• Vision
• Major Challenges in the Arab World
• The Reality of Innovation in Lebanon
• Recommendations
  • Law on Innovation and Technology Transfer
  • Science and Technology Parks
  • Science, Technology and Innovation Observatory
    • Key Performance Indices (KPIs) for NIS
  • Arab Fund for Innovation
LEBANON’S ECOSYSTEM PERFORMANCE

Strongest Area: Startup Skills; Internationalization

Weakest Area: Risk Acceptance, Technology Absorption

Improving the conditions for entrepreneurship by 10% could add $13 billion to the economy.

#63 of 137 countries globally

#10 of 15 in the Middle East / North Africa region

STI in Lebanon - ESCWA November 27-2017
LEBANON’S PROFILE

GDP: $51.2 billion (2015)
GDP per capita: $11,239 (2015)
SME contribution to GDP: 99% (2014)
World Bank Starting a Business Rating (2015): N/A; Rank: 139/190
Economic Development Phase: Efficiency-Driven

Expert Ratings of the Entrepreneurial Eco-system (ranked out of 65)

- ASIA & OCEANIA
- LEBANON

1 - highly insufficient, 9 - highly sufficient
GERD AS A PERCENTAGE OF GDP

- United Kingdom: 1.82%
- EU-27: 1.78%
- Tunisia: 1.02%
- Turkey: 0.72%
- Morocco: 0.64%
- Jordan: 0.34%
- Qatar: 0.33%
- Lebanon: 0.30%
- Sudan: 0.29%
- Egypt: 0.23%
- Oman: 0.17%
- Algeria: 0.16%
- Syria: 0.12%
- Kuwait: 0.09%
- Saudi Arabia: 0.05%
- Bahrain: 0.04%

GERD as a percentage of GDP
SPECIALIZATIONS PATTERN
1994-2004
TOTAL SPENDING ON TERTIARY EDUCATION AS A PERCENTAGE OF GDP
## MARKET SOPHISTICATION
### 2013-2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Global Rank 2017</th>
<th>Year 2013</th>
<th>Year 2014</th>
<th>Year 2015</th>
<th>Year 2016</th>
<th>Year 2017</th>
<th>Data Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Arab Emirates</td>
<td>33</td>
<td>47.3</td>
<td>46.2</td>
<td>48.1</td>
<td>48.7</td>
<td>52.9</td>
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<tr>
<td>Saudi Arabia</td>
<td>51</td>
<td>53.5</td>
<td>59</td>
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<td>49.6</td>
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<tr>
<td>Kuwait</td>
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<td>38.7</td>
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<tr>
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<td>45.1</td>
<td>38</td>
<td>42.1</td>
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<tr>
<td>Lebanon</td>
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<tr>
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<td>35</td>
<td>29</td>
<td>38.7</td>
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<tr>
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<td>35.4</td>
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<td>34.2</td>
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<tr>
<td>Jordan</td>
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<tr>
<td>Algeria</td>
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<td>36.8</td>
<td>31.7</td>
<td>29.5</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Global Innovation Index Reports 2013-2017.*
CUMULATIVE NUMBER OF DISCLOSED DEALS BETWEEN 2013 AND 2016 BY COUNTRY

MAJOR CHALLENGES IN THE ARAB WORLD
HIGHEST PERCENTAGE OF YOUTH UNEMPLOYMENT IN THE WORLD

Wasted youth
Youth population and unemployment in the Arab world

Source: ILO; World Bank; US Census Bureau

*15- to 24-year-olds
THE REALITY OF INNOVATION IN LEBANON
UNPRECEDENTED NUMBER OF BRAIN DRAIN

Rate of expatriation to OECD countries by highly skilled migrants

MENA Average 9.1%
THE REALITY OF INNOVATION IN LEBANON
NEED FOR AN INTEGRATED NATIONAL INNOVATION SYSTEM

Policy Environment – Tax Incentives, Subsidies, Regulation

Policy Interventions

Innovation Chain

MARKET PULL

Supply Side
- Academia
- Research
- Business

Demand Side
- Consumers
- Energy Sectors
- Government
- Exports

Basic Research
R&D
Demonstration
Deployment
Commercialization (Diffusion)

FEEDBACKS

PRODUCT/TECHNOLOGY PUSH

Investments

Government, Financial Firms, VCs, Equity Markets

FRAMEWORK CONDITIONS: MACRO-ECONOMIC STABILITY, EDUCATION AND SKILLS DEVELOPMENT, INNOVATIVE BUSINESS CLIMATE, IP PRODUCTIONS, ETC.
THE REALITY OF INNOVATION IN LEBANON
DISCONNECTED NETWORK ACROSS THE INNOVATION STAKEHOLDERS

PRESIDENCY OF THE COUNCIL OF MINISTERS
- National Council for Scientific Research - CNRS
- Tripoli Special Economic Zone - TSEZ
- Investment Development Authority of Lebanon - IDAL

Ministry of Education and Higher Education
- Lebanese University - LU
- Innovation and Development of Academic Industry Partnerships Through Efficient Research Administration in Lebanon - IDEAL

Ministry of Industry
- Industrial Research Institute - IRI
- Center for Innovation and Technology - CIT
- Euro-Lebanese Center for Industrial Modernization - ELCIM
- Lebanese SoftShore

Ministry of Economy and Trade
- Lebanese Industrial Research Achievements Program - LIRA
- Quality Program Lebanon - QUALEB
- Trade Information Center - TIC

Ministry of Finance
- Kafalat
- Kafalat Basic
- Kafalat Plus
- Kafalat Innovative
- Kafalat Startups and Innovation
- Kafalat Agriculture
- Kafalat Energy
- Kafalat ISME

European Union - EU
- Integrated SME Support Program - ISSP
- United Nations Industrial Development Organization - UNIDO
- Business Incubation Association in Tripoli - BIAT

Ministry of Telecommunications
- SouthBIC
- Beirut Digital District - BDD

Commercial Lebanese Banks
- Banque du Liban (BDL)

World Bank
# THE REALITY OF INNOVATION IN LEBANON

## GAP IN TECHNOLOGY TRANSFER

<table>
<thead>
<tr>
<th>Science and Technology</th>
<th>Support Intensity</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge Generation and Technological Production</strong></td>
<td><strong>Technology Transfer</strong></td>
<td><strong>Using Technology to Meet the Needs of Society and Economy</strong></td>
</tr>
</tbody>
</table>
| Universities, CNRS, Research Centers, IRI, LIRA | BRIC | ACCELERATORS
AltCity, Speed@BDD, UK Lebanon Tech Hub |
| Industries | World Bank – iSME | SCIENE/TECH PARKS
BDD, LSTP |
| Research Development | Early Stage Innovation | Startup |
| | World Bank – iSME | BDL Circular 331 (600M$) Kafalat – iSME |
| | | FACILITATORS
IDAL, MOET, MOT |
| | | INCUBATORS/TECHPARKS
Berytech, BIAT, SouthBIC, BDD |
| | | VENTURE CAPITAL FUNDS
Berytech Fund II, IM Capital, Leap Ventures, B&Y Venture Partners, Cedrus Mundi, MEVP, Phoenician Fund I, Wamda Capital Fund |

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STI in Lebanon - ESCWA November 27-2017
Gaps in Accessing Funds

Source: World Bank Analysis
VC LANDSCAPE IN LEBANON

Evolution of VC Landscape in Lebanon
(per year of establishment and fund size)

- Berytech Fund I
- Berytech Fund II
- MEVP Fund I
- MEVP Fund II
- ISME Fund
- B&Y Ventures
- IM Capital
- Saned Capital
- Azure Fund
- Leap Ventures Fund
- Impact Fund

Figure does not include funds that stopped operating: BDF Fund in 2006 and Lebanon Growth Capital Fund in 2011. It also does not include Angel Funding: LBA - Business Angels in 2009, Seeds in 2016. It does not include funding made available by accelerators such as SPEED.

Source: Funds Websites, World Bank analysis
GUIDING PRINCIPLES

• Promoting collaboration between universities, universities, industries, at the national, regional, and international level
• Transfer of technology is the critical issue. Put in place TTOs (ESCWA initiative across the Arab countries), sustain and maintain
• Protect by a legal framework to be enforced
• Provide the financial support (BDL)
SATT essentially translates to Technology Transfer Accelerators, whose objectives are to “simplify and professionalize the transfer of innovations from academic research to socio-economic markets” (SATT, 2014a).

The main services of the SATT reach across the entire innovation technology transfer chain, which includes:

• Protection of research results through the filing and maintenance of intellectual and industrial property titles
• Marketing to transfer into the economic market in the form of licensing and creation of start-ups.
• Detection of innovations with potential for valuation and identification of market needs
• Support for activities for the negotiation of partnership contracts relating to research projects with companies
• Actions to sensitize staff and students towards innovation, technology transfer and intellectual property
• Monitoring, studies and mapping of research themes, markets (needs, actors, regulations, etc.) and intellectual property
• Management of financing and support for the incubation of innovative companies
SOME RECOMMENDATIONS

• Tackling the Disconnected Innovation Network and Lack of Coordination
  • Collective law that encourages and organizes generation and transfer of advanced technologies (Read More)

• Bridging the Gap in Early Stage Innovation
  • Investing in Technology Incubators and not only incubators for technology companies (Read More)

• Continuous M&E for the Effectiveness of the Innovation System, Effects and Investment Payoff of this sector through the establishment of a Science, Technology and Innovation Observatory and a number of Key Performance Indices (KPIs) (Read More)

• Establishing an Arab Fund for Innovation to encourage cooperation and the formation of critical masses of specialists and sufficient material resources (Read More)
Objectives of the Law

1. To prioritize the development of high technologies and advanced technologies and the creation of places of employment in industry and the absorption therein of scientific and technological manpower, simultaneously with making investment in technological renewal.

2. To strongly develop the technology market; to encourage and promote technology and technology business incubation; to step up the transfer of research results to production and business activities, for increased economic benefit.

3. To encourage and create favorable conditions for technology transfer activities in all geographical areas, in the development of science-intensive industry whilst utilizing and expanding the technological and scientific infrastructure, and the existing human resources of the country.

4. To improve international cooperation and create favorable conditions for organizations and individuals to enter into international cooperation in technology transfer activities.
Means of Achieving Objectives

- For the purpose of achieving the objectives of the Law, grants, loans, exemptions, reductions and will be provided, which shall be given on the basis of an approved plan, all as set out in the Law.

Implementation

The Ministry of Economy and Trade and the Ministry of Finance are jointly charged with the implementation of the Law.
Contents of State Management of Technology Transfer Activities

1. Promulgating and organizing the implementation of propagating, disseminating and educating about the law on technology transfer

2. Formulating and directing the implementation of strategies, plans, programs, measures, mechanisms and policies to promote technology transfer and technological renewal

3. Managing technology transfer activities in a unified manner

4. Entering into international cooperation in technology transfer

5. Inspecting and examining the observance of the law on technology transfer; to settle complaints and denunciations, and handle violations of the law on technology transfer
Objectives of an S&T Park
- To support and develop projects and companies working in the sphere of innovations and high technologies

Technology Infrastructure
- Administrative Center with Business Incubator
- Furnished Offices
- Scientific Research Laboratories
- Production Spaces, Exhibition and Conference Halls
- Data Centers
- Educational Training Centers
- Equipment Sharing Centers

Business Incubation Program
- Assistance in raising and gaining access to funds
- Expenses subsidizing for innovative activities
- Assistance in projects promotion
- Establishment of business contacts

Educational Training Center
- Staff training and professional development (adaptation) using innovative educational techniques
- Organization and holding of all types of practical training for students on enterprises using S&T Park innovative and technological possibilities
- Evaluation of competence level of personnel on enterprises and organizations

Equipment Sharing Center
- SuperComputing Center
- 3D Prototyping Center
- Software Sharing
### INNOVATION INFRASTRUCTURE
### SCIENCE AND TECHNOLOGY PARKS (2)
### FACTS AND FIGURES IN THE MENA REGION

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of S&amp;T Park</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>Mubarak City for Scientific Research and Technology Applications (MuCSAT)</td>
<td>Hosts <strong>12 research centers</strong></td>
</tr>
</tbody>
</table>
| Israel*       | MATAM/Haifa Industrial Park for R&D Centers           | - Hosts **50 leading high-tech companies** (ex. Intel, Elbit Systems, Microsoft, Philips, Zoran, Google, and Yahoo, among others)  
                 | - Has **6,000 employees**                                              |
| Jordan        | Royal Scientific Society                              | - Has **600 staff members**                                              
                 | - Hosts **8 research centers**                                         |
| Morocco       | Casablanca Technopark                                 | - Supports **800 companies per year in Casablanca, 80 in Rabat, and 20 in Tangier Technopark** 
                 | - Hosts **250 Moroccan companies**, startups and SMEs with **2,000 employees** |
| Oman          | Knowledge Oasis Muscat                                | - Hosts **1 One-Stop-Shop facility** handling all administrative services and commercial registration requirements with relevant government entities |
| Saudi Arabia  | King Abdul-Aziz City for Science and Technology       | - Hosts **6 research institutes**                                        
                 | - Hosts the **Saudi Patent Office**                                    |
| Tunisia       | Elgazala Technopark                                   | - Has **2,950 employees**                                                
                 | - Creation of **300 new jobs**                                         
                 | - Includes **1 incubator** and **18 regional Cyberparks**               |
| UAE           | Dubai Techno Park                                     | - Has **133,000 employees**                                              
                 | - Has housing for **60,000 permanent residents**                        |

*around 4% of GDP is spent on R&D (2014), higher than average for OECD countries
• **Definition and Objective**
  - A tool to provide independent information (quantitative and qualitative) about the structure and development of science, technology and innovation in Lebanon, to both public and private stakeholders on a regular basis, as well as the contribution to key economic metrics including employment, productivity, export activity and macroeconomic linkages
  - This information is best presented as an online platform (website) and can be complemented by periodic outreach and dissemination events such as workshops and trainings
  - The range of subjects it could cover include SMEs and innovation, labor market studies, access to finance, access to infrastructure, academia-industry technology transfer, and sector studies

• **Means of Creating the Observatory**
  - This includes data collection, data housing, data analysis, and dissemination of studies

• **Stakeholders Involved**
• **Organization**
  
  • A cooperation framework should be signed between all the involved ministries and other governmental institutions.
  
  • The framework should outline high-level principles related to the rationale and purpose of an Observatory.
  
  • A steering committee should be created comprising all key stakeholders with the objective of overseeing the operationalization of the Observatory and playing an advisory role on subjects covered by the Observatory.
Key Performance Indices (KPIs) for the National Innovation System

- **Absorptive Capacity**
  - Expenditures in education in % of GDP
  - Science and Engineering graduates
  - Population with tertiary level education
  - Employment in medium/high-tech industries
  - Employment in high-tech services industries

- **R&D Capability**
  - Public R&D expenditures (% GDP)
  - Business R&D expenditures (% GDP)
  - R&D personnel per labor force
  - High-tech patents (per million population)
  - Resident patents per capita

- **Diffusion**
  - Training enterprises as % of all enterprises
  - Continuous Vocational Training in % of labor costs of all enterprises
  - ISO 9000 certifications per capita
  - Internet users per 10,000 inhabitants
  - PC per 100 inhabitants
  - ICT expenditures (% GDP)

- **Demand for R&D and Innovation**
  - Stock market capitalization in % GDP
  - Domestic credit provided by banking sector
  - Share of FDI in GDP
  - Share of trade in GDP
  - Index of patent rights
  - Registered unemployment
  - Consumer price index

## Type of Knowledge Flow

<table>
<thead>
<tr>
<th>Type of Knowledge Flow</th>
<th>Main Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry Alliances</strong></td>
<td></td>
</tr>
<tr>
<td>Inter-firm research cooperation</td>
<td>Firm Surveys</td>
</tr>
<tr>
<td></td>
<td>Literature-based Counting</td>
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<tr>
<td><strong>Industry-University-Research Institutes Interactions</strong></td>
<td></td>
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<tr>
<td>Cooperative R&amp;D</td>
<td>University Reports</td>
</tr>
<tr>
<td>Co-patents</td>
<td>Government Reports</td>
</tr>
<tr>
<td>Co-publications</td>
<td>Patent Record Analysis</td>
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<tr>
<td>Industry use of university/research institute</td>
<td>Publications Analysis</td>
</tr>
<tr>
<td>patents</td>
<td>Citation Analysis</td>
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<tr>
<td>Cooperative information-sharing</td>
<td>Firm Surveys</td>
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<tr>
<td><strong>Technology Diffusion</strong></td>
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<tr>
<td>Technology use by industry Embodied technology diffusion</td>
<td>Firm Surveys</td>
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<tr>
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<td>Input-Output Analysis</td>
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<tr>
<td><strong>Personnel Mobility</strong></td>
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<tr>
<td>Movement of technical personnel among industry, universities and research institutes</td>
<td>Labor Market Statistics</td>
</tr>
<tr>
<td></td>
<td>University/Institute Reports</td>
</tr>
</tbody>
</table>

Source: OECD, *National Innovation Systems*
• **Putting in place an Arab Fund for Innovation**
  
  • **Mechanism**: the Fund should be based on Public-Private Partnerships
  
  • **Objectives**
    • To invest in social and technological innovations that aim to improve the lives and opportunities of millions of people in the Arab World
    • To pool talent and expertise from the participating countries to form a collective and integrated network
    • To help in the integration of markets and resources (human capital, technology, infrastructure, etc.)
    • To support a collective innovation strategy for the Arab World
Principles of the Arab Fund for Innovation

- Include but are not limited to:
  - Transparency
  - Replicability
  - Fair Allocation
  - Shareholder Participation and Cooperation
  - Compliance
  - Periodic Review and Reporting

Source: Triodos Bank. *Principles of Fund Governance*