Promotion of Innovation and Technology in Higher Education in the MENA Region: Past, Present, and Future

H.E. Prof. Hassan B. Diab

Expert Group Meeting (EGM) on Innovation and Technology for achieving the 2030 Development Agenda”, ESCWA, Beirut, December 5 – 7, 2017
Outline

1. Science, Knowledge, & Innovation in the MENA Region
2. Role of HE in SDG3: “Good Health & Well Being”
3. Role of HE in SDG5: “Gender Equality”
4. Role of HE in SDG8: “Decent Work and Economic Growth”
5. Role of HE in SDG9: “Industry, Innovation & Infrastructure”
6. Role of HE in SDG10: “Reduced Inequalities”
7. Role of HE in SDG17: “Partnerships for the Goals”
Science, Knowledge, and Innovation in the MENA Region
Weak Education System in the MENA

› Students recall Knowledge instead of producing it
› Not allocating an independent & encouraging budget for scientific research
› Lack of time & funding to achieve the desired results
› Low level of awareness of scientific research and its positive paybacks
› Brain drain

Rania Halabi, AlJazeera television
The Liberal Arts Model of HE (LAHE)
Graduating Global Citizens

Over 95% of more than 1000 universities in the MENA region lack the provision of 21st century skills needed for graduates in today's global job market.

MENA HEIs should graduate global citizens with 21st century skills in line with market needs.

Universities that implement this model (LAHE) seek to create leaders and life-long learners who aspire to the highest standards of moral and ethical responsibility in their societies.
New Teaching Methodology (LAHE)

Teaching students how to Learn, Discover, & Research

Promoting Analysis, Synthesis, Entrepreneurship & Innovation Skills

“Depth” in specialization & “Breadth” (soft skills)

The role of MENA region universities in creating leaders: Liberal Arts Higher Education Model, Prof. Hassan Diab, November 11, 2015 – Abu Dhabi, UAE, MENA HELF Conference
During my Tenure as Minister (2011-2014) of Education and HE in Lebanon

- Introduced entrepreneurial teaching in secondary education curricula
- A new law for compulsory education (middle school)
- Compulsory community service in high school education
- The first strategic plan for ICT use in education
- A law to create a national council on quality assurance for higher education
- A new HE Law
- A decree to regulate PhD programs

This is the link for my achievements: https://www.dropbox.com/s/ealriziinfm6enf1/Ministry-Book%202-ALL.pdf?dl=0

The role of MENA region universities in creating leaders: Liberal Arts Higher Education Model, Prof. Hassan Diab, November 11, 2015 – Abu Dhabi, UAE, MENA HELF Conference
1. Science, Knowledge, and Innovation in the MENA Region
Science & Technology in the MENA

National authorities in most Arab countries have not given special attention to S&T

6%  Globally  
Percentage of the Research Centers in the MENA  
Population in millions 358

29%  Globally  
Percentage of the Research Centers in North America  
Population in millions 355
Global Competitiveness Index 2017-2018
Lebanon & MENA

Source: International Monetary Fund; World Economic Outlook Database (April 2017)
## Ranking of Research Output at Arab Universities

Ranking according to the proportion of the publications of a University belonging to the top 50% of their field

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Country</th>
<th>Total papers (2012-2015)</th>
<th>Papers in top 50%</th>
<th>% of papers in top 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>King Abdullah Univ. Sci. &amp; Technology (KAUST)</td>
<td>KSA</td>
<td>2,106</td>
<td>1,276</td>
<td>60.60%</td>
</tr>
<tr>
<td>2</td>
<td>American University of Beirut</td>
<td>Lebanon</td>
<td>1,199</td>
<td>575</td>
<td>48.00%</td>
</tr>
<tr>
<td>3</td>
<td>King Abdulaziz Univ.</td>
<td>KSA</td>
<td>3,436</td>
<td>1,635</td>
<td>47.60%</td>
</tr>
<tr>
<td>4</td>
<td>Mansoura Univ.</td>
<td>Egypt</td>
<td>1,441</td>
<td>630</td>
<td>43.70%</td>
</tr>
<tr>
<td>5</td>
<td>King Fahd Univ. Petrol &amp; Minerals (KFUPM)</td>
<td>KSA</td>
<td>1,669</td>
<td>724</td>
<td>43.40%</td>
</tr>
<tr>
<td>6</td>
<td>Alexandria Univ.</td>
<td>Egypt</td>
<td>1,193</td>
<td>493</td>
<td>41.40%</td>
</tr>
<tr>
<td>7</td>
<td>Univ. Sfax</td>
<td>Tunisia</td>
<td>1,826</td>
<td>750</td>
<td>41.10%</td>
</tr>
<tr>
<td>8</td>
<td>Cairo Univ.</td>
<td>Egypt</td>
<td>2,866</td>
<td>1,176</td>
<td>41.00%</td>
</tr>
<tr>
<td>9</td>
<td>King Saud University (KSU)</td>
<td>KSA</td>
<td>4,896</td>
<td>1,951</td>
<td>39.90%</td>
</tr>
<tr>
<td>10</td>
<td>Ain Shams Univ.</td>
<td>Egypt</td>
<td>1,776</td>
<td>674</td>
<td>37.90%</td>
</tr>
</tbody>
</table>
QS 2018 University Rankings: AUB No. 1 University in the Arab region

<table>
<thead>
<tr>
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<td>American University of Beirut (AUB)</td>
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<td>King Saud University</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>4</td>
<td>King Abdulaziz University (KAU)</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>5</td>
<td>United Arab Emirates University</td>
<td>United Arab Emirates</td>
</tr>
</tbody>
</table>
Between 1901 and 2016, the Nobel Prizes were awarded to 881 individuals & 23 organizations only

4 Researchers* of Arab origin

PETER MEDAWAR

The father of Transplantation, first half Lebanese to win a Nobel Prize in Medicine, 1960

ELIAS COREY

1st of Lebanese descent. Nobel Prize in Chemistry, 1990

AHMED ZEWAIL

Father of Femtochemistry, 1st Egyptian to win a Nobel Prize in Chemistry, 1999

NAGUIB MAHFOUZ

First Egyptian Arab to win a Nobel Prize in Literature, 1988

*excluding the 4 Nobel Prizes for Peace for Arab individuals
1. Science, Knowledge, and Innovation in the MENA Region

Case Study: Lebanese Higher Education System
Overview of Research Institutions in Lebanon

50 Higher Education Institutions

12 Universities with Science & Technology Faculties

6 Universities with Research Centers

Grant Research Programme
Accepted Projects by thematic
2014-2016

- Basic Sciences & engineering, 72, 29%
- Agriculture and Food Sciences, 30, 12%
- Medical Sciences, 74, 30%
- Environmental Sciences, 44, 18%
- Human Sciences, 29, 11%
Grant Research Programme (GRP)
Accepted Projects by University
2014-2016 (249 Projects)

3773.5 MILL. LBP

- AUB, 78, 31%
- UL, 72, 29%
- LAU, 19, 8%
- CNRS, 24, 10%
- Balamand, 7, 3%
- USJ, 17, 7%
- USEK, 6, 2%
- NDU, 11, 4%
- Other *, 15, 6%

National Council for Scientific Research
Proposed strategy from MEHE

Lebanon is a signatory to UN Agenda 2030 & needs to meet SDG4 (QUALITY EDUCATION)

Develop a policy on infrastructure & maintenance of school buildings

Ensure that policies & decisions follow data driven approaches

Create a learning assessment framework strategy which incorporates the different types of student assessments

Develop the new curriculum for Lebanon as part of the World Bank financed program (2017-2021)

Create Educational opportunities & programs which prepare students for the demands of the labor market
2. Role of HE in SDG 3: Good Health & Well Being
Physicians & Doctors: Brain Drain, 2012

28%
Of physicians from medical schools in developing countries practice in the US, UK, Canada, & Australia

40%
Of doctors from Lebanese medical schools over the past 25 years practice in the US

Reversing the brain drain: a Lebanese model, Mohamed Sayegh, Kamal Badr
Published online 4 October 2012 http://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2012.143
Reversing the Brain Drain: A Lebanese healthcare Model

Access their willingness to return home

Build local infrastructure in home country

Create networks of collaboration with regional medical & healthcare centers

Maintain links with USA & EU medical centers & universities

AUBMC initiative: 180 doctors are back over the past 7 years

# Health and Primary Education

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country / Economy</th>
<th>Score</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Finland</td>
<td>6.9</td>
<td>•••••</td>
</tr>
<tr>
<td>2</td>
<td>Switzerland</td>
<td>6.8</td>
<td>••••</td>
</tr>
<tr>
<td>3</td>
<td>Singapore</td>
<td>6.8</td>
<td>••••</td>
</tr>
<tr>
<td>4</td>
<td>Netherlands</td>
<td>6.7</td>
<td>••••</td>
</tr>
<tr>
<td>33</td>
<td>United Arab Emirates</td>
<td>6.3</td>
<td>••••</td>
</tr>
<tr>
<td>34</td>
<td>Qatar</td>
<td>6.2</td>
<td>••••</td>
</tr>
<tr>
<td>37</td>
<td>Bahrain</td>
<td>6.2</td>
<td>••••</td>
</tr>
<tr>
<td>72</td>
<td>Lebanon</td>
<td>5.8</td>
<td>•••</td>
</tr>
</tbody>
</table>

Source: International Monetary Fund; World Economic Outlook Database (April 2017)

China

At least 40 hospitals deployed IBM’s Watson using AI to improve healthcare and speed up diagnosis

USA

Bill Gates investing $100 million to seek treatments for the Alzheimer disease

Lebanon

Engineer (Fouad Maksoud) developed (Winner of Stars of Science 2017) Nanoskin machine that can deliver drugs, & works on 3 categories: Wounds burns, diabetic ulcers, and muscle strains
3. Role of HE in SDG 5: Gender Equality
Regional Shares of Female Researchers, 2013 (%)
Perception towards female education in the MENA (2014)

32.8% of population in the MENA believed that University education is more important for a boy than a girl

The leaky pipeline: global share of women in HE & Research, 2013 (%)

36.8% in MENA

Secondary School Enrollment of Women 2013

Compulsory education in Lebanon up till grade 9 (15yrs) is now a law (during my tenure as Minister of MEHE)

4. Role of HE in SDG 8: Decent Work and Economic Growth
Gross domestic expenditure on R&D (GERD) as a percentage of GDP

https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=1A
Unemployment rate by educational attainment, age 25 & over, in the US

Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, Unemployment rate 2.5 percent for college grads, 7.7 percent for high school dropouts, January 2017
MENA region retains highest youth unemployment rate in the world

30.5% in 2014

Libya has the highest youth unemployment rate in the region
44.8% in 1991 to 48.6% in 2017

The Genius Visa built USA industry

- The secret weapon of the US is the **H-1B visa**
- **50%** of PhD candidates in the US are **Foreign Born**
- Innovators/researchers are going back to their home countries to build up their own Silicon Valleys & research facilities
Youth* population & unemployment in the Arab World

Top 5 Reasons (Globally) for Difficulty Filling Jobs

- Lack of available applicants (35%)
- Lack of technical competencies (34%)
- Lack of experience (22%)
- Lack of soft skills (17%)
- Looking for more pay than is offered (13%)

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Supporting Startups for Job Growth in the MENA region & the USA

$815M+
Invested in MENA startups in 2016

$60 billion
Invested in US startups in 2016
$3 billion funding only the top ten startups (combined)

https://www.statista.com/topics/2565/venture-capital/
https://tech.co/top-funding-rounds-startups-2016-04/gallery/2#scroll-to-gallery
US and Europe will Steadily Lose Ground to China and India

Share of world GDP (PPPs) from 2016 to 2050...

Sources: IMF for 2016 estimates, PwC analysis for projections to 2050
(PwC): Emerging Markets Will Dominate the World’s Top 10 Economies in 2050

Emerging Countries (E7): Brazil, Russia, India, China, Turkey, Indonesia and Mexico (BRICTIM)

Western Countries (G7): US, UK, France, Germany, Japan, Canada and Italy.
5. Role of HE in SDG 9: Industry, Innovation & Infrastructure
R&D in the Arab World

Researchers face blank walls when commercializing their Research output

- Limited link between Universities & Industry pertaining to research output
- Weak Intellectual property (IP) regimes/systems, which leads to
- Little IP protection for the research output of scientists, and results in
- Little wealth generation via the commercialization of R&D, because there is
- No support of patent culture

UNESCO science report: towards 2030
Universities’ Contribution to Innovation

- The American University of Beirut approved the setting up of an Innovation Park: AUB-iPark
- A hub to pull all together, the business community, the banking sector, and the entrepreneurship networks
- A space that is conducive to collaborative innovation, with a technology lab for hardware, and a pool of AUB faculty members on hand to pass on their expertise to the next generation
<table>
<thead>
<tr>
<th>Country</th>
<th>Initiative/Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>Program to develop solar energy, 2015</td>
</tr>
<tr>
<td>Egypt</td>
<td>Zewail City of Science &amp; Technology</td>
</tr>
<tr>
<td>Morocco</td>
<td>Africa’s biggest wind farm, 2014</td>
</tr>
<tr>
<td></td>
<td>Africa’s biggest solar farm</td>
</tr>
<tr>
<td>Gulf States</td>
<td>Emirates Institution for Advanced S&amp;T to operate Earth observation satellites</td>
</tr>
</tbody>
</table>

*UNESCO science report: towards 2030*
Infrastructure (e.g. airports) is essential for the development of economies

13,513 Airports in USA

637 Airports in Indonesia

9 Airports in UAE

1 Airport in Lebanon
6. Role of HE in SDG 10: Reduced Inequalities
Intercultural Learning

Ensure sustainable progress of active citizenship

Life-skills, transferable knowledge & intercultural competences

Lifelong learning opportunities for all generations

Sensitive interpretation & skillful targeted education programs for contemporary challenges

Criminal Records by Education (Men only)

Among **Americans age 28-33 in 2013**, 35% of men who did not graduate from High School have been incarcerated at least once during their lifetimes.

Differentiated teaching & learning approaches
By 2024, it is expected that there will be 3.85 million outbound mobile higher education students globally

https://ei.britishcouncil.org/educationintelligence/future-world-mobile-students-2024

Distance learning
(On-line degrees, MOOCs, etc.)
Globally, the number of students enrolled in HE by 2030 is forecast to rise from 99.4 million in 2000 to above 414 million in 2030


Reaching out to students in rural parts
7. Role of HE in SDG 17: Partnerships for the Goals
UN Global Compact: Hosted at AUB for Facilitating SDG Partnerships

135 partners have joined the multi-stakeholder network to mobilize the community (private, public, non-profit and academic) towards building partnerships and tackling the SDGs.

Engaging Public, Private & Academic Institutions

- Regional External Programs (REP) at AUB is a recognized leader in international consulting & technical assistance (over 1,000 projects – public & private sector- implemented in four decades across over 30 countries)

- Impacted the education & higher education map in GCC
- Strengthening health systems & government ministries
- Expanding economic opportunity for rural populations
- Supporting educational enhancement and reform, etc.

https://website.aub.edu.lb/rep
### Malaysia Education Blueprint 2015-2025 (Higher Education)

More than 10,500 people were engaged over 2 years


<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,300+</td>
<td>survey responses</td>
</tr>
<tr>
<td>2,300+</td>
<td>townhall and focus group participants</td>
</tr>
<tr>
<td>16</td>
<td>international advisors and experts</td>
</tr>
<tr>
<td>14</td>
<td>Malaysian expert advisors</td>
</tr>
<tr>
<td>1</td>
<td>national survey</td>
</tr>
<tr>
<td>18</td>
<td>townhalls</td>
</tr>
<tr>
<td>9</td>
<td>focus groups</td>
</tr>
<tr>
<td>250+</td>
<td>stakeholder representatives</td>
</tr>
<tr>
<td>5+</td>
<td>workshops</td>
</tr>
<tr>
<td>90+</td>
<td>HLI Chairman, Vice-Chancellors, and Chief Executives</td>
</tr>
<tr>
<td>4,500+</td>
<td>HLI staff</td>
</tr>
<tr>
<td>40</td>
<td>industry skills councils and professional bodies</td>
</tr>
<tr>
<td>25+</td>
<td>members of national education councils</td>
</tr>
<tr>
<td>50+</td>
<td>senior thought leaders and professors</td>
</tr>
<tr>
<td>140</td>
<td>Parent-Teacher Associations across school districts</td>
</tr>
<tr>
<td>20+</td>
<td>unions and associations</td>
</tr>
<tr>
<td>250+</td>
<td>students and alumni</td>
</tr>
<tr>
<td>500+</td>
<td>Ministry staff</td>
</tr>
<tr>
<td>30+</td>
<td>engagement sessions</td>
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</tbody>
</table>
Educational systems should graduate students with 21st century skills in line with market needs. These skills would ensure employment of youth, reduce poverty, and thus diminish social tension and civil unrest.

THANK YOU