the survey in **Figure 5.13** demonstrated that 51 percent of HEI were not sure of the need for certifications while 30 percent believed that workforce certifications were required. Only 19 percent considered certifications unnecessary. Nominations for certifications included textile, fashion, automotive, autotronics and mechatronics, electrical and electronics, mechatronics. Other information technology certifications mentioned that exist internationally, included CAD, CAM, SAP, CCNA and CC++.



When asked about alignment of certifications to international bodies, the HEI respondents indicated that they were not sure (63 percent). However, as shown in **Figure 5.14,** 22 percent stated that certifications should be aligned internationally with only 15 percent considering international recognition unnecessary.



When asked if more certifications should exist, 81 percent of HEI respondents did not know while 15 percent considered certification not applicable in the Egyptian workplace and 4 percent stated no extra certifications were necessary. These data are shown in **Figure 5.15.**



The result of the survey found that few if any skills certifications existed or were deemed of any importance by HEI in the Egyptian workplace.

5.3 Institutional Capacity of HEI

This section addresses questions raised in the SOW under the heading of "Tertiary Institutional Capacity", which calls for institutional assessments of faculties or programs identified for strengthening. It provides greater detail on points raised in Section 5.2 above, and includes summary recommendations.

5.3.1 Alignment of Needs and Current Programs

What program modifications or new degree programs are needed at identified institutions?

The LMA Team first examined the academic disciplines and degree programs that are most prevalent in the 15 Egyptian HEI that participated in the assessment of institutional capacity. IBTCI mapped the disciplines identified by respondents of the institutional capacity assessment against the academic degrees that are in highest demand by businesses, as well as sectors that Egyptian Economists (and other market experts) identified as being most likely to contribute to economic growth. This provided some limited perspective into which program modifications and/or new degree programs are needed.

Table 5.16, which rank orders the data on academic programs shown in Table 5.3, illustrates a clear focus on Engineering, "Commerce" (e.g., Marketing, Accounting, Finance), and Computer Science in Egyptian HEIs.

Table 5.16 Most Commonly Offered Degree Programs

Program	Percent of Responding HEIs that Offer Degree	# of Responding HEIs that Offer Degree
Civil Engineering	86.7%	13
Accounting	80.0%	12
Computer Science	80.0%	12
Electrical Engineering	80.0%	12
Finance	80.0%	12
Management	80.0%	12
Marketing	80.0%	12
Mechanical Engineering	80.0%	12
Economics	66.7%	10
Foreign Languages & Literature	66.7%	10
Arabic Literature	60.0%	9
Banking	60.0%	9
Health Sciences	60.0%	9
Human Resources	60.0%	9
Biology	53.3%	8
Chemical Engineering	53.3%	8
Chemistry	53.3%	8
Mathematics	53.3%	8
Statistics	53.3%	8
Archaeology	46.7%	7
History	46.7%	7

Law – Domestic	46.7%	7
Law – International	46.7%	7
Medicine	46.7%	7
Physics	46.7%	7
Political Science	46.7%	7
Psychology	46.7%	7
Sociology	46.7%	7
Anthropology	40.0%	6
Botany	40.0%	6
Education - Primary & Secondary	40.0%	6
Education – University	40.0%	6
Egyptology	40.0%	6
Geography	40.0%	6
Life Sciences	40.0%	6
Music, Dance, Drama, Performing Arts	40.0%	6
Tourism	40.0%	6
Actuarial Science	33.3%	5
Astronomy	33.3%	5
Government	33.3%	5
Hotel or Restaurant Management	33.3%	5
Petroleum Engineering	33.3%	5
Public Health	33.3%	5
Systems Engineering	33.3%	5
Zoology	33.3%	5
Education - Technical/Vocational	26.7%	4
Educational Administration	26.7%	4
Religious Studies	26.7%	4
Agriculture	13.3%	2
Communication and Media Studies	13.3%	2
Dentistry	13.3%	2
Pharmacy	13.3%	2
Special Education	13.3%	2
Biomedical Engineering	6.7%	1
Electronics	6.7%	1
Networking	6.7%	1
Nursing	6.7%	1
Veterinary Medicine	6.7%	1
Mass Communication - Arts and Design	6.7%	1

As discussed in Section 5.2, businesses were asked "When hiring or recruiting new employees, what academic backgrounds do you seek". As shown in Table 5.17 below, there is a high degree of correspondence between the backgrounds sought by businesses and the degree programs currently offered by a majority of the Egyptian HEIs interviewed for this assessment.

Table 5.17 Academic Backgrounds Sought in New Employees

Academic Background	Percent of Respondents	Number of Respondents
Business, commerce, banking, marketing, accounting, management	61.5%	67
Engineering	48.6%	53
Computer science	36.7%	40
Other	30.3%	33
Unknown	21.1%	23
Natural science (physics, chemistry, biology, zoology, botany, astronomy)	17.4%	19
Law	15.6%	17
Arts, letters, languages, literature, music, dance, drama, performing arts, photography	10.1%	11
Mathematics, statistics, or actuarial science	9.2%	10
Medicine, public health, health sciences	7.3%	8
Social science (economics, political science, government, sociology, anthropology)	4.6%	5
Teaching or education	3.7%	4
History, Egyptology, archaeology	2.8%	3
Religion, theology, religious studies	0.9%	1

The LMA Team also examined this issue by comparing current academic programs with sectors considered as high growth sectors. However, it is difficult to draw conclusions about specific programs based on such analysis, as multiple disciplines are usually required within a single economic sector. As discussed in Chapter 4, economic experts were asked to classify sectors according to their expected contributions to economic growth. Their responses are shown in Table 4.11, repeated below as Table 5.18. A maximum score of 10 was possible in each sector per the respondents amongst the demographic of Economists and other experts. For the purpose of this discussion related to program modifications and/or new degree programs needed at identified HEI, there is a focus on only those sectors with a weighted average of 6.75 or greater.

Table 5.18 – Egyptian economic sectors most likely to contribute to economic growth

Answer Options	Highly likely	May contribute	Unlikely to contribute	Weighted Average
Tourism	31	9	0	8.88
Manufacturing Industries	31	6	2	8.72
Suez Canal – Operations	30	7	3	8.38
Construction & Building	28	11	1	8.38
Transportation & Storage	29	7	3	8.33
Communications	28	10	2	8.25
Agriculture, Irrigation & Fishing	30	6	5	8.05
Electricity	27	10	3	8.00
Wholesale & Retail Trade	22	15	1	7.76

Restaurants & Hotels (other than direct Tourism)	19	20	1	7.25
Health	24	7	8	7.05
Mining - Oil & Gas	20	16	4	7.00
Real Estate Activities	19	16	4	6.92
Education	24	7	9	6.88

Tourism provides a good example of the difficulties of trying to align sectors and academic disciplines, as there are a number of academic disciplines that are needed in the sector, which itself is composed of many different sectors. Academic disciplines like 'Egyptology' and more loosely 'Anthropology' and 'Archaeology', of which all are present in 40+ percent of identified HEI, could feed into Tourism, given Egypt's extraordinarily rich history and cultural heritage. Additionally, the degree program 'Hotel & Restaurant Management' was identified by respondents at 27.3 percent of selected HEI, and it could be said that courses of study in this program also feeds into Tourism. However, this academic program has parallel alignment with the sector Restaurants & Hotels (other than Direct Tourism), which itself is its own high-growth sector, earning a score of 7.25.

Recommendations

Specifically needed in the near term are occupational forecasts commensurate with what have been reported as sectors of high-growth potential. This can be communicated to MOHE with the intention of promoting enrollment into those disciplines that would prepare students for careers in those fields. We encourage USAID to support further examinations by the MOHE into these areas that should:

- Lead to the creation of new academic programs;
- Place an increased emphasis on existing programs that do align with high-growth economic sectors;
- Create greater alignment to industry needs by making required adjustments/modifications to those existing programs in high-growth sectors; and
- Synchronize these efforts based on the data that are available in this report, plus any related information that is available from local sources such as the Central Agency for Public Mobilization and Statistics (CAPMAS) and the Ministry of Manpower & Migration (MOMM).

5.3.2 Promoting Improved Alignment of Academic programs with the Needs of Businesses

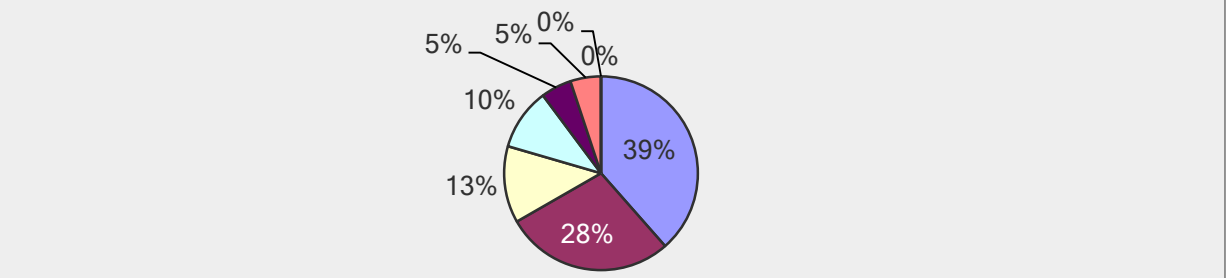
Describe how Egyptian universities and technical colleges determine how to start new academic and technical programs.

To develop a response to this question, HEI were asked to identify their primary method for starting new programs. Eight optional responses were provided. These options were created after a number of discussions with relevant stakeholders including HEI professors and industrial associations.

The results of the HEI survey showed that 39% of new programs are developed in response to business need (or labor market demand). This response of 39 percent was significant considering industry had identified a definite gap between graduate skills and labor requirements. Twenty-eight percent of the survey respondents stated that programs were developed through an individual professor recognizing an industry need. This information

corroborated comments made by the Egyptian LMA team members and the university Dean who assisted in testing the interview question pilot. Following in importance were the review of data from other sources at 13%, and input gathered from students at 10%. The next two options, each showing 5%, were 'not sure' and 'follow the mandate of MOHE'. Of particular note is that no one mentioned any reliance on data from the Ministry of Manpower and Employment. None of the respondents indicated that they do not start new programs.

Figure 5.19
Primary methods for starting new academic programs



In another question, respondents were asked if a documented process for program development should be based on the Egyptian labor market. 87 percent of respondents were in agreement.

Explore the feasibility, institutional commitment, requirements, and cost of new degree programs (some of which may be joint degree programs with U.S. universities).

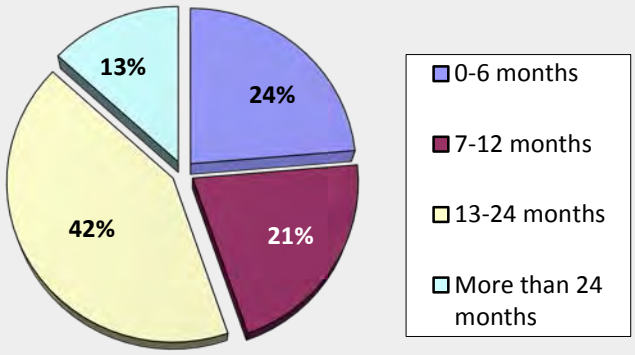
The road to launching new degree programs (or modifying existing ones) appears challenging given the lack of regular communication between HEI, the MOHE, CAPMAS, MOMM and the room for improvement regarding the engagement and cooperation with the private sector. Private sector engagement is a two-way street and the quantitative, qualitative, and anecdotal evidence collected by the LMA Team suggests that Industry could be doing significantly more to reach out to HEI – particularly if they are not satisfied with the hands-on knowledge and soft skills students are acquiring via Egyptian HEI. Some private HEI (e.g., Nile University, Future University) said that certain Egyptian companies made financial investments to the Universities and that various "Captains of Industry" participated on their Boards. It is important to note that these two institutions in particular cited little to no difficulty in launching new courses of study or degree programs despite being under the oversight of the MOHE. Each of their University Presidents also noted that they specifically avoided offering programs in disciplines such as 'Pharmacy' and 'Dentistry,' fields which they noted had enrollments in public HEI that

grossly outstripped the Egyptian labor market's ability to absorb the supply of graduates from these programs.

Feasibility

The LMA Team considered the time needed to implement new academic programs as one indicator of feasibility. When asked how long it took to launch new programs once a need had been identified, the data varied widely **(See Figure 5.20).** Forty-five percent of respondents indicated that the HEI could complete the full lifecycle from identifying need for a new program within one-year; whereas 55 percent reported that the implementation process took greater than one year, with 13 percent of the total indicating more than two years.

Figure 5.20
How long is the typical lifecycle from identifying need for new programs to actually offering courses?



A large cluster of responses in a single timeframe (e.g., 7-12 months) would have indicated that a defined process from the MOHE was in place and is adhered to by any/all HEI under the oversight of the MOHE. The wide distribution of data points suggests that the process for new program implementation may not be fully documented, clearly articulated, or universally applied throughout Egyptian HEI.

Institutional Opportunities and Constraints

With the centralization of authority over HEI within the MOHE, and with nearly all HEI falling under MOHE oversight (exceptions are Al Azhar University and American University in Cairo), there is an opportunity for the MOHE (possibly with USAID support) to ensure that there exists a clear, standard approach to implementing new programs and/or modifying existing ones. This standard process could include an evaluation of criteria which would demonstrate how the curricula and individual course content has been sufficiently aligned with industry competencies.

The centralization of authority over HEI within the MOHE came up almost universally as a constraint to more effectively managing the institution and the curricula of programs during the KIIs conducted with academic personnel. However, an advantage of centralization, in this case, is that if the MOHE could standardize program offerings and establish that standardized process for program implementation – especially across the public HEI – and mirror those to international programs that are already accredited and widely recognized for their quality in preparing 21st century, "market-ready" graduates, then implementing new programs (or modifying existing ones) could be done in a coordinated fashion across Egyptian HEI as opposed to individual HEI making their own disconnected, piecemeal contributions to an overall reform strategy absent of a standard approach.

Among potential obstacles to the timely introduction of new programs are: bureaucracy related to obtaining approvals to make required program modifications that better meet the needs of industry; response in updating course content not commensurate to the pace of market needs; and inconsistently applied curricular enhancements (e.g., not simultaneously implementing accredited programs to all public HEI). An additional possible issue is that there may be resistance on the part of some faculty to standardization of curricula and materials since it might interfere with earning opportunities.

Which Modifications Seem the Most Effective?

To determine which degree program modifications would most significantly improve the HEI, the LMA Team asked HEIs to assess each of eight potential actions and indicate if they would achieve high, medium, or low improvement. We then calculated a weighted average for the responses to each questions with high improvement=3, medium=2, and low=1. (Respondents could also select 'Not Applicable' (N/A)). Thus, the maximum aggregate score for each answer option was 3. Respondents almost unanimously cited "align curricula with industry competencies" as the top choice – earning a score of 2.85 **(See Table 5.21)**.

Table 5.21 – Program modifications that would most significantly improve the HEI

Answer Options	Rating Average
Align curricula with industry competencies	2.85
Mirror program to a U.S. partner institution	2.76
Mirror program to a Non-U.S. leading institution (e.g., Germany, Sweden)	2.76
Implement a maximum student/teacher ratio for all classes	2.63
Replace laboratory equipment more than 10 years old	2.58
Offer fewer degree programs (e.g., narrow focus to high-quality specializations)	2.00
Offer distance education (e.g., live broadcast of lectures on internet)	2.00
Offer more degree programs (e.g., have something for ALL Egyptians)	1.83

Mirroring academic programs – either to leading U.S. or non-U.S. HEI – is tied for second position, and represents another clear indicator for the desire (and institutional commitment) of individual Egyptian HEI to partner with U.S. HEI. This is the manifest intent of USAID's HEPP program and the broader Higher Education Initiative.

"Mirroring" as a Means of Facilitating Cross-National Interactions. If Egyptian HEIs adopt a credit hour system, which is frequently used in higher education systems throughout most higher-income nations, this would greatly facilitate the efficacy of these partnerships. This would remove barriers to more effective dual degree programs, and address issues surrounding degree equivalency. Moreover, part of the HEPP proposal is to fund Master's and Ph.D. scholarships for faculty members to strengthen their capacity. However, with the career path of academic faculty outlined below, and the difficult equivalency of degrees, there may be little incentive to participate in these scholarships. Additionally, developing a better "mirror" to the academic semester or quarter systems that are prevalent in the U.S. would provide students with the flexibility to design programs of study tailored to their unique career objectives and academic interests. This mirroring would also open the door to more inter-disciplinary offerings. Finally, "mirroring" a program with leading HEI from the U.S. (or elsewhere) also would likely accomplish the "alignment to industry competencies" because top academic institutions in the U.S. would have almost certainly undertaken this exercise in developing their

own curricula. Partnership with U.S. HEI gives the MOHE the ideal opportunity to adopt and install ready-made curriculum that is already widely admired by Egyptians.

We should note that this question may be irrelevant (or even confusing) to respondents from public HEI given the way that students are placed into a curricular track. After the assessment instrument was developed, it was pointed out to the LMA Team that once an enrolled student has been assigned to a Faculty, all courses and sequencing are pre-set and there are no mechanisms for tailoring courses of study to individual student schedules, academic interests, or career aspirations. The LMA Team understands that this framework is currently under review with the MOHE and the Supreme Council of Universities (SCU) with plans to eventually transition into a credit hour system for the public HEI that more closely resembles the established frameworks in place at internationally recognized HEI. As aforementioned, this would greatly facilitate any program mirroring that could come about via partnership with U.S. HEI.

The Role of Commitment and Complicating Factors

Table 5.22 – Institutional commitment to improve the HEI	
Answer Options	Rating Average
Align to industry competencies	9.00
Mirror U.S. Institution	8.53
Replace lab equipment	6.00
Mirror Non-U.S. Institution	5.00
Offer more programs	5.00
Offer distance education	4.00
Cap student/ teacher ratio	3.33
Offer fewer programs	2.50

Often the missing ingredient for successful change management is commitment. For the items identified as making the greatest improvement to the HEI, the LMA Team also assessed institutional commitment to driving towards those changes/improvements.

Again, respondents overwhelmingly pointed to getting in sync with industry, followed closely by mirroring U.S. HEI and noticeably more distantly by replacing lab equipment, then other indications of commitment. Mirroring and partnering are in fact not synonymous terms, but certainly a highly effective way to mirror would be via partnership wherein the U.S. HEI could support the institutional change(s) necessary.

The LMA Team was also keen to capture the perceived factors that could impede or otherwise adversely affect productive partnering between Egyptian and U.S. HEI.

Again a 3-point scoring scale was employed wherein high risk=3, medium=2, and low risk=1 (respondents could also select 'Not Applicable' (N/A)). Table 5.17, below, shows that respondents indicated that the greatest risk to a productive partnership include lack of appropriate funding to sustain the partnerships. (The term "sustain" was left undefined as to whether it referred to start-up and/or ongoing partnerships.)

Cost

The cost of new programs will vary greatly depending on the nature of the programs being supported, even for those with high growth potentials. For instance, *Electric Power* has been identified as a sector with high-growth potential. The LMA Team has conducted KIIs among industry professionals in this sector; one sub-sector that has been identified with particular opportunity for significant growth is renewable energy. For HEI to offer new programs in this

sector and sub-sector would call for investments in solar and wind technology that are significantly higher than would be the investment required to launch programming in Agribusiness that would align to the growth sector of *Agriculture, Irrigation, and Fishing*.

Traditionally, in most countries, a National Higher Education strategy is first developed and discussed to generate support and gain the awareness of all high level stakeholders (e.g., affected Ministries, HEI); then, critical priority areas get established. At that point, USAID and the GOE could collaboratively identify target areas for USG support and develop appropriate costing structures.

Table 5.23 - Factors that could impede partnerships with U.S. HEI

Answer Options	Rating Average
Appropriate funding not allocated to sustain partnerships	2.21
Inadequate independence given by Ministry of Higher Education (MOHE)	2.18
Difference in the academic standards between my HEI and the U.S. HEI (e.g., too easy or too difficult for our students)	2.00
Internal bureaucracy or insufficient governance (e.g., policies, procedures)	1.89
Difference in instructional methodology between my HEI and the U.S. HEI (e.g., instructor-centered vs. participant-centered learning)	1.79
Inadequate instructional technology, laboratories, or equipment	1.78
Difference in the professional standards between my HEI and the U.S. HEI (e.g., too easy or too difficult for our Professors)	1.63
Lack of commitment from my Institution's Administration/Leadership	1.58
Not aligned to my HEI strategic objectives	1.56

5.3.3 Promoting Professional Development

Describe the qualifications and experience of the faculty in high potential sectors/programs.

The required qualifications and experience of the faculty members in Egyptian public HEI are standard throughout the nation and across faculties. The LMA Team was advised that these same standard qualifications were also applied to private HEI. However, the team could not obtain specific documentation with respect to any differences to this standard being applied. In theory, private HEI could have different criteria or requirements at the individual institutional level, but it is probable that each private HEI subscribes to the same applied standard. The requirements for faculty members do not vary based on whether their academic disciplines or programs align to high-potential economic sectors. Instead there is a clear positional ranking and career path for progression as an academic. The following qualifications are applied to all public HEIs and probably private HEIs as well:

1. **Teaching Assistant (TA)**: Also called Moa'ed (معيد) or "Demonstrator", must have at least a Baccalaureate degree, and have likely graduated with Honors or at the top of the class. Academic Faculties typically hire TAs by directly hiring the top-ranking students of the most recent graduates. After being hired, TAs are required to obtain a Master's degree within five years of their start-date. If no Master's degree is achieved, then he/she must leave the HEI, or transfer to a non-academic administrative role.
2. **Senior TA**: Also called Modaress Mosa'ed (مساعد مدرس) or "Assistant Lecturer". After TAs obtain the required Master's degree, they are eligible for promotion to Senior TA. To

retain employment as an academic member of staff, a Senior TA must earn a Doctoral degree within five years of promotion to Senior TA – or as above, transfer to a non-academic administrative role.

3. **Assistant Professor**: Also called Modaress (مدرس) or "Lecturer". Once a Senior TA earns a Doctoral degree, he/she is eligible for promotion to Assistant Professor and receive tenure.
4. **Associate Professor**: Also called Ostath Mosa'ed (مساعد ستاذ). Assistant Professors with a minimum of five years of experience at that level are eligible to apply for a promotion to Associate Professor. The promotional decision is made based on the publication of scholarly contributions to the discipline and the number of student Theses and Dissertations that he/she has supervised.
5. **Full Professor**: Also called Ostath (أستاذ). Following a minimum of five years at the Associate Professor rank, an academic is eligible to apply to become a Full Professor.

Only Associate Professors and Full Professors are eligible to serve in senior leaderships positions such as Faculty Dean, Vice President, or President.

There is also the title of Ostath Mota'Faregh (متفر غ أستاذ), but that is not subject to an application process as in the case of Associate and Full Professors. This can only be designated to a Full Professor and is equivalent to a "Professor Emeritus" (Academic Ranks in Egypt https://en.wikipedia.org/wiki/Academic_ranks_in_Egypt).

IBTCI's institutional capacity assessment instrument asked respondents to identify the most important qualifications and/or experiences required to be successful in an academic position. A 3-point scale was used with 3=High Importance and 1=Low Importance – respondents were also given the choice of Not Applicable (N/A). Average scores closest to 3 across the respondents are to be considered most significant.

Not surprisingly, advanced degrees (i.e., Master's and Doctoral degrees) are viewed with the greatest esteem. With an aggregate score of 2.9 **(see Table 5.24)**, the attainment of these advanced degrees is an absolutely essential component for the career path of Academics within HEI.

Table 5.24 – Most important qualifications for academic staff

Answer Options	Rating Average
Academic qualifications (e.g., Doctorate, Masters)	2.90
Research experience	2.74
Teaching qualifications	2.74
Industry experience	2.53
Professional certifications	2.47
Industry awards or certifications	2.11

What is interesting from the data is that 'Academic qualifications'; 'Research experience'; and 'Teaching qualifications' can all be obtained within the "Ivory Tower of Academia" exclusive of "real world" exposure – and these categories comprise the top three ranks in the list. Conversely, 'Industry experience'; 'Professional certifications'; and 'Industry awards or certifications' must come from expertise and achievement in the business community – and these comprise the bottom three scores.

Although aggregate scores of 2.53, 2.47, and 2.11 respectively do not indicate that these items are to be dismissed, the LMA Team repeatedly heard in KIIs that Academics tend to consider

business people intellectually inferior, and business people tend to consider Academics as "out-of-touch". These perceptions are, of course, widely held in many parts of the world, and are certainly not unique to the Egyptian context.

One Assistant Professor interviewed as part of the Task 3 assessment (Academic Disciplines and Skills in Labor Sectors for Potential Growth) commented that he had spent eight years in industry before taking his position at a public university. Although he has now spent more than a decade at his HEI, he continues to feel like the odd man out – for example, one of his peers once disregarded a recommendation he had made, noting that this Assistant Professor was not a "pure" academic

However, as illustrated above, there is a clear and common understanding that higher education and industry must come closer together, improve their relationship, and create greater alignment to industry competencies as it relates to curriculum development and applied research. One respondent to this question noted, "Faculty members need to develop more applied research to benefit communities". In order for that research to be "applied," it should be commercialized in some fashion; this would, again, require increased engagement with Industry.

Identify the capacity building requirements of faculties and programs (research, qualifications, pedagogy approaches, policy changes, collaboration).

The optimal manner of identifying the capacity building requirements of faculties and academic programs was to perform a basic gap analysis. Respondents were requested to identify opportunities for improvement at their respective HEI. Using data collected from KIIs conducted for Task 3 (Academic Disciplines and Skills in Labor Sectors for Potential Growth), Task 5 (University Research, Development, and Innovation in Labor Sectors for Potential Growth), and from the review of existing literature, a tailored list of gaps most likely to impact Egyptian HEI was established. The focus of this particular question was on the shortcomings of current faculty.

Table 5.25 – Capacity Gaps among HEI Faculty

Answer Options	Rating Average
Collaborating with industry	2.22
Producing applied RDI that benefits the Egyptian economy	2.22
Alignment between curriculum and industry	2.21
Ability to apply adult learning methods	2.18
Design and implementation of distance learning	2.12
Instructional design and development with clearly identified learning outcomes	2.08
Administering "real world" case-studies in instruction	1.89
Classroom management (e.g., keeping students engaged)	1.63
Managing project groups/teams	1.60

The severity of these gaps was assessed using a 3-point scale wherein 3=High Gap and 1=Low Gap – respondents could also identify if no gap existed. Thus, a score of 3 is the largest, and in turn reveals the priority areas for capacity building **(See Table 5.25)**.

The Top 3 options are of particular interest not only because they represent the greatest opportunity for further developing faculty and institutional capacity, but because each correlates strongly with increasing engagement with and alignment to the private sector/industry. Consistent with the previous discussion regarding program modifications that would most

significantly improve HEIs, the most frequently cited response to this question was 'collaborating with industry'. Tied for the highest score, 'Producing applied Research Development, and Innovation (RDI)' that benefits the Egyptian economy' is consistent with what was mentioned qualitatively by a respondent in the previous question.

The capacity building tactics that would be aimed at greater 'Alignment between curriculum and industry' and those pertaining to 'Collaborating with industry' would be complementary. This increased engagement and alignment should specifically address those elements related to research, qualifications, pedagogical approaches, policy changes, and collaboration.

As discussed above, among choices provided in the questionnaire for program modifications that would improve the HEI, respondents overwhelmingly responded that the single greatest improvement would be to 'Align curricula with industry competencies'. These consistent data points across respondents and throughout the assessment of institutional capacity suggest that there exists both the desire and the will to remove the barriers between industry and HEI.

5.3.4 Industry – Academic Linkages and Job Placement

One manner of increasing collaboration between HEI and industry is via internship opportunities and other job placement services. This is an excellent first step that is relatively simple to implement that has historically been a successful mechanism for opening lines of communication between two entities and for HEI to begin better understanding what skills are required by employers. Once those service offerings are established and/or become more robust, then obtaining an increased awareness of skills needed in the market can directly inform program modifications and adjustments in curricula.

For each of the identified tertiary programs provide a description of the program's student job placement services and internship placement services within the sector.

The term 'Job Placement Services' is generally straightforward, and we have added Career Guidance Services.

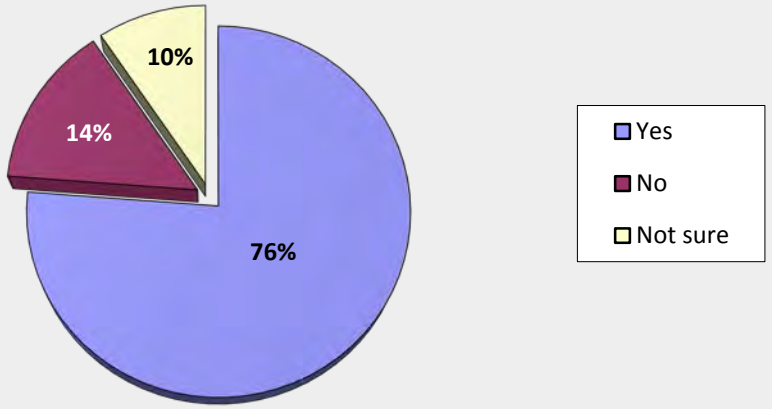
To collect data, a two-part question was utilized: **(a)** a simple, closed-ended inquiry regarding whether these services were offered at each respondent's respective HEI; and **(b)** a maturity model to determine the extent and efficacy of these service offerings. This maturity model has been previously applied by members of the LMA Team on various USAID HICD programs. This maturity model was tailored to the context of Egyptian HEI and employed a 5-point rating scale as follows:

1. Level 1 – Base;
2. Level 2 – Reacting;
3. Level 3 – Focusing;
4. Level 4 – Leading; and
5. Level 5 – Sustaining

Job Placement Services

In the first part of this two-part question, a majority of respondents (76 percent) noted that their respective HEI offered job placement services to students **(See Figure 5.26)**.

Figure 5.26
Does your HEI offer job placement services to students?



Using the maturity model, the LMA Team considered various elements within the 5-point scale that would speak to the current state of this service offering.

For instance, is the job placement service a formal service such as in a resource center? Is there a dedicated staff whose responsibility is to assist students, graduates, and alumni with job placement? Are there Key Performance Indicators (KPIs) regarding the effectiveness (e.g., placement rate within six months) and/or quality of the service offering? How are these KPIs monitored and evaluated?

Although 76 percent of respondents indicated that their HEI offered job placement services, just 33 percent identified those services as being in Levels 3-5. The LMA Team was most interested in assessing that segment of the maturity model considering that this would represent at least a formal dedication on the part of the HEI to offering job placement services.

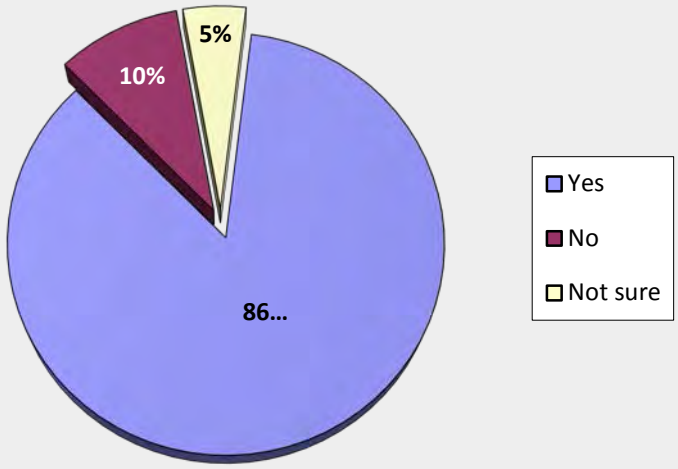
Table 5.28 – Maturity model of job placement services at Egyptian HEI

Level 1 – Base	We do NOT have defined job placement mechanisms (e.g., internships, recruiting) or established industry relationships.	**19.0%**
Level 2 - Reacting	We have some informal job placement activities such as personal networks of professors assisting students. We maintain no formal internship program, have few (if any) industry partnerships, and do NOT monitor/report performance metrics or take data driven actions.	**42.9%**
Level 3 - Focusing	We formally offer job placement services, but do not employ a dedicated staff knowledgeable of labor market supply/demand (e.g., ad hoc responsibility of other staff). Student use of job placement services is low or unknown, and there are few (if any) performance monitoring mechanisms.	**9.5%**
Level 4 - Leading	We have on-campus staff dedicated to job placement services. Staff are knowledgeable of labor market supply/demand, the HEI partners with industry, and BASIC performance metrics are monitored/reported. Improvements are implemented based on performance data.	**9.5%**
Level 5 - Sustaining	We have robust job placement services as well as support for start-ups and entrepreneurs. Most students formally gain "hands-on" experience in the industry of their choice pre-graduation. Industry partnerships are actively managed, and job placement staff have deep expertise in recruiting, selection, and placement. Performance metrics inform STRATEGIC performance improvements.	**14.3%**
	Unknown	**4.8%**

It is of note that 62 percent of respondents (Levels 1-2) indicate that their HEI has no internship program. This would suggest that respondents likely define job placement as something wholly different than internship placement. No respondents from public HEI identified themselves as being in Levels 3-5 within this model, yet 63% of those respondents had previously stated that they do offer job placement services. This incongruence is difficult to reconcile.

Career Guidance Services

Figure 5.29
Does your HEI offer career guidance services to students?



In the first part of this two-part question, 86 percent of respondents indicated that their respective HEI offered career guidance services to students **(See Figure 5.29)**.

The LMA Team considered elements such as is it a formal service? Is there a dedicated staff? What KPIs exist and does monitoring them lead to actionable strategy?

Of all the respondents the breakdown by public and private HEI was 73 percent public and 27 percent private. Thus, the majority of the 86 percent that confirmed the availability of career guidance services being offered to students came from the ranks of public HEI.

Once more, the LMA Team was most interested in those HEI which had identified as being in Levels 3-5 **(See Table 5.30)**. Respondents from Ain Shams University (Level 3) were the only ones from a public HEI to self-identify their service offering in this area within the more mature levels. As with job placement services, more than half of all respondents indicated that they had no formal career guidance service offerings. Again this appears quite incongruent given that 86 percent of respondents had indicated on the preceding question in the assessment instrument that this service is made available to students.

Table 5.30 – Maturity Model of Career Guidance Services at Egyptian HEI		
Level 1 – Base	We do NOT have a career guidance center and/or no services are available to students to plan and tailor academic courses of study aligned to chosen occupation post-graduation.	**9.5%**
Level 2 - Reacting	We offer career guidance counseling via informal channels, but it lacks structure and the HEI does NOT monitor/report metrics such as student satisfaction or post-graduation outcomes. Students rarely (if ever) avail these informal channels.	**42.9%**
Level 3 - Focusing	We offer career guidance counseling via formal channels, but do not monitor/report performance indicators. Career guidance counselors are not well qualified, lack training, and are NOT current on labor market supply/demand. Student use is low or unknown.	**4.8%**

Level 4 – Leading	We have a career guidance center with a staff dedicated to student services to align courses of study to chosen occupation. BASIC performance metrics are monitored/reported to identify AND act upon performance improvements. Counselors are well qualified and some students utilize their services.	**23.8%**
Level 5 - Sustaining	We have a career guidance center and students can plan and tailor academic courses of study. Counselors are well qualified and knowledgeable of labor supply/demand. DETAILED performance metrics are monitored, reported, and acted upon for performance improvements. Nearly ALL students utilize career guidance services.	**14.3%**
	Unknown	**4.8%**

In summary, despite the apparent incongruences in the response data, it is evident that Egyptian HEIs have an excellent opportunity that can be seized specifically in the area of job placement services. This effort would be significantly enhanced via increased cooperation, coordinated communication, and engagement with **(a)** the private sector entities; and **(b)** organizations such as MOMM and CAPMAS. The former would provide students and job placement service providers with a more robust network to locate employment opportunities post-graduation as well as a chance to gain critical hands-on, industry-specific skills pre-graduation. The latter would provide MOHE and individual HEI with valuable data and analysis about occupational forecasts and labor market trends that would empower HEI to both better respond to market needs with an appropriate volume of human capital flowing into occupational categories, and also continuously improve the alignment of course content and faculty curricula to industry competencies.

Even at relatively modest funding levels, HEPP programs could support establishing and/or improving job placement and career guidance service offerings at the HEI level. Levels 3-5 of the maturity model provide very high-level milestones that can be targeted with progress evaluations, as well as opening those lines of communication and improving coordination with industry and key informants such as MOMM and CAPMAS.

Commonly there are two associated risks that need to be considered and overcome when using job placement services as the conduit between industry and higher education: **(1)** faculty deans and administration may not be receptive to taking cues from a non-academic source within the HEI with respect to program modifications or curricular enhancements; and **(2)** individual companies may have undue influence regarding what skills are needed in order for students to become more "market ready" rather than it coming from a perspective of the entire industry or economic sector.

Provide information on whether and where students secure employment or improve their work performance after participating in the institution's programs and activities (disaggregated by gender).

Securing employment is a difficult proposition for most students and graduates. Chapter 4 reported that in 2013 the unemployment rate in Egypt exceeded 13 percent. Although this figure is not alarming in relative terms when compared, for instance, to Italy, Greece, or Portugal, what is concerning is that more than 80 percent of those persons unemployed have already graduated from a secondary or tertiary educational institution. In all, 74 percent of the unemployed had some post-secondary education (64 percent of unemployed males and 87

percent of unemployed females). School and college graduates are more likely to be unemployed than those who have not completed primary school (Tanya El Kashef, "Why Can't the Average Educated Egyptian Find a Suitable Job?", Community Times, http://egyptianstreets.com/2014/12/29/why-cant-the-average-educated-egyptian-find-a-suitable-job/, December 29, 2014).

Identify the equipment/infrastructure requirements and costs required for successful programs.

As indicated above, equipment and costs will vary greatly depending on the program. However, the LMA team believed that it would be useful for USAID and MOHE to learn the perspectives of HEI personnel on their own procurement circumstances.

In order to arrive at a comprehensive set of responses to this question, the LMA Team posed a series of five questions to respondents. Some of these questions were designed to gather the data needed to inform recommendations and other questions were intended to validate:

a) Qualitative information gathered from KIIs during the administration of Tasks 3 and 5; and/or
b) Findings from research conducted during the desk review of literature.

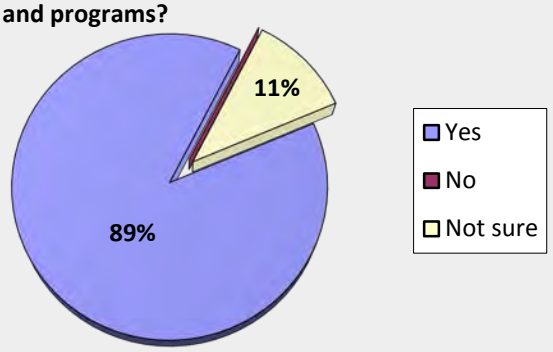
In the following paragraphs these questions will be broken down and analyzed individually, along with any observations that can be drawn from the summary data captured during the assessment of institutional capacity.

1. **Is your HEI able to procure equipment/materials and build the infrastructure required by the academic disciplines and programs?;** and
2. **Is your HEI able to maintain equipment/materials required by the academic disciplines and programs?**

Thirty-three percent of respondents indicated that their HEI is able to efficiently and easily procure the equipment and materials required for the academic disciplines and programs being offered. A further 29 percent stated that procurement processes are transparent and that funding is generally available. Nearly 2/3 (62 percent) of respondents feel that both adequate funding and procurement procedures exists to facilitate the execution of academic programming at his/her HEI. In stark contrast just 4.8 percent of respondents to this question cited that his/her HEI is unable to effectively procure the requisite equipment and materials as a result of too much "red tape" or funding not available.

With respect to maintaining equipment and materials, 89 percent of respondents noted there was not any difficulty with maintenance once equipment and materials had been procured. Eleven percent were not certain of the maintenance situation. Not a single respondent indicated that his/her HEI was unable to properly perform needed maintenance **(See Figure 5.31)**.

Figure 5.31
Is your HEI able to maintain equipment/materials required by the academic disciplines and programs?



Qualitatively speaking the LMA Team repeatedly heard that equipment, particularly in laboratories and workshops where students can gain valuable hands-on experience, is out of date and/or cannot be properly maintained due to lack of resources. One HEI that offers instruction in the discipline of automotive technology noted that they currently train students using an internal combustion engine that was donated (not procured) from a German automobile manufacturer in 1948. Another HEI cited that they had procured a piece of state-of-the-art medical diagnostic equipment in 2007. Unfortunately no one knew how to operate the machine, and everyone was too afraid to damage the machine if they used it improperly. Thus it remains unused under plastic sheeting in a corner of the laboratory under a thick coat of dust. The qualitative themes emerging from KIIs, particularly from faculty members, appear disconnected from the quantitative indications from university administrators in positions such as President, Vice President, and Provost; which was the typical audience of the Task 4 – Institutional Capacity assessment.

In other KIIs the LMA Team was told by three separate interviewees that they were unaware of any specific guidelines pertaining to procurement. Each noted that a request had to be submitted to his/her respective Dean, but that they did not know the lifecycle workflow of actually procuring equipment. The LMA Team cannot say definitively if a documented, standardized procurement process and/or set of procedures do (or do not) exist. However, internet research was conducted and no documentation related to procurement for HEI was evident or located when querying the Government Procurement Portal (https://etenders.gov.eg/en/index.php), Egypt's Government Services Portal (http://www.egypt.gov.eg/english/home.aspx), or the Ministry of Higher Education (http://www.egy-mhe.gov.eg/en).

3. How are costs related for procurement and program establishment most commonly funded?

Sixty percent of respondents from public HEI indicated that funding most commonly came from the Government of Egypt; whereas 100 percent of private HEI cited student tuition and fees as the most common source of funding. Both public and private HEI also mentioned that donor funding and investment from industry/private sector were 'Sometimes' received.

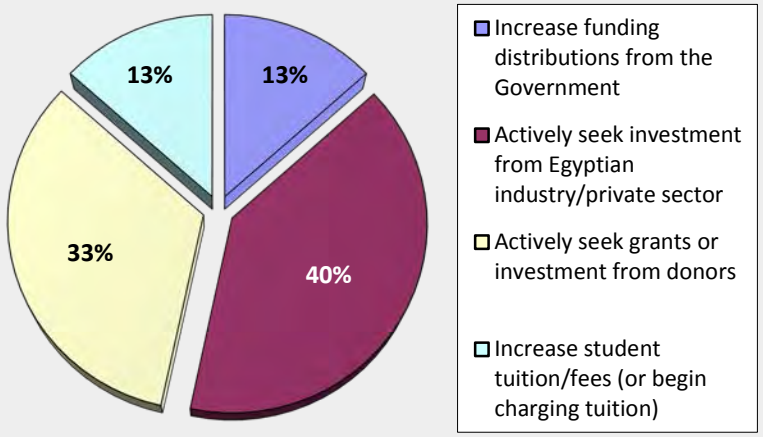
4. How can your HEI most likely generate additional revenue or increase budget allocation?

Only 13 percent of respondents felt that obtaining an increase in the level of funding from the Government of Egypt was the most likely way of generating additional revenue for the HEI.

By contrast nearly ¾ of all respondents (73 percent) believed that the means of generating additional revenue would most likely come through more active investment from the business community and/or investment from grants and donor assistance **(See Figure 5.32)**.

Increasing student tuition/fees or beginning to charge tuition was not commonly cited. It seems that public HEI still fundamentally believe in a "free" education for Egyptians and that private universities cannot further increase tuition and remain competitive against other private HEI or as a significantly attractive alternative to public HEI.

Figure 5.32 How can your HEI most likely generate additional revenue or increase budget allocation?



One respondent suggested that "We need to commercialize our intellectual property and engage [the private sector] in knowledge transfer" as a principle means of generating revenue for the HEI.

Another respondent said, "[To] Increase fund[ing] from the related entities [we can make the] best use of resources that already exist". If increasing revenue is not entirely possible, then greater fiscal responsibility is well within the control of HEI Leadership.

Other respondents from public HEI indicated that specialized programs could be established or further expanded. Tuition/fees are charged within those courses of study – one respondent in particular noted "Special Units (could generate revenue) however there are legislative impediments". These "special units" are called 'Excellence Programs'. The Excellence Programs are fee-based and are offered in English as the language of instruction.

Excellence Programs are currently offered at ten Egyptian public HEI **(See Table 5.33)** and offer courses in a variety of faculties. If any of the legislative impediments mentioned by one respondent could be effectively overcome and/or greater autonomy could be provided to the public HEI, then it could become possible for Egyptian public HEI to run parallel models. One would continue to be tuition-free enrollment, and the Excellence Programs could be "pay as you go". It would be useful to get more information about the existing Excellence Programs (e.g., student demand, net operating margin, relative academic standards, alignment to industry competencies) with a view to eventually phasing-in more programs of this nature across public HEI in Egypt.

Although a "quasi-private" model has the potential to generate significantly more revenue for the public HEI and decrease dependence on GoE budgetary allocation, it also brings with it some administrative difficulty and more complex governance issues.

Resistance to increasingly commercializing higher education should be expected, yet it is evident that there is a need to increase revenue and create greater curricular alignment with industry competencies.

Table 5.33 – Public HEI with Excellence Programs	
Alexandria	Assiut
Ain Shams	Cairo
Helwan	Mansoura
Menofia	Suez Canal
Minia	Zagazig

5. Does your HEI have the will and/or ability to increase funding?

This question yielded unexpected responses. The answer choices were:

A. We have both the will and the ability to increase funding
B. We have the willingness to increase revenue/funding, but not the ability to do so
C. We have the ability to increase revenue/available funding, but there is no need
D. We have neither the will nor the ability to increase revenue/available funding

The team anticipated that given that the lion's share of funding, particularly for public HEI comes from the GoE based on a budgetary allocation and passive receipt of those funds, most respondents would indicate a response of either B or D. In fact the design of the question was intended to validate an assumption drawn from initial KIIs (and other literature examined in the desk review) that HEI had little autonomy or influence over the budgetary allocation from the GoE to run HEI operations, fund existing disciplines, or create new program offerings. Contrary to expectations, 78 percent of respondents indicated that they have both the will and the ability to increase funding. Surprising the team, respondents of HEI Leadership (i.e., University Presidents, Vice Presidents, Provosts, Deans) for Task 4 of the LMA Team's SOW overwhelmingly expressed that they can and will increase funding for their respective HEI. This either **(a)** invalidates the previously held assumptions; **(b)** suggests that respondents may not have understood the question; or **(c)** suggest that the respondents did not answer in a way that is consistent with their actual level of control over budgetary allocation and educational expenditure.

5.3.5 Collaboration between Public HEI and Local Communities and the Private Sector

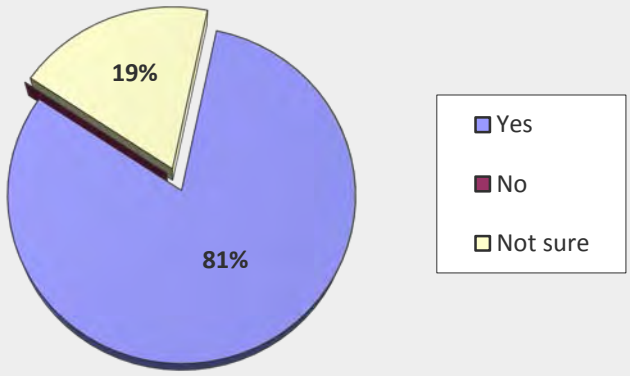
What is the nature and relative success of collaboration between public higher education institutions and local communities and the private sector?

To examine the nature and relative success of collaboration between HEI, local communities, and the private sector it was important to establish a baseline of respondents' awareness of collaboration.

Figure 5.27 illustrates that the vast majority of respondents (81 percent) were aware of collaborative efforts by their respective HEI. Not a single respondent indicated that his/her HEI did not collaborate, but nearly 1 in 5 (19 percent) were not sure; which suggests that HEI could be doing more to promote these collaborations – especially considering that the respondents were those holding positions such as University Presidents, Faculty Deans, and other top HEI leadership who would ordinarily be aware of HEI operations and public relations.

Qualitatively one respondent noted, "We work in some of the disadvantaged rural communities and try to build partnerships with both domestic and international companies, as well as Small to Medium Enterprises (SMEs)". Other respondents pointed to the Investors Associations and various Chambers – "We have [a] representative from industry who attend[s] our university council meeting," noted another respondent, and "Our institution has collaborative networks with [both the] Alexandria Businessmen Association and Alexandria Business Women Association".

Figure 5.34
Does your HEI build collaborative networks with local communities and/or businesses?



Respondents were then asked to rate the results of any collaborative efforts with **(a)** businesses, and **(b)** their local communities. The LMA Team employed a rating scale for respondents to evaluate the results of collaborative efforts. 'Excellent'=4; 'Good'=3; 'Fair'=2; 'Poor'=1; and 'No Results'=0.

For businesses, against the maximum aggregate score of 4.00, the weighted average across all respondents equaled 3.38 indicating that on average respondents felt that their collaborative efforts were producing results better than 'Good' but not 'Excellent'. This suggests that there remains room for improvement in the area of collaboration between higher education and industry; which is well documented in previous sections of this report.

For the HEI's local communities, the weighted average across all respondents equaled 3.33. Again, respondents felt that their collaborative efforts in their local communities were producing results better than 'Good' but not 'Excellent'.

The LMA Team sought to establish the factors that either facilitated or constrained the collaborative efforts of HEI. Responses varied across the HEI, which further indicates the different stages of organizational maturity achieved by Egyptian HEI. For example, one respondent from a private HEI noted "Availability of databases, communication channels with students through posters internally and internet websites" as a factor that facilitates outreach and broad collaboration with industry and their local communities. Citing databases, having an internet presence showcasing available resources, and publishing collateral materials (e.g., posters) highlights one level of organizational maturity that is in stark contrast to another response, "No public relations department – team members lack professional skills related to marketing" that was listed as a constraint from an official at one public HEI.

For every "Willingness and understanding of the benefits to be gained" listed as a facilitating factor, there was a counteracting comment in the constraining factors such as, "[There is a] lack of understanding on the part of both the University and the business community of the benefits of collaboration". Another facilitating factor was "Availability of funding, [and] having a clear MOU prior to commencing with clear identification of roles and responsibilities" against

"Lack of fund[s]" and "losing commitment from both parties" that would seem to indicate that a memorandum of understanding (MOU) and clear definition of outcomes was not present.

Other themes regarding constraints that emerged from the qualitative data were that **(1)** bureaucracy and "red tape" makes the effort of collaborating a low return on investment (ROI) of the time; and **(2)** that collaboration and outreach are simply not part of the organizational culture. Responses along that line include, "Lack of vision of others"; and "Lacking of the culture [to collaborate]".

Somewhat confounding are the aggregate scores of 3.38 (collaboration with business) and 3.33 (collaboration with local communities) on a scale wherein the maximum score is 4 which seemingly belie many of the qualitative responses regarding the constraints. It can be speculated that some respondents may have unconsciously inflated the quantitative data for some reason.

In any case, it would appear not only from the assessment questions specifically related collaboration, but also those from the other aforementioned points with regards to better aligning curricula to industry competencies, improving engagement with the private sector, and producing more applied RDI that there is room for improvement in collaborative efforts.

5.4 Academia, Gender and Other Constraints

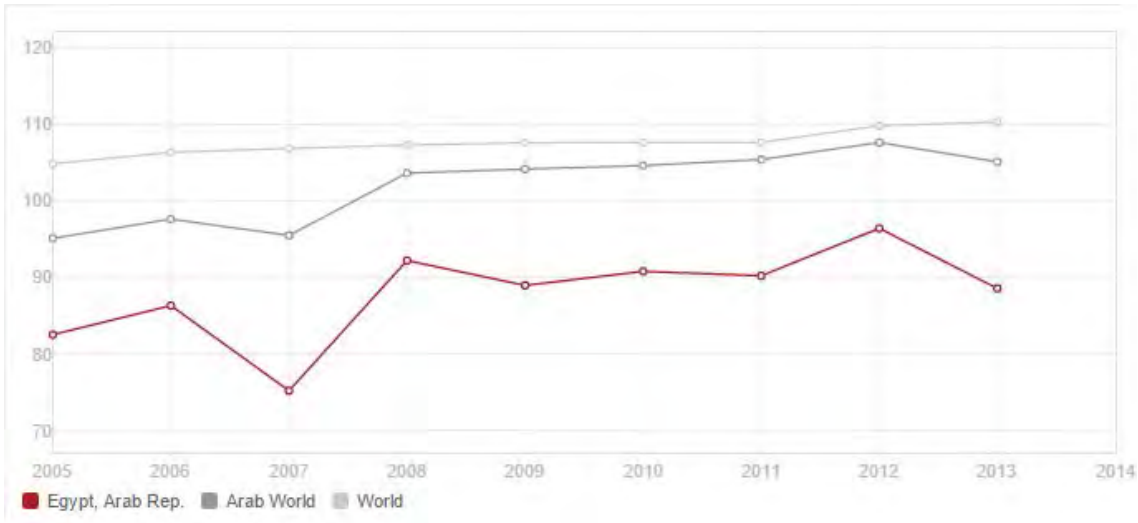
5.4.1 Gender Disparities – General Perspectives

Are there certain disciplines that are predominantly male or female? If so, please identify and analyze the reasons for the disparity.

Information gathered during desk review of tertiary education enrollment by gender indicates a lower proportion of females to males across Egyptian public and private HEI. **Figure 5.35** shows the ratio of females to males in higher education in Egypt, the Arab world, and the world from the most recently available report from the UNESCO Institute for Statistics (2013). In 2013 Egypt had .89 female per 1male enrolled in higher education. Although this does not appear to be grossly disproportionate, it is interesting to note how Egypt seems to be lagging behind when compared to what UNESCO classifies as the 'Arab World' (1.05 female:1.0 male) and the 'World' as a whole (1.10 female:1.0 male).

Figure 5.35

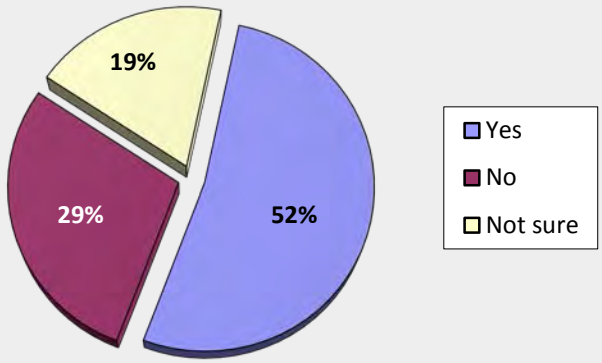
Ratio of female to male tertiary enrollment in public and private educational institutions



United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.
http://data.worldbank.org/indicator/SE.ENR.TERT.FM.ZS/countries/EG-1A-1W?display=graph

The UNESCO data does not break down gender distribution by academic program, but according to respondents in this study, there are some select disciplines which remain predominantly male or female. More than half of respondents indicated that certain disciplines attracted gender-disproportionate enrollments **(See Figure 5.36)**.

Figure 5.36
Are there academic fields/disciplines where enrollments are predominantly male or female?



Female enrollment tends to exceed male enrollment most notably in the areas of Nursing, Language Arts, Liberal Arts, and Architecture. Social Sciences and Humanities as well as Literature and Journalism also received mention. Fields related to health (e.g., Pharmacy, biomedicine) were mentioned on several occasions as being predominantly female, yet there were several mentions of male predominance with respect to those enrolled to become doctors and surgeons.

According to respondents, disproportionate male enrollments occur in Engineering and its sub-disciplines (e.g., Petroleum, Civil, Structural). Other so-called "industrial" disciplines such as automotive technology were cited by multiple respondents as being a mostly male demographic.

When probed for the probable reasons behind any disparity, respondents overwhelmingly (63.6 percent) cited cultural beliefs, traditions, and/or the nature of work being better suited for people of one gender rather than the other. One respondent noted "Architects work inside. Construction Managers and Petroleum Engineers work outside. Otherwise, the gender imbalance is not too bad".

Another respondent indicated "Female nature in the East doesn't tend to work in exhausting jobs". The desk review of myriad studies and papers illustrates the pervasiveness of this mindset across Egypt as a whole. At 0.89 female:1.0 male Egypt is relatively close to gender parity with respect to HEI enrollment, yet the figures for labor force participation of women drops precipitously to 0.30 female:1 male versus the global average is 0.68 female:1 male – for the 2012 data from the World Economic Forum's *Global Gender Gap Report* this ranks Egypt 126 of 135 nations evaluated in labor force participation of women.

The wide gap between men and women participating in the labor force may be attributed in part to personal choice. However an independent report from the Egyptian Center for Women's Rights appears to reinforce the perceptions of some respondents in this USAID assessment that women are frequently viewed as fragile. Moreover, there is an undercurrent of concern that women will disrupt business operations by leaving the labor force unexpectedly due to pregnancy. These perceptions converge to affect hiring and/or promotional decisions irrespective of academic achievement resulting in a female unemployment rate (24 percent) in Egypt that is more than double the rate of unemployment of men (10 percent) (Barma, Mustansir, "Half the Country, but still Unequal", http://carnegieendowment.org/sada/2013/03/14/half-country-but-still-unequal/fqke, March 14, 2013).

Addressing this dynamic of gender inequity within Egyptian labor force and changing perceptions regarding female graduate participation in the labor force is outside the scope of this assessment.

5.4.2 Gender Aspects of Leadership and Research

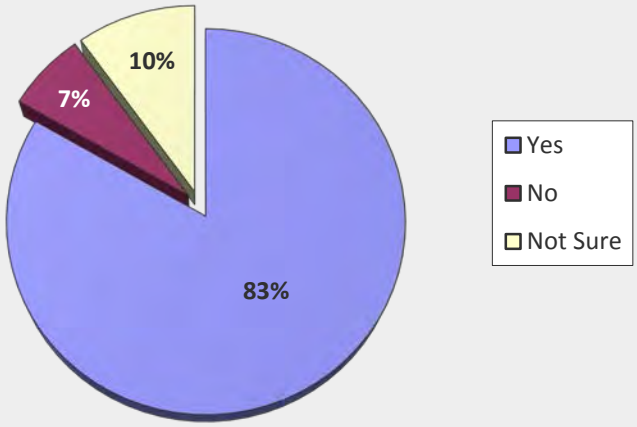
What are the key gender-related issues, constraints and opportunities in leadership and research staff?

According to data collected from Egyptian HEI surveyed, respondents indicated there is near parity in the ratio of female-to-male teaching and research staff **(See Table 5.37).**

Table 5.37 - Number of teaching and research staff

Answer Options	Response Average	Response Total
Male	1,269	22,837
Female	1,172	21,094
Female: Ratio	**0.92 : 1**	

Figure 5.38
Does your University promote gender equity amongst Researchers?



Respondents were then asked if they believed that the HEI promoted gender equity specifically amongst research staff. The majority (83 percent) indicated to the affirmative **(See Figure 5.38)**.

Respondents commented that "EOE [Equal Opportunity Employment] for women [is] encouraged", and "Full EOE [and] metrics are kept to seek balance." One respondent pointed out that her HEI has an Office for Equal Opportunity.

This quantitative and qualitative data indicate that **(a)** there is reasonable gender equity amongst researchers, and **(b)** measures have been taken in several HEI to ensure that balance is achieved and/or maintained. This were also the case when hiring for new research positions.

Table 5.39 summarizes respondent data regarding whether gender is a consideration when hiring candidates for new faculty research roles. One respondent noted, "All candidates, males and females, have the right to work at the different faculties of the university and participate in the research and teaching activities". The aggregate data would appear to validate that comment – not a single respondent indicated that either males or females are given preferential treatment – with 93 percent specifically noting that hiring for the purpose of gender equity is not a consideration.

Table 5.39 – Are specific gender-types encouraged for Research Staff opportunities?

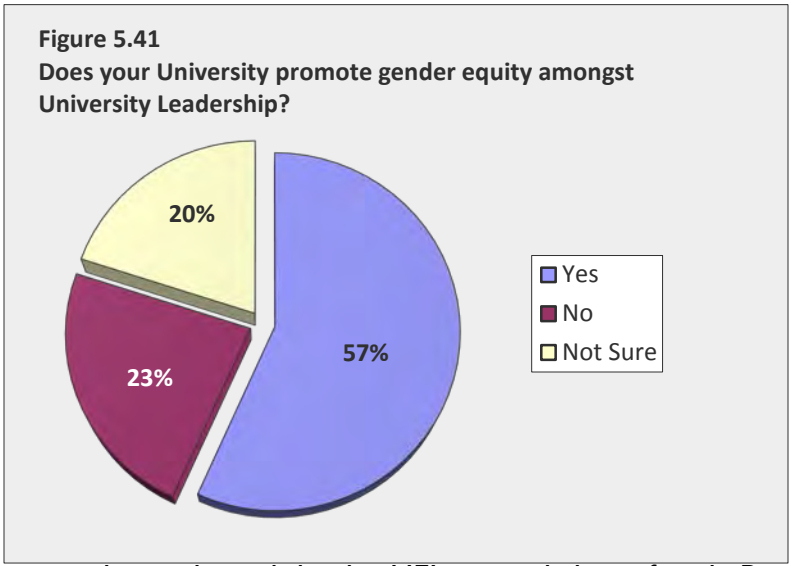
Answer Options	Response Percent
Yes – Male Researchers	0.0%
Yes – Female Researchers	0.0%
No – Research Faculty opportunities do not consider gender	93.3%
Not sure	6.7%

Table 5.40 – Are specific gender-types encouraged to seek University Leadership opportunities

Answer Options	Response Percent
Yes – Males	3.3%
Yes – Females	0.0%
No – Leadership positions do not consider gender	93.3%
Not sure	3.3%

Similar responses were provided when respondents were asked about hiring for university leadership roles. Again, 93 percent indicated that gender is not considered when hiring to fill positions of leadership **(See Table 5.40).**

Whereas 93 percent of respondents had suggested that the HEI promotes gender equity amongst researchers (**See Table 5.40**), only 57 percent of the same pool of respondents could say the same for leadership positions **(See Table 5.41)**



One respondent said "We encourage females to take the lead. Our council encourages competencies without looking to gender…but it gives more attention to females". Another respondent noted that, generally speaking, more time is needed for women to acquire the required skills. He remains optimistic and stated "Women have not yet developed into having the qualifications for University Leadership roles...not so far, but will come". One University respondent indicated that his HEI currently has a female President and Vice President. The key lies in "developing leadership skills of female professors & academic personnel. Affirmative action [must actively] seek female leaders," replied another respondent.

Based on response data, there appears to be greater gender equity across Egyptian HEI faculty than many other occupations in Egypt. More actions can be taken in order to ensure that female university personnel have the time and other resources to further develop leadership skill sets that will better position them to be candidates for promotional opportunities when leadership roles become vacant.

What are the main constraints and opportunities for gender equitable participation and access to…academic programs?

The LMA Team asked respondents to identify which mechanisms could improve gender equity in academic programs. A weighted score was used wherein high=3, medium=2, and low=1. Thus, the maximum aggregate score for each answer option was 3.

Table 5.42 - Mechanisms for improving gender equity

Answer Options	Rating Average
Increase access via distance education and e-learning opportunities for women	1.84
Provide scholarship opportunities for under-privileged women	1.62
Increase access via distance education and e-learning opportunities for men	1.60
Reduce the overall financial burden of education to allow greater access	1.55
Provide scholarship opportunities for under-privileged men	1.35

Increasing distance education opportunities (e.g., e-learning, live streaming of lectures, virtual classroom) for women was indicated as the top mechanism **(See Table 5.42).** Access to more or better scholarship opportunities for women is also considered a mechanism that would have a higher influence.

Are there other critical constraints related to the development of labor that should be addressed?

HEI were given a number of constraints that could impede the development of market-ready labor. Respondents were asked to rate these constraints.

Table 5.43 Constraints to developing graduates with labor market skills	High	Medium	Low
Academic readiness of secondary or technical school graduates	**42%**	**55%**	**3%**
Enrollment demands from the Ministry of Higher Education (or other governing body)	**39%**	**34%**	**26%**
Equipment of labs and physical facilities	**39%**	**34%**	**26%**
Centralization as a government approach to Higher Education strategy	**37%**	**34%**	**29%**
University (or Faculty) Leadership	29%	42%	259%
Lecture-based instruction as the preferred (or only) methodology	29%	37%	34%
Level of practical, "hands-on "experience held by instructors	26%	47%	26%
University Operations (e.g., policies, procedures)	24%	58%	18%
Level of engagement with the Private Sector	21%	61%	18%
Unknown	5%	18%	39%
Technical or Academic qualifications of instructors	1%	50%	37%

As shown in **Table 5.43** above, while academic readiness of secondary school students is the highest constraint at 42 percent, enrollment demands of the Ministry for Higher Education (39 percent) and equipment for laboratories and physical facilities (39 percent) closely follow. The constraint of government centralization (37 percent) was also considered a strong constraint.

6. UNIVERSITY RESEARCH, DEVELOPMENT, AND INNOVATION (RDI) IN SECTORS FOR POTENTIAL GROWTH

This chapter corresponds generally to the questions posed in Task 5 of the Scope of Work, although it incorporates responses to a question in Task 3 related to R&D. It should be noted that realistically only universities are in a position to take part in R&D.

What kind of university research is most needed by the private sector to address needs for innovation or sophistication in consumer-product development?

HEI were asked to list the top research needs of the private sector to improve consumer product development. Energy was the most often-mentioned field (Table 6.1):

Table 6.1 HEI Views on the Top Research Needs of the Private Sector to Improve Consumer Product Development

	Research Need	Alexandria	Arab Academy	AUC	Cairo	Deraya	Helwan	Suez Canal	Technical Colleges	Total
1	Energy and renewable Energy	1			1		1			3
2	Environmental and health concerns	1			1					2
3	Marketing research		1						1	2
4	Pharmaceutical studies	1				1				2
5	Software development & programming	1					1			2
6	Animal farming & Pets							1		1
7	Automation				1					1
8	Business history			1						1
9	Data security						1			1
10	Developing Competency Based Curriculum								1	1
11	Energy-wind				1					1
12	Equipment design				1					1
13	Esthetics				1					1
14	Food safety and Security							1		1
15	Functional Foods	1								1
16	Health science	1								1
17	Heritage Management						1			1
18	Information Technology						1			1
19	Linking of biology & technology					1				1
20	Logistics			1						1
21	Market pricing economics								1	1
22	Museology						1			1
23	Nanotechnology	1								1
24	Petroleum studies	1								1

25	Product compliance testing								1	1
26	Product design & packaging				1					1
27	Production management				1					1
28	Quality				1					1
29	Social Research			1						1
30	Supply chain management			1						1
	Totals	**8**	**1**	**4**	**9**	**2**	**6**	**2**	**4**	**36**

HEI mentioned a wide variety of RDI activities in their responses, including the following:

Table 6.2 Illustrative Research by Egyptian HEI

HEI	Research activity
Alexandria	We have an accredited clinical trial center that helps in medical trials. Many partnerships with industrial sector include petroleum companies and pharmaceutical industry. Other applied research includes energy conservation and renewable energy, ready-made garments (RMG), agriculture, fertilizer development, food processing and cultural heritage.
Cairo	Applied research in wind energy, control and engines. Some collaborative research projects in poultry and animal production. Other applied research includes castings, space, petroleum and spare parts industry.
Deraya	Launched the first ever lab for drugs industries. We teach the ethics of nanotechnology which will greatly serve the Egyptian market through adding the ethical dimension to business.
Suez Canal	Individual contacts with some companies for applied research with farm animal producers.
American University in Cairo	Cooperation with IT industry, energy research and sustainable development. A number of initiatives to support business start-ups and industry development. Other applied research includes construction, agriculture, real estate, logistics, innovation support, education.
Helwan	Applied research in business, energy, tourism and hospitality
Nile	Applied research in agriculture, genomics, Food GMO. Also provide SMART distribution of pesticides along with training and m-Learning
Ain Shams	ICT applied research
Higher Technology Institute	Applied research in civil engineering and mechanical engineering.

6.1 Potential of Egyptian Higher Education Institutions to Address the Needs of Egyptian Businesses

Describe how the [research and development] activities and programs are effectively addressing the interests and needs of the client or stakeholder institutions (local businesses, farmers, and agribusinesses, etc.) that have an interest in the activities and programs.

One HEI respondent, referring to research linkages with industry, stated that we "could do more if we can change the mind set and private sector can collaborate with universities". However, there was evidence of some activities and programs appearing to effectively address

the interests and needs of clients and other institutions. **Table 6.2** lists research activities and programs that were being undertaken at Ain Shams, Alexandria University, American University in Cairo, Cairo University, Deraya University, Helwan University, Higher Technology Institute, Nile University and Suez Canal University

Responses to other **Task 5** questions provided information on the type of research conducted in the past five years and projections for the next five years. From a list of industry-based applied research areas, HEI selected the areas that were focused on by their university. **Table 6.3** shows industry-related research areas conducted in the past five years, whereas **Table 6.4** shows potential research to be conducted in the next five years that should address the interests and needs of industry and other stakeholder institutions.

Table 6.3 – Applied research over the past 5 years

	Research Area																			
Universities	ICT	Hospitality & Tourism	Health	Innovation Support	Materials & Nanotech	Business, Finance, HR, Marketing	Agriculture	Transportation	Energy	Water	Manufacturing	Environment	Education	Space	Food	Petrochemical	Entrepreneurship	Other (i.e., Social Service, Fine Arts, Music, PE)	Other (i.e., CSR, Poverty)	TOTAL
Ain Shams	1		1	1	1	1	1		1	1		1	1		1					11
Alexandria	1		1		1		1	1		1		1			1	1				9
AUC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				16
Arab Academy		1		1	1	1		1	1		1	1				1				9
BUE	1	1	1	1				1								1	1			7
Cairo	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	16
Deraya	1		1		1	1					1									5
Future	1		1		1															3
Helwan	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1		16
Higher Tech. Inst.	1		1																	2
Nile	1		1	1	1	1		1	1	1	1									9
Pharos		1			1	1			1		1		1			1				7
Suez Canal	1		1			1	1			1		1	1		1					8
Tiba		1																		1
TOTAL	11	5	11	7	10	9	5	7	7	7	7	7	6	3	6	7	1	1	1	

Table 6.4 – Applied research planned over the next 5 years

	Research Area																	
Universities	ICT	Hospitality & Tourism	Health	Innovation Support	Materials & Nanotech	Business, Finance, HR, Marketing	Agriculture	Transportation	Energy	Water	Manufacturing	Environment	Education	Space	Food	Petrochemical	Stem Cell Research	TOTAL
Ain Shams						1												1
Alexandria	1	1	1	1	1		1	1	1	1	1	1	1		1	1	1	15
AUC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
Arab Academy		1				1												2
BUE																		0
Cairo	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
Deraya	1		1		1	1			1		1							6
Future	1		1	1	1				1									5
Helwan	1	1	1	1	1	1		1	1	1	1	1	1		1	1		14
Higher Tech. Inst.				1														1
Nile	1		1	1	1		1	1	1	1	1	1	1	1				12
Pharos	1	1	1	1	1			1	1		1		1		1	1		11
Suez Canal									1		1			1		1		4
Tiba																		0
TOTAL	8	6	8	8	8	6	4	6	9	5	8	5	6	4	5	6	1	

Provide a profile of the "customers" that are served by the existing program(s). Identify actual or potential "client" and "stakeholder" institutions – the institutions that might reasonably have an interest in seeking services from, providing students or trainees for, or otherwise participating in the institution's activities and programs (in the substantive area).

HEI were asked to identify Egyptian market sectors that their Research, Development, and Innovation (RDI) efforts are benefiting in the present and in the past. In response, HEIs mentioned both sectors as well specific organizations, as noted in **Tables 6.5** and **6.6.** As shown by this data, research beneficiaries may include Egyptian government bodies (e.g. Ministry of Tourism) as well as commercial entities (e.g. McDonalds Egypt).

Table 6.5. Current RDI Beneficiaries

University	Current RDI Beneficiaries					
Alexandria	Energy; conservation and renewable energy	Food Processing	Agriculture	Drug manufacture	Food processing	
Arab Academy	Transportation	Maritime	IT	Energy		
AUC	Construction	IT	Logistics	Human resources	Education	Food processing

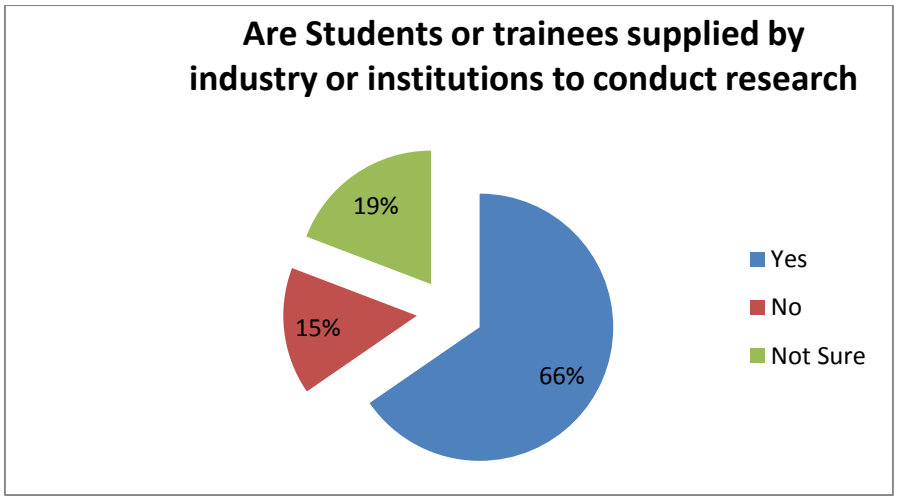
	Health	Chemical engineering	Agriculture	Energy sector	Corporate social responsibility	Finance
	Housing					
British (BUE)	Energy	Engineering				
Cairo	Ministry of Education	Private schools	Ministry of vocation education	Power generation (wind and solar)	Industrial design	Pollution
	Energy and power industry	Construction	Steel industry	Petroleum		
Deraya	Drug Industries	Medical Care	Pharmaceutical Industry	Health Care Sector		
Future	Produced a medication jointly with 2 pharmaceutical companies					
Helwan	Banks	Ministry of Tourism	Factories	Ministry of Antiquities	McDonalds Egypt	Americana group Egypt
Higher Technical Institute	Chemical industries including Environment and pollution research	Mechatronics	Maintenance/ operation/ repair of equipment	biomedical engineering		
Nile	Agriculture	Healthcare	Transportation			
Suez Canal	Food Processing	Energy- Solar cells				

Table 6.6 Previous RDI Beneficiaries

University	Previous RDI Beneficiaries					
Ain Shams	ICT					
Alexandria	Drug manufacture	Energy; Renewable Energy & energy conservation	Agriculture	Ready Made Garments and Style	Fertilizer Development	Food processing
AUC	Construction	IT	Agriculture	Logistics	Education	Innovation support
	Real estate					
Cairo	Ministry of Education	Private schools	Poultry Industry	Casting	Power	
	Power generation	Military	Space	Petroleum	Spare parts	
Deraya	Drug industries					
Helwan	Ministry of Environment	Ministry of Military Products				
Higher Technical Institute	Civil engineering	Mechanical engineering				
Nile	Agriculture – genomics	Food - GMOs				
Suez Canal	Farm Animal Produces	Ministry of Health				

HEI were also asked if industry or other institutions supplied students or trainees to conduct research and development activities. As shown in **Figure 6.7**, 66 percent gave an affirmative response while only 15 percent provided a negative answer.

Figure 6.7 Egyptian or International Institutions that Have Supplied Students or Trainees to Conduct Research Activities



This data together with the HEI comments shown in **Table 6.8** below demonstrate that many Egyptian and international stakeholders have a strong interest in seeking research services provided by universities.

Table 6.8
Examples of Stakeholder Institutions that Supplied Students or Trainees for Research Activities

Coca Cola, Intel, Astra Zeneca
IBM
Faculty of engineering provides students to agriculture faculty
Private sector provides candidates for M.A. and Ph.D.s in agriculture
Many Ph.D. and Master's students come from industrial sector and usually the main focus of their research is solving problems in their field. Most commonly petroleum sector
Ministry of Education for several years
University students from Libya and Sudan for Masters and PhDs
Ministry of education, Ministry of Tourism, Ministry of Military Products

6.2 Patterns of Collaborative Activity

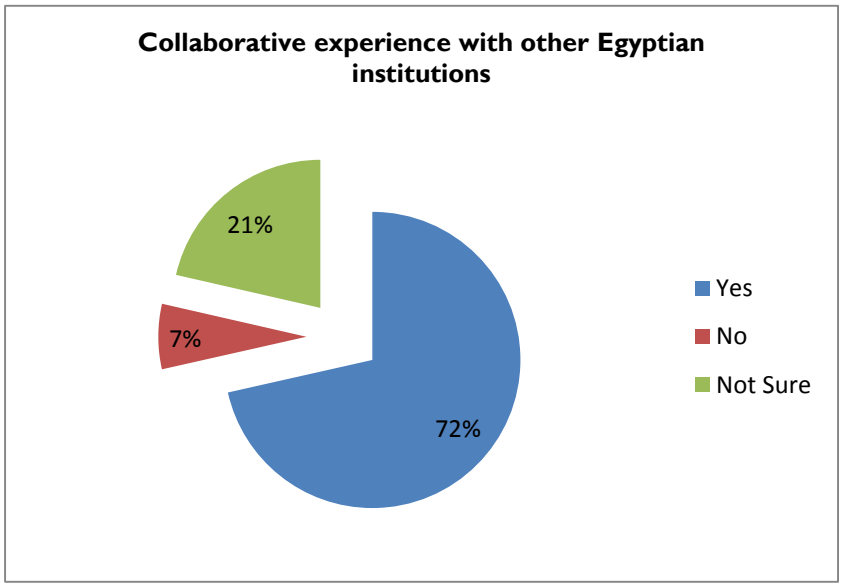
Identify and describe the institution's current and prior experience working with other institutions of higher education (research, collaborative teaching), within Egypt or internationally, and characterize the factors that appear to facilitate or constrain such collaboration.

This question was subdivided into three sub-questions:

1. HEI experience collaborating with other Egyptian HEI. An explanation on their positive (facilitators) or negative (constraints) responses was also requested.
2. HEI experience collaborating with international organizations and other HEI. An explanation on their positive (facilitators) or negative (constraints) responses was also requested.
3. HEI ability to sustain collaboration with U.S. universities.

HEI responses to the first question showed 72 percent of universities had experience in collaborating with other Egyptian HEI. This result, shown in **Figure 6.9** below, also shows that 21 percent of university respondents were not sure about past collaborative experiences with other Egyptian HEI.

Figure 6.9 HEI Experience Collaborating with Other Egyptian HEI



While the 28 percent who were not sure or did not have collaborative HEI experience did not share information on constraints, a number of statements showed the existence of current collaborative experience. Listed in **Table 6.10** are examples of confirmed collaboration with Egyptian institutions. These collaborations appear to be facilitated by individuals as well as institutional MOUs.

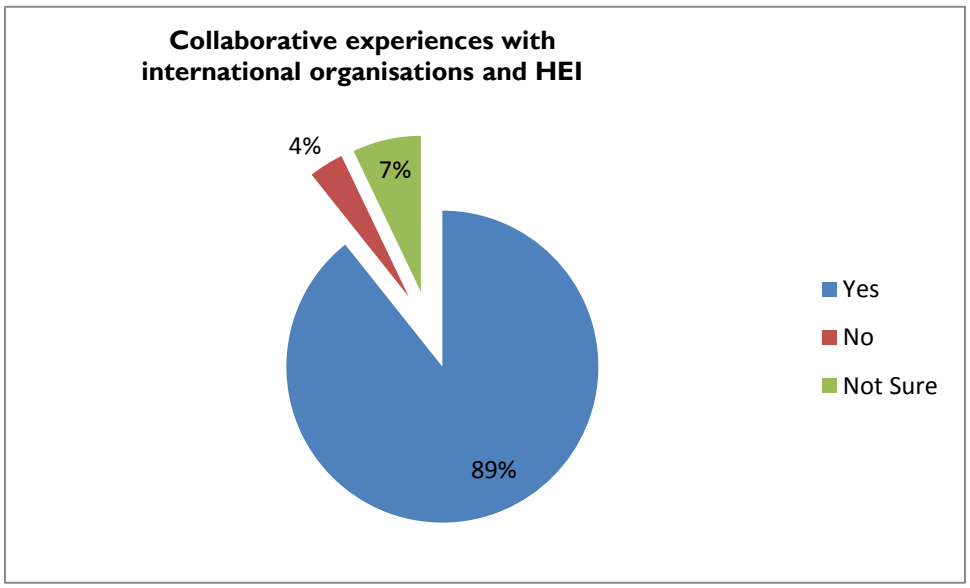
Table 6.10
HEI Comments on Collaborative Experiences with Other Egyptian Universities

Yes, we have very good collaboration with Alexandria University, Cairo University, Tanta University and others. Such collaboration is at the postgraduate levels, where our teaching assistants are admitted to get their Ph.D. and Master's degrees, with joint supervisions from both institutions. This collaboration also includes teacher exchange and external examiners exchange
We are collaborating with the other Faculties of Industrial Teacher Education to exchange the teaching and research staff we all have.
Collaborate with Ahram Canadian - Sinai Universities
Helped Egyptian universities establish technology transfer offices; allow Egyptian researchers to use AUC facilities for research benefits from collaborative research with other universities

We work with a number of Egyptian national universities on training their teachers, providing technology transfer and career services consulting, etc.
Make regular public presentations at other institutions such as Cairo university
Collaborate with Minia, Assuit and Cairo universities
Many BUE staff are seconded from public universities - they can go back to teach at the public university
Collaborative supervising on Master's and Ph.D.; Collaborative research activities for graduates and undergraduates

HEI responses to the second question showed that 89 percent of responses had international collaborative experience, while only 11 percent were not sure or did not have experience. These results are shown in **Figure 6.11.**

Figure 6.11 Experience Collaborating with International Organizations



While the 11 percent who were not sure or did not have collaborative international HEI experience did not share information on constraints, several respondents shared the facilitating factors to international collaborative agreements. Listed in **Table 6.12** below are examples of statements demonstrating successful existing and past international collaborations. These collaborations appear to be facilitated by individuals as well as institutional MOUs.

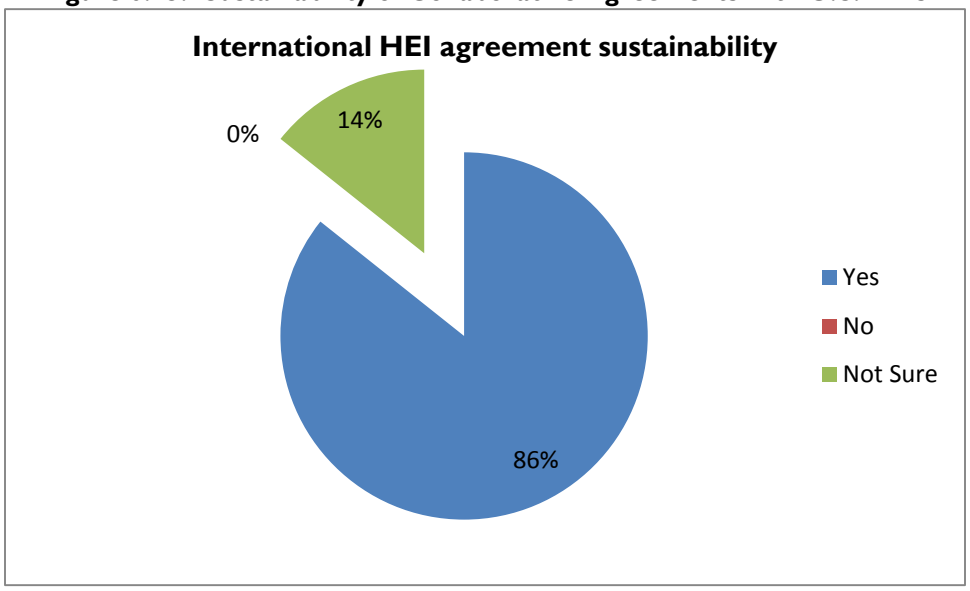
Table 6.12 HEI Comments on Collaborative Experiences with International Organizations and HEI

Yes, through our partnerships with the international institutions, such as the Pacific, Dublin Institute of Technology (DIT), Royal Institute of Technology (KTH) and others, many collaborative activities are implemented, including faculty exchange, students exchange, joint research and publications as well as admission to the Master's or Ph.D. programs at the partner university
TEMPUS program experience
Collaboration with Georgia Tech
Collaboration with European universities

Collaboration with UNESCO
We have had a TEMPUS project. We are in collaboration with DAAD and with UK in Newton-Mushrafa program
We have many, many partnerships, MOUs, etc. with U.S., European and other HEI
We have joint projects under EU funding. Erasmus and TEMPUS. Lots of collaboration with European universities. We have 45 international projects and 24 cooperation agreements as well as MOUs with international partners
We did a collaboration with UN, Academic Impact, Global compact, the Swedish academy of science
We have economics programs with British universities as well as research collaborations with international organizations

HEI responses to the third question showed 86 percent of HEI were confident that collaborative agreements with U.S. HEI could be maintained by their university. While 14 percent were not sure, there were no negative responses to this question. This result, shown in **Figure 6.13,** demonstrates that collaborative agreements would be facilitated by Egyptian HEI as an attempt would be made to mitigate any constraints.

Figure 6.13. Sustainability of Collaborative Agreements with U.S. HEIs



While the 14 percent who were not sure about sustainability of international HEI collaborations, did not share information on constraints, a number of statements provided examples of past experience with international collaborative agreements. Listed in **Table 6.14** are examples of statements that shared details on past experiences with international organizations and USA HEI. These MOU collaborations appear to be facilitated by institutions and USAID funding.

Table 6.14 HEI Comments on Experiences with U.S. HEI

Yes, our experience with the International relations during the past eight years may help us in sustaining the collaboration with US Universities. Pharos University has established two dual certificates undergraduate programs with KTH and DIT in Engineering and Business Administration, respectively. We may implement

similar programs with US universities, in addition to the staff and students exchange programs, as well as collaboration at the postgraduate and research level.
Helwan can sustain collaboration with US universities if we both find the real needs for this collaboration
We have many supportive measures to maintain sustainability as: 1- Previous collaboration and success stories; e.g. Collaboration with the University of Alabama, Birmingham started in 2009 as planning project and succeed for application of joint cooperative partnership this year. 2- Many alumni who are graduated from US universities and still in good contact. 3- Supportive bodies in university as grants and international office who support any partnership
Already have several partnership (U.S. and International) in place. Been operating since 2008. Professors from U. of Minnesota come as visiting professors
We already have two established. Dual degrees, share professors, student exchange.

Although past experience is not a guarantee of future results, the LMA Team felt that one indicator of "partnering capability" is provided by those Egyptian HEI which have previously affiliated with international HEI.

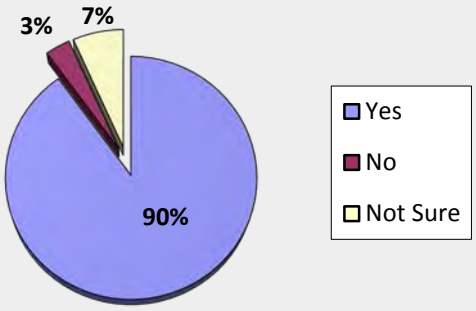
Respondent data suggests that more than ¾ of the Egyptian HEI surveyed have signed MOUs between the universities **(See Table 6.15)**.

Table 6.15 – Universities with affiliations and MOUs

Answer Options	Response Percent
Yes	77.4%
No	12.9%
Not sure	9.7%

Additionally, 90 percent of surveyed HEI noted that there is experience collaborating with international HEI **(See Figure 6.16)**.

Figure 6.16
Does your University have experience collaborating with international organizations or institutions of Higher Education?

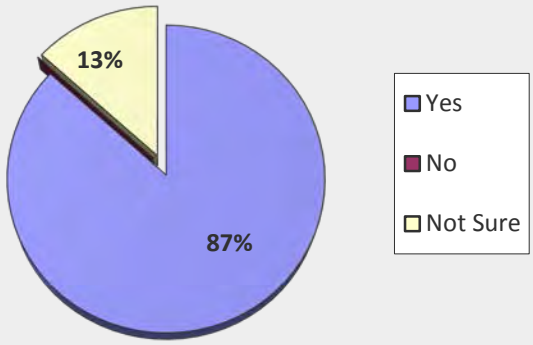


The statements in Table 6.14 suggested the presence of 'Commitment to a broad range of exchanges with U.S. partners' from the HEPP RFA. This reported partnership with UAB was confirmed and the data was thus validated. This process was also applied to other collected data.

Across all HEI (not just the selected HEI) the LMA team asked respondents whether their institution was confident in their institutional capacity to partner with U.S. HEI and sustain the relationship. Nearly every respondent answered in the affirmative (**Figure 6.17).** The LMA Team used the qualitative data to substantiate this confidence – in some cases it was possible to locate evidence to support the respondent's assertion, and in others it could not be verified or seemed implausible.

One respondent indicated "We have two offices to care about these partnerships. We have active MOUs with distinguished U.S. universities. We manage many scholarship programs for our faculties and researchers to use (e.g., Cairo initiative and Fulbright). English is [also] the teaching language in most of our faculties especially the science and engineering programs". This could be verified through follow-up interviews with the Fulbright Commission.

Figure 6.17
Can your University sustain collaboration with U.S. Universities?



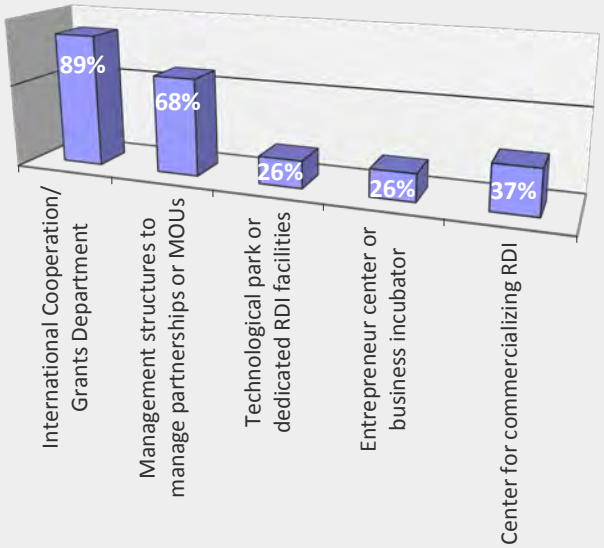
Another respondent noted, "Staff… have degrees from USA – all program specializations are there, [for example] well developed programs in different specializations (equipment and geographical distribution of different faculties); land space for further cooperation and extensions as new campuses; [and] International recognition and ranking".

A method of further validating institutional capacity of Egyptian HEI to engage in successful partnerships with U.S. HEI was an assessment of the existence of program management and support functions.

Figure 6.18 illustrates which functions are in place today, and also lends insight into how and where the U.S. HEI can offer the most value to their Egyptian counterparts. For instance, factors pertaining to entrepreneurship, business incubation, and RDI are not commonly present.

Generally the identified presence of an International Cooperation function, and management structures at the Egyptian HEI assessed was encouraging so the LMA Team asked respondents about whether they believed their institution could sustain the partnership after it had been established.

Figure 6.18
Functions that exist today at your HEI



USAID/Egypt
1A Nady El Etisalat Street
New Maadi, Cairo, Egypt 11435
Tel: (2-02) 2522-7000
Fax: (2-02) 2516-4628
cairomedia@usaid.gov
www.usaid.gov/egypt