



**IDAL**  
INVEST IN LEBANON

# TECHNOLOGY

FACT BOOK  
2016



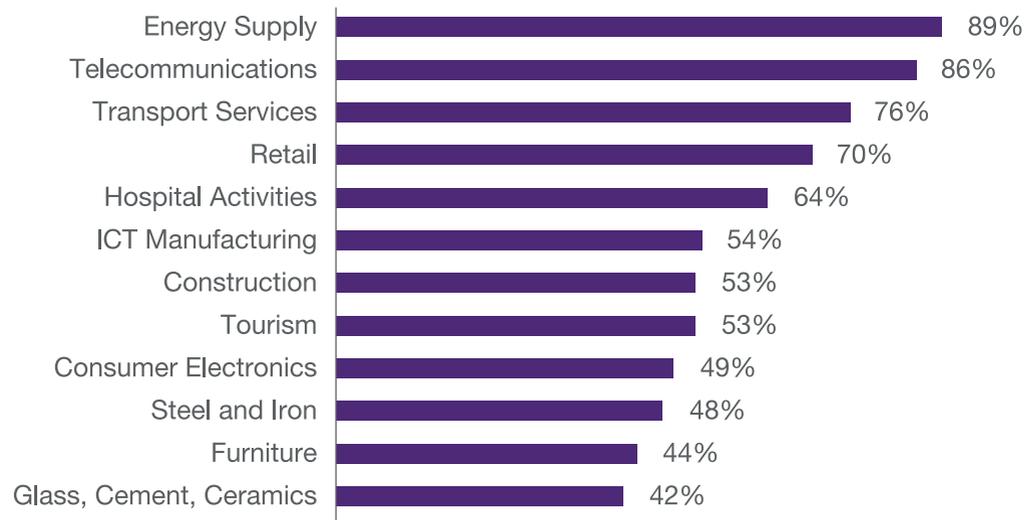
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# SECTOR OVERVIEW

Technology innovations are increasingly acting as engines for the competitiveness and sustainability of world economies. Advances in the technology sector have not only driven the fast growth of the sector itself, but also innovations and productivity across all other sectors and industries (Figure 1).

**Figure 1: Innovation Activity Enabled by ICT for each Industry 2016-2009 | %**



Latest available figures.  
**Source:** e-Business Watch, 2010, Booz & co.

Knowledge and technology intensive industries offered a strong multiplier effect on the economic performance of several countries. In 2016, industries that use Knowledge and Technology Intensive advances in their production process accounted for 29% of global economic output<sup>1</sup>. In 2014, the global export of High-Technology products totaled USD 2.4 trillion<sup>2</sup>.

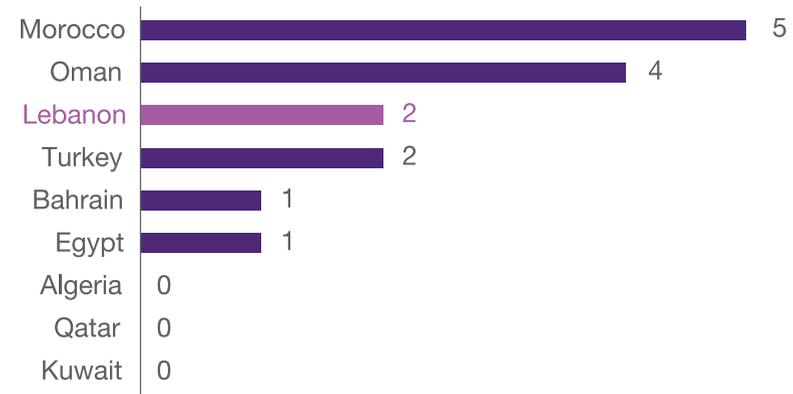
While sector developments continue to be concentrated in North America, Europe and East Asia, activities are shifting towards emerging economies with low-cost production and high innovation potential, such as India, Malaysia and Middle Eastern countries.

The MENA region is riding the technology wave, highlighted by commitments from various national governments to diversify their economies and invest in industries with high technology focus.

Lebanon has also started to benefit from the restructuring of the global value chain and has witnessed a surge of high tech companies specialized in the manufacturing of electrical equipment, clean technologies and in the design of hardware components and semi-conductors.

These industries, characterized by high growth dynamics, are helping to create various opportunities for pioneering and innovative companies in Lebanon. The country's trade activity in high tech products provides great insight into its potential and competitiveness. Indeed, Lebanon possesses one of the highest shares of high technology exports as a percentage of total manufactured exports in the region, accounting for 2% of total manufactured exports in 2014, equivalent to USD 38,146.559<sup>3</sup> (Figure 2).

**Figure 2: Share of high-tech exports as a % of total manufactured exports 2011-2014 | %**



Note: High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.

**Source:** World Bank Data, 2016

1, 2 National Science Board, Science and Engineering Indicators, 2016

3 World Bank, 2016

# COMPETITIVE ADVANTAGES

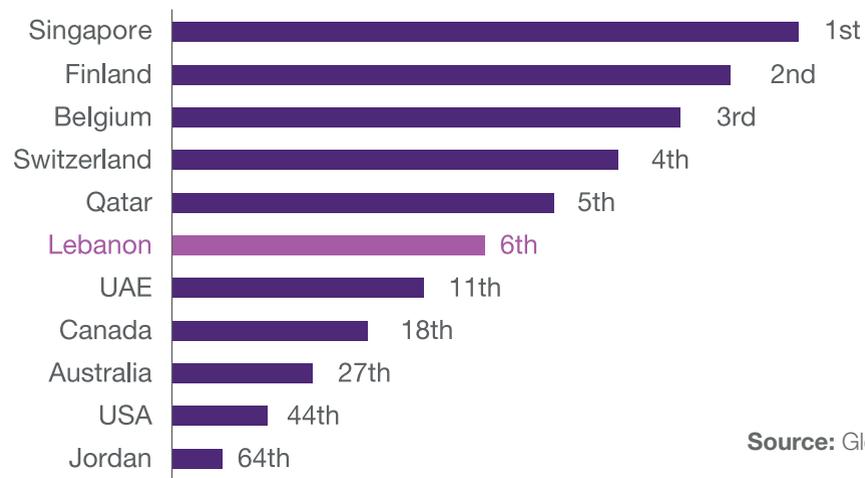
## A STEADILY RISING POOL OF QUALIFIED AND INNOVATIVE LABOR AT COMPETITIVE COSTS

▶ Lebanon's innovative power hinges on its human capital, a well-educated, multi-lingual and creative workforce. Around 3000 engineers graduate each year and join a labor force currently comprising 1.3 million workers<sup>4</sup>.

▶ High tech companies operating in Lebanon benefit from human resources with the most competitive technical skills in the region at very competitive costs relative to the EU, US and most neighboring countries (Figure 4).

▶ Lebanon occupies the 6th place worldwide for the Quality of Math and Sciences Education (Figure 3), while it ranks 19th worldwide for the Quality of its Higher Educational System<sup>5</sup>.

**Figure 3: Quality of Math and Science Education Index 2015-2016**

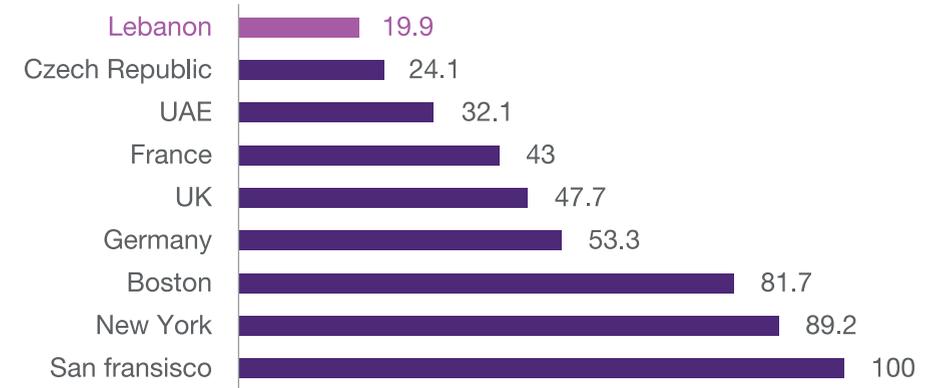


Source: Global competitiveness report 2015-2016

<sup>4</sup> Global Competitiveness Report 2014-2015

<sup>5</sup> Global Competitiveness Report 2015-2016

**Figure 4: Median annual wages of software engineers in selected countries USD Thousands | 2016**



Source: Payscale, 2016

## THE HIGHER EDUCATION SYSTEM & THE SCIENTIFIC COMMUNITY IN LEBANON

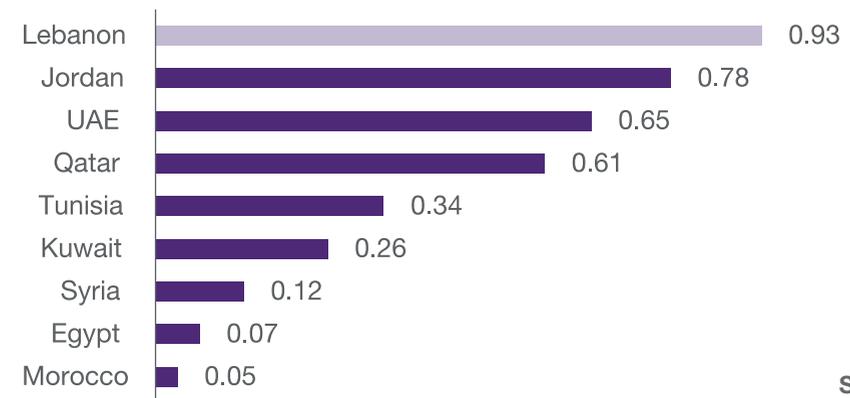
Lebanon enjoys a strong reputation as a home to an excellent scientific community, a network of world-class universities and an exporter of skills and innovation.

▶ Lebanon is home to 47 universities<sup>6</sup>, and has the highest concentration of universities in the region (Figure 5).

▶ A growing number of research and training centers are being established mainly in the fields of environmental technologies, medical science and agriculture.

▶ American University of Beirut ranks 2<sup>nd</sup> regionally

**Figure 5: Number of universities per 100,000 population in selected regional countries**



Source: IDAL's research

<sup>6</sup> Ministry of Education, 2016

## RISING GLOBAL AND REGIONAL DEMAND FOR INNOVATION

The technology market in the Arab world is far from being saturated and is witnessing a fast increase. The value of science and technology exports recorded 128% growth from 2008 to 2014, reaching USD 14,354

in 2014<sup>7</sup>. Lebanon's strategic position, located at the crossroads of Europe, North Africa and the Middle East allows it to serve expanding markets.

## A FAVORABLE INVESTMENT & INNOVATION ENVIRONMENT

Given the spillover effect that technological innovations have had on the growth of the economy as a whole, the government of Lebanon is committed to actively support and facilitate the establishment and expansion of innovative companies.

### INVESTMENT INCENTIVES:

The Investment Development Authority of Lebanon (IDAL) provides companies engaged in the technology sector with a set of fiscal and financial incentives including tax exemptions on corporate income tax along with administrative and facilitation services. For more information, check out the Incentives for The Technology Sector fact sheet here.

A number of business incubators and accelerators such as the UK Lebanon Tech Hub, South BIC, BIAT, speed@bdd, AltCity and Berytech, also offer financial support along with incubation and training services. For more information, check out the Financing your Business fact sheet on our website.

### FINANCING SCHEMES:

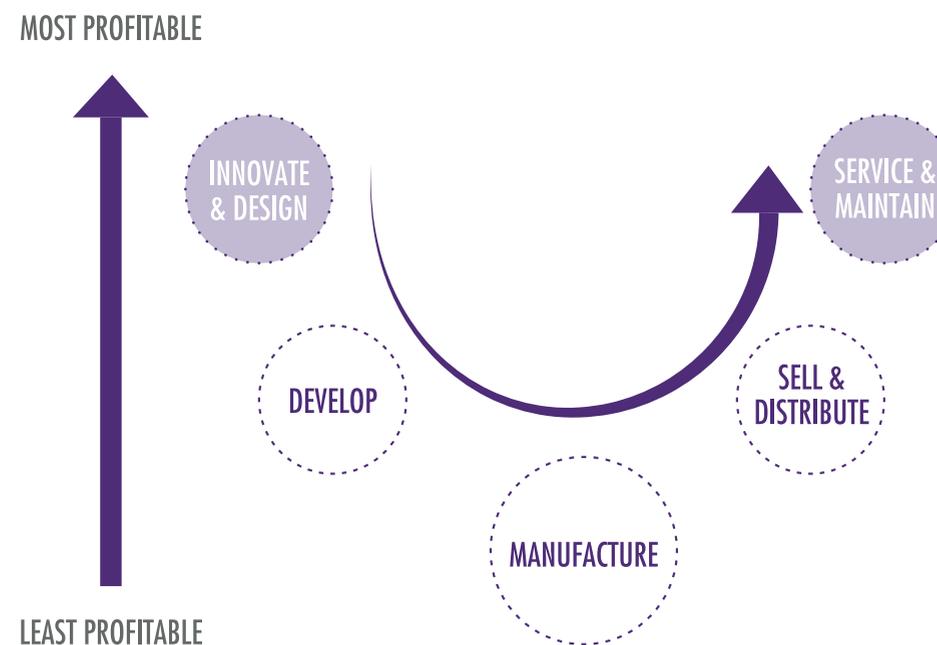
Private venture capital firms recognizing the potential and tremendous opportunities of the Lebanese tech sector are aggressively investing in the development and expansions of Lebanese firms. Other more traditional sources of financing available include Kafalat and Commercial Bank loans.

# INVESTMENT OPPORTUNITIES

The tech industry's value chain is one of the most globalized and complex chains, with its products supplied by multiple companies and assembled by more than one manufacturer. Lebanon's potential lies in the design of high-end products and the manufacturing of specialized components rather than in the mass manufacturing or assembly of equipment.

As such, Lebanon can act as a product development base, or as an outsourcing base mainly for the design & manufacturing of critical components as well as in services & maintenance. Opportunities thus exist in both ends of the value chain which are the most two profitable segments: Design and Services (Figure 6).

Figure 6: Industry Value Chain | Profit Curve



A considerable number of Lebanese small and medium-sized enterprises (SMEs) are taking up the challenge of finding real world solutions and developing new products for the global market. However, the technology sector in Lebanon is still concentrated in very few players and niches, with a large number of promising areas not yet developed. Ample opportunities exist, therefore, for local and foreign investors to explore, diversify and expand.

IDAL has identified 3 promising sectors with the potential to mature, mainly:

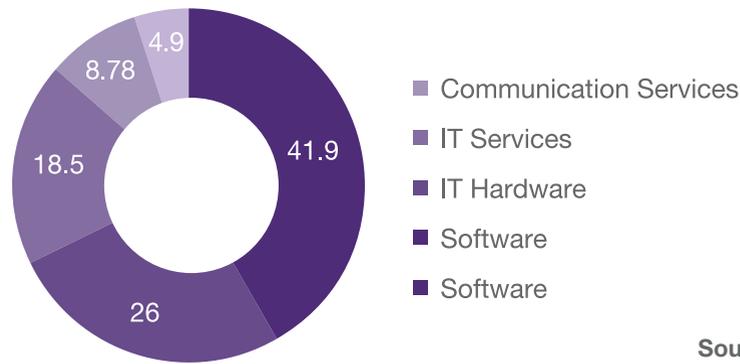
1. The manufacturing of ICT components, including electronics, semiconductors, etc.
2. The manufacturing of medical technologies
3. Research and Development.

# 1. ICT MANUFACTURING

In 2015, global spending on ICT was estimated at USD 3.51 trillion, of which 18.5% was spent on hardware<sup>8</sup> (Figure 7). ICT manufacturing specifically is one of the world's fastest moving industries with very short product life cycles. At present,

the world's five largest markets are the US, Japan, China, Germany and the UK. Globalization and the emergence of new markets and technologies have presented profound challenges and threats to the leaders of this sector.

**Figure 7: Distribution of Global ICT Spending across subsectors 2015 | %**



Source: Gartner press release, 2016

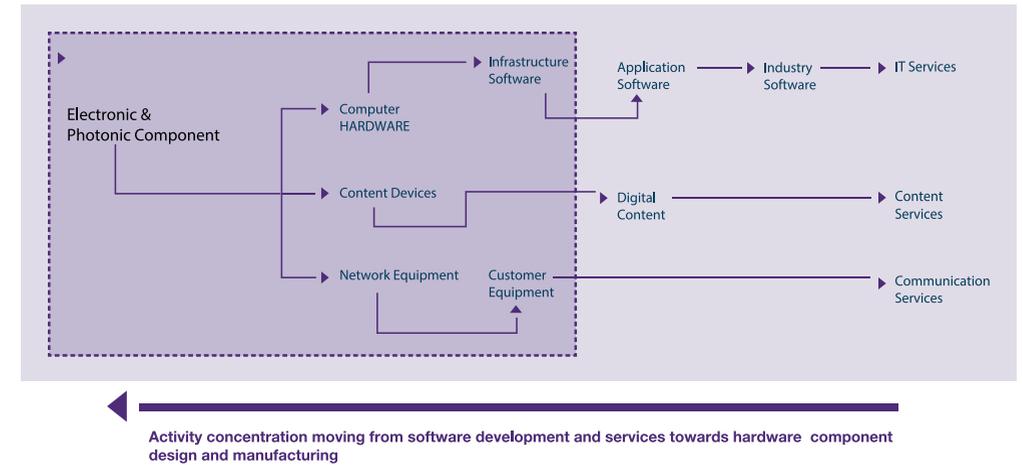
In 2016, the Lebanese ICT sector was estimated at USD 436.2 million, and is projected to grow to USD 543.5 million by 2019<sup>9</sup>. After achieving remarkable successes in ICT services and the development of software applications, Lebanon's ICT industry is moving up the value chain.

to break-through in the near future, if the right ecosystem is made available locally. In 2016, hardware sales were estimated at USD 262.2 million<sup>10</sup> (accounting for 60.2% of total market size<sup>11</sup>) and are expected to grow at a CAGR of 8.3% over the 2016-2019 period<sup>12</sup>.

Opportunities are now emerging in the manufacturing and design of hardware components. These ventures are generally initiated by Lebanese expatriates who relocate their processes to Lebanon, driven by the cost advantage of a talented local labor force. The performance of these companies has been noticeably positive over the last few years and is expected

While significant progress has been made, the local hardware industry is at its early stages and is concentrated in specific activities and products (Figure 8). At present, activities in the hardware industry include systems concepts and infrastructure software, semiconductor design, design and production of circuit boards, fiber optic cables, electronic components and power supply systems

**Figure 8: Components, IT, Communications, Content and Associated Services Value Chain**



## INVESTMENTS MEDIATED BY IDAL

IDAL has provided 2 investment projects involved in ICT manufacturing with financial incentives and the needed facilitation services:

### INKRIPT CARDS

Inkript Cards is a Lebanese technology company specializing in the development, manufacture, and sale of cards embedded with integrated circuits, microprocessors, and memory chips. All production stages, from conception through research and development to manufacturing and sales, take place in Lebanon. The company exports to the Middle East and the Gulf area, Asia and Africa, but also Eastern and Central Europe.

**USD 21 MILLION**  
**295 JOBS CREATED**

### DIAMOND SEGMENT & TOOLS

Diamond Segment and Tools is a new Lebanese-Saudi manufacturing company which has acquired the trademark, know-how, and technology for the manufacturing of diamond segments and tools from a leading European firm. 95% of the production is exported to nearly 55 countries, including Germany, France, Italy, Switzerland and the USA, providing high-quality products at low cost.

**USD 2 MILLION**  
**43 JOBS CREATED**

<sup>8</sup> Gartner press release 2016

<sup>9</sup> Business Monitor International, Lebanon Information Technology Report, 2016

<sup>10, 11, 12</sup> BMI 2016

## INVESTMENT OPPORTUNITIES

Lebanon can serve as an outsourcing base for companies involved in the semiconductor and communication industries, aiming at maintaining their competitiveness and flexibility. Based on Lebanon's competitive advantages, opportunities are mainly concentrated in three areas:

1. Design and manufacture of specialized, high end electrical components
2. Design and software engineering of hardware equipment and components
3. Manufacturing of telecom infrastructure products

Opportunities exist for Lebanon stemming from the needs in the region for: Arabic and Islamic products, smart devices for the energy and utility sectors, devices and systems for urban and infrastructure management, all of which could be manufactured locally.

## 2. MEDICAL TECHNOLOGIES

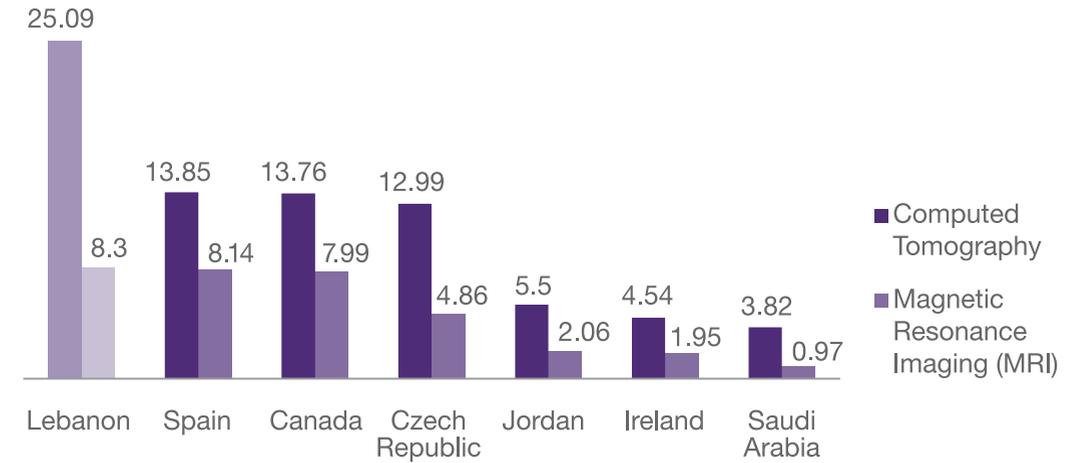
The medical equipment industry has witnessed explosive growth in recent years, fueled by rapid technology and science advancements. In 2014, the global market was valued at USD 380 billion, and is projected to reach USD 398 billion in 2017<sup>13</sup>.

Lebanon's well developed medical and health infrastructure underlies the country's potential to offer services ranging from research, product development, design and systems engineering of medical applications.

Lebanon's health care system is mostly privatized and provides a firm foundation for overall market growth. It is characterized by a high ratio of advanced medical equipment per capita, well above most higher-income countries.

The density of MRI equipment in Lebanon for example is 8.3 per million people, much higher than in Saudi Arabia (0.97) and in Jordan (2.06)<sup>14</sup> (Figure 9), which indicates the exceptional appetite of the domestic health sector to acquire and develop new technologies.

**Figure 9: Total Density of Medical Equipment per 1,000,000 population | 2013\***



Latest available data, **Source:** WHO 2016

In 2014, the local medical devices market was estimated at USD 240.3 million and forecasted to grow at a CAGR of 7.1% for the next 4 years, to reach a value of USD 339.4 million by 2019<sup>15</sup>. Despite being an important consumer of medical

equipment and a major destination for medical tourism, innovators do not only rely on the domestic sector activities, but also export their innovations to both regional and global markets.

## COMPETITIVE STRENGTHS

Besides the competitive advantages that characterize Lebanon as a technology hub, a number of reasons are specific to the medical technology industry:

- 1 Growing regional demand for healthcare services & increasing inward investments

In 2014, Healthcare Expenditure amounted to 5.3% of GDP in the MENA<sup>16</sup>, and is expected to reach 144 billion dollars by 2020<sup>17</sup>. Investment projects in healthcare infrastructure are already in progress and are mainly concentrated in GCC countries<sup>18</sup>.

- 2 World-class academic framework & strong synergy between hospitals & universities

Most Lebanese medical schools and universities are internationally accredited and boast significant achievements in basic and applied research in medical sciences and engineering. Universities have also developed very close linkages between the country's top hospital and medical institutions, facilitating technology and skills transfer.

- 3 High concentration & specialization in medical research

Fundamental biology and medical research are among the top 3 disciplines that have witnessed the biggest increase in the number of scientific publications over the past years.

<sup>13</sup> Vision Gain, Medical Devices Industry And Market Prospects 2013-2023

<sup>14</sup> Latest available data, WHO 2016

<sup>15</sup> BMI, 2016

<sup>16</sup> World Bank, 2016

<sup>17</sup> <http://saudigazette.com.sa/business/mena-healthcare-spending-to-reach-144-billion-by-2020/>

<sup>18</sup> Deloitte, 2015 health care outlook, Middle east

#### 4 Highly educated graduates & researchers at competitive costs

Lebanon is characterized by the highest ratio of doctors to population (32 per 10,000 people<sup>19</sup>) in the region and one of the highest in the world.

#### 5 A well-developed health infrastructure

The medical technology industry is backed by developed pharmaceutical and clinical industries. The local clinical industry is one of the most active clinical industries in the Middle East.

The pharmaceutical sector enjoys a strong presence of large international pharmaceutical companies and a market value equal to USD 1.63 Billion in 2015<sup>20</sup>. In all, health expenditures constituted 6.4% of Lebanon's GDP in 2014, compared to a MENA average of 5.3% and 10.0% for European Union countries<sup>21</sup>.



Reviva is a medical technology project that aims to establish an all-in-one medical center focusing on the use of stem cells for therapeutic, cosmetic, and banking purposes.

**Investment Size: USD 2,010,000**  
**Jobs Created: 30**

### INVESTMENT OPPORTUNITIES

Lebanon offers great potential in product development, supported by a set of competitive advantages in the complementary industries of the medical technology sector such as software engineering and development. An example of a breakthrough startup is

<sup>19</sup> Latest available figures, World Bank 2011

<sup>20</sup> BMI, 2016

<sup>21</sup> World Bank, 2016

CardioDiagnostics which offers state-of-the-art technology to monitor cardiac patients through their daily lifestyles for cardiac abnormalities. CardioDiagnostics received international attention when it was announced as the winner of the Global Innovation through Science and Technology GISTech-I Competition and received funds from various international foundations.



### 3. RESEARCH AND DEVELOPMENT

The R&D potential in Lebanon is not yet fully explored and the R&D base continues in its limited form. The last estimation of R&D personnel and expenditures dates from 2006, during which around 750 researchers were active in R&D activities with an estimated budget of USD 55 million. This is equal to 0.22% of the country's GDP that year, a percentage comparable to the regional average (0.2%) but well below the average in Europe (1.85% in 2007)<sup>22</sup>. However, Lebanon has the fundamentals to move along the path of innovation. The large number and unique specialization of scientific

publications indicate that Lebanon enjoys a substantial scientific infrastructure and has the capacity to innovate and develop new products, whenever investments are made available. Scientific and technical journal articles have increased at a rate of 143% from 2003 to 2013 in Lebanon<sup>23</sup>.

Lebanon enjoys a flourishing scientific and technological community embedded in 47 universities and higher education institutions, of which 12 include science and/or technology faculties, and 6 research centers.

#### INNOVATIVE WORKFORCE AND OPEN ECONOMY

The large inflow of foreign direct investments into the country since 2006 made the Lebanese economy the most open & internationalized among all the countries in the region, in terms of FDI/GDP and FDI/capita.

Although still relatively small as an R&D base, the level of openness positively impacted the quality of technology transfer and the globalization of the Lebanese workforce.

#### AREAS OF SPECIALIZATION

Over the past years, Lebanon developed a strong and increasing specialization in medical science, as a result of close links and partnerships between academic institutions, hospitals and research centers. Another area of specialization is agricultural sciences, with significant progress made as a result of new investments in the sector, mainly the opening of the Agricultural Sciences Department at the American University of Beirut.

<sup>22</sup> Latest available data, World Bank 2016

<sup>23</sup> IDAL's calculations, World Bank 2016

# MAIN STAKEHOLDERS

## MAIN STAKEHOLDERS

The National Council for Scientific Research (CNRS) aims at promoting, coordinating and developing the scientific research capabilities in Lebanon, and runs various integrated action programs and manages 4 research centers, which are linked to regional and international networks for implementation of collaborative programs. The CNRS also manages a number of funding schemes in collaboration with other governments and institutes. Examples are Programme Cedre, The Grant Research program (GRP), which benefited more than 600 projects over the past few years.

Other government initiatives exist for the development and consolidation of a knowledge-based economy:

### **The Industrial Research Institute (IRI):**

The Industrial Research Institute is a publicly owned institution that conducts extensive research and testing across various fields in the industrial sector in an effort to enhance the latter's performance. The IRI offers services including lab testing, certifications, techniques and equipment development (testing, measurement, analysis and calibration), industrial studies as well as the organization of fairs, seminars and conferences for local professionals.

### **The Lebanese Industrial Research Achievements (LIRA):**

The Lebanese Industrial Research Achievements Program is a government initiative that aims at building effective cooperation between

industry, academia, and research centers to address the research and development needs of the Lebanese industry.

### **LIRA's objectives are to:**

1. Encourage university-industry cooperation towards building a knowledge-based economy;
2. Match university activities/research with industry needs/problems towards increasing productivity;
3. Seek industrial sponsorship for proposed university projects;
4. Offer a national platform for potential new products and services;
5. Help engineering and science students in developing their research projects;
6. Provide industrial training to fresh graduates and engineers.

## INVESTMENT OPPORTUNITIES

The Science Technology and Innovation Plan developed by representatives of universities and national organizations identified a number of opportunities in 3 specific areas:

- 1. Industry and engineering**
- 2. Environment and agriculture**
- 3. Medicine and health care**

In a regional context and given Lebanon's competitive edges in the field of medical sciences, health care and medical innovations will constitute a main pillar of the Lebanese science and technology base. Environmental technologies are also increasing in popularity among research centers with the promising future of renewable energy innovations.

**Altcity**  
[www.altcity.me](http://www.altcity.me)

**Berytech**  
[www.beryttech.org](http://www.beryttech.org)

**Beirut Creative Cluster**  
[www.beirutcreativecluster.org](http://www.beirutcreativecluster.org)

**Business Incubation Association in Tripoli (BIAT)**  
[www.biatcenter.org](http://www.biatcenter.org)

**Endeavor**  
[www.endeavor.org](http://www.endeavor.org)

**Investment Development Authority of Lebanon - IDAL**  
[www.investinlebanon.gov.lb](http://www.investinlebanon.gov.lb)

**Kafalat**  
[www.kafalat.com.lb](http://www.kafalat.com.lb)

**Ministry of Economy and Trade**  
[www.economy.gov.lb](http://www.economy.gov.lb)

**Professional Computer Association of Lebanon - PCA**  
[www.pca.org.lb](http://www.pca.org.lb)

**South Business Innovation Center (SOUTH BIC)**  
[www.southbic.org](http://www.southbic.org)

**The Lebanese Industrial Research Achievements (LIRA)**  
[www.liraprogram.com](http://www.liraprogram.com)

**The National Council for Scientific Research (CNRS)**  
[www.cnrs.edu.lb](http://www.cnrs.edu.lb)

**The Industrial Research Institute (IRI)**  
[www.iri.org.lb](http://www.iri.org.lb)





## CONTACT US

If you require any further information on investing in Lebanon or on the services IDAL can offer you, please do not hesitate to contact us at the following:



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