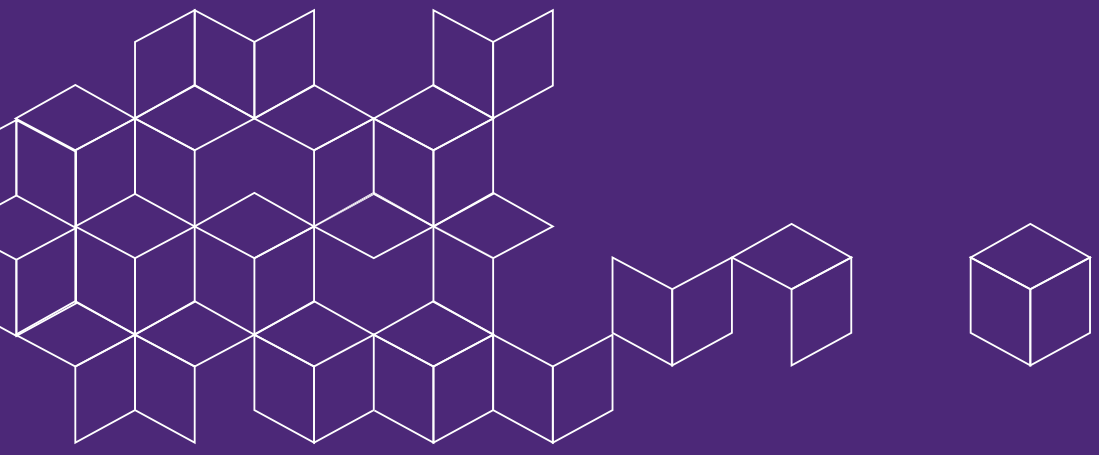
IDAL

INVEST IN LEBANON

TECHNOLOGY
FACT BOOK

Content

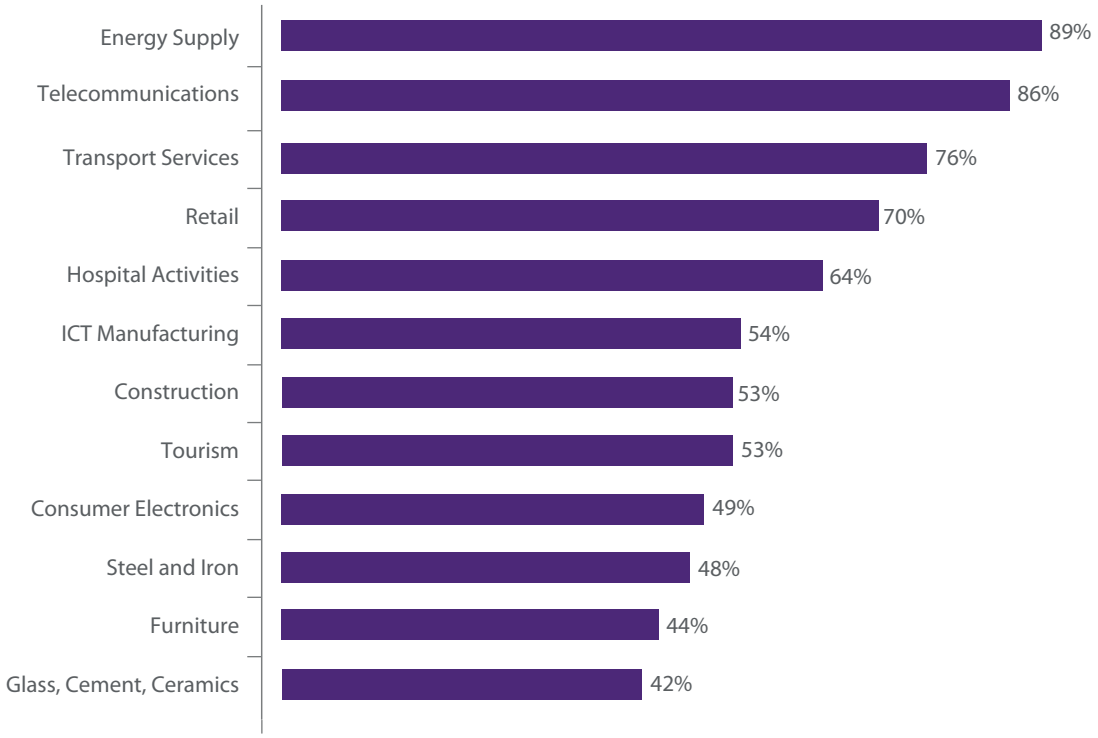
SECTOR OVERVIEW



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: Percentage Of Innovation Activity Enabled by ICT by Industry | **2006-2009**



Source: e-Business Watch, **2010**. Booz &Co

Knowledge and technology intensive industries offered a strong multiplier effect on the economic performance of several countries, and represented a global value added equal to USD 18.2 trillion in 2010. This represented 30% of the world's GDP, with the US, EU, Japan and China providing the major centers of global activity.

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 Singapore, China and Malaysia.

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.

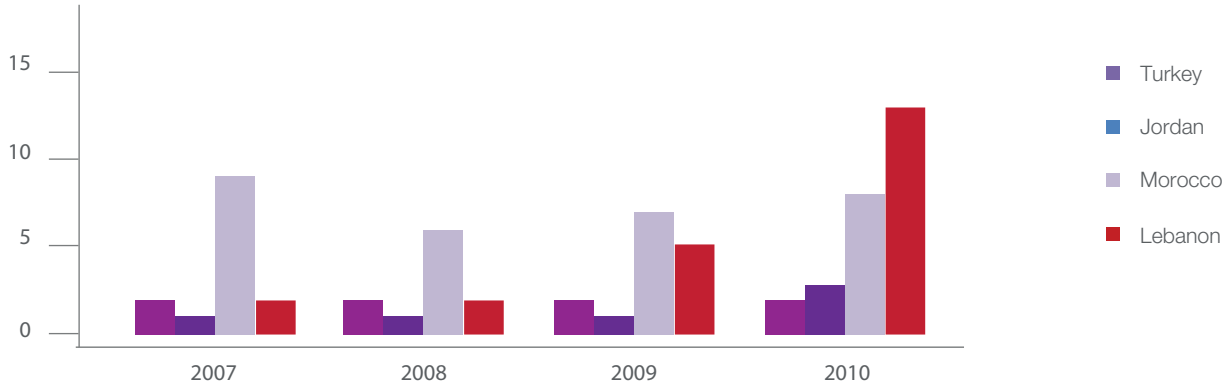
Lebanon has also started to benefit from the restructuring of the global value chain and has witnessed a surge of high tech companies specialized in the manufacturing of electrical equipment, clean technologies and in the design of hardware components and semi conductors.

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.

The domestic technology sector hinges on export-oriented manufacturing which is reflected by the rising shares of Lebanese high tech products as a portion of total manufactured exports, from 2% to 13% over the 2007-2010 period **(Figure 2)**. The growth of tech exports is remarkable relative to the region, with Lebanon recording the highest increase in both percentages and export values, according to the World Bank **(Figure 3)**.

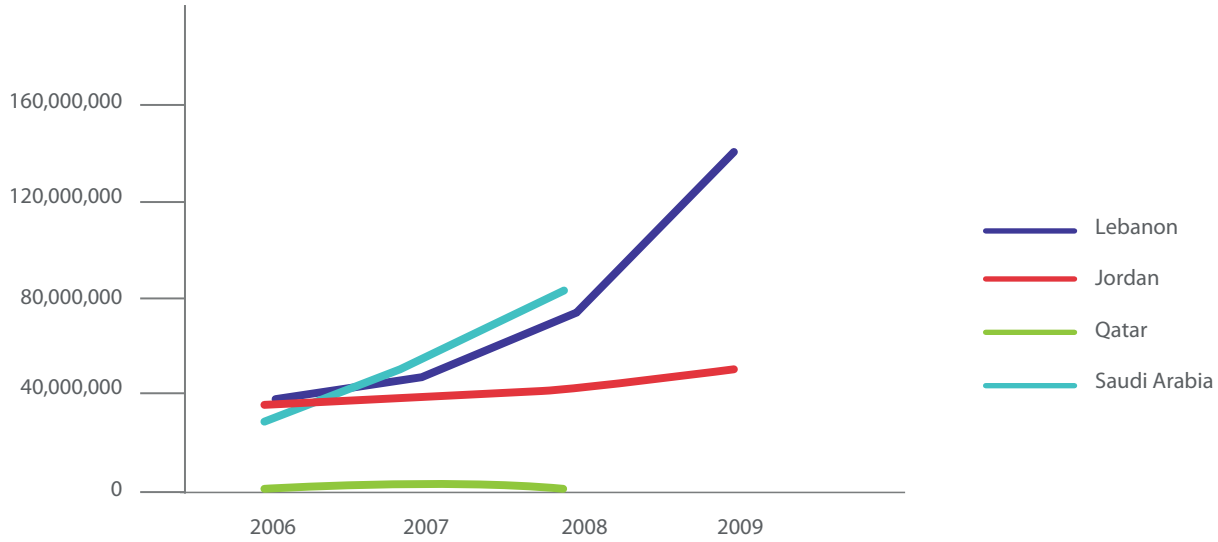
Figure 2: Share of high-tech exports in total manufactured exports | %



Source: World Bank Data **2011**

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

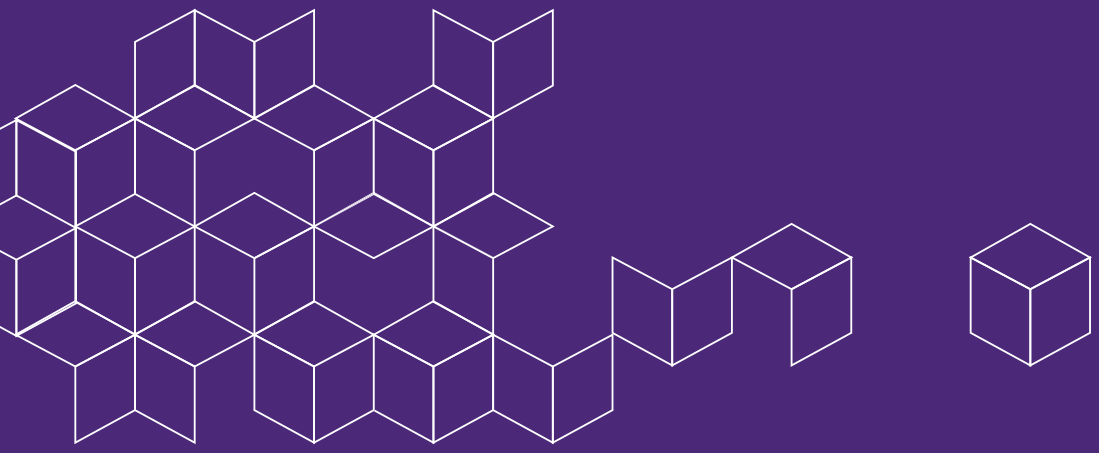
Figure 3: High-tech export values in current U.S. dollars | **2006-2009**



Source: World Bank Data **2011**

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

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[1] graduate each year and join a labor force currently comprising 1.3 million workers
- Lebanon occupies the 4th place worldwide for quality of math and sciences education **(Figure 4),** while it ranks 10th worldwide for the quality of its overall educational system
- 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 5)**

Around

3000

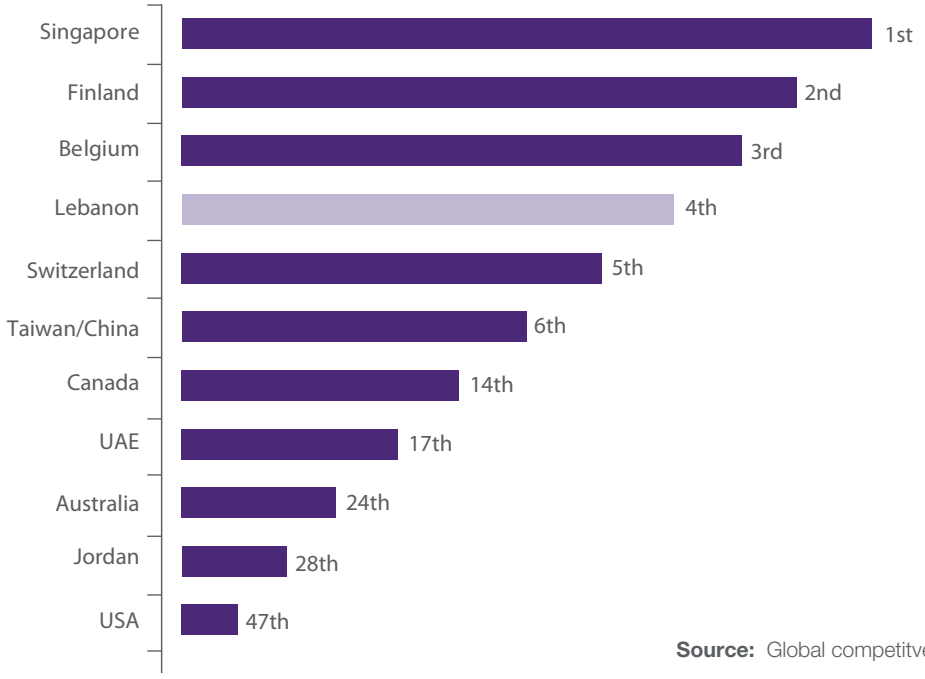
engineers graduate each year

Lebanon occupies the

4th

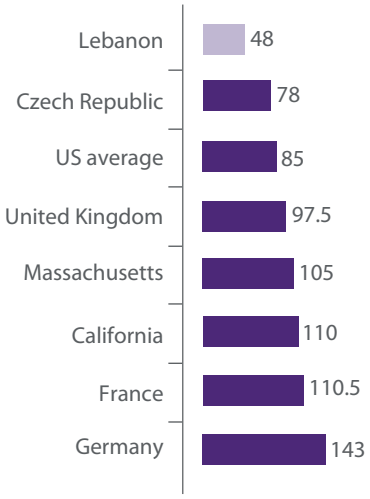
place for the quality of math and sciences education worldwide

Figure 4: Quality of Math and Science Education Index | **2012 - 2013**



Source: Global competitveness report **2012-2013**

Figure 5: Wages in the High Tech Sector in thousands | **2010**



Source: The Tech AmericaFoundation, Global 50. Remuneration Planning Report **2009-2010**, Watson Wyatt Data Services

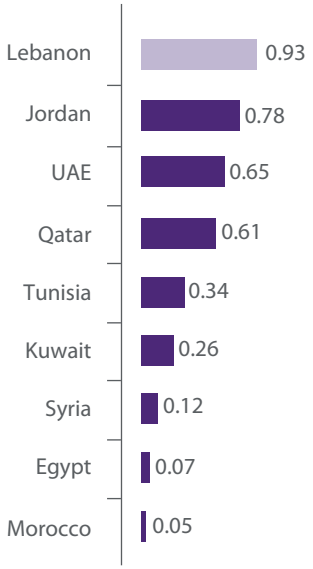
[1] This number includes; electrical, computer, mechanical, telecommunication and environmental engineers

THE HIGHER EDUCATION SYSTEM & THE SCIENTIFIC COMMUNITY IN LEBANON

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

- Lebanon is home to 41 universities, and has the highest concentration of universities in the region **(Figure 6)**.
  A growing number of research and training centers are being established mainly in the fields of environmental technologies, medical science and agriculture.

Figure 6: Number of Universities | per 100,000 population in selected regional countries



Source: Countries'websites

A FAST EMERGING CLUSTER

The technology cluster is rapidly emerging in Lebanon, with a considerable number of small and medium-sized enterprises (SMEs) 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.

A FAVORABLE INVESTMENT & INNOVATION ENVIRONMENT: CONNECTING & CATALYZING

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

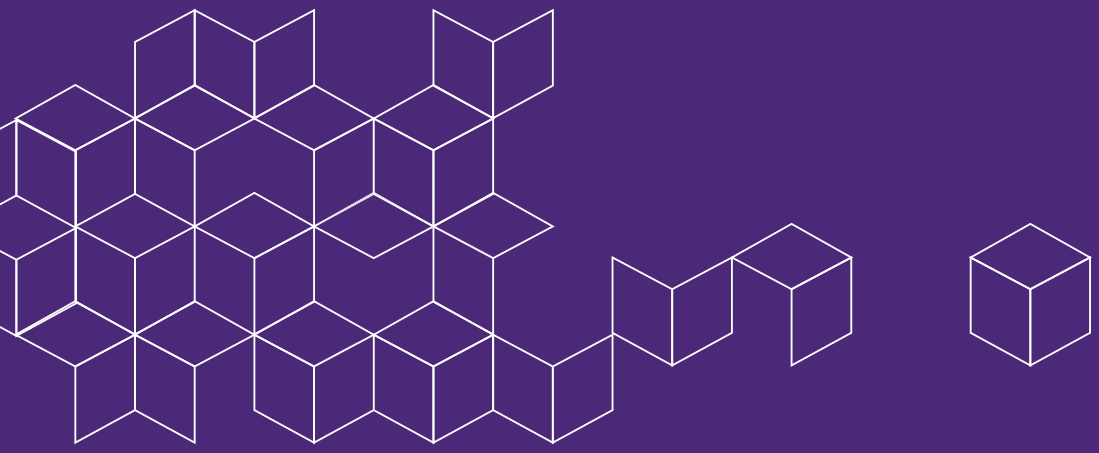
- **Financing schemes:** Private venture capital firms recognizing the potential and tremendous opportunities of the Lebanese tech sector are aggressively investing in the development and expansions of Lebanese firms.
  Other more traditional sources of financing available, including Kafalat and Central Bank loans.
  A number of business incubators and accelerators such as Sequence and Berytech, also offer financial support along with incubation and training services.

- **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 facilitation services.

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 in the value of science and technology exports, recording 45% growth from 2004 to 2007 according to the World Bank.
Lebanon's strategic position, located at the crossroads of Europe, North Africa and the Middle East allows it to serve expanding markets.

INVESTMENT
OPPORTUNITIES

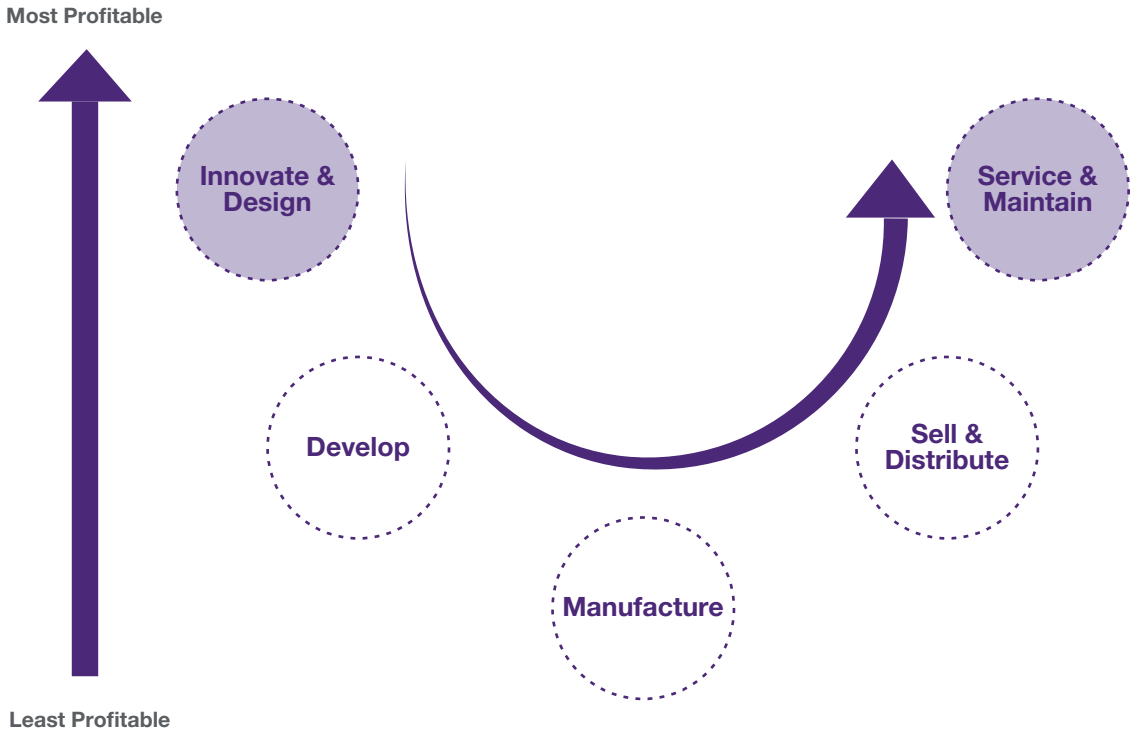


INVESTMENT OPPORTUNITIES

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 manufacture 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 7).**

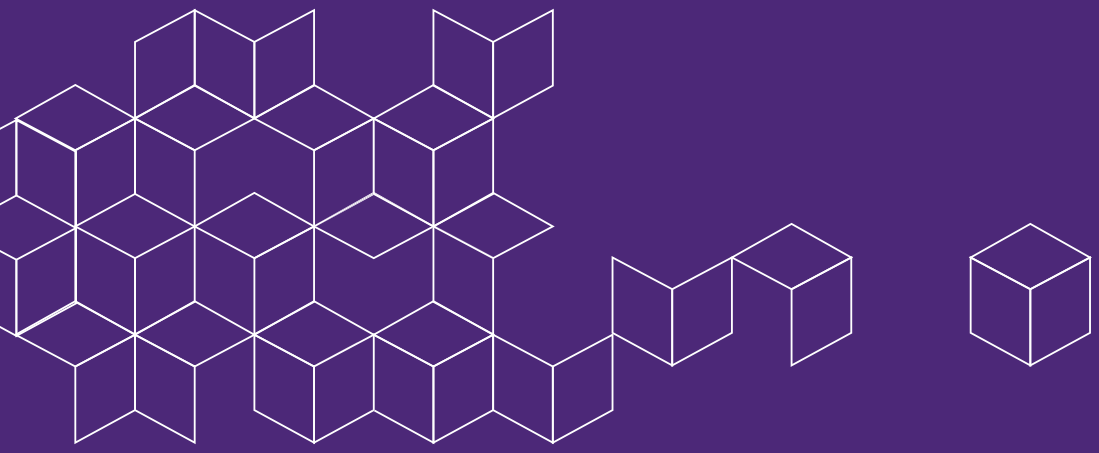
Figure 7: Industry Value Chain | **profit curve**



Within the technology sector, 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**.

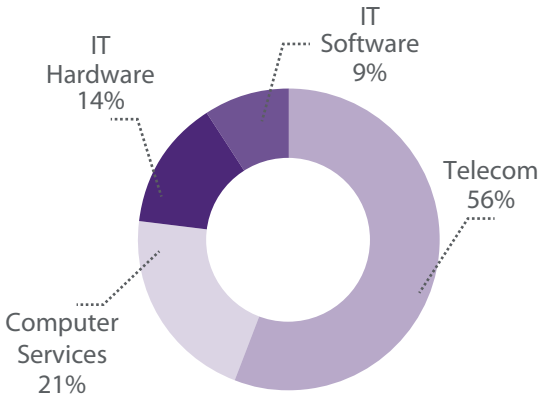
ICT MANUFACTURING



ICT MANUFACTURING

Globally, spending on ICT was estimated at USD 4.3 trillion in 2011, of which 56% was spent on telecommunications, 21% on computer services, 14% on IT hardware and 9% on IT software **(Figure 8)**. ICT Manufacturing specifically is one of the world's fast moving industries with very short product life cycles. At present, the world's five largest markets for ICT 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 8: Global ICT Spending | **2011**



Source: World Information Technology and Services alliance, **2011**

After achieving remarkable success in ICT services and the development of software applications, Lebanon's ICT industry is moving up the value chain.

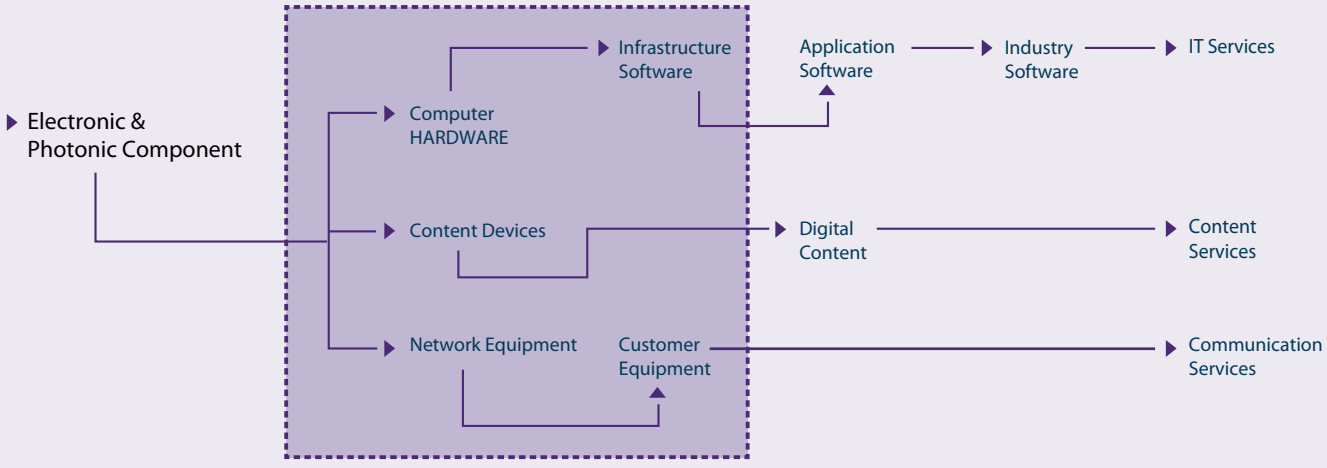
Opportunities are now emerging in the manufacturing and design of hardware components. These ventures are generally initiated by Lebanese expatriates who move part of their operations out of Silicon Valley and relocate their processes to Lebanon, driven by the cost advantage of a talented local labor force.

The performance of these companies has been noticeably positive over the last few years and is expected to break-through in the near future, if the right ecosystem is made available to them locally.

While progress has been made, the local hardware industry is at its early stages and is concentrated in specific activities and products **(Figure 9).**

At present, activities in the hardware industry include systems concepts and software engineering, semiconductor design, design and production of circuit boards, fiber optic cables, electronic components and power supply systems.

Figure 9: Components, IT, Communications, Content and Associated Services Value Chain



Activity concentration moving from software development and services towards hardware component design and manufacturing

INVESTMENTS MEDIATED BY IDAL

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

IPT Cards

IPT 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 target market is the Middle East and the Gulf area, Asia and Africa, and Eastern and Central Europe.

USD 5.6 million
43 jobs created

Diamond Segments and 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
28 jobs created

INVESTMENT OPPORTUNITIES

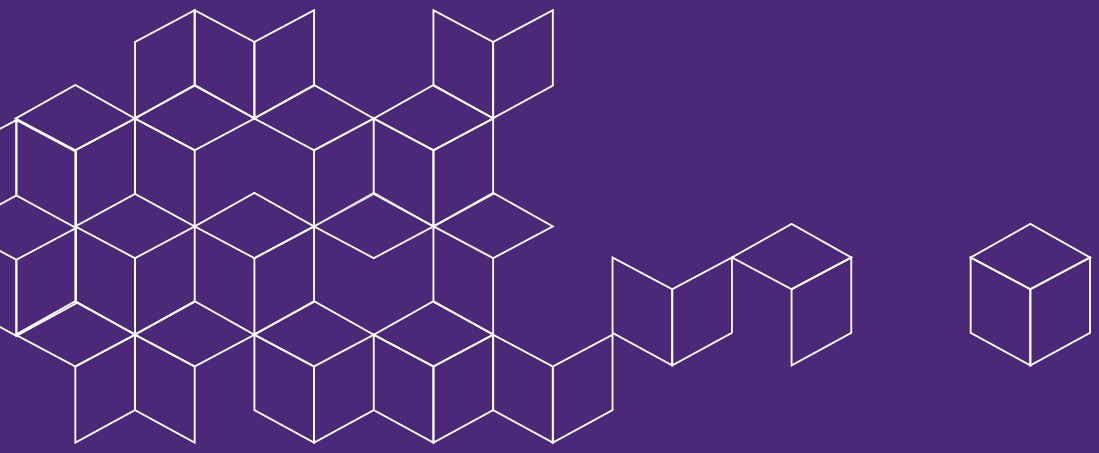
Lebanon can serve as an outsourcing base for certain companies involved in the semiconductor and communication industries and which aim to maintain their competitiveness & flexibility.

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.

MEDICAL
TECHNOLOGIES

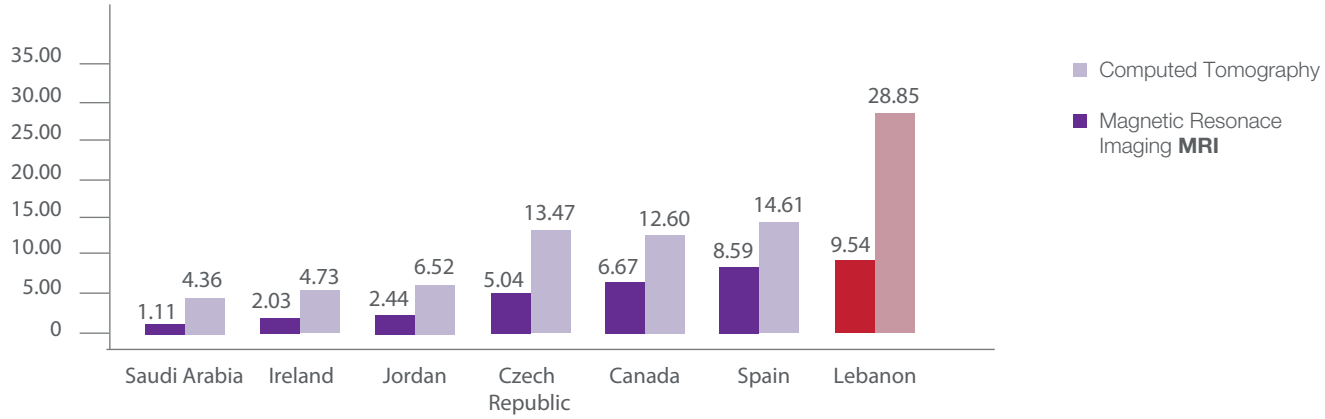


The medical equipment industry has witnessed explosive growth in recent years. The global market was valued at USD 273.3 billion in 2011, and growth prospects are rapidly increasing, fueled by rapid technology advancements.

Lebanon's well developed medical and health infrastructure underlie the country's potential to offer services ranging from research, product development, design and systems engineering.
Lebanon's health care system is mostly privatized and could provide a firm foundation for overall market growth. Lebanon has 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 9.54 per million people versus 2.44 in Jordan and 6.67 in Canada **(Figure 10)**. This indicates the strong appetite of the domestic health sector to acquire and develop new technologies.
In 2009, the local medical devices market was estimated at USD 187 million with a predicted compounded annual growth rate (CAGR) of 7.14% for the next 10 years, reaching a value of USD 372 million in 2019. Despite being an important consumer of medical equipment and devices, innovators do not only rely on domestic sector activities but export their innovations to both regional and global markets.

Figure 10: Total Density of Medical Equipment **| per 1,000,000 population**



Source: World Health Organization **2011**

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 AND INCREASING INWARD INVESTMENTS

In 2009, healthcare spending amounted to USD 65.6 billion (4.3% of GDP) in the MENA, a figure estimated to reach USD 125 billion by 2015. Investment projects in healthcare infrastructure worth USD 14 billion are already in progress and are mainly concentrated in Saudi Arabia, the UAE and Kuwait.

2 WORLD-CLASS ACADEMIC FRAME-WORK AND STRONG SYNERGY BETWEEN HOSPITALS AND UNIVERSITIES

Most Lebanese medical schools and universities are internationally accredited and boast significant achievements so far in basic and applied research in medical sciences and engineering.

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. Medical articles constitute the highest share of published articles that are produced in Lebanon for international journals.

4 HIGHLY EDUCATED GRADUATES AND RESEARCHERS AT COMPETITIVE COSTS

Lebanon is characterized by the highest ratio of doctors to population (33 per 10,000 people) in the region and one of the highest in the world, with 85% of Lebanese physicians having received at least one specialization.

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 with 89 studies recorded as of May 2010.The local health system is also characterized by one of the largest and most developed drug markets in the CEE region with a strong presence of large international pharmaceutical companies. In all, health expenditures constituted 8.6% of Lebanon's GDP in 2010, compared to a MENA average of 4.3% and 10.1% for OECD countries.

INVESTMENTS MEDIATED BY IDAL

CYNOPROD™ LEBANON

Cynoprod is a company specializing in the production of dental products which has selected Lebanon to cater for a growing regional market in the dental industry.This project benefited from the Investment Project Incentives offered by IDAL.

USD 675,000
10 jobs created

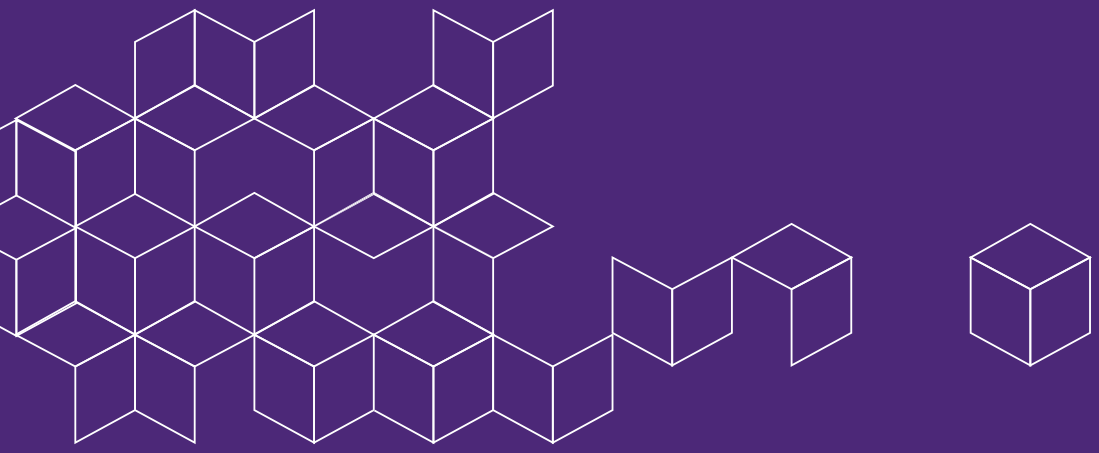
INVESTMENT OPPORTUNITIES

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

CardioDiagnostics

Qatar Foundation

RESEARCH
AND DEVELOPMENT



Lebanon enjoys a flourishing scientific and technological community embedded in 41 universities and higher education institutions, of which 12 support science and/or technology faculties, and 6 research centers.
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).
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.

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 its workforce.

AREAS OF SPECIALIZATION

Over the past years, Lebanon developed a strong and stable 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.

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MAIN STAKEHOLDERS

The National Council for Scientific Research (CNRS) which aims at promoting, coordinating and developing the scientific research capabilities in Lebanon, 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 and 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):** IRI is a not-for-profit institution under the Ministry of Industry, specializing in industrial research and scientific testing and analysis
- **The Lebanese Industrial Research Achievements (LIRA):** the LIRA program aims at bringing together academic and industrial expertise by building effective cooperation and matching the activities of universities and research centers with the needs of the various industries. It also promotes, through training programs and partnerships, innovations resulting in increased competitiveness and productivity of the industrial sector.

INVESTMENT OPPORTUNITIES

The Science Technology and Innovation Plan released in 2006 and developed by representatives of universities and national organizations identified a number of opportunities in 3 specific areas:

1. Basic science, industry and engineering
2. Environment and agriculture
3. Medicine and health care

In a regional context and given Lebanon's competitive advantages 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 increasing in popularity among research centers with the promising future of renewable energy innovations.

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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