GOLA!

GLOBAL ONLINE LEARNING ALLIANCE

NATIONAL SERIES ON SKILLS TRANSFORMATION – EGYPT, 2 MARCH 2022

DIGITAL HIGHER EDUCATION: INNOVATION, RESEARCH, EMPLOYABILITY & FUTURE SKILLS

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GOLA Report

Contents

FORMAT AND PARTICIPANTS

SECTION 1. Format and participants

1.1 Introduction

The purpose of this private video meeting of university officials, organised in partnership with Coursera, was to discuss skills transformation in higher education and scientific research. In regular meetings of the Global Online Learning Alliance (GOLA), officials have spoken of the need to develop and transform the skills of young people to better prepare them for jobs of the future. University participants were encouraged to discuss the actions and policies of their institutions, and to make recommendations where appropriate.

Egypt has a fundamental commitment to improve educational and research services in universities according to the future needs of the labour market. The two key strategies for higher education and for scientific research, aligning with Egypt's Vision 2030 and digital transformation across all sectors of society. The unique format of the meeting was designed around four roundtable groups of university officials. Each group had an Egyptian moderator and a Coursera chair who provided a closing synthesis.

The roundtable groups were split into four main discussion areas:

A. Accelerating Skills Transformation and Creativity for Future Jobs

B. Policies and Recommendations for Online Degrees & Learning Platforms

C. Scientific Research, Innovation, IP and Industry Collaboration

D. International Cooperation, Partnerships and Smart Universities

Section 1.2 provides an executive summary of the discussions; section 1.3 gives the meeting format and main discussion points addressed in each of the roundtable groups; section 1.4 details of all participants listed by group and in section 2, a dissemination of the issues addressed, and recommendations made.

We would like to thank all participants for taking time out of their busy schedules to participate in this meeting and offer their invaluable and erudite contributions. Many of Egypt's leading universities were represented in this meeting along with the Ministry of Higher Education and Scientific Research. The dedicated roundtable groups allowed everyone to converse in private, have good time to express their own thoughts and to discuss recommendations for skills transformation, online learning, research and cooperation in Egypt.

The overarching issues reflecting Egypt's national vision include:

Digital transformation and creativity in higher education

Develop skills of young people and graduates to better prepare them for jobs of the future

Improve research and development, linking academia with industry

Ensure an Egyptian tertiary sector based on quality, competitiveness, and internationalisation

Accelerate the information infrastructure to develop "smart" universities

Increase innovation and IP awareness through increasing trust and industry partnerships

Promote scientific research with academic freedom, integrity, collaboration, and social responsibility

In section 1.3 we provide more detail of the specific questions within each roundtable group

1.2 Executive Summary

This executive summary is based on the major points raised by the opening speakers and all officials participating in the roundtable groups.

<u>Opening Statements</u>
Egypt has a fundamental commitment to improve educational and research services in universities to better reflect the needs of the knowledge

economy. The country has a new national strategy for higher education that includes digital transformation, skills development, improving research & development and accelerating investment in the information infrastructure. Critical to the transformation is the need to encourage academic freedom, integrity, collaboration and social responsibility.

The ministry of Higher Education and Scientific Research has post-Covid policy recommendations for institutions. Responses to a nationwide survey in higher education found that 45% of Egyptian students disagreed with online education being an overall positive experience. So the government has implemented an action plan with the blueprint "*Leading Out of Adversities: Policies for Post-Covid Pandemic.*"

The prime concern for industry and employers is the skills gap in Egypt. There is a need for soft, communications, business and problem-solving skills that are required for young Egyptians to be more proficient in project management. Hybrid communication skills are important as physical and digital communications merge. Creativity and design thinking are the watchwords for innovation, with industry needing a far more collaborative approach to business management and organisation.

<u>Egyptian Universities and National Development</u>
In bridging the gap between what is learnt at university and what is applied at work, universities are addressing the question of how to better combine practical and theoretical skills. Can universities embed professional skills within curricula? The national strategy of investing in the information infrastructure to build smart universities is a key component of modernisation of the higher education sector. There exists a wide variance between public and private universities in this regard.

Research productivity in Egypt is on the rise but of prime concern to policymakers is the scientific brain drain. This needs to be met with more investment in university resources and protecting innovation and intellectual property. The Government launched "Science Up" in 2020 to improve the effectiveness of research and development.

Reforms should better reflect societal needs. Innovation and research need to be conducted in the context of the wider needs of the community and aligned with the sustainable and social responsibility vision of Egypt 2030. Change management is an important consideration when implementing reform and modernisation given the complex nature of the university as an institution. Ongoing training and professional development programs are critical to delivering such change.

<u>Skills Transformation: Academia & Industry</u>
The 4th industrial revolution has created a demand for a whole new set of skills that fall outside of the normal academic subjects. The issue for universities is how much to address and provide programs for the new skills of creativity, communications and critical-thinking, while also responding to the needs of a fast changing labour market.

Any approach to skills transformation needs to be future-proof as we see new technologies emerging but with short lifespans. This is a dilemma for universities – on the one hand giving students the competencies required for jobs now, and on the other hand equipping learners with problem-solving skills to better prepare them for jobs of the future. Regarding the skills gap, many new competencies such as design thinking and utilising artificial intelligence do not necessarily require accreditation. Universities can build micro courses and new ideas such as 'digital badges' can better inform employers of the skillsets of applicants. That said, is it role of universities to satisfy the needs of the job market when educated people are often the producers and providers of jobs not the seekers? Should the priority be just the intellectual development of society?

There is an acknowledged gap between academia and industry in Egypt with the former focussing on publishing papers and the latter on production. Egypt requires more industrial product development to provide a potential well for the higher education sector to feed back into with research and innovation. A virtuous circle of innovation with investment in human resources and collaboration between academia and industry will produce the wider societal benefits envisioned by policymakers.

Can entrepreneurship be taught? Education has a role and young people need to learn more about accepting 'failure' and although education plays a critical role in skills development, equally the business and trading environment is a critical determinant.

Innovative Learning: Curricula, Assessment & Online

Egyptian universities can develop current academic programs according to the needs of societal changes and the labour market. Foundational curricula should be accompanied by the teaching of more design thinking to stimulate creativity. Students nowadays must have the skillsets of the master subject to solve specific problems in their field yet also have the ability to think with a psycho-technical viewpoint, relating technology to society. Any reforms should reflect the technological changes, setting the scene for greater collaboration with industry.

Online learning during the Covid pandemic was more remote emergency learning than full e-learning with accompanying instructional design. The positives of the experience have been the wider use of digital and online resources while reaching more learners. There is an opportunity for universities to share digital learning resources & tools and collaborate as no one institution has everything in place. Online learning requires planning for every single moment and this granular detail of online course development is a challenge. Instructional design is the toughest part of e-learning and training of faculty staff in digital learning skills is a necessary requirement of ongoing professional development.

We are yet to see the ideal scenario for online assessment. The experience of the last couple of years has shown that virtual examinations are some way from being a success. Accreditation of online assessment is critical for the students, families and future employers. Have students attained their learning outcomes correctly and honestly? Whichever set of standards is implemented, one size does not fit all. A hybrid approach may be best, and the Egyptian government needs guidance from universities as to what forms of assessment work best.

Partnerships, Collaboration and Intellectual Property

An important factor in Egypt's tertiary educational development is the internationalisation of universities and bringing in more project-based learning connecting students with wider societal challenges. An Egyptian university that enters into a partnership needs to ensure that the international institution is already configured with their system. The aligning of partnerships should be based on sustainability. Egyptian universities have the opportunity to benefit from a 'best of both worlds' approach by ensuring the embed local advantages and competencies into any agreement.

Bringing together curricula is a challenging dimension when developing international partnerships and Egyptian universities are governed by laws that cannot be changed, especially with regard to grading and course materials. An effective approach is to look at the broader spectrum of competencies rather than specific course descriptors.

Intellectual Property (IP) policy in Egypt is currently being developed to better align with international standards. The government will produce an IP policy roadmap to protect and commercialise innovations. There remains some weaknesses in the application of IP law and what would be of help is a single entity – a one stop shop for intellectual property, patent filing and trademarks. Inward investors need to be sure that Egypt has robust enforcement of intellectual property rights. Each university should have its own IP unit that can take responsibility for patenting when the faculties are innovating.

1.3 Format of Virtual Meeting & Group Discussions

In section 1.4 we list the participants of this video meeting by the roundtable groups. The most immediate lesson of online video conferencing is to ensure that every participant has a voice. Small groups are essential. So, after opening statements the event was broken into small groups each with a moderator to take notes and support the conversation.

Prior to the break-out rooms there were two opening statements representing government and industry: HE Mohammad Ayman Ashour, Deputy Minister for

Higher Education, Scientific Research and University Affairs, Egypt; and for Orange Egypt – Marwa Abdelmoniem, Head of Innovation & Competency Centres and Mohamed Essam, International Business Manager.

The following was the video conference format:

Part 1: HE Mohammad Ayman Ashour, Deputy Minister for Higher Education, Scientific Research and University Affairs, Egypt; Marwa Abdelmoniem, Head of Innovation & Competency Centres, Orange and Mohamed Essam, International Business Manager, Orange. *20 minutes*

Part 2: Four main roundtable groups, each with a moderator and chair to record discussions and take note of the key points raised. *60 minutes*

Part 3: Closing synthesis by the four Coursera chairs. *10 minutes*

The total time of the video conference was 90 minutes.

In each roundtable group the floor was open for all participants to freely express their ideas and make policy recommendations. The discussion points in each roundtable were prepared in advance as follows:

Group A: Accelerating Skills Transformation and Creativity for Future Jobs

To improve employability and promote a culture of creativity for students to be better prepared for future jobs, the skills gap between education and employment needs closing. Hence, this group aimed to make policy recommendations for improving employability, transforming skills, and promoting increased entrepreneurship amongst young Egyptians.

Skills: The jobs market urgently needs communications, problem-solving, teamwork and organisational skills. What programs have you recently established to give students a wider range of soft skills in response to the ever-changing jobs market?

Entrepreneurship: To better embed creativity and innovation to develop entrepreneurial talent, what more can be done now to ensure that students build initiative and enterprise skills to produce innovative outcomes? Are Egyptian students ready for the concept of entrepreneurial "failure"?

Employability: Given the need for emerging skills in areas such as artificial intelligence, how can universities be more responsive to industry in identifying new trends, adapt to socio-technological changes and thus develop the granularity of courses?

Digital Egypt: One key pillar is the focus on training and human resource development for digital skills and jobs. What role can Egyptian universities play in the Digital Egypt strategy to ensure the program has a long-lasting impact on transforming graduate opportunities?

Assessment: Given the ongoing challenges of reforming Thanaweya Amma, what policy recommendations are advisable to ensure that reforms and amendments can satisfy both legislative change and the expectations of Egypt's higher education system?

Group B: Policies and Recommendations for Online Degrees & Learning Platforms

Recent survey results in Egypt show a disparity between university staff and student satisfaction with online learning. Hence, this represents an opportunity for actors in the Egyptian education sector to make policy recommendations for improving online higher education and how hybrid teaching can make a positive contribution to Egypt's skills and digital transformation.

Pedagogy: How can we improve teaching in the online learning environment to ensure stronger student engagement and interaction?

Accreditation: What systems and processes that need to be in place to ensure accreditation of degrees and courses from international online education providers?

Course Requirements: A clear distinction needs to be made between theoretical-based disciplines and laboratory and practical-based disciplines. What are the defining elements of such a distinction in terms of face-to-face teaching and distance learning?

Outcomes: What are the necessary adaptations needed in learning outcomes according to the techniques defined by course requirements and should be new assessment protocols – such as more project-based evaluation?

Curricula: Does online course content need to be adapted to better reflect both changing needs of the jobs market, such that students develop a range of softer skills?

Group C: Scientific Research, Innovation, IP and Industry Collaboration

In the World Economic Forum benchmark for research and development (R & D) Egypt's ranking in innovation performance has climbed 13 places since 2017. The aim is to spend 1% of GDP on R & D, up from 0.43% in 2010. International collaboration is prioritised this group aimed to make policy recommendations for improving innovation, scientific research and development along with strengthening industry collaboration.

Research Distribution: Egypt has strong R & D in disciplines such as medical science and chemistry, yet the government has identified the need for a wider distribution of capacities. What programs are universities implementing to increase enrolment for research in areas that will give the scientific base more breadth?

Innovation Investment: To exploit funding opportunities and international partnerships, what more can be done by Egyptian universities to have a clear and unified mechanism for marketing scientific research results to investors and the global business community?

Intellectual Property: With an existing network of technology, innovation and commercialisation offices (TICOs) in universities, why are the annual number of patent registrations relatively low? Do existing IP regulations need reforming to improve the economic returns from scientific research?

Industry Collaboration: How can Egyptian universities connect and align better with industry R & D given that 21st century industries often rely on global turnkey solutions?

Clustering: Many industrialised countries benefit from focussed research aligned with economic clusters (e.g. automotive in Germany, Pharma in UK, Agribusiness in the Netherlands). How is Egyptian university research supporting the advantageous Egyptian industry clusters such as electronics, energy, medical technologies, and the agri-food industries, for example?

Group D: International Cooperation, Partnerships and Smart Universities

Egypt has a vision to transition into "smart" universities that aligns with developing a national strategy for artificial intelligence, increasing scientific research and the need to ensure the higher education system meets the demands of the 4th industrial revolution. This approach supports the drive to increase international partnerships and cooperation in higher education and research.

Transformative Partnerships: To avoid partnership for partnership-sake, what are the key pedagogical ingredients of any international cooperation agreement that will raise standards and make a difference to innovation and research in Egyptian universities?

New Faculties: Academic partnerships with foreign universities will be mandatory for all existing institutions that want to launch new faculties. How do we guard against this leading to inherent biases where some traditional subjects may get neglected – therefore depriving the higher education system of important socio-cultural breadth and depth?

Change Management: What guidelines should be given to senior university leaders who need to apply a structured process that ensures coherent delivery of the shift to internationalisation and technological modernisation?

Smart Universities: How does a smart university make the educational process more effective in engaging students to develop digital and emerging skills for the knowledge economy? Is this an opportunity to develop new skills-based materials to reduce the discrepancy between what is taught and what is needed by industry?

Academic Culture: Suggest guidelines for Egyptian university leaders faced with different cultural, ethical, and professional frameworks of partner countries when considering the co-development of educational materials?

Roundtable Discussions

As stated above, the meeting was split into four roundtable groups. Given the nature of the topics and the often overlapping issues, the dissemination of the discussions (sections 2.2 to 2.5) is based on the issues addressed across the groups rather than a simple delineation by roundtable. From the discussions, four main areas best define the conversations as follows:

Egyptian Universities and National Development

Skills Transformation: Academia & Industry

Innovative Learning: Curricula, Assessment & Online

Partnerships, Collaboration & Intellectual Property

1.4 Participants

We would like to thank all those for participating and providing such outstanding contributions. The opportunity for them to openly converse in small groups provides us with a discerning judgement on the key issues and immediate policy recommendations. It is an honour for the organisers to host such a distinguished gathering of officials. Participants are listed from the opening statements and then by group A to D.

Opening Statements

HE Mohammad Ayman Ashour, Deputy Minister for Higher Education, Scientific Research and University Affairs, Ministry of Higher Education and Scientific Research. Opening Speaker

Marwa Abdelmoniem, Head of Innovation & Competency Centres, Orange. Opening Speaker

Mohamed Essam, International Business Manager, Orange. Opening Speaker

Group A: Accelerating Skills Transformation and Creativity for Future Jobs

Group Moderator: Dr Hossam Osman, Vice President, Information Technology Industry Development Agency (ITIDA) and Chairperson of Technology Innovation and Entrepreneurship Centre (TIEC)

Dr Sally Kamal Abdel-Fattah, Head of Curriculum Development Department, Faculty of Education, Ain Shams University

Dr Ahmed Abdel-Meguid, Tenured professor at AUC School of Business, The American University in Cairo

Prof Mohammad Al-Makky, Professor of Manufacturing and Engineering & PUA School of Digital Education, Pharos University in Alexandria

Dr Nancy Asaad, Vice President for Education & Students, Menoufia University

Dr Samar El Saadany, Executive Director - ASU Career Centre, Ain Shams University

Prof Ahmed El-Zaki, Professor in Management and Strategic Planning for Education, Damietta University

Dr Ayman Ismail, Abdul Latif Jameel Endowed Chair of Entrepreneurship and Founding Director of the AUC Venture Lab, The American University in Cairo

Dr Mona Nasr, Chief Information Officer, Helwan University

Prof Sherif Sedky, Vice President and Provost, Newgiza University

Group Chair: Pedro Moura, Director of Partnerships, Coursera

Group B: Policies and Recommendations for Online Degrees & Learning Platforms

Group Moderator: Prof Abeer Elshater, Advisor to the Deputy Minister of Higher Education and Professor of Urban Morphology, Ain Shams University & Ministry of Higher Education and Scientific Research

Prof Yosri Abouelenein, Professor of Educational Technology, Damietta University

Dr Tamer Ashour Ali, Director of Continuous Improvement and Accreditation Unit, Zewail University

Dr Yara Ibrahim, Professor of Finance & Investment, Faculty of Business Administration, The Egyptian E-Learning University

Dr Rami Iskander, Vice Director of Electronic & Knowledge Service Centre (SCU) & Director (NELC), Supreme Council of Universities & National E-Learning Centre

Dr Hoda Moustafa, Director of the Centre for Learning & Teaching, The American University in Cairo

Dr Ayman Nabil, Head of Computer Science Department, Misr International University

Dr Walid Namane, Senior Policy Advisor, Coventry University

Prof Boshra Salem, Dean of Postgraduate Studies and Research, Pharos University in Alexandria

Dr Inas Sobhy, E-learning Consultant, Badr University

Dr Dalia Ahmed Yusuf, Director of e-Leaming Central Unit, Education Strategy Administration, Ain Shams University

Group Chair: Michael Morczinski, Consultant, Coursera

Group C: Scientific Research, Innovation, IP and Industry Collaboration

Group Moderator: Dr Alaa Adris, Vice President for Strategic Development and Innovation, Nile University

Dr Neveen Assem, Professor of Genetics & Biotechnology, Director of Training and Development Centre, Ain Shams University

Prof Samhaa El-Beltagy, Dean of School of Information Technology, Newgiza University

Dr Amgad El-Deib, Dean of Renewable Energy Engineering Department, Zewail University

Dr Hesham Farouk, Assistant Minister for Digital Transformation, Ministry of Higher Education and Scientific Research

Prof Satoshi Goto, Vice President of Research, Egyptian Japanese University

Dr Eman Ibrahim, Vice President, Egyptian Patent Office, The Academy of Scientific Research and Technology

Dr Noha Saeed, Business Administration Instructor and Director of Technology Innovation Commercialisation Office (TICO), The Egyptian E-learning University

Dr Marwa Zein, Professor of Private International Law, Supervisor of the R&D Department, Egyptian Cabinet's Information and Decision Support Centre, The British University in Egypt

Group Chair: Louay Dayoub, Development Representative, Coursera

Group D: International Cooperation, Partnerships and Smart Universities

Group Moderator: Prof Mohamed El-Shinawi, Acting President and Advisor to the Minister of Higher Education, Galala University & Ministry of Higher Education and Scientific Research

Dr Ansam Abdelsalam Alshaikh, Professor of Psychology, The British University in Egypt

Dr Ahmed Abdelsamea, Director of Academic Advising Unit, Zewail University

Prof Ayman Bahaa, Dean of Faculty of Computer Science, Misr International University

Aboubakr Fathalla, Head of Partnerships (Middle Easy North Africa), Coventry University

Prof Mennatallah Gowayed, Head of International Relations & Professor of Pharmacology & Toxicology, Pharos University in Alexandria

Dr Lamis Ragab, Vice President, Newgiza University

Dr Omar Ramzy, Director of the Centre of Excellence & Dean of the Faculty of Business & Economics, Heliopolis University

Dr Mostafa Refat, Vice Dean for Education and Student Affairs, Director of International Relations Office, Ain Shams University

Dr Hadya Suleiman, Lecturer of Educational Psychology, Faculty of Education, Suez Canal University

Dr Hoda Yousry, Principal Coordinator of Erasmus Project: Technology-Based Entrepreneurship for Supporting Sustainability in MENA Region, Suez Canal University

Group Chair: Valerie Lisova, Development Representative, Coursera

DISCUSSIONS

SECTION 2. Discussion

2.1 Opening Statements

The opening statements were provided by HE Mohammad Ayman Ashour, Deputy Minister for Higher Education, Scientific Research and University Affairs, Egypt; and for Orange Egypt – Marwa Abdelmoniem, Head of Innovation & Competency Centres and Mohamed Essam, International Business Manager

HE Mohammad Ayman Ashour

One of the common themes that policy makers and educators have expressed in the last couple of years has been the need to move rapidly to ensure skills transformation, such that young people are better prepared for jobs of the future. Egypt has a fundamental commitment to improve educational and research services in universities according to the needs of the labour market. This process has begun in both public and private universities to improve scientific research and align with Egypt's Vision 2030 with digital transformation across all sectors of society.

Following the implementation and outcomes of the short-term distance learning system, the Ministry of Higher Education and Scientific Research immediately started the development of long-term systems to be in place. This establishes a new national strategy for university education, considering several key points. First is the digital transformation and creativity in higher education. Second is to develop the skills of young people and graduates to better prepare them for the labour market. Third is to improve research and development by linking academia with industry. Fourth is to accelerate investment in the information infrastructure to develop smart universities.

The final pillar of this transformation is to encourage academic freedom, integrity, collaboration and social responsibility in scientific research regarding the government's policy to empower the process of human capital development. This is especially so after the impact and consequences of the pandemic which has accelerated the need to uplift teacher capabilities in adopting new technologies and the tools required for online teaching, research and management. Egypt also wishes to develop inflow and outflow mobility models for collaborative projects in which people from different fields work together across sectors.

In response to the need to expedite digital transformation, the Ministry of Higher Education and Scientific Research has taken several actions related to building the digital technology infrastructure by assessing the maturity and readiness of the existing system. The government has concurrent plans that include a roadmap for leading education out of the current adversity created by the pandemic and has post-Covid policy recommendations for institutions in the higher education sector.

Marwa Abdelmoniem and Mohamed Essam

This opening statement is in conjunction with the presentation as per appendix A.

In Egypt, Orange Business Services is the business-to-business arm of the Orange Group serving international clients across multiple sectors. In Egypt the company employs 3,000 people and the skills required range from technical to soft business skills, and at the heart of this is the Innovation and Competency Centre that develops leading technologists and industry experts. These innovation centres are spread across the world from the US to India to Malaysia as well as in Cairo and are responsible for hiring young talent to design the best networks and digital services for global clients. All these centres are connected via a virtual digital lab.

This experience has taught Orange Business Services where the skills gaps are and in the case of Egypt how they can be bridged. In such skills development it is critical to ensure that there is a well-defined future in terms of career paths for young people. As well as soft skills there is a real need for business skills and the ability of new recruits to tackle agile project management. Such project management methodologies and techniques are qualities that should be part of the broader higher education

curriculum and we find that having organisational talent is also a life skill.

Another key skill required is creativity and in industry this is very much linked to design thinking. Here it is necessary to have the innovative and problem-solving skills that can be tackled through collaboration amongst colleagues. It would help industry a great deal if young people learnt more about design thinking while in education as well as giving them a far wider and deeper choice of career opportunities.

Another key quality is hybrid communication skills. By hybrid we mean the new mixture evolving from our technological world in which physical and digital communications merge. This is not always straightforward. We can all appreciate that young people are digital natives but that does not necessarily mean they are digitally literate and have mastered the nuances of interpersonal communications in both the digital and physical spaces combined. Mentorship in information literacy is important and even embedding such skills into curricula would better prepare young people for the needs of the jobs market.

In the telecommunications sector, clearly technical skills are the most in demand and at the top of that is cybersecurity. As the world progresses with digital transformation, we will see an ever-increasing need for continued data and privacy security, with artificial intelligence (AI) driving the agenda in the coming decade. The application of software is now a part of our daily lives, often invisible but always there and young people will see an increasing demand for having the necessary software skills, especially focussed on AI.

2.2 Egyptian Universities and National Development

In Egypt it is very important to provide graduates with the proper skills that make them not only fit the market, but to lead the market. Hence, someone who is forward thinking, and has the ability to bridge the gap between what is learnt in university and what is applied at work. For higher education institutions, the core of the problem resides in the way to educate students. So within the structure of the curriculum, how does one combine the practical skills with the theoretical skills? And how can universities provide students with the proper professional skills that should be embedded within the curriculum? Currently, this is the key element that is missing – having the proper hands on experience and practical training, such that students can identify, analyse and problem-solve.

A central strategic pillar of the Government of Egypt is the transformation of Egyptian universities into smart institutions. Minister, H.E. Dr Khaled Abdul-Ghaffar spoke publicly at MENA Innovation in 2019 stating that it requires the development of the information infrastructure in universities, through the modernisation of university data centres, the establishment of test centres, raising the speed of the internet, and connecting all colleges and institutions of universities with fibre-optic cable. Alongside this is the National Plan for Artificial Intelligence in Egypt, which aims to develop and use smart technologies in education, aligning with the framework of the Fourth Industrial Revolution.

In the Egyptian context there was a particular comment, unique to the country, regarding the separation between public (government) universities and private universities. In the public universities, there are a set of challenges around faculty staff, student profile and the campus facilities. If there is to be genuine digital transformation then there is an urgent need to upgrade the qualifications of faculty staff in digital literacy, along with an improvement in the methods of communicating with the new generation of young digital natives. The campus facilities, particularly the information infrastructure, still require substantial investment in the public universities.

In Egypt, several policies are being implemented that relate to technical and vocational skills along with specific regulations relating to the number of credit hours being taught to engineers and the practical part of general requirements for professional skills. Yet, simultaneously there should be some policies that will oblige stakeholders, such as industry, to interact more actively with academia. This helps the course and professional development, and after all industry is the beneficiary of quality higher education. That interaction between the university and the community is very important. Accordingly, it requires having policies that can regulate the relationship between the university and industry, reflecting how business can support the institution and vice versa.

Research productivity in Egypt is climbing in certain areas, yet the breadth of coverage in some sectors still has plenty of scope for expansion, especially in the cutting edge technologies. The most important output of research and development is its wider contribution to Egypt's socioeconomic infrastructure. In recent times there has been a trend of research moving from within educational programs to dedicated research institutes. These institutes can focus on a clear objective with increasing collaboration and the sharing of information

between core disciplines. Research is often closely aligned with the society and in the case of Egypt there is a huge requirement in the energy, food and water sectors.

For developing research activity in Egypt there are some challenges and of prime concern to policymakers and investors is the scientific brain drain in Egypt. In developing the necessary skills amongst scientists and engineers there needs to even more investment in the tertiary sector. With about three million students in higher education, there is ongoing pressure on the available university resources from science labs to digital and information technology to libraries and to the proper physical equipment required for scientific research. Important clusters in Egypt include energy and agribusiness, though there is an opportunity to leverage more in the information technology space. Software and application development require skills but not major capital investment. Doing more in areas such as artificial intelligence and ensuring that process for protecting intellectual property is more refined will contribute to reducing the brain drain that is so often damaging to developing and middle-income economies.

From a national developmental perspective, public universities are critical in conducting research and practical experiments but are limited because college laboratories lack the full range of necessary equipment. The Ministry of Higher Education launched a new program in 2020 called "Science Up" aiming to improve the efficiency and effectiveness of university research and development laboratories. The first stage will last three years and will focus on mathematics and physics and overall the project will contribute to a qualitative shift in research and its outcomes. This is being complemented with incubation programs that aim to seek out promising students before they enter universities and give them financial support and mentoring once they become undergraduates. In addition, big-data processing centres will be built at Cairo University, the Library of Alexandria and the Academy of Scientific Research and Technology.

The rapid changes we are seeing in economies demonstrate the global trend into knowledge, intellectual property, and developing innovations that support the digitalisation of societies. For example, 5G is going to have a huge economic impact, especially in developing parts of the world where robust broadband connectivity remains challenge. Hence, a smart university is not a luxury but a necessity in ensuring the information infrastructure is in place such that students can develop the necessary skills and competencies of the knowledge economy. The key issue to address for Egyptian universities is how to best leverage this infrastructure to produce skilled citizens for jobs of the future. An important cluster for Egypt is the healthcare and medical sector. Egypt has several advantages here. Firstly, many of the universities already excel in medical sciences with well-renowned faculties and a long history going back to the early 1800's with the goal of providing qualified physicians to serve communities. The country has a large population which underpins the development of medical sciences in Egyptian universities. Building this into thriving medical device, diagnostics and pharmaceutical industries can be achieved through improved data collection and dissemination to drive research and development in the healthcare sector.

As well as the breadth and depth of research, there is the issue of impact. What meaningful impact can the scientific research have in the context of Egypt's social and industrial needs? Clearly, the answer means better aligning the nature of research with the socioeconomic needs of Egypt and for universities to reduce the emphasis on just publishing papers – often with little relevance to the country's requirements.

When conducting research, Egyptian universities should focus on the community needs with an outside looking in approach that assesses the needs of the community and acts upon what the community will appreciate. Education for sustainable development is a must and is aligned to the agenda of Egypt 2030 where a sustainable approach will generate alumni that match the developmental needs of the country. To cope with the new trends, then it is critical to embed ICTs within education, contributing to the objective of producing actionable research projects that serve the community.

Whenever introducing new policies or reforms to the

higher education sector so to better reflect societal needs it is critical to be cognisant of managing any change. Universities are complex institutions with often labyrinthine governance and complicated sources of funding. Such institutional complexity often means introducing change is a slow process and if there is no effective change management strategy then such processes can stall. Maybe, as suggested, there is a case for universities to look at their existing governance structures and ask seriously how quickly can change be adopted in line with the digital transformation we are witnessing in society.

Managing the training of faculty staff in online learning is a major issue that all universities need to address and have in place a strategy – without which can lead to an ad hoc approach with some professors happy and others unhappy. That depends on the university and its resources. Misr International University (MIU) is medium-sized, yet they now have training during every semester, insisting that all staff receive e-learning system training. Such programs need to accommodate an increase in difficulty levels yet at the same time provide coordinated support for those who are far less capable in instructional design.

Equally, there is a need to train the students to ensure they get the most out of the learning experience. It is a different form of training as they have learnt at the Egyptian E-Learning University, whereby the key focus is tracking student engagement and interaction. For this, first year students need particular attention. Critically, the professor needs to make sure that the learner has truly understood what has been covered in the lecture and the institution must ensure they become competent in using the online platform.

2.3 Skills Transformation: Academia & Industry

The skills palette has a number of key components. Firstly there are the set of soft skills required in business and the world of work, including soft and communications skills. Then there are entrepreneurial skills and particularly innovation driven entrepreneurship. ICT and digital skills are needed for the digital age that we live in; and then there are disruptive technology skills that are emerging everyday with the rapid rate of new technological development.

The conspicuous question for Egyptian university leaders revolve around their ability to change in accordance with modern demands on the higher education system. How can they deliver the right set experiences and academic qualifications for graduates? How will the graduates really benefit society? Will they fit the job market or not? Will they have the right set of skills to enable them to be entrepreneurs that serve the economy in a different way? How can Egypt stop the brain drain? For example, medical schools in Egypt are some of the best in the world, yet many graduates travel abroad for jobs. Answering these questions does not involve any one specific plan or project but rather sustainable interdisciplinary and civic engagement that includes training academic staff in interdisciplinarity as part of their professional development.

There remains a big gap in accepting failure, reflecting on it, and teaching that in the educational system through assignments and projects. Moving beyond the hard and technical skills there is the experiential aspect, involving skills that cannot be taught through textbooks. Here the learning involves more trial and error. Although there is a lot of talk about the likes of artificial intelligence and cybersecurity, currently Egyptian companies are not producing the demand for those types of jobs. So Egypt is very good at producing really good young technologists but there is a real danger of them migrating to other countries where they develop further skills and have the job opportunities. Hence, there is need for greater balance between the supply side and the demand side in industry which should involve educating the corporates about the value that they can get from using the new technology.

Fundamental to the skills development and transformation of Egyptian students is to appreciate that a technology can often have a short lifespan as it is usurped and disrupted by the latest innovations. Graduates will have no shortage of technology to use but for their skills to be future-proofed they need to be equipped with the solid scientific basis. This is part of the dilemma for universities – on the one hand giving graduates the competencies required for jobs now yet having the creativity and problem-solving skills to be equipped for future jobs, the nature of which are unknown until they happen. This centres on the need for students to have self-learning abilities. So the investment in technology for smart universities is there to help with education, but the main objective is to equip young Egyptians with the lifelong learning skills.

The digital skills transformation requires more than just embedding new skills into existing curricula but may require wholesale restructuring of certain courses that reflect the changes in society – especially the workplace. With the rapid rate of change in automation and digitisation of all industrial sectors then the tertiary sector needs to ensure key elements of change, such as artificial intelligence,

data acquisition systems, automatic sensing, etc. are part of applied programs otherwise students will be handicapped in the future.

One major growth area in Egypt is FinTech that deserves special attention in university education. How can this Fintech boom be leveraged, while enhancing and transforming the skills of students? To capitalise on the FinTech boom, there is a need for more instructors in the classroom to convey that type of knowledge and necessary skills the students need to build on. It is extremely important to have a continuous conversation between the employers, the market and the higher education institutions. Any skills or knowledge gap is as a result of having certain curricula that are not keeping up with the fast pace of change in the market, including the likes of FinTech. Generally, academia is a little bit slower than the market or businesses with different structures. That is common to any academic institution, regardless of size, whether public or private.

Regarding experiential learning, especially in emerging areas, it is often easy to talk about the future of work. But critical is the future of education and the future of learning and possibly the future of learning is all experiential. Whatever is taught in the classroom, it has to have application and to have some relevance to the wider society. The AUC school of business recently adopted a model whereby students take six months vocational leave prior to graduation. They are carefully monitored by both the employer and a faculty member, then they come back to the university after the six months. So now they are receiving new academic knowledge viewed from the lens of the six months work experience. There is a lot of lateral learning amongst students, allowing them to transfer the knowledge or some of the experience and skills they acquired back to the classroom. Hence, FinTech and other emerging areas require a type of toolbox of changes in how to manage and lead the academic institution, along with the receptiveness and ability of instructors and professors to learn new skills in terms of content and teaching methods.

For the higher education sector as a whole, there is the need to ask the question, why does a student wish to take an online course as opposed to a campus-based degree. The student choosing to do a particular course online is demonstrating a different set of lifestyle motivations than a student who wishes to have a full on-campus degree experience. This returns to the question of filling the skills gap between education and vocation. Such gaps are identified as utilising artificial intelligence, design and critical thinking, creativity, problem-solving and digital literacy. Much of these skills do not necessarily require accreditation. Universities can design and build online micro courses to address these skills or use third party providers, such as Coursera. An example of this in AUC is the public speaking course, the most popular at the university. Students can use a multitude of online resources, without the need for accreditation. More importantly, they need to be acknowledged in the labour market – this is why we are seeing a growth in things like 'digital badges'.

One area where the universities are seeing a skills gap is in the development of artificial intelligence (AI) expertise. One vision is to prepare content for AI, depending on the course – say for example the medical sector. Already, in some institutions we are witnessing a shortage in information technology and artificial intelligence skills.

The gap between academia and industry in Egypt was identified as mainly due to universities focussing primarily on publishing papers and industry working on the production process. Industry in Egypt does not develop enough of its own products, rather relying on the import of components, especially from Asia, and then having local assembly. If there are factories committed to product development then this provides a potential well for the higher education sector to feed into with research and innovation. Compared to other industrialised countries the number of annual registered patents is low for a country as large as Egypt. Patent filings are currently a little more than 1,000 per year, compared to 300,000 for Japan and in BRIC countries: Brazil 25,000; Russia 35,000; and India 57,000.

Scientific research and development benefits from a wider societal virtuous circle of innovation. Modern businesses are now using data much more to drive innovation, creating that circle of data capture, integration, improvement and implementation. This requires continuous improvement in product design and is where the higher education sector can come in with universities establishing their own innovation hubs. As software and communications technology becomes increasingly embedded in the physical world, the line between services and products starts to blur. Integrating data capture and analysis into the work of a university innovation hub gives a distinct advantage to product development. The hub can collect information from industry, analyse the problems then train and encourage students to solve such real-world problems. This investment in human resources and collaboration between industry and academia then completes the innovation virtuous circle.

Regarding preparing young people for jobs of the future, it was pointed out that the role of the

university should not always be to satisfy the needs of the labour market. Industry and the jobs market require educated people, yet well-educated people are not job seekers but job providers and if they have the learning and competencies then they will always fit into the labour market. Hence, the number one duty of the university is the intellectual development of society.

Egypt has an opportunity to create large-scale projects that can form an umbrella of collaboration and innovation. For example, if there is a mega-project for electrical vehicles this provides a comprehensive program in which multiple innovations can feed into from software to engineering and accordingly galvanize collaboration between the universities and industry. Complementing this is the commitment to develop higher order thinking skills in students and building research and development capacity. Equally, capacity building amongst Egyptian university staff is required to meet the demands of digital transformation and providing industry with the feedstock of skilled young people.

Newgiza University has been addressing this problem through courses that are dedicated to building the professional skills, such as human and social skills, along with some technical skills. There are some dedicated courses within the curriculum that encapsulate the necessary human professional skills, deployed through group projects, whereby students identify a problem, analyse the issues, and work out how to apply critical creative thinking to obtain an effective and efficient solution. This is done throughout the semesters. In parallel, this is then complemented with the requisite technical professional skills, which is more or less domain related.

Generally, participants in the meeting acknowledged that there remains a huge gap between academia and industry. Many Egyptian universities develop innovation hubs or incubators for start-ups, yet there remains wide variance between the private and public universities with the latter often under-funded to support innovative research. Access to capital is critical in R & D, so with limitations on public funds the onus is on far closer collaboration between the universities and industry.

In terms of entrepreneurship the future is for graduates who can create opportunities rather than seeking opportunities. Graduates, of course, are waiting to find a job, yet it is better if they are able to create their own job. Once graduated, learners already have the knowledge on how to build a business through a well-designed curriculum on business and entrepreneurship. This may require several levels of complexity, starting from the very simple introduction to business terminology, up to building a business model for, say a start-up, including obtaining investor support.

It is important to note that many people are very interested in becoming entrepreneurs, but few act, and even fewer are successful in building a sustainable business. A big part of it has to do with education, and equally, a large part of it has to do with the business and trading environment. In the last couple of years Egypt is starting to witness a point of inflection in terms of the tech enabled start-ups where there is now growth and an increase in investments. But still, it remains a very small niche of the economy. The university sector is good at educating the necessary hard and technical skills and in more recent times has been adding the soft skills needed for entrepreneurship, risk taking and initiative.

It is noted that in terms of entrepreneurship skills in Egypt, anecdotally there seems to be better interactions from female entrepreneurs. There are more women in universities than men, and significantly more women in graduate studies. So this is not an education gap in terms of participation, it might be a risk gap in terms of taking risk. As with anywhere else in the world there are systemic issues related to funding and investments. This is a global phenomenon about appreciating the value that female entrepreneurs bring and opening up equal opportunity investment in start-ups.

2.4 Innovative Learning: Curricula, Assessment & Online

Regarding the curriculum in higher education, it is critical to focus on three tracks: academic programs; applied research; and capacity building. Egyptian universities should develop current academic programs according to the needs of the labour market. Ain Shams University has already developed an academic program according to competency-based learning in the faculty of nursing, whereby they make a job analysis according to the nursing labour market. This has the flexibility to be adapted over time, particularly as the softer skills requirements evolve. Similar analysis has been done in the agribusiness sector, allowing for new academic programs. Currently, there still needs to be more participation from industry and key stakeholders to ensure students acquire the right professional skills for the labour market.

One of the first goals from an academic perspective is to achieve the transition from productivity-centre jobs to creativity-centred work. As well as the foundational curriculum is it now necessary to teach students more design-thinking to stimulate their creativity, giving emphasise to the principle of design? Do students need to be trained in the manner of being professional in the workplace with creative tools, especially as we enter the artificial intelligence arena and how machine-learning can problem solve? So, students nowadays must have the skillsets of the master subject to solve specific problems in their field from agriculture to medicine, to the environment. Yet with that, also have the ability to think more creatively, to think with a psycho-technical viewpoint – to not only look at technology but relate to that technology in their society.

In certain sectors, such as engineering, there is a strong call to reform the learning curriculum as a matter of priority to better reflect the technological changes in society. Doing so, requires upgrading university and laboratory facilities, along with upscaling the digital transformation required in the higher education sector. This approach then sets the scene for a deeper and more effective collaboration with industry. Reforming any curricula comes with the need to change methods of assessment. Evaluation that better identifies gaps and seeks to fill those with the necessary skills in young people. Introducing a more multidisciplinary program can also help in maintaining wider student engagement.

In Egypt as in the education community around the world, what we have experienced during the pandemic has been remote emergency teaching and not proper online learning with its full capabilities and applications. That said, the last couple of years has given the experience of teaching online – and such participation has meant educators learning best practices and methods themselves while on the job. The positives that have come out of the experience include access to digital materials and more resources, while being able to reach more learners. Yet, this sits alongside the fact that there are those universities who may not have the fully developed information infrastructure who could not reach their students nor had the learning management systems in place which reduced the quality of learning participation.

So how do Egyptian universities approach online learning in the post-Covid landscape? Firstly, there is the issue of cooperation and the sharing of resources between institutions. For example, if one university produces online courses with good instructional design and another university has expertise in building a robust learning management system (LMS) there is an opportunity to share resources. Not one institution has everything and not one can do everything – given the wide spectrum of technical and information-based requirements of online learning. Another important consideration for Egypt is to decide what kind of rubric should be used – whether existing models that are predominantly US and Eurocentric or whether the higher education sector in Egypt creates its own, incorporating open educational resources (OERs).

One approach to online education is to simply look at it as a learning experience and design lessons accordingly. Just as any professor will design a course or syllabus with appropriate milestones. The challenge is the granular detail of online learning which is very different to the front-of-classroom format in that the lesson requires the designing of every single moment. Furthermore, such instructional design needs far greater effort to ensure interaction and engagement. These qualities are automatically assumed with the presence of students in a lecture room. This is fundamentally why online learning is so different and why there has been such variability in the feedback from students on the quality of their experience during the pandemic.

Online learning can be divided into two main parts: firstly the technology and infrastructure, such as the software tools, the LMS etc., and the course materials hosted on an interactive e-learning platform. The toughest part is the instructional design and training faculty staff how to build an online learning course and especially online assessment with a high standard of proctoring. Universities in Egypt

have been using some form of e-learning for up to a decade now, it is the pandemic that has forced institutions to adapt at scale. Such adaptations need to include having an e-learning support unit for staff and students who will regularly encounter technical issues.

For some institutions the online courses were mainly at the postgraduate level pre-Covid. But since the pandemic we now see the most common online courses are undergraduate. The concern is the effectiveness of those courses compared to face-to-face instruction. Central to improving competency is the monitoring and judging how much students are engaged while online. Software that provides learning analytics is important. Furthermore, the role of the professors is evolving with e-learning whereby they are less responsible for delivering knowledge and act more as facilitators of learning, providing the necessary guidance of what online learning resources are best for the student.

The most important element of online learning that needs improved evidence-based research is assessment. The general sentiment is that online examinations are some way from being a success and over the last two years, faculty staff have encountered a variety of problems. Even with the students having the cameras on it is extremely difficult to know what is happening and if they have been doing the exams correctly and honestly. Then,

once online assessment is determined as being robust enough and of the standard required, the qualifications need accrediting and that requires a unified national approach.

Accreditation is critical because there is still a general sentiment, especially amongst employers, that an online degree is less credible. The wider societal acceptance of online qualifications moves a lot slower than the pace of change of technology. This challenge is accompanied by the fact that it remains harder for the institution to judge whether the students have attained their learning outcomes correctly and without cheating or obtaining help from a third party. The technological tools, such as proctoring software, are not yet fully reliable which means it is critical that the universities and the accrediting bodies agree on a set of standards for online assessment. These standards need to apply both to the methodology and the technology. This is particularly where faculty staff need help, instead of having to determine themselves the criteria and best-fit technology, there should be certified tools that have met with higher education regulatory approval.

While designing and implementing criteria for online assessment, one must be cognisant of the fact that one size does not fit all. There are many types of course, many types of degrees and a clear distinction between the theoretical and practical. One suggestion to overcome this challenge is to adopt a more hybrid approach that combines online learning with face-to-face assessment and continuous evaluation, especially for technical and vocational subjects. Whichever set of standards is implemented, they must be mandated by the government with clear guidelines for the universities. That said, the Egyptian government, like other countries, needs guidance from the universities on what forms of online assessment do and do not work. Certainly, there should be a national framework with well-defined online certification.

The flip side of these assessment challenges is that technology can offer new tools and methods that have not existed before. For example, examinations can be recorded, e-learning systems can produce metrics and provide new tools for evaluating that the professors may have not had before. There is also the opportunity for improved international accreditation of online degrees. Global university rankings are put in the context of both country and university ranking, but with e-learning certification that is less relevant, and it is the courses themselves that deserve the ranking – which in turn gives greater confidence to learners and future employers.

Although there have been improvements with online learning and assessment, the general sentiment is that evaluation is far from perfect, and

a hybrid system is better placed to solve a variety of problems. The hybrid approach then allows opportunities for the use of synchronous and asynchronous lessons and for the students to have more self-paced learning. In particular, we are likely to see more project-based learning and formative assessment methods aligned with the different forms of e-learning. The hybrid system is then much better at accommodating more technical subjects and vocational courses which require laboratory and hands-on study.

Another important dimension is how to embed research within the curriculum. i.e. how applied research, with innovative ideas, can be deployed in solving real world problems. Thus for the university it is necessary to know the best methodologies for preparing graduates with the proper professional skills and ensuring they have the training in business management and entrepreneurship, regardless of their major. The aim is that students are ready to go into the market with innovative ideas, with their own projects and a desire to lead the market through innovation and problem-solving. Important features within the university may include being represented on an advisory board within programs and helping with internships. Alongside this the university must ensure the necessary capacity building for faculties, especially with digital transformation and online learning.

2.5 Partnerships, Collaboration and Intellectual Property

The Egyptian Ministry of Higher Education is trying to do more to develop collaborative programs between the staff in universities and the scientific research institute staff. Egypt currently has more than 120,000 University staff, and about 1,000 researchers in the 11 research institutes who may often be working in the same field but are not connected. The Minister has given guidance for the development of a platform to allow for collaboration and matchmaking between members in the universities and research institutes communities. Furthermore, the ministry is trying to create a digital hub for research to develop projects while giving the institutes the opportunity to partner and access the wealth of knowledge in the universities.

An important factor in Egypt's tertiary educational development is the internationalisation of universities and the huge investment being made in the new administrative capital where several university campuses have already been established. Key components of this internationalisation, include high quality teaching and faculty staff, the development of curricula in line with the very best international standards and stringent admission examinations. Another element involves bringing in more project-based learning that connects students with wider societal and industrial challenges.

When talking about partnerships with universities in other countries, it is necessary to make sure that the Egyptian institution is partnering with a university that is already configured with their system from the perspective of the curricula and the staff capacity building programs. This partnership alignment also means developing the curriculum so that it addresses the future potential in the jobs market. The aligning of international partnerships should be based on sustainability, learning to live sustainably, learning to share, learning to understand the community and the society along with the appropriate technologies applicable between partners.

An imperative consideration when developing partnerships and the internationalisation of higher education in Egypt is to have a 'best of both worlds' approach, because in a developing country just to adopt a curriculum that may work in a more developed country will more likely fail without embedding local advantages and competencies. If we want to change the outcomes of education, then change the assessment which produces students who can better interpret and understand with higher order thinking, rather than just learning by rote. The most successful partnerships for internationalisation are those designed to be a contract between people who understand what they need from each other.

Bringing together curricula is a very challenging dimension when developing international university partnerships. Public universities in Egypt are governed by local laws that the institution cannot change which presents challenges with student grades and the equality of course materials. An effective approach is to look not at a specific course description but rather the broader spectrum of what competencies the course wishes to fulfil. Then the university leadership and faculty staff can look at the course similarities and shared outcomes. At the centre of such an approach is quality – academic quality and the defining characteristics of assessment.

The regulators in Egypt regularly monitor the performance of international university partnerships and in doing so it is essential to look at the nature of 'coupling' between the Egyptian institution and its partner university. This involves the pairing of instructors by subject between each institution and making sure that this brings greater diversity and allowing the practice to feed back into the Egyptian curriculum. Understanding mental well-

being is another dimension that helps support such partnerships – how students cope with stress and have the mental flexibility to adapt to the educational challenges. Learner mindset feeds back into the demand for skills transformation, exposure to international collaboration and how the student can better access resources of the partner institution.

There is a need for a clear policy that defines every international partnership the university is doing, such that it is not only the responsibility of the leaders, but also for the staff and faculty members, thus promoting a natural quality assurance system. Existing partnership have plenty of scope to be revised, allowing university leaders to raise awareness of all members in the university about the importance of the partnership and encourage all faculties to participate.

The experience of Galala university provides an interesting insight. The University was established just one and a half years ago, and now has 2,700 students. It was a bit challenging because people came from all over the country, and it involved building a new culture along with implementing the internationalisation aspect. They brought in fifteen professors from Hiroshima university to teach in engineering, dentistry and the Japanese language. Integrating them into the system was not easy. Also Galala finalised its agreement with Arizona State University (ASU) and is now giving dual degrees in engineering, computer science and business. Fortunately ASU is ranked the number one innovative university in the United States, as well as being one of the best universities worldwide. For the leaders, it was a challenge to adapt and to think how to coordinate with ASU, but at the same time to keep the traditions. Understanding this cultural change in internationalisation is very important. It is not a simple copy and paste job, but rather the skilled adaptation of curricula and assessment according to needs. This marriage between different universities is not easy yet done properly becomes a fulfilling collaboration.

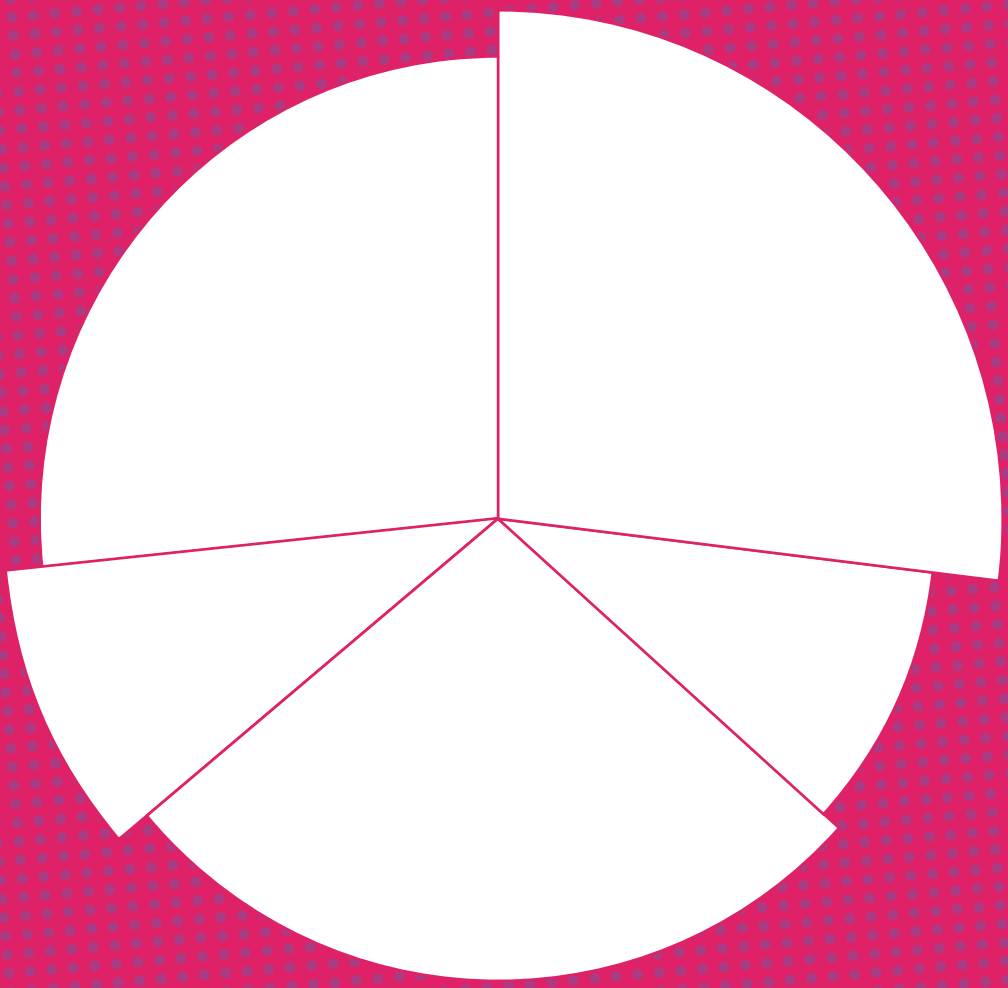
The development of IP policy for universities is already under way by the Egyptian government, with important stakeholders playing a role such as the Academy for Scientific Research and Technology (ASRT) working with the World Intellectual Property Organisation (WIPO). An IP policy roadmap will help with the protection and commercialisation of innovations generated within the universities. Another benefit of a comprehensive IP policy is the use of information. The publishing of international patent documents provides a wealth of information in the public domain that can be accessed by academic staff and students. The Egyptian Patent Office is now one of 23 International searching authorities under the Patent Cooperation Treaty. This is a treaty administered by WIPO that facilitates the process of protecting patents around the world. More should be done to encourage Egyptian universities to use this system and the services provided by the patent office.

Regarding intellectual property there remain some issues that are specific to Egypt, starting with a weakness in the application of IP law. This includes a single entity for registration and oversight of intellectual property rights. The ASRT handles patents, but multiple government ministries come into play, such as the Ministry of Communications and Information Technology holding the databases, and the Internal Trade Development Authority for registering trademarks. The lack of a reliable system for processing trademark and patent applications will be an obstacle for the growth of IP exports. Conversely, inward investors need to be sure that there is robust intellectual property rights enforcement, especially if the consumer market has widespread use of pirated and counterfeit goods.

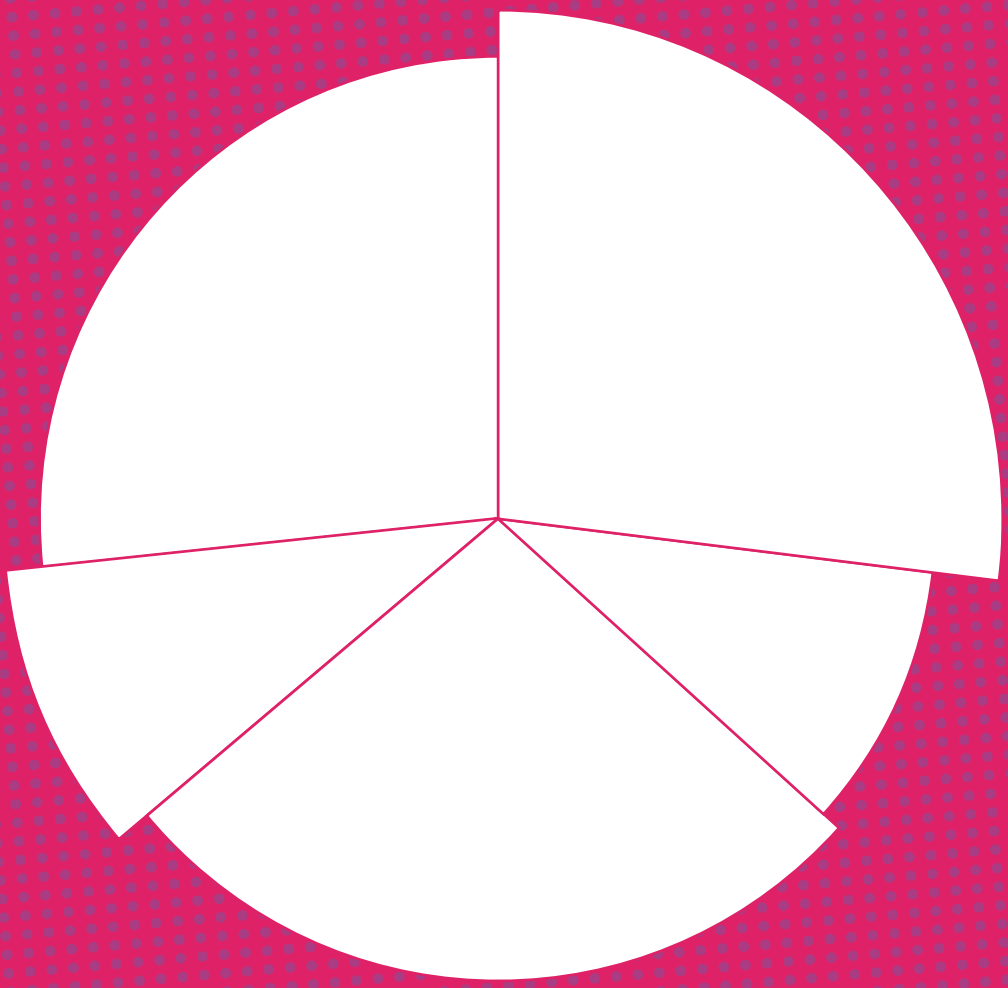
As is the case for universities in North America, Egyptian universities should be looking at how to best manage intellectual property (IP), with an IP unit in each university that can take responsibility for the patenting and IP processes when faculties are innovating. Such units play an important role in managing the legal issues and the production of patent applications. We are starting to see this in some of the universities, though there is plenty of room to learn from other international universities as well the Ministry of Higher Education and Scientific Research giving guidance.

- End -

For further details or copies of this report, please contact john.glassey@brains.global



APPENDICES



APPENDIX A

Agenda

Skills Gaps

by Marwa Abdelmoniem
Mohamed Essam

Orange Business Services

Marwa Abdelmoniem
International Business,
Digital Innovation & Competency Centers lead

Mohamed Essam
International Business,
Digital Innovation Manager

orange™ Business Services

Brief

- Total of 1200 employees
- 2 IB Offshore Centers
  Cairo & India
- 5 On & Nearshore Centers
  CL, Petropolis, Russia, BRA, KL
- Main functions
  Sales Ops, Design , Customization & Integration of Digital solutions
- Equipped with a Digital lab focused on Customer Digital Innovation

Our International Competency & Innovation Centers

Key to boost our Customers Digital Transformation

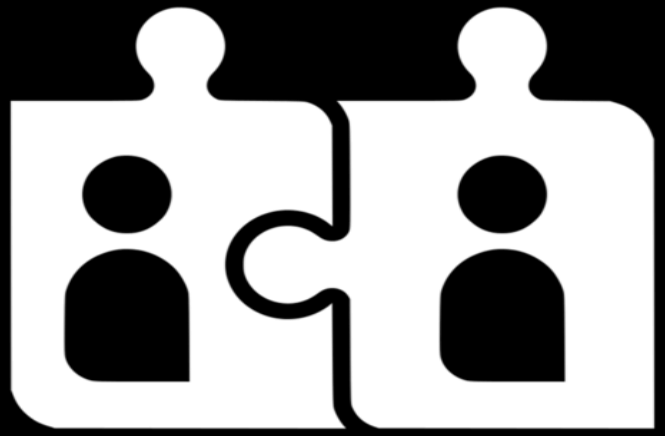
Skills Gaps
Job market vs. Education

1) Business Skills
(key for career & personal life)

a) Agile Project Management: methodology used to manage any scope that has a start and end. Drives Effectiveness, Efficiency , & moreover Professionalism.

b) Design thinking: an iterative problem solving / opportunity capturing technique that capitalizes on collaboration putting the human at the center of solutions designed and cocreated.

c) Communication : remote & face to face



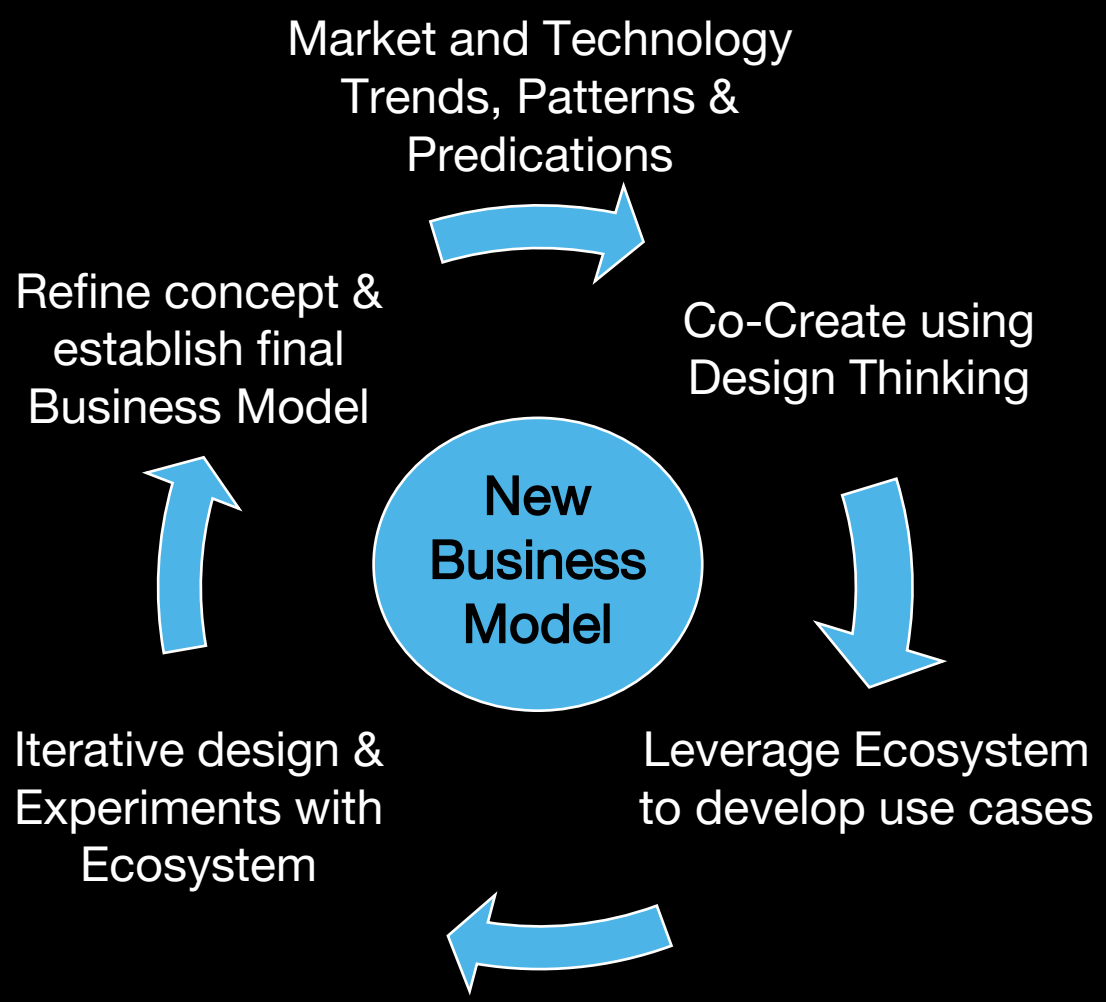
2) Technical Skills

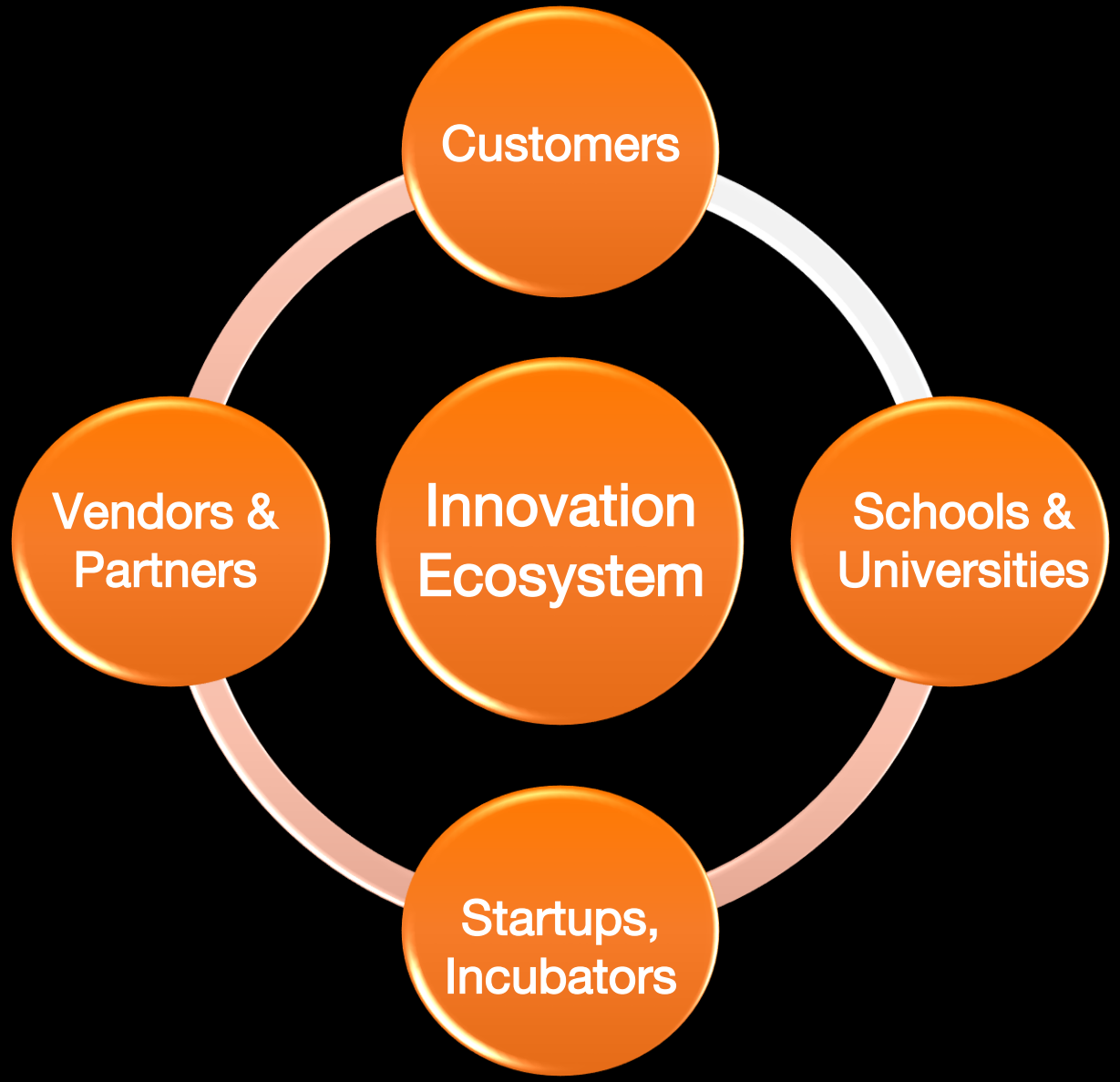
a) DevOps
b) Cyber Security
c) Artificial Intelligence

Key to accelerate Digital Business

Key for IT Career & jobs !

Shared Skills, Intelligence & Co-Creation





Thank you

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