Study on the Economic Contribution of the Software Industry in Lebanon

WIPO
WORLD
INTELLECTUAL PROPERTY
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ABBREVIATIONS

BMI: Business Monitor International

CAGR: Compound Annual Growth Rate

CRM: Customer Relationship Management

MENA: Middle East and North Africa

NRI: Networked Readiness Index

PC: Personal Computers

IDAL: Investment Development Authority of Lebanon

ICT: Information and Communication Technology

IT: Information Technology

ITU: International Telecommunication Union

SME: Small and Medium Enterprises

VAS: Value Added Services

WEF: World Economic Forum

WIPO: World Intellectual Property Organization

EXECUTIVE SUMMARY

The purpose of the study is to estimate the economic importance of the software industry to the Lebanese economy, as well as to identify the opportunities and main problems these industries face.

The term 'Software' is used in this report to cover a wide range of products that may be developed using different techniques such as ordinary programming languages, scripting languages, microcode or any other configuration. The software industry includes businesses dedicated to the development, maintenance and publication of software using different business models. The industry also includes software services, such as training, documentation and consulting.

The study describes and explains the economic performance of software industries in Lebanon, using the WIPO methodology. Lebanon has an active software sector with good growth potential over the next decade. Many Lebanese software companies are in a favourable position not only because they offer good products and services, but also because they can operate in several cultural and linguistic environments.

The consultant conducted a review of the major stakeholders in these industries covering firm representatives, industry and government experts, unions and associations representatives and specialised universities. The study integrates the results of the field work, as well as existing reports and industry analysis, to evaluate the performance of the software activities in Lebanon.

There were several methodological difficulties, mainly:

- Defining exactly what the industry defines as software activities;
- What are the upstream and downstream boundaries of the software industries;
- Which parts of the value-chain of the software industry should be included in the analysis;
- The lack of availability of reliable data.

Prior to delving into the dynamics of the software sector in Lebanon, it was important to provide an overview of the scope of work and to explain the adopted methodology, along with the detailed global structure of the report.

The second chapter presents the legal and regulatory framework, the copyright protection of the software industries, along with the enforcement context, the judicial procedures and processes and the different administrative measures and remedies.

In Chapter 3, the study examines the infrastructure and the development level of the Information and Communication Technology (ICT). Main indicators to evaluate a good technical environment for the software activities are identified, and these include the accessibility and penetration rates of fixed and mobile lines, as well as internet, the affordability measuring cost and prices of ICT services and its technical capacity, especially the international internet bandwidth.

In Chapters 4 and 5 there is an analysis of the major characteristics and profile of the software industry in Lebanon, including its evolution and main trends, the market structure and the different supportive public and private institutions. They describe the orientation of the software market with its local and external demand dimension. In Chapter 6, the business environment, along with the development of a SWOT analysis assessing weaknesses and opportunities of the software industry, is presented.

Chapter 7 estimates the economic contribution of the software industry in Lebanon and its direct effects on the economy, especially its contribution to GDP, employment generation and export flows. The study benchmarks software activities with other sectors and calculates the secondary economic impacts generated by backward and forward linkages, the multiplier effect and the spin-off effects on business culture.

Economic contribution analysis

An analysis of the economic contribution of the software industry examined the effect of software activity on the Lebanese economy by measuring it in terms of output and value added, along with its impact on employment and wages. The results are compared to other sectors of the Lebanese economy. The analysis also provides an evaluation of the indirect and induced impact of the software activities.

The main results of the analysis could be summarised as follow:

The software industries in Lebanon contributed a **total value-added (VA) of US$ 290 million** in 2011, or about **0.73 per cent of GDP estimated at a total of US$ 39.5 billion**.

The value added (VA) of software activities is very high compared to other traditional activities. The average value added generated by software activities reached 79% of its total output as compared to an average of 34% for the manufacturing activities and an average of 31% for all Lebanese economic activities. This VA is attributed to the high value generated by ideas, innovation and copyrights.

The second component of the direct effect of the software industry concerns the number of direct jobs created by the cluster.

In 2011, employment in the software industries was estimated at 6,600 workers (0.52 per cent of nationwide employment) for the 317 companies considered all over

the country. The average number of workers per company was 21 persons. Therefore the productivity per worker was established at US$ 43,762.

For the skills profiles, most jobs (64% of total employment in the software industries) require a good level of technical skills, while highly qualified persons (engineers and graduates) represent 12% of those employed. Unskilled persons represent 14% of total workers and 10% are involved in the management.

The study benchmarked the Information Technology (IT) software activities with the banking and manufacturing sectors, as well as with global economic results. The performance of the IT software industry sector is clearly above the national average and only banks are doing better.

Table A–1: Average Value Added per worker in different sectors of activity in Lebanon

Year 2011	National Economy	Banking sector	Manufacturing sector	Software activities
Average Value Added per worker in USD	31,027	110,819	40,655	43,762

The secondary economic impact of the software industry concerns its indirect but quantifiable contribution to the national economy. This contribution involves the multiplier effect of spending by the software companies. This multiplier effect refers to the increase in final income arising from any sector activities.

The tertiary economic impact of software activities concerns their direct but less tangible contribution to the national economy. This includes the contribution of software activities to industrial invention, innovation and differentiation, and ultimately economic competitiveness.

The multiplier effect of the software industries ranges from 1.5 to 1.7, according to its two major components:

- Ackward linkages: 1.20 to 1.30
- Forward linkages: 1.30 to 1.40

As for labour, the multiplier stands at around 1.6.

An additional economic impact of software activities concerns their indirect and non-quantifiable contribution to the quality of life, cultural identity and their contributions to the attractiveness of the country.

In the conclusions recommendations are given, key factors in achieving a well-designed and implemented process for upgrading and innovation in industries and clusters related to software activities are suggested, and the major steps public policy in Lebanon can play in this process are identified.

1. INTRODUCTION

The software industry is viewed by many Lebanese as an exciting sunrise industry that is key to future competitiveness for the national economy.

1.1 Scope of Work

The purpose of this study is to estimate the economic importance of the software industry in Lebanon, as well as to identify the main problems that this industry face. It will:

- Describe the economic performance of software activities and operators in Lebanon, including the contribution of each activity to GDP, employment and foreign trade;
- Analyse the economic performance of the industry through a quantitative and qualitative analysis of the main elements affecting the growth process of those industries, including political, economic, legal (notably Intellectual Property (IP)), cultural, social and technological factors;
- Provide policymakers and business leaders in Lebanon with comprehensive, evidence-based recommendations on the issues analysed in the study.

1.2 Methodology

The first methodological difficulty is to define the industry.

The second methodological problem is to define the upstream and downstream boundaries of the software industry and to identify the parts of the value chain that should be included in this analysis.

The third methodological problem is to define the number of copyright-based industries. This varies over time. For instance, the computer software industry has been an important component of recent studies; it was mentioned as a secondary feature in earlier studies. For these reasons comparisons of the economic importance of copyright-based industries at different times and between different countries are difficult to make.

The fourth methodological problem is the availability of reliable data, especially in developing countries such as Lebanon. This has to be emphasised.

To achieve the objectives of this study, the ISIC (International Standard Industrial Classification) industrial classifications version 3.1 was used. Both the Ministry of Finance and the Central Administration of Statistics (CAS) in Lebanon employ this standard.

The study uses the following three indicators adopted by WIPO to evaluate the impact of any copyrights activity, including the software industry:

- Gross Added Value of all software activities as a percentage of total Gross Domestic Product (GDP);
- Share of employment as a percentage of total national employment;
- Share of foreign trade as a percentage of total national foreign trade.

The base data was gathered in a global back office and field survey. The objective was to track all existing companies, then determine their line activities by looking at websites and attending meetings with business specialists and experts, including interviews, questionnaires and focus groups.

To estimate the indirect and induced economic impacts of the software industry on the Lebanese economy, an assessment of available data, including the National Accounts publications, discussions with professionals and operators and benchmarking with international studies, was made.

1.3 Structure of the Report

The study is divided into four parts.

1. The first part introduces the research and the major characteristics and profile of the software industry in Lebanon. It provides data on the overall economic, social and cultural importance of this sector and presents statistics on the number, type and size of companies, major stakeholders, the employment and trade generated by the software industry.

   Additionally, it provides information on the structure of the industry, its main subsectors and their relative market shares. With regards to the organisation of the industry, the study explores the forms and structures of the industry, participation, the specific roles of various industry bodies and the interaction of these various bodies with the government and their participation in policy dialogue, as well as mechanisms for consultation and problem-solving.

   A brief review of relevant provisions in Lebanese law impacting on the software industry will be presented.

   In this study there are references to information sources on the software industry, including official sources, and industry information collected from its members. The links between the software industry and other sectors of the Lebanese economy such as education, culture, science and others as appropriate were reviewed. Additionally it presents the conditions for the development of the software industry and reviews the role of the various

factors for its development. It pays special attention to the specific role of intellectual property and in particular copyright for the functioning of the industry.

2. In the second part the opportunities and challenges facing the industry will be reviewed. It will describe the opportunities and challenges of a global, regional and national nature and will expand on their impact on the various stakeholders and the value chain of the industry.

   Particular attention will be given to the digital challenges and the effect on demand and consumption patterns. In this section the way Lebanese software developers are coping with the challenges stemming from global and regional competition will be shown, plus how these factors are affecting the growth of the software industry in the country. Success stories and failures will be mentioned to support the conclusions of the consultant.

3. The third part of the study will focus on industry performance, according to a set of indicators agreed with WIPO. It will compare the performance of the industry with other sectors of the Lebanese economy, highlighting its role in the Lebanese creative economy.

   The analysis will explore the specific supply and demand factors affecting the output of the industry, its sales and the value added generated by the industry. It will pay particular attention to the different type of royalties generated, collected and distributed by the industry and, to the extent possible, analyse the use of copyright in the operation of the industry.

   Special attention will be paid to trade and industry practices, counterfeiting and piracy, competitive advantages and disadvantages that Lebanon has in terms of software development and licensing capacity in regional and global contexts.

   Institutional and government policies to support the software industry will be described, including fiscal incentives, access to capital and financing for software companies. Issues related to additional technology, infrastructure and labour market will also be reviewed.

   An overall performance assessment will include a study of the direct, indirect and induced impacts of the software industry in terms of output, value added value, earnings, employment and foreign trade, and will identify bottlenecks in the operation of the industry. Efforts will be made to establish different multipliers, showing and comparing the indirect effects produced by the software industry.

4. In the fourth section the future prospects for the growth and development of the software industry in Lebanon will be presented and recommendations

will be formulated. The recommendations will be specific and targeted towards the various stakeholders in the software industry.

1.4 The Scope of Software Activities

Computer software, commonly referred to simply as software, covers a wide range of goods and services that may be developed using different techniques, such as ordinary programming languages, scripting languages, microcode, operating video logic systems, digital applications, programs, web pages or any other configuration for other industries, or other consumer electronics. This cluster is fuelled by ideas at the intersection of creation, business and technology.

The software industry and related economic activities includes those industries which have their origin in digital activities, and includes all the various forms and functions that digitally stored data have in digital devices (or similar systems).

Different approaches are used to define the scope of the software industries cluster. In this study the copyright industries approach developed by the World Intellectual Property Organization (WIPO) is used. For example, the software industry is considered a core copyright industry, and related activities are categorised as interdependent. Where possible, partial and non-dedicated support industries are identified accordingly.

Emphasis is placed on the direct (core) software industries as they are the primary drivers of the sector.

The breakdown of the software activities and related distribution industries is based on the International Standard Industry Classification (ISIC) Version 3.1 codes as follows:

Table 1.1: ISIC Number and Main Activities

ISIC Number	Main Activities
8220	Activities of call centres
6201	Computer consultancy, programming and facilities management
332002	Installation of mainframe and similar computers
8316	IT infrastructure and network management services
6202	Mobile applications and wireless telecommunications services
5820 6209 8314	Software publishing and Information technology (IT) consulting design and support services
8315 6312 6311	Web design development and services

2. LEGAL AND REGULATORY FRAMEWORK

The 1999 Copyright Law in Lebanon extends copyright protection to 'all human intellectual products, whether written, photographic, sculptured, handwritten, or oral, regardless of their value, importance, aim, or manner or form of expression.' A non-inclusive list of covered works includes computer programs, which includes software. The law specifies that protection does not extend to certain categories of works: daily news, legislative materials, public speeches, thoughts and abstract scientific facts, and historic folkloric works. The same law extends protection to the works of phonogram producers, broadcasting organisations and performers.

2.1 Copyright Protection of the Software Industry

Article 1 of the 1999 Lebanese Copyright Law defines a computer program as a set of orders expressed in words or symbols, and/or in any other form which when entered into a matter readable by a computer shall enable the computer to perform or execute a certain task or give a certain result.

Article 2 of the 1999 Lebanese Copyright Law provides that computer programs shall be protected whatever their language and that protection shall be also extended to include any preliminary work undertaken.

Computer Programs may also be deposited in accordance with the procedures required under the 1999 Lebanese Copyright Law.

Authors' economic rights subsist until fifty years after the author's death. Moral rights are protected in perpetuity. Performers' rights continue for fifty years counted from the end of the year of the performance. Producers of phonograms enjoy protection for fifty years effective from the end of the year in which the recording was first made. Broadcasting organisations are granted protection for fifty years from the end of the year in which the broadcast took place.

There are no procedures for the acquisition and maintenance of these rights, since they arise by virtue of creation. However, the 1999 Copyright Law includes optional procedures for the registration of copyrighted and related works.

Right holders have the exclusive right of reproduction, recording, adaptation, translation, selling and renting, importation of copies of the work manufactured abroad, performance, broadcast and communication of a work (Article 15). In addition to economic rights, right holders enjoy moral rights pursuant to Articles 21 and 22 of the Law, i.e. the right to disclose the work; to claim authorship; to use a pseudonym or remain anonymous; to object to any distortion, modification or any other derogatory action in relation to the work that would be prejudicial to their honour or reputation; and to withdraw the work from the market, provided third parties were compensated

for the damages resulting thereof. Moral rights applied to all protected works mentioned in Article 2, including computer software, video films and audiovisual works.

Limitations to exclusive rights were laid down in Articles 23 to 34 of the Law and included copying for personal use (Articles 23 and 24); copying of a limited number of computer software programs by non-profit educational institutions, universities and public libraries for the purpose of lending them to students (Article 25.1); and use for critical or educational purposes (Articles 25.2 and 26).

The 1999 Copyright Law did not seem to fully comply with the requirements of the TRIPS Agreement. Article 25 of the Law (implemented by Decision No. 16/2002 of 1 July 2002) and did not meet the requirements of Article 9(2) of the Berne Convention and Article 13 of the TRIPS Agreement, as it permitted students to make copies of 'educational or general learning' software, while students were the primary purchasers of such software.

Article 25 went beyond the specific exceptions for 'certain limited cases' contemplated by the TRIPS Agreement and threatened to eliminate an entire market.

The Ministry of Economy and Trade issued the decision No. 4/1 on 25 May 2006, concerned with the protection of computer programs and fighting piracy. The decision reiterates the penalties applicable under Articles 83 – 89 of the 1999 Lebanese Copyright Law and affirms the Ministry's commitment to pursue and prosecute those involved in the infringement of intellectual property, and in particular computer programs including acts infringing upon preliminary works.

The Copyright Law, in particular Articles 25, 36 and 98, was reviewed by the Ministry of Economy and Trade. The draft amendments were approved by the Council of Ministers in November 2007 and sent to Parliament for adoption. The amendments eliminated the option for students to make one copy for his/her personal use, ensuring that the point of attachment requirement of the TRIPS Agreement was fully satisfied.

2.2 Enforcement Context

a) **Civil Judicial Procedures and Remedies**

Civil remedies for infringement of all kinds of intellectual property include fines, seizure, destruction of infringing materials and publication of rulings. The 1999 Copyright Law also provides for injunctions and compensatory damages.

b) **Provisional Measures**

The 1999 Copyright Law permits 'all necessary provisional measures' in cases where there is fear of possible infringement. Temporary seizure is permitted to preserve evidence.

c) **Any Administrative Procedures and Remedies**

According to the 1924 Law, Law No. 75/99 (on Copyrights), and Law No. 240/00 (on Patents), the Intellectual Property Protection Office at the Ministry of Economy and Trade may, based on complaints or its own initiatives, inspect suspected violators, take samples of products and prepare reports to be used before the court which will handle the case. Remedies include monetary damages, seizure of products and imprisonment. (Please see Articles 50-58 of Law No. 240; Articles 99-136 of Decision No. 2385; and Articles 81-97 of Law No. 75).

d) **Any Special Border Measures**

Articles 63, 65, 66, 181, 197, of the 2000 Decree Law on Customs require border measures for ensuring intellectual property protection.

The 1999 Copyright Law prohibits the importation, warehousing, entry into the free zone or transit of 'audio-records and forged work for recording, or any work that is protected under the Copyright Act', and adds that such works will be confiscated 'wherever they are found.'

e) **Criminal procedures**

The 1999 Copyright Law established fines and imprisonment periods for certain types of infringement:

Concerning crimes committed over the Internet, a police unit for combating cyber-crime and enforcing intellectual property rights was created by the Judicial Police at the Internal Security Forces. The unit was comprised of 20 officers and started to operate on 13 March 2006.

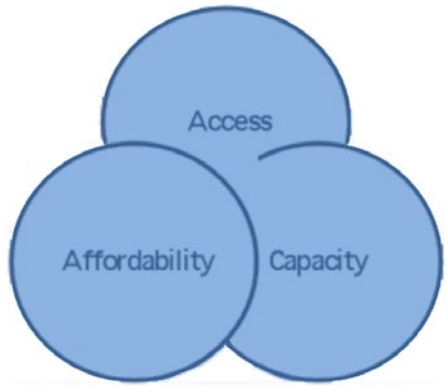
3. THE ICT DEVELOPMENT LEVEL

Software is a substantial component of the Information and Communication Technology (ICT) sector. According to the Investment Development Authority in Lebanon (IDAL), in 2011, 74% of ICT companies in Lebanon were in the software development industry[1]. Furthermore, the software sector is intrinsically correlated to, and relies heavily on, the development level of the ICT infrastructure, which enables the spread of software use and applicability.

Prior to delving into the dynamics of the software sector in Lebanon, it is important to place the ICT sector in context. To that end, this section offers a glance at where Lebanon's ICT sector stands today, its progress in past years, as well as its position relative to other countries in the region.

The ICT development level in Lebanon is considered based on three main indicators:

- **Access:** fixed line, mobile and internet penetration rates
- **Affordability:** ICT price and affordability index
- **Capacity:** international internet bandwidth



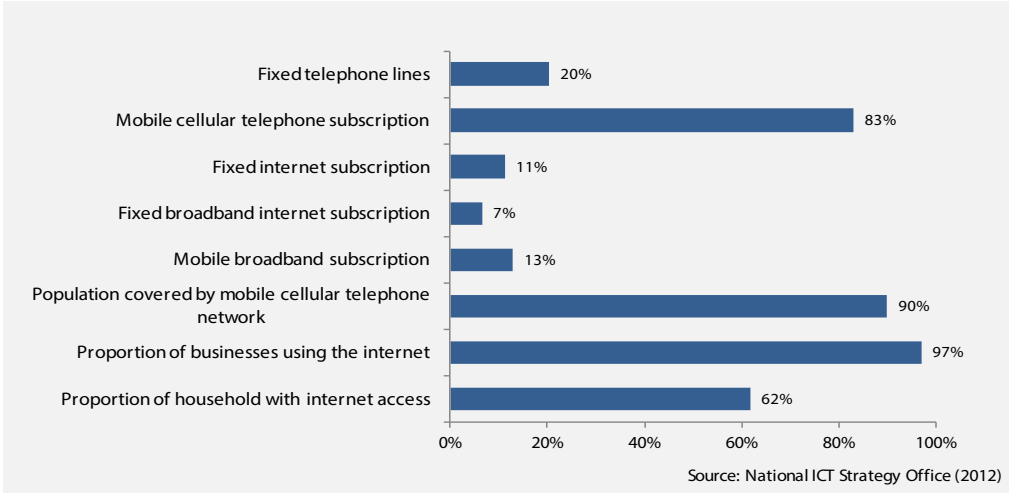
An indicator developed by the World Economic Forum (WEF) and INSEAD, the **Networked Readiness Index** (NRI), is presented. The NRI provides a comprehensive assessment of the current state of ICT in each country.

3.1 Access

Figure 3.1 presents a snapshot of Lebanon's ICT access indicators in 2012. According to the National ICT Strategy Office, Lebanon's fixed line penetration stands at 20%, while mobile cellular subscriptions are at 83%. In terms of internet access, fixed internet subscribers amount to about 11%, whereas broadband internet subscriber reached 7%. Furthermore, 62% of Lebanese households have internet access, and 97% of businesses use the Internet.

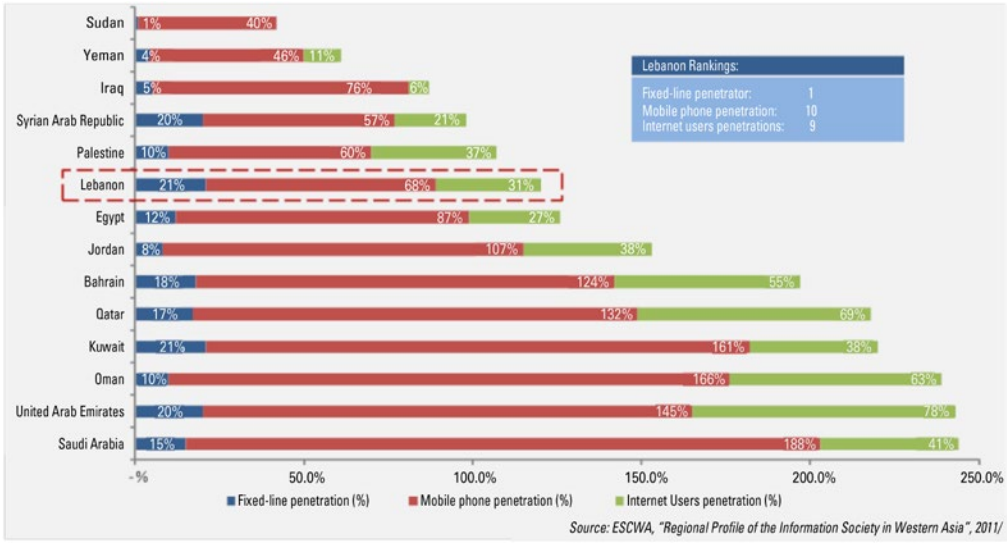
[1] IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

Figure 3.1: Lebanon ICT Infrastructure & Access Indicators (2012)



When benchmarked to the region, Lebanon leads in terms of the number of fixed telephone line subscribers; however, the country lags behind the Gulf States and Jordan when it comes to mobile phone penetration rates and internet users (see Figure 3.2). Furthermore, Lebanon's mobile broadband subscription penetration at 13%[2] is lower than the Arab average of 19%[3].

Figure 3.2: Fixed-line, Mobile, and Internet Subscription Penetration in Western Asia (2010)



It is interesting to note that between 2010 and 2011, the share of the Lebanese population online grew by an impressive rate of 68% from 31[4] to 52[5] internet users per 100 inhabitants. This new wave of internet users puts Lebanon ahead of Jordan (34.9%) in terms of internet access.

2 National Strategy ICT Office, 2012
3 ITU, 'ICT Facts & Figures', 2013
4 WEF & INSEAD, 'The Global Information Technology Report 2012', 2012
5 WEF & INSEAD, 'The Global Information Technology Report 2013', 2013

In Lebanon, Beirut registers the highest use of ICT services (see Figure 3.3), followed by Mount Lebanon and Nabatieh, which have similar penetration rates when it comes to share of individuals that use a computer (63%) and internet users (~55%). North Lebanon has the lowest share of internet users at 41.7%. Moreover, most of the individuals in Beirut (94%) who use a computer tend to access the internet, but only 81% of the individuals that use computers in North Lebanon are online. This indicates that internet access in North Lebanon is poor in comparison to the rest of the country.

Table 3.1: Individual use of ICT across Lebanese Governorates (2012)

Indicator	Lebanon	Beirut	Mount Lebanon	North	Bekaa	South	Nabatieh
Number of individuals with use of a mobile cellular telephone	87.4%	89.8%	89.2%	88.1%	85.7%	81.6%	84.4%
Number of individuals who use a computer	60.2%	71.1%	63.0%	51.7%	55.9%	60.0%	63.0%
Number of individuals who use the internet	52.0%	66.5%	54.7%	41.7%	47.9%	51.7%	54.9%

Source: National ICT Strategy Office, 2012

3.2 Affordability

In addition to access and penetration rates, it is equally important to evaluate the cost, and therefore the accessibility, of ICT services. In order to assess the 'affordability' of the ICT infrastructure in Lebanon, this study looks at the Affordability Index (see Figure 3.4).

Affordability Index is an indicator developed by the WEF and INSEAD in order to measure 'the extent to which digital services are priced in a range that makes them available to as many people as possible'[6]. The Affordability Index includes the cost of accessing ICT, namely mobile cellular prices (PPP[7] $/min) and fixed broadband tariffs (PPP $/month), as well as the level of competition in the internet and telephony sectors on a 0-2 scale (whereby 0 is not competitive, and 2 is perfectly competitive).

6 WEF and INSEAD, 'The Global Information Technology Report 2013', 2013
7 PPP: Purchasing Power Parity

Table 3.2: Affordability Index (2011)

Country	Affordability Index	Rank (over 144)
[1 = not affordable at all; 7 = very affordable]		
Egypt	6.47	8
Jordan	6.03	27
Oman	5.90	34
Bahrain	5.64	46
Saudi Arabia	5.35	65
Kuwait	5.18	71
Yemen	4.75	88
United Arab Emirates	4.70	89
Lebanon	4.12	95
Qatar	3.92	103

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013

Lebanon, in 2011, ranked 95th out of 144 countries with a score of 4.12, while the UAE ranked 89th with a score of 4.7, and Jordan was among the top 30 with a score of 6.03 (See Figure 3.4). In the region, only Qatar's ICT services are more expensive than Lebanon's.

In Lebanon, the average cost of mobile cellular per minute is high at $0.54 (Jordan = $0.15 per minute), the monthly subscription charge for broadband internet service stands at $26.37 (Jordan = $29.18 per month) and the level of competition index in the internet and telephony sectors is low at 0.55 over 2 (Jordan = 1.94). Although ICT services in Lebanon remain expensive, in the past few years the country has directed considerable effort towards providing access to ICT infrastructure at more affordable prices, improving its rank by one position.

3.3 Capacity

Finally, the capacity of the ICT infrastructure in terms of international internet bandwidth is an important indicator to look at. In this respect, capacity remains a big, if not the biggest, challenge for Lebanon.

Table 3.3: International Internet Bandwidth (2011)

Country	International Internet Bandwidth	Rank (over 144)
International Internet bandwidth (kb/s) per Internet user		
Saudi Arabia	33.00	43
United Arab Emirates	27.60	49
Qatar	22.30	57
Bahrain	14.70	73
Jordan	6.30	97
Oman	6.30	98
Kuwait	6.00	102
Egypt	3.80	114
Lebanon	2.30	123
Yemen	1.10	134

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013/ ITU, 2012

Lebanon, in 2013, ranked 123rd out of 144 countries (see Figure 3.5). With an international internet bandwidth per user as low as 2.3 Kb per second, Lebanon lags behind the Gulf States (>15 Kb/s), Jordan (6.3 Kb/s) and Egypt (3.8Kb/s).

It should be noted however that Lebanon has made considerable efforts in increasing its internet bandwidth in the past two years. The latest figure posted by the ICT National Unit of Lebanon is 3.2 Kb per second per inhabitant in 2012. This would translate to a higher bandwidth per internet user of a little over 6 Kb per second.

3.4 Networked Readiness Index

The Networked Readiness index (NRI) is a comprehensive indicator computed by the WEF and the INSEAD Business School that offers an overview of the current state of ICT readiness in the world. The measure includes a large variety of indicators in order to assess: the political and regulatory framework in supporting ICT uptake; the affordability of the sector's services; the use of the service by all stakeholders; and finally the socio-economic impact that the ICT sector generates. The Index is compiled for 144 countries in the world, and is a measured on a 1 to 7 (best) scale.

Table 3.4: Networked Readiness Index (2013)

Country	Networked Readiness	Rank (over 144)	Ranking Change
[1= Low Network Readiness; 7 = High Network Readiness]			
Qatar	5.10	23	+5
United Arab Emirates	5.07	25	+5
Bahrain	4.83	29	-2
Saudi Arabia	4.82	31	+3
Oman	4.48	40	0
Jordan	4.20	47	0
Kuwait	3.94	62	0
Egypt	3.78	80	-1
Lebanon	3.53	94	+1
Yemen	2.63	139	+2

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013

In 2013 Lebanon ranked 94th out of 144 countries, moving up by one position since 2012 (see Figure 3.6). Nonetheless, Lebanon's ICT sector is significantly underdeveloped both on a global and regional scale. There is an apparent and growing divide in the Middle East region. At one end of the spectrum, the Gulf States boast a highly competitive ICT industry and are continually investing in order to improve it. At the other end of the spectrum, the Near-Eastern countries have underdeveloped infrastructures.

The performance of Lebanon in the Government Usage indicators is poor. Government Prioritisation of ICT is 142nd out of 142[8] and the Importance of ICT in Government Vision of the Future is 144th out of 144[9]. The Country scores at the bottom for both indicators (see Figure 3.5). The Government Prioritisation of ICT aims to assess the importance the government places on the sector, while the Importance of ICT in the Government Vision of the Future index evaluates whether the government has a clear implementation plan to leverage and improve Information and Communication Technologies in order to increase competitiveness.

8 WEF & INSEAD, 'The Global Information Technology Report 2012', 2012
9 WEF & INSEAD, 'The Global Information Technology Report 2013', 2013

Table 3.5: Government Prioritisation of ICT (2010-2011) and Importance of ICTs to Government Vision (2011-2012)

Country	Government prioritization of ICT*	Rank (Over 142)*	Importance of ICTs to Government Vision	Rank (Over 144)
	[1= Low; 7 = High]		[1= Low; 7 = High]	
Bahrain	6.0	7	5.4	8
Qatar	6.0	8	5.8	2
United Arab Emirates	5.9	11	5.7	3
Saudi Arabia	5.7	14	5.4	7
Oman	5.5	19	5.1	15
Jordan	5.0	47	4.4	43
Egypt	4.6	71	3.1	122
Kuwait	3.9	114	3.2	119
Yemen	2.9	139	2.2	143
Lebanon	2.6	142	2.1	144

Source: WEF, "The Global Information Technology Report 2013", 2013
*WEF, "The Global Information Technology Report 2012", 2012

4. THE SOFTWARE SECTOR

The assessment of Information and Communication Technology (ICT) in Lebanon provides important background to the software sector. The review of ICT indicators enables a more accurate understanding of, and a deeper insight into the dynamics of the Lebanese software sector.

In this section the main characteristics of the Lebanese software industry including its evolution, market size and the market structure are given.

4.1 Evolution and Main Trends

The Lebanese software industry emerged in the 1970s. The sector started off with a handful of local companies catering to large organisations. The firms provided software consultancy services and developed proprietary enterprise solutions mainly in finance, banking, accounting, payroll and logistics. Such software was meant to run at the big computer centres, i.e. mainframes and mini-computers. Since hardware was expensive and limited to some sectors and areas, demand stemmed from large institutions in the public sector and the finance and banking industries, as well as education and healthcare. Although the software sector has significantly evolved during the last three decades, the enterprise software business continues to constitute the biggest share of the Lebanese software sector, and some of the early firms are still among the leading players today.

In the early 1980s, the introduction of micro-computers made hardware accessible to more companies, such as industrial firms and medium-sized banks. Furthermore, as the need for IT solutions became clearer, many banks created IT subsidiaries for in-house development.

A considerable boost in the Lebanese software sector occurred with the emergence of Personal Computers (PCs) in the mid-80s. This brought computing within reach for a wider pool of clients. The technology developments triggered an important wave of new software business start-ups that catered to medium-sized companies from all sectors, including retail and hospitality. At the same time, the larger corporations invested in upgrading their IT systems to the latest technologies, and therefore drove demand up even further. It is interesting to note that in 2012 up to 71.5% of Lebanese households owned a computer and 99.4% of businesses used computers[10].

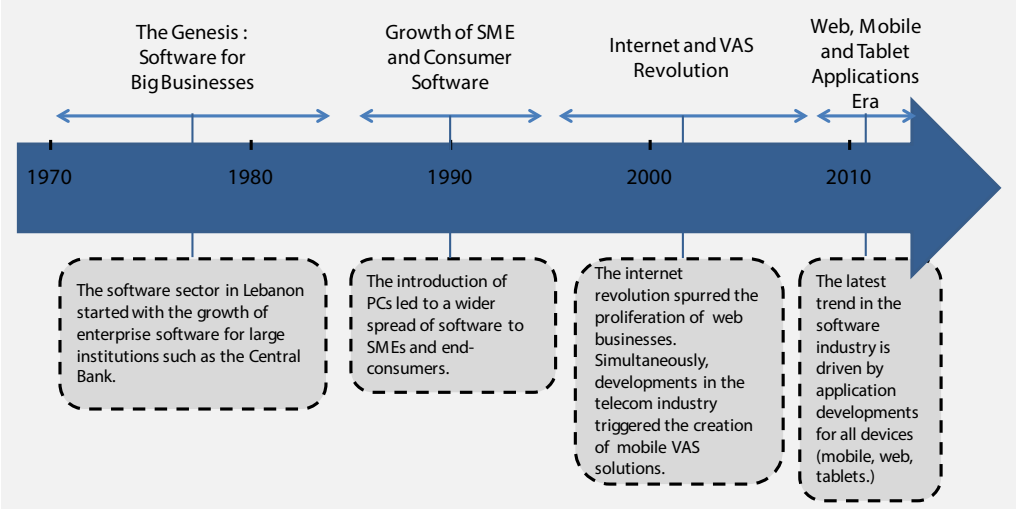
Two trends dominated the market since the second half of the 1990s. The first is the internet, which spurred a new generation of website development and digital services companies. In 2012, 76.5% of businesses in Lebanon had a web presence.[11] The second trend is related to the rise of the telecom-related software, whereby

[10] National Strategy ICT Office, 2012 – http://www.ict.pcm.gov.lb/
[11] National Strategy ICT Office, 2012 – http://www.ict.pcm.gov.lb/

many firms began to develop Value Added Services (VAS) for mobile operators. Local software companies are able to compete against multinationals – especially when targeting Small and Medium Enterprises (SMEs) – because of their competitive prices, as well as their ability to customize their offering.

Finally, since 2009 the software industry has shifted to mobile applications. The proliferation of mobile applications ('apps') is essentially driven by the rapid growth of smart phone penetration. According to Ipsos, 36% of the Lebanese population owns a smart phone, and 70% of smart phone users download applications[12]. Gaming and entertainment applications are among the top downloads, and are evolving at a rapid pace thanks to relatively low barriers to entry.

Figure 4.1: Evolution and Main Trends of the Lebanese Software Sector



4.2 Market Size

According to Business Monitor International (BMI),[13] the IT industry in Lebanon is comprised of hardware, IT services and software development, and is estimated to reach US$364M in 2013. The sector is expected to grow by a Compounded Annual Growth Rate (CAGR) of 12% for the next four years to US$570M in 2017. The growth is mostly driven by the planned investments in the Information and Communication Technology (ICT) infrastructure.

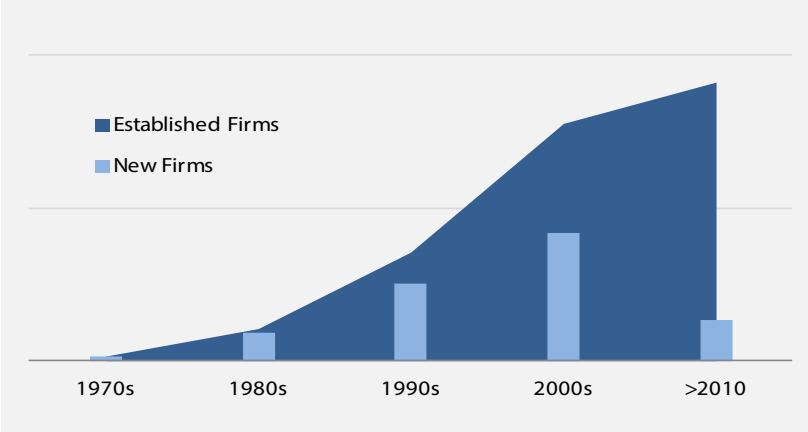
According to the Investment Development Authority of Lebanon (IDAL), there are over 300 companies that employ an aggregate of 7,000 people. This is a highly skilled labour force in the IT industry. Out of the 300 companies, 222 (74%) are software

12 Ipsos, 'MENA Internet Usage and Consumption Habits', *presented at ArabNet Conference March 2013* – http://www.slideshare.net/IpsosMENA/ipsos-arab-net-presentation-beirut-2013

13 IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

development firms[14]. Figure 4.2 illustrates the growth in the number of new entrants in the software sector per decade. Although some software firms were founded in the 1970s, the sector started to pick in the 80s, and grew progressively in the 90s into the 21st century.

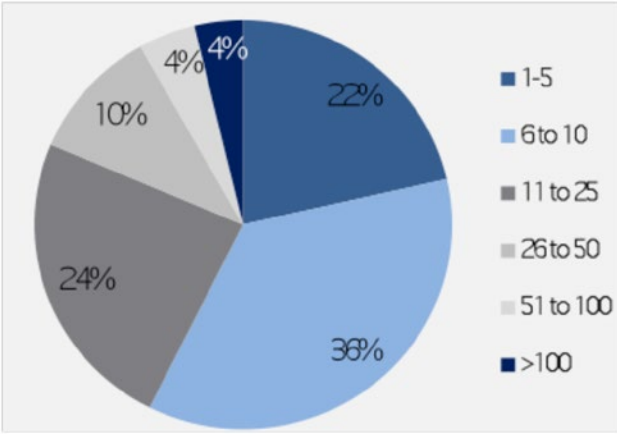
Figure 4.2: Growth of software sector measured by the number of companies



4.3 Market Structure

The Lebanese software sector is mostly comprised of SMEs. Indeed, 82% of software companies have less than 25 employees, and only 4% employ over 100 staff members (See Figure 4.3). The larger groups tend to be international companies that have part of their development operations sub-contracted to their Lebanese subsidiary.

Figure 4.3: Breakdown of Software Companies per Number of Employees

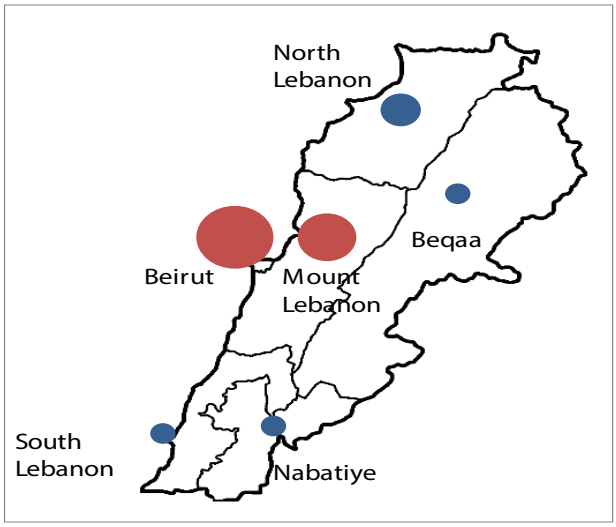


The majority of software firms (just over 50%) are based in Beirut. An important share of the companies is located around the capital, in the Mount Lebanon governorate (44%). Indeed, many firms have headquarters in areas such as Mansourieh and

[14] IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

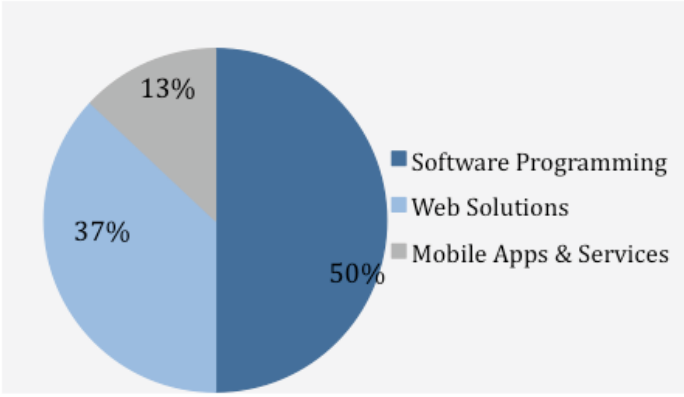
Jounieh. Tripoli, in North Lebanon, is starting to develop as an appealing environment for technology companies, and 3% of software firms are located there. In fact, the Lebanese Government decided to implement a Special Economic Zone in Tripoli which includes the creation of an ICT and software hub[15].

Figure 4.4: Software Companies per Governorate (2013)



Within the software sector, there are three main categories of companies: (i) software development, (ii) mobile applications and services and (iii) web solutions. According to IDAL, 50% of Lebanese firms focus on software programming, 37% are web agencies, and finally a growing 13% represent mobile apps and services.

Figure 4.5: Breakdown of the Software Industry in Lebanon (2013)



A survey published by SRI International in May 2004[16] lists the following four software domains as the most competitive in Lebanon: banking, retail, education and distribution/trade. Industry experts state that software programming, system integration, software design and web development and design are the

[15] USAID Lebanon, 'Tripoli Special Economic Zone Feasibility Study Project: Phase 1 Main Report', March 2011

[16] SRI International, 2004

core capabilities of Lebanese software firms. The Lebanese software industry's comparative advantages lie in its quality to price ratio, as well as the companies' ability to customise its services according to client needs.

4.4 Supportive Institutions

The Lebanese software eco-system is developing rapidly. Since 2008, programs and institutions aimed at supporting the private sector have proliferated. It is the growth opportunities in software and IT that are driving the development of the entrepreneurial eco-system. The latter in turn provides support to all sectors. This is part of the indirect value created by the software sector.

The **table** below lists the main associations and initiatives that provide support to the Lebanese software sector as well as to other sectors:

Table 4.1: Main associations and initiatives

Organisation	Description	Founding Year
Professional Associations		
Professional Computer Association (PCA)	A platform for ICT companies based and operating from Lebanon that aims to transform Lebanon into a knowledge-enabled economy	1994
Association of Lebanese Software Industries (ALSI)	A professional association representing and promoting the interests of the Lebanese software industry	1999
Lebanese League for Women in Business (LLWB)	LLWB is an organisation that brings together professional women by providing them with a forum in which they can exchange experiences and expertise, discuss common challenges and issues, receive specialised training, facilitate the exchange of information, network and promote the potential of women in the world of business.	2006
Lebanon SoftShore Cluster (LSS)	A cluster of software companies that focuses on expanding software development services directed to international companies, especially in Europe, the US and the Middle East.	2007
Internet Society Lebanon (ISOC)	ISOC Lebanon is the Lebanese Chapter for the Internet Society. ISOC Lebanon was created with the purpose of maintaining and extending the development and availability of the Internet and its associated technologies and applications.	2010

Organisation	Description	Founding Year
Professional Associations		
MA3BAR	MA3BAR is the Arab Support Center for Free and Open Source Software.	2012
	The objectives of MA3BAR are three-fold: i. Capacity building by providing the necessary training and assistance; ii. Support the creation of applications (or toolkits); iii. Raise awareness at government and business levels on the potential and viability of free software solutions and applications as alternatives to proprietary software.	
Government Initiatives		
ELCIM	ELCIM was initiated in 2001 by the Lebanese Government in order to improve the performance of Lebanese manufacturing enterprises. Hosted at the Industrial Research Institute (IRI), ELCIM is part of the EU co-financed Integrated SME Support Programme (ISSP), which will help Small and Medium Enterprises in Lebanon by providing a combination of legislative, business development and financing support.	2001
SME Support Unit	As part of Lebanon's efforts to create jobs and reduce poverty, the SME Support Unit at the Ministry of Economy and Trade was established to oversee the creation of an enabling business environment and to implement the EU-funded project 'The Integrated Small and Medium enterprise support programme (ISSP)' at the Ministry of Economy and Trade.	2005
Tripoli Special Economic Zone	There are imminent plans to establish of a Special Economic Zone in Tripoli. This initiative is still under development.	--
Financing		
International Finance Corporation (IFC)	IFC, a member of the World Bank Group, is the largest global development institution focused on the private sector in developing countries. IFC creates opportunities by providing financing to help businesses employ more people and supply essential services by mobilising capital from others and delivering advisory services to ensure sustainable development.	1994
Kafalat	Kafalat is a Lebanese financial company with a mission to assists small- and medium-sized enterprises (SMEs) to access commercial bank funding. Kafalat helps SMEs by providing guarantees to their banking loans based on business plans / feasibility studies that show the viability of the proposed business activity.	1996

Organisation	Description	Founding Year
Financing		
Berytech Fund	Berytech Fund makes venture capital and equity-related investments in start-up information, communication and technology (ICT) portfolio companies in Lebanon. The Fund believes it is uniquely positioned to make profitable investments in innovative, technology-based start-up ventures in Lebanon.	2008
Cedrus Ventures	Cedrus Ventures is a venture capital and private equity (VCPE) firm whose primary focus is Lebanese companies. Cedrus Ventures' mission is to give investors access to opportunities in the Lebanese market.	2009
Riyadah Enterprise Fund (RED)	Riyada Enterprise Development (RED) is the Small and Medium-Sized Enterprise (SME) initiative of the Abraaj Group. RED was established as an independent platform dedicated exclusively to the SME segment, with a focus on providing long-term capital to high growth, entrepreneurially-led businesses. RED is a pan-MENA platform with teams operating in Lebanon, Jordan, Palestine, Egypt, Dubai, Tunisia, Morocco and Algeria.	2009
Lebanese Business Angels (LBA)	LBA consists of individual 'angel' investors as well as institutions interested in financing privately held companies or ventures typically in a start-up based in Lebanon.	2010
Middle East Venture Partners (MEVP)	Middle East Venture Partners is a Middle East-focused venture capital firm that invests in the early and growth stages of innovative companies.	2010
Wamda	Wamda is a platform designed to empower entrepreneurs in the MENA region. It takes a 360-degree approach to providing the support that entrepreneurs need, filling the gaps in the emerging MENA ecosystem via three primary platforms: A media site, a fund, and programs geared towards helping start-ups set up, run and grow a company.	2010
FARO Fund	The Beirut and Mount Lebanon Chamber of Commerce, Industry & Agriculture (CCIB) launched a seed capital, development and orientation fund named FARO Lebanon to support entrepreneurs and small- and medium-sized enterprises (SMEs) in the country. The fund's idea is derived from an initiative by the French government to encourage innovation and cooperation among firms and entrepreneurs across the Mediterranean Basin and to create a network of similar funds within the framework of the Union for the Mediterranean project.	2011

Organisation	Description	Founding Year
Business Incubators and Accelerators		
Berytech	Berytech is a business innovation centre that provides incubation, support and hosting opportunities to start-ups and growing enterprises operating in the fields of Technology, Multimedia and Health.	2001
South Business Innovation Center (SouthBIC)	SouthBIC is a business development centre in South Lebanon, established through the funding of the EU delegation in Lebanon through the Integrated SME Support Programme managed by the Ministry of Economy and Trade. SouthBIC offers incubation services to both start-ups and SMEs.	2001
Business Incubation Association in Tripoli (BIAT)	BIAT is a not-for-profit organisation established with the assistance and backing of the Integrated SME support programme, an EU-funded project at the Ministry of Economy and Trade of Lebanon. BIAT's mission is to identify, incubate, host, network, train and support value-added business opportunities.	2003
Nabad	Nabad is one of the first social entrepreneurship incubators in the Middle East. This innovative programme, created by Arcenciel, aims at providing social entrepreneurs with the resources, expertise and space to launch sustainable social enterprises that address local challenges.	2009
Seeqnce	Seeqnce is an Internet start-up accelerator.	2011
University Initiatives		
LAU Institute of Family and Entrepreneurial Business (IFEB)	The Institute for Family and Entrepreneurial Business at the Lebanese American University provides a forum to share and develop knowledge about family businesses. The IFEB was created by the School of Business at the Lebanese American University to help professionals solve their family problems while enhancing the continuity, wealth and growth of their family enterprise. The Institute is a non-profit academic-based organisation that intends to develop educational programmes which support individuals and families in the growth and continuity of successful family enterprises. It is characterised by integrity in research and commitment to LAU values.	2004
BAU Center for Entrepreneurship	As one of Beirut Arab University's social responsibilities, CFE aims to promote the culture of entrepreneurship. It aims to identify the individuals with entrepreneurial potential and assist them in an integrated manner with information, knowledge, skills and project implementation support. The Center offers training, counselling, funding, incubation and matching services.	2012

Organisation	Description	Founding Year
Programs and Competitions		
MIT Enterprise Forum Business Plan Competition	The MIT Enterprise Forum organises the 'MIT Enterprise Forum Business Plan Competition', targeting 21 Arab countries and bringing in more than 4,000 applications every year.	2006
The Ideaz Price	*The Ideaz Prize* is firmly established as the leading Lebanese TV show for entrepreneurs. *The Ideaz Prize* is an annually televised competition that provides anyone over the age of 16 years with the opportunity to pitch their idea to a jury and win investment in their business idea.	2012
Other Entrepreneurial Support		
Injaz	INJAZ Lebanon is a non-profit, non-governmental educational organisation dedicated to educating youth about work readiness, entrepreneurship and financial literacy through experiential hands-on programmes, to help inspire a culture of entrepreneurialism and business innovation among youth in Lebanon increasing their future economic opportunities.	2001
Bader	Bader aims to promote private initiative by inspiring the young generation and providing support to entrepreneurs through education, finance and networking. The organisation provides workshops, mentorship and scholarship programmes. Bader is also a partner to the MIT Business Plan Competition.	2006
MIT Enterprise Forum	The MIT Enterprise Forum of the Pan-Arab Region is one of the eleven international chapters of the MIT Enterprise Forum, global office. Although it is headquartered in Lebanon, the Pan-Arab Region chapter serves the Middle East, North Africa and the Gulf. The MIT Enterprise Forum of the Pan-Arab Region's vision is to develop and nurture a culture of entrepreneurship across the Arab region, in view to becoming the most influential entrepreneurial network in the Arab world. This is done through building a platform for networking, knowledge-sharing, showcasing, coaching and mentorship for entrepreneurs.	2006
Lebanese International Finance Executives (LIFE)	LIFE provides a platform to channel the influence of the Lebanese finance executives worldwide in order to establish stronger bonds, nurture the next generation and promote Lebanon. The platform allows for access to the Lebanese Diaspora.	2009
AltCity	AltCity was designed from the bottom up to help facilitate, mobilise, encourage and support high-impact entrepreneurship and innovation in Lebanon and the region.	2011

Organisation	Description	Founding Year
Other Entrepreneurial Support		
Beirut Creative Cluster (BCC)	The Beirut Creative Cluster, is a not-for-profit, sectorial business association. The objective of the BCC is to promote Lebanese media services to regional and international markets. The association provides training facilities in all media industries. It promotes research and development and supports business development and job creation in the sector. The cluster aims to become a hub for creativity and innovation.	2011
Endeavor	Endeavor helps high-impact entrepreneurs unleash their potential by providing an unrivalled network of seasoned business leaders, who provide the key ingredients to entrepreneurial success.	2011
Entrepreneurship Club (eClub)	eClub aims to inspire and encourage the success of potential entrepreneurs and start-ups. The NGO provides an effective platform for start-up advice and networking opportunities. In addition, eClub organises various workshops and events, such as the Weekly Entrepreneurship Brunch & Start-Up Weekend, Beirut.	2011
Mowgli	Mowgli provides mentoring to inspire, connect and guide entrepreneurs and leaders to overcome business challenges.	2011
Beirut Digital District (BDD)	The Beirut Digital District is a digital zone with spacious facilities, including access to advanced IT services and infrastructure at reduced rates. It is a Public / Private Partnership led by the Ministry of Telecoms to improve Lebanon's position as a hub for ICT development and innovation in the region.	2012
Cloud 5	Solidere's Cloud 5, a technology park in the heart of the Beirut Central District, boasts a cutting-edge 500 square meter space dedicated to boosting small and medium sized ICT companies. Offering facilities for up to 60 entrepreneurs, it builds on the work of incubators and accelerators to provide start-ups with a pioneering work environment at minimum cost.	2012
Society for Social Entrepreneurship (SSE)	The Society for Social Entrepreneurship is comprised of NGOs, social enterprises and individuals committed to the promotion and support of social entrepreneurship. The objective of the organisation is to build an effective structure capable of catering to the growing needs of social entrepreneurship and fostering a supportive ecosystem for the sector in Lebanon.	2012

5. SOFTWARE MARKET ORIENTATION

The value creation of a national software policy depends on the nature of market orientation. For most countries the domestic market is the natural entry point for the software industries. However, Lebanese software enterprises succeeded to develop their activities to the regional Arab markets expanding the range of software services and products offered domestically.

5.1 Local Demand for Software

Domestic demand for software development services and goods is primarily driven by traditional service sectors such as banking, insurance, trade, retail, hospitality, education and healthcare. The local market is far from saturated, and companies across several industries are still investing in IT.

Demand for software in Lebanon is price-sensitive. Therefore international companies providing software-related services and goods do not perform very well when faced with local supply, which provides good prices and a flexible offering. Due to the competitiveness of local supply as well as the risk of piracy, international developers of software have made some efforts to provide incentives to academic and other large institutions by reducing their prices.

The government and other public institutions represent an important share of demand. National e-government strategies have already started to take shape, and the Lebanese government has launched several initiatives. Most recently, the government launched an initiative to boost the development of cloud computing. The government has also put forward healthcare plans to computerise all medical records with the implementation of a mandatory hearth card system.

Many of the efforts are being inhibited due to insufficient trainings, and public institutions can still play a much bigger stimulating role in the sector. On the other hand, national e-strategies, such as the e-signature law, have been stalling, with reforms blocked for the past decade. The slow and inconsistent decision process at the government level is negatively impacting the industry's growth.

Educational institutions (especially secondary schools and universities) are also a driver of demand. Many Lebanese universities and colleges are investing in school management and student information systems. There are about 41 universities in Lebanon. The country registers the highest university concentration in the region at 0.93 universities per 100,000 inhabitants[17].

[17] IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/technology

Banking is another key driver of demand. The banking sector in Lebanon comprises over 50 commercial banks. Commercial banks invest considerably in the purchase of software to optimise operations and to maximise compliance with industry standards and regulations.

Demand for software products and services started with large corporations, since they could afford and understand the benefits of IT. As the spread and use of technology widened, software solutions became accessible to smaller-sized firms. SMEs, which make up most of the market, have started to demand software. SMEs are in the initial IT phase; as a result, there is still a lot of room for growth, even for basic enterprise solutions. The last two years has seen an impressive wave of enterprise software deployments. According to BMI[18], Customer Relationship Management (CRM) tools, which are used to manage a company's interactions with current and future customers, are not frequently utilised. Nonetheless there is a growing awareness among SMEs about the advantages of such solutions. HR software is becoming more widely adopted to track recruitment information and employee attendance, training and performance. In the future, demand from SMEs is expected to grow as manufacturing firms seek to optimise their processes by automating them.

Finally, consumers are demanding software as well. The internet and mobile revolution has created demand from end-consumers directly. For instance, the significant growth of smart phone penetration (which stands at 36% in Lebanon[19]) spurred the development of, and the subsequent demand for, mobile software targeting consumers directly, such as gaming and social applications.

5.2 Foreign Demand for Lebanese Software (Exports and Subcontracting)

The small size of the local market (less than 4 million persons) is a constraint for businesses development. Therefore, entrepreneurs tend to pursue export sales. Approximately 25% of large Lebanese software companies are export-focused, with 75% of their revenues generated in foreign markets[20].

In 2010, ICT related exports accounted for 29% of total service exports, one of the highest shares in the Middle East[21] – above Jordan, Egypt and Turkey. ICT goods exports are low, at 1% share of total goods exports[22]. Most of the software sold abroad includes business enterprise solutions, applications, web development and

18 BMI, 'Market Overview – Lebanon 2013', 2013
19 Ipsos, 'MENA Internet Usage and Consumption Habits', *presented at ArabNet Conference March 2013* – http://www.slideshare.net/IpsosMENA/ipsos-arab-net-presentation-beirut-2013
20 SRI International, 2004
21 International Monetary Fund (IMF), 2010 – in IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/technology', 2013
22 World Development Indicators, 2011

outsourcing software. Key export markets lie in the Gulf Region, but the Lebanese software operators are gradually expanding their activities to Europe and USA.

On another note, a few international companies have established back-end offices in Lebanon and are sub-contracting some of their development. There are success stories that use this business model. These companies tend to employ an important share of the software workforce. The Lebanese diaspora has proved to be instrumental in this process. They bridge local and foreign markets, thereby driving foreign investment to the country.

6. ASSESSING THE BUSINESS ENVIRONMENT: SWOT ANALYSIS

6.1 Strengths

Lebanon's **human capital** constitutes one of the country's most important strengths. The local workforce is IT skilled and multi-lingual. In fact, Lebanon is ahead of most Arab states when it comes to tertiary literacy rates and quality of education systems (See Table 6.1). The country's management schools are ranked among the top 15 in the world. In addition, the education system as a whole is ranked 10th out of 144 countries. Lebanon performs particularly well when it comes to Maths and Science education, where it is ranked 4th out of 144 countries. The talented local workforce is available at a relatively inexpensive price. The wage of a software engineer averages US$50K per year, which is about 40% cheaper than in neighbouring Gulf States and 50% less expensive than some Western States such as the United Kingdom[23]. There are over 2,000 ICT graduates that join the workforce each year[24].

Table 6.1: Human Capital and Skills

Country	Tertiary Education Enrollment Rate*	Quality of Management Schools**	Quality of the Educational System**	Quality of Maths & Science Education**
	%	[1= Low ; 7 = High]		
Lebanon	57.7	5.4	5.3	5.9
Jordan	37.7	4.3	4.4	4.7
Saudi Arabia	36.8	4.6	4.4	4.5
Egypt	32.4	2.8	2.3	2.3
Algeria	32.1	3.0	2.5	2.7
Oman	28.7	3.6	3.9	3.7
United Arab Emirates	25.2	5.0	5.0	5.2
Kuwait	21.9	3.7	3.1	3.4
Morocco	13.2	4.5	3.1	4.3
Qatar	11.6	5.7	5.7	5.5
Yemen	10.2	2.4	1.8	1.9
Bahrain	N/A	4.1	4.4	4.2

*2010
**2011-2012 Weighted Average

Source: WEF & INSEAD, 'The Global Information Technology Report 2013', 2013

23 IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

24 IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

Despite the pool of talent, the lack of local opportunity is causing a brain drain, with many workers opting to pursue their careers abroad. Lebanon's ranks 113th out of 139 countries in terms of local opportunities for talented people within the country[25].

Although the Lebanese education system is known for its quality and high standards, industry experts have noted that ICT curricula are no longer up to date with global developments in the field. Therefore employers are forced to set up thorough and often lengthy training programmes for new technicians.

The country's geographic location is strategic. Lebanon is positioned at the crossroad of several continents. Its proximity to many regions makes it an ideal doorway to the Levant, Gulf and North African markets.

Lebanon's **cosmopolitan and multi-cultural heritage** is also an important strength. The population can easily communicate with different cultures in the world which allows for uninhibited interactions. Indeed, the country's openness to the West and shared traditions with the East makes Lebanon a unique platform for exchange.

Lebanon has a **liberal market economy**. Supply and demand interact in a competitive and efficient environment.

The Lebanese economy boasts **competitive creative industries**. In fact, the creative industries in Lebanon register one of the highest contributions to GDP in the region[26]. According to a WIPO study conducted in 2007, the copyright-based industries represented 4.75% of GDP in 2005[27].

25 WEF & INSEAD, 'The Global Information Technology Report 2010–2011', 2011
26 Harabi, N., 'Knowledge Intensive Industries: Four Case Studies of Creative Industries in Arab Countries', 2009
27 Melki, R., 'The Economic Contribution of Copyright-Based Industries in Lebanon', *WIPO*, July 2007

6.2 Weaknesses

Table 6.2: Venture Capital Availability (2011-2012)

Country	Venture Capital Availability	Rank (over 144)
	[1= Low ; 7 = High]	
Qatar	4.70	1
Bahrain	4.30	7
United Arab Emirates	4.10	8
Oman	3.80	14
Saudi Arabia	3.70	18
Morocco	3.00	38
Egypt	3.00	40
Kuwait	3.00	41
Jordan	2.90	48
Lebanon	2.70	63
Yemen	2.30	98
Algeria	1.80	138

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013

The **small size of the domestic market** constrains the growth of local IT firms. In most cases, companies cannot rely on local demand alone; they need to export their services and products in order to expand. As soon as a corporation is established, it is already looking to enter new markets.

The biggest barrier to the growth of the software industry lies in the country's **poor ICT infrastructure**. As described in Section 3, in Lebanon telecommunication costs are high and the speed of internet connections are low (See Figure 3.4 and Figure 3.5 in Section 3). Despite efforts to improve broadband speed and affordability, Lebanon's ICT platform is still significantly below international standards.

In addition, the **lack of an encompassing government plan for the ICT industry** is stalling the software sector and preventing it from being more competitive. Governments in neighbouring countries have taken an active and comprehensive role in promoting their domestic IT sectors (See Figure 3.7 in Section 3).

Another weakness in the Lebanese IT sector is the lack of access to investment. Lebanon registers a low score in venture capital availability (see Table 6.2), ranking 63rd out of 144 countries, and lags behind all of the Gulf States, Jordan and Egypt. There are a few venture capital institutions that have emerged in Lebanon in the past few years; however, the competitiveness of this sector remains low.

Lebanon is a poor environment for innovation. Scientific and research institutions are given a score of 2.4 out of 7, which puts Lebanon in the 130th position out of 139 countries worldwide (see Figure 6.3). Although Lebanon ranks the worst in the

Arab world in terms of quality of research institutions, it performs slightly better when it comes to patent applications (See Figure 6.4).

Table 6.3: Quality of Scientific Research Institutions (2009-2010

Country	Quality of Scientic Research Institutions	Rank (over 139)
	[1=Low ; 7 =High]	
Qatar	5.1	22
Saudi Arabia	4.4	37
Tunisia	4.3	38
United Arab Emirates	4.1	45
Oman	3.9	57
Kuwait	3.5	75
Morocco	3.1	93
Algeria	3.1	96
Jordan	3.1	98
Egypt	2.9	110
Bahrain	2.8	117
Syria	2.5	127
Lebanon	2.4	130
World Average	3.8	-

Source: WEF & INSEAD, "The Global Information Technology Report 2011", 2011

Table 6.4: Number of Patent Applications (2009-2010)

Country	PCP Patents Aplications	Rank (over 144)
Number of applications filed under the Patent Cooperation Treaty (PCT) per million population		
United Arab Emirates	4.2	46
Saudi Arabia	3.2	48
Bahrain	1.9	54
Qatar	1.8	56
Oman	1.3	63
Lebanon	1.3	64
Egypt	0.6	72
Morocco	0.5	76
Kuwait	0.2	83
Jordan	0.2	84
Algeria	0.1	98

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013

A comprehensive innovation index computed by Cornell, INSEAD and the WIPO ranks Lebanon 75th out of 142 countries (See Table 6.5). The leading innovators in the region are the Gulf States and Jordan.

Table 6.5: Global Innovation Index (2013)

Country	Global Innovation Index	Rank (over 142)
	Score (0–100)	
United Arab Emirates	41.9	38
Saudi Arabia	41.2	42
Qatar	41.0	43
Kuwait	40.0	50
Jordan	37.3	61
Bahrain	36.2	66
Lebanon	35.5	75
Oman	33.3	80
Morocco	30.9	92
Egypt	28.5	108
Algeria	23.1	138
Yemen	19.3	142

Source: Cornell, INSEAD, & WIPO, "The Global Innovation Index 2013", 2013

Finally, the software sector suffers from a **weak legal framework** (see Table 6.6). Although initiatives such as the E-transaction and the E-signature laws have had some momentum, the lack of implementation of these projects is preventing the development and maturity of the IT sector. The protection for intellectual property is very low, with software piracy rates reaching levels as high as 71% (See Table 6.6). Software piracy represents a significant obstacle to local software development. As previously mentioned in Section 5, local demand is price-sensitive; this combined with a weak legal framework and enforcement tends to lead to a high risk of piracy. Furthermore, piracy rates increase during times of instability and unrest. However, although Lebanon is a high consumer of pirated software, it is neither a significant producer nor distributor of such software.

Table 6.6: Legal ICT Framework (2011-2012)

Country	Laws Relating to ICTs	Intellectual Property Protection	Software Piracy Rate
	[1 = highly underdeveloped; 7 = well-developed]	[1 = very weak ; 7 = very strong]	%
United Arab Emirates	5.5	5.2	37
Qatar	5.5	5.8	50
Saudi Arabia	5.0	5.1	51
Bahrain	4.9	5.1	54
Oman	4.8	5.2	61
Jordan	4.3	4.5	58
Egypt	3.7	3.3	61
Morocco	3.7	3.4	66
Kuwait	2.9	4.0	59
Algeria	2.3	1.8	84
Yemen	2.2	2.0	89
Lebanon	2.10	2.6	71

Source: WEF & INSEAD, "The Global Information Technology Report 2013", 2013

6.3 Opportunities

There is **room for domestic growth**. Demand for IT and consequently for software is increasing, especially in the telecom and banking sectors. The rapid pace of software development is encouraging corporations and government institutions to upgrade their current technologies. Simultaneously, the need for software has become more evident, and access to it more affordable; therefore demand from SMEs is increasing.

Lebanon has access to a **rapidly expanding regional market**. The ICT sector in the Middle East and North Africa (MENA) is growing significantly and is expected to reach US$120Bn by 2015[28]. There are about 90 million internet users in the MENA region, a number that is expected to double by 2015[29]. Similarly, growth in the use of the Arabic language online has increased +2500% over the past 10 years and is projected to be the fourth most widely-used language on the internet by 2015.

The country benefits from a l**arge and influential diaspora**. While statistics on the number of Lebanese living abroad varies, estimates range from 5 million to 15 million. The diaspora serves as a credible and effective intermediary, thereby creating opportunities for the local market. The Lebanese abroad have in many instances driven foreign investment to their home country despite the regional instability. Indeed, there are several success stories whereby international firms connected with the Lebanese Diaspora have established development offices in Lebanon.

Taking into consideration the list of strengths, Lebanon can serve as:

- **An outsourcing hub:** Its location is ideal, its culture facilitates interaction, and its quality-to-price ratio is appealing.
- **A headquarter for multinational corporations:** Lebanon provides access to the growing regional market, as well as an IT skilled workforce.
- **A creative software development centre:** The local market produces internationally competitive software thanks to the availability of talent and creativity at an affordable price. Local software development is particularly sophisticated in the following sectors: banking, finance, trade, health, media and education.
- **A cluster for Arabic content production:** The country's creative industries, low censorship rates and multi-cultural heritage put Lebanon in a strategic position to produce Arabic content for the region.

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28 IDAL, 'Information Technology Fact Book', http://www.idal.com.lb/en/sectors_in_focus/information_technology

29 World Internet Users Statistics, http://www.internetworldstats.com/stats.htm

6.4 Threats

The country's **recurring domestic turbulence combined with the region's recent turmoil** constitutes the main threat to the software industry. This instability deters foreign investments, disrupts the private sectors efforts and delays government initiatives and reforms, with the BMI ranking Le banon in 10th out of 11 countries in its IT risk/reward rating[30]. Despite the country's relatively educated workforce and strategic geographic location, the low risk score significantly reduces its attractiveness.

In addition, Lebanon faces **rising regional competition** from neighbouring countries. Markets such as Jordan and Egypt provide cheaper labour and offer lower cost of living, whereas markets like the United Arab Emirates and Saudi Arabia boast developed ICT infrastructure and stable political environments.

Figure 6.1: Software Sector SWOT

30 BMI, 'Industry Risk/Reward Ratings – MEA IT Risk/Reward Ratings, Q412', 2012

7. ECONOMIC CONTRIBUTION OF THE SOFTWARE INDUSTRY IN LEBANON

As previously mentioned, the base data was gathered at a global back office and in a field survey to track all existing companies; to determine the line of activity by searching the web; and by attending meetings with business specialists and experts, including interviews, questionnaires and focus groups.

Economic contribution analysis examines the effect of the software activities on the Lebanese economy by: (i) measuring it in terms of output and value added, as well as its impact on employment and wages; (ii) evaluation export and import flows during the same period, as well as the indirect and induced impact of these activities.

With over 30 years of evolution, the software industry in Lebanon continues to grow and adapt, and Lebanon is among the most important regional players both in terms of volume of activity as well as quality of talent and resources.

The software cluster is the most innovative and evolving sector in Lebanon. Therefore it will be difficult to appreciate its economic impact out of global estimations and extrapolations of average observations, and in comparison with models of the existing activities of the country.

Directly employing nearly 6,600 persons and contributing approximately to US$290 million in value-added in 2011, the software industry is expected to continue a remarkable double-digit growth rate in the next decade.

The industry cultivates an interesting combination of creative, technological and management skills which are transferable to a wide range of industries.

7.1 Main Characteristics of Software Industry

The software industry in Lebanon is providing an opportunity to develop the national economy. It is a fast-growing sector with great potential of growth fostered by a dynamic local and regional market. The Lebanese software industry is still in the process of development and the scale of the enterprises tends to be small and with low productivity.

The economic contribution of the software activities on the Lebanese economy can be evaluated at three levels:

- **The first direct economic impact** concerns the basic quantifiable contribution to the national economy. This includes how much software activities contribute to Gross Domestic Product (GDP) and employment and foreign trade.

- **The second economic impact** of the software activities concerns their indirect but quantifiable contribution to the national economy. This contribution involves the 'multiplier effect' of spending of the software companies.
- **The third economic impact** of the software activities concerns their direct but less tangible contribution to the national economy. This includes the contribution of the software activities to industrial invention, innovation and differentiation, and ultimately economic competitiveness.

An additional economic impact of the software activities concerns their indirect and non-quantifiable contribution to the quality of life, cultural identity and their contributions to the attractiveness of the country.

Table 7.1: Main characteristics of the Lebanese software industry

Business segment	Industry profile
Basic structure of establishments	• Dominance of small- and medium-sized enterprises • Family business management • Existence of large number of new entrepreneurs • Existence of numbers of incubators
Products and processes concepts	• Insufficient R&D activities • Replication or installation of existing products and concepts • In-house product development alternatives • Emergence of a small amount of local know-how
Production model	• Short chain of value • High value added production, more than 75 of % total output • Medium to high quality production • Low investment in machines and equipment • Lengthy delays for product or service development
Sales and Marketing	• Unsophisticated distribution system • Local market-orientated distribution • Exports concentrated on the regional Arab markets • Access to the international market facilitated by the sector technology • Important role of the Lebanese diaspora

Business segment	Industry profile
Investment and financing	• Availability of subsidised loans • Existence of new seed capital investment funds • High need of cash flow • Low equity ratio vs. high loans ratio • Low rate of FDIs • Insufficient profitability and low rate of return
Human resources	• Major need for skilled technicians • Skilled labour population eroded by emigration • Insufficient training • Negligible links with education institutions

7.2 The Direct Economic Effects of the Lebanese Software Industry

7.2.1 *Economic Contribution of Software Activities to GDP*

The first direct economic impact of software activity is the total net revenue generated by the software industry put in a specific year.

For 2011 the software industries contributed a **total value-added (VA)** of **USD 290 million**, or about 0.73 per cent of GDP. The value added generated is built on a conservative basis.

By sector of activity almost 55% of the value added of the sector is generated by **Software publishing and Information technology (IT)**, followed by the **Web Design Development and Services** (16% of the VA generated by the IT activities)

Table 7.2: Economic Contribution of Software Activities

Main Activity	Total Output in USD	% of Value Added / output	Total Value Added in USD	As % of Total Value Added
Activities of call centres	4,950,000	55.0%	2,722,500	0.9%
Computer consultancy, programming and facilities management	27,898,000	81.0%	22,597,380	7.8%
Installation of mainframe and similar computers	7,400,000	55.0%	4,070,000	1.4%
IT infrastructure and network management services	19,250,000	67.0%	12,897,500	4.5%

Main Activity	Total Output in USD	% of Value Added / output	Total Value Added in USD	As % of Total Value Added
Mobile applications and wireless telecommunications services	50,848,000	81.0%	41,186,880	14.3%
Software publishing and Information technology (IT) consulting design and support services	197,531,000	80.0%	158,024,800	54.7%
Web design development and services	57,510,000	82.0%	47,158,200	16.3%
Total	365,387,000	79.0%	288,657,260	100.0%

The value added of the cluster reaches 79% of the total output compared with an average of 34% in the manufacturing activities. Indeed, as in most knowledge-based industries, the VA of the software activities is very high compared to other traditional activities. This could be attributed to the high value generated by ideas and innovation.

However, the value added ratio varies between the different activities of the software cluster, reaching 82% in the web design and development services versus a 55% in the call centres or the installation of mainframes and computers.

According to operators and professionals that were interviewed, the software industry grew at an annual average rate that ranged from 7% to 12% from the early 1990s up to 2012, in comparison to 4% to 9% to the average annual growth rate of the GDP in this period.

Figure 7.1: Company Sales and Value Added According to Firm Size (in Millions of USD)

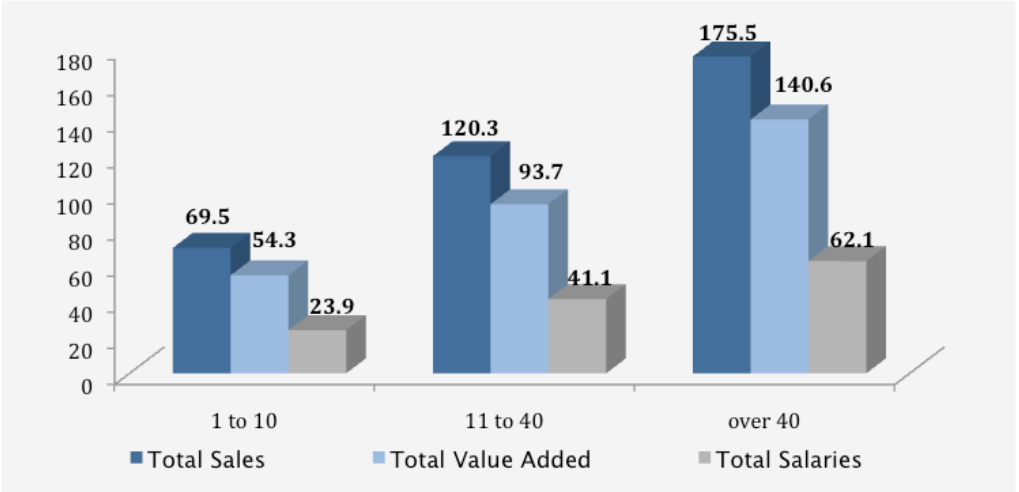


Table 7.3: Direct Economic Impact of Software Activities Input Breakdown

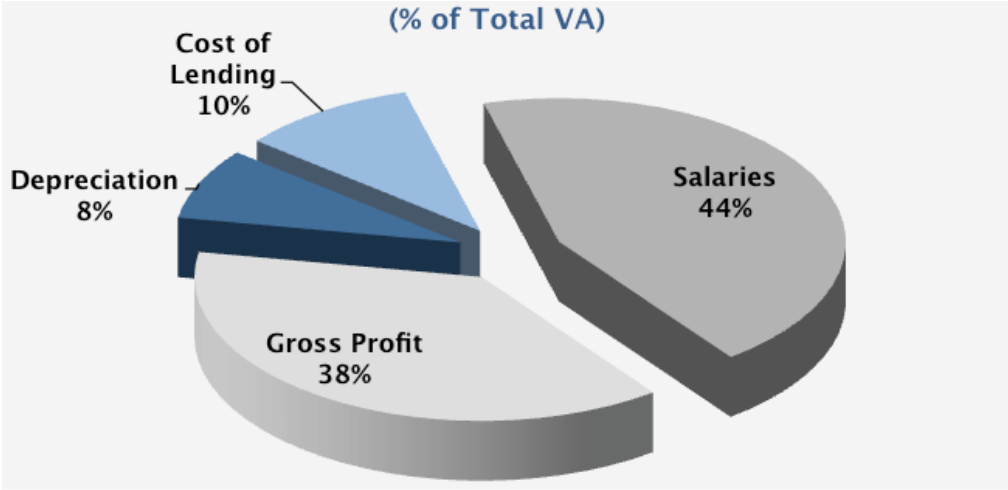
Software activities	Total Outputs USD	Total Inputs out of which				Total Value-Added
		Support services	Other inputs	Operation costs	Total	
Total	**365,387,000**	**41,650,000**	**14,850,000**	**20,230,000**	**76,730,000**	**288,657,260**
As % of Total Output	100.00%	11.40%	4.06%	5.54%	21.00%	79.00%

Table 7.4 shows the main outcome induced by the demand of the establishments for their input, including supporting services and telecom and communication charges.

Table 7.4: Financial Results of the software industries activities

Industry	Depreciation USD	Cost of Lending USD	Salaries USD	Gross Profit USD	Total Value-Added
Total	**23,086,000**	**28,865,726**	**127,074,994**	**109,630,540**	**288,657,260**
As % of Total	8.0%	10.0%	44.0%	38.0%	100.0%

Figure 7.2: Financial Breakdown of Software Activities Value Added



Estimation of the financial results is based on the different components of the value added:

Value-Added breakdown of the software activities:

- After an analysis of the main components of the production process, the derivation of profit is now possible. The analysis is conducted in the table below.
- With a total of US$ 127 million, total salaries represent 34.8% of sales and 44% of the value added.
- Depreciation of assets represents a total of US$ 23 million representing 6.3% of sales and 8% of the value added. This confirms the low level of fixed assets in the software industries, especially in a country like Lebanon where the main output of this cluster is services rather than products.
- Interest charges, which amounted to US$ 28.9 million, accounted for 7.9% of the sales and 10% of the value added.
- The gross profit total is around US$ 110 million, representing 30% of sales and 38% of the value added.

Table 7.5: Value Added Breakdown of the Software Activities

		In USD	In % of output		In % of value added
Output / sales		365,387,000	100.0%		
Intermediate consumption / input		76,730,000	21.0%		
	Support services	41,650,000		11.4%	
	Other inputs	14,850,000		4.1%	
	operational costs	20,230,000		5.5%	
Value added		**288,657,260**	**79.0%**	**79.0%**	**100.0%**
	Wages and salaries	127,074,994		34.8%	44.0%
	Depreciation	23,086,000		6.3%	8.0%
	Interest	28,865,726		7.9%	10.0%
	Gross profit	109,630,540		30.0%	38.0%

7.2.2 *Employment Generation*

The second direct impact of the software industry concerns the number of direct jobs created by the cluster.

– In 2011, software activities accounted for the employment of 6,600 workers (0.52 per cent of nation-wide employment) in an estimated 317 companies across the country. The average employment per company was 21 persons with large differences between the various activities. The average number of workers per company was 28 in the mobile applications and wireless telecommunications services, while this ratio was 9 in the Installation of mainframe and similar computers branch.

Table 7.6: Employment Generation of the Software Industries

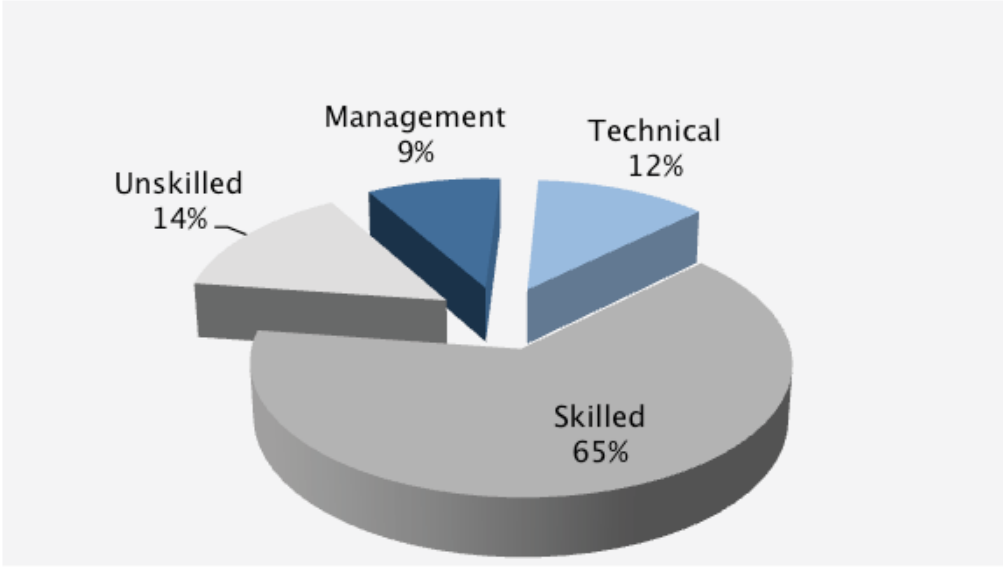
ISIC Number	Main Activities	Number of companies	Number of Workers	Average Number of Workers / Company
8220	Activities of call centres	7	66	9.4
6201	Computer consultancy, programming and facilities management	23	481	20.9
332002	Installation of mainframe and similar computers	8	74	9.3
8316	IT infrastructure and network management services	13	275	21.2
6202	Mobile applications and wireless telecommunications services	33	908	27.5
5820 5820 6209 8314	Software publishing and Information technology (IT) consulting design and support services	149	3,727	25.0
8315 6312 6311	Web design development and services	84	1,065	12.7
Total		**317**	**6,596**	**20.8**

Employment generation effect is summarised as follow for the different sectors of activities according to ISIC classification:

- For the skills profiles, most jobs (64% of total employment of the software industries) require a good level of skill. 'Skilled workers' bring some degree of expertise to the performance of the companies.
- Compared to an 'unskilled worker', who can fulfil the requirements of his job with little or no knowledge of the inner workings of software, a 'skilled worker' would possess the knowledge to be able to identify and correct problems with the activity.
- 'Technical workers' need a higher knowledge and expertise and they usually have undergraduate, professional or post-graduate degrees.

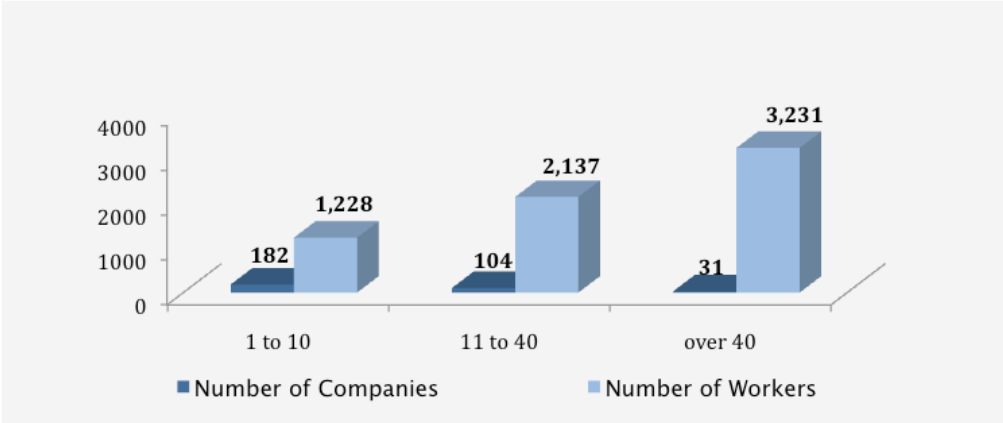
The following figure shows a breakdown of the profile of jobs in the Lebanese software industries:

Figure 7.3: Number of Workers by Skill Type in Software Activities



- The labour productivity of software activities, at USD 43,543 per worker, was close to the average manufacturing labour productivity (estimated to be USD 40,850 per worker) in 2011. The VA per worker of the financial sector is particularly high at USD 110,850. The average VA per worker for the national economy was about USD 31,027 for that same period.

Figure 7.4: Number of Companies and Workers According to Firm Size



The value added is deeply concentrated on a small number of companies. Out of the 317 °companies in the sector, around 50% of the total value added is concentrated around the largest 31 (more than 40 employees). The 181 small companies (57% of total) employing less than 10 workers account for less than 19% of the total VA of the cluster.

7.2.3 *Benchmarking Software Activities with Other Sectors*

Compared to other economic sectors, the software sector is highly competitive, with a value-added per worker of around US$ 43,700 compared to US$ 31,000, the average for the all other sector activities.

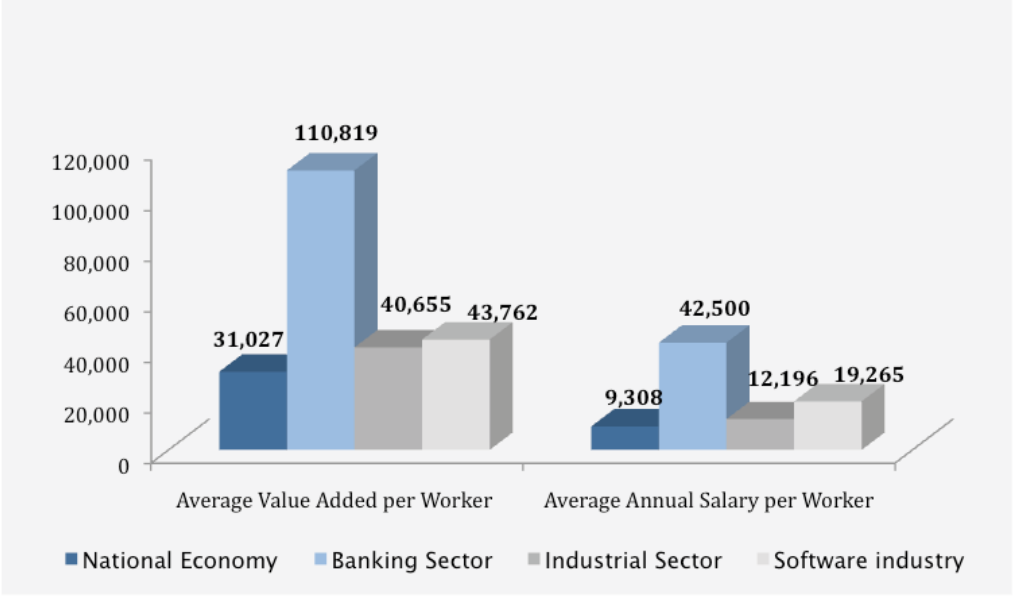
The annual salary per worker in the software sector is US$ 19,300 to compare to US$ 12,200 in the manufacturing sector and US$ 9,000 for the average of total activities. However, this level is far below that of the banking sector, with the average wage per worker estimated at US$ 42,500 per year.

Table 7.7: Benchmarking the Direct Contribution of the Software Sector with Other Key Sectors

Year 2011	National Economy	Banking sector	Industrial sector	Software activities
Employment	1,275,000	23,200	84,662	6,596
As % of total employment	100.0%	1.8%	6.6%	0.52%
Value added in USD	39,560,000,000	2,571,000,000	3,441,946,573	288,657,260
Value added as % of Total GDP	100.0%	6.5%	8.7%	0.73%
Average value added per worker in USD	31,027	110,819	40,655	43,762
Total salaries (1) in USD	11,868,000,000	986,000,000	1,032,583,972	127,074,994
Average annual salary[1] / employee in USD	9,308	42,500	12,196	19,265

[1] Including benefits and social charges

Figure 7.5: Average Value Added and Annual Salary of Workers by Economic Activity (USD)



7.2.4 *Export-orientated Software Industries*

The external market is considered to be one of the main drivers for the Lebanese software industries. There are two drivers of the export business:

(i) Lebanese developers are very active in the international market, mainly in Europe, and are establishing subsidiaries in Lebanon to produce items and products dedicated to the mother company, which will take in charge the distribution.

(ii) The second driver comprises local operators, services to the Arab countries mainly the Gulf countries.

Benefiting from a cultural Arab advantage and supported by a very active Lebanese network in the Gulf area (between 300.000 to 350.0000 active persons,) the Lebanese software industry is delivering services in the area.

It's difficult to evaluate the external flows of the Lebanese software activities due to the total absence of data. In fact, some partial results generated by external activities are included in the tables of activity and employment, shown above, but these numbers are fractional and need to be completed by more detailed surveys.

Competition is growing from other Arab countries such as Egypt, the Gulf Emirates and Jordan.

7.3 Secondary Economic Impact

- The secondary economic impact refers to spin-offs resulting from expenditure indirectly created by the software industry. The software industry encourages production in other industries as they purchase goods and services for their own production. Such multiplier effects can be traced through input-output (I–O) tables.
- The output/VA multiplier of the IT industry measures the total production/VA in the economy induced by one additional unit of final demand in the software industry. For instance, one additional dollar of expenditure in the software industry will result in a higher worth of production output, and almost 0.70 dollar of VA in the entire economy.

7.3.1 *Mapping the Value Chain of the Major Activities of the Software Industries*

A value chain analysis provides information that can help to assess the impact of IT activities on the national economy, as well as to recommend an action plan to support this segment of activity.

The use of the term chain suggests a focus on 'straight up' relationships between buyers and suppliers and the movement of goods or services from producer to consumer.

The value chain framework can be used as a powerful tool to analyse the Lebanese software industry, and can be applied to the whole supply chain and distribution network.

The software value chain can be divided into two: the production segment and the distribution segment. In both these segments different important groupings participate in the expansion of the wider software sector.

- The first consists of equipment and services suppliers. The most important components of the industry inputs are imported, especially basic electronic devices and programs.
- The second includes telecom and internet providers and the quality and the cost of provided services. These services are considered one of the major weaknesses of the software industry in Lebanon.
- On the demand side the industry is supported by the growing needs of the traditional business sectors including banking, insurance, trade, hospitality, education and healthcare, as well as the public demand generated by government and public institutions and e-government services.

- Finally, the export market allows the industry to capitalise on the Arab and international markets. The Arabian culture of Lebanese operators and diaspora network are considered as strengths for the Lebanese software industry.

The production of software is increasingly internationalised, and small Lebanese companies or individual developers can export to clients abroad or participate directly in regional or international projects. Such international interaction is proving a critical learning experience, offering important linkages to Lebanese software developers. It is important for the Lebanese software operators to secure access to imported know-how and software as well as to export markets.

7.3.2 *Technical Impacts on the Value Chain*

The value chain of the Lebanese software industry has been transformed recently as a result of technological advances.

The first impact began with the digitalisation of economic activities and their management. This expansion is observed in all sectors including manufacturing, transport, finance, health, education and hospitality.

The next level is linked to e-government and e-commerce operations, including the elimination of large parts of the traditional systems of operation and distribution. These transformations are very much related to the introduction of virtual and creative processes

Analysis of existing data pertaining to the local market and available national data for the same sectors of activity has been derived from:

- Site visits, field research and interviews with firms, revealing the importance of various aspects of the software industries, and how opportunities and market environment might affect their investment decisions;
- Discussions with statisticians, analysts and professionals from the different fields of software activities.

The value chain is shaped by two groups of factors:

1. **Direct or primary activities**

2. **Indirect or supportive activities**

7.3.3 *Backward and Forward Linkages Generated by Software Industries*

Assessment of the impact of the software industry on the national economy is estimated by measuring levels of employment and demand for input generated by the different operators in the Lebanese economy.

The total economic impact from an activity includes not only its direct and indirect effects, but also its induced effects.

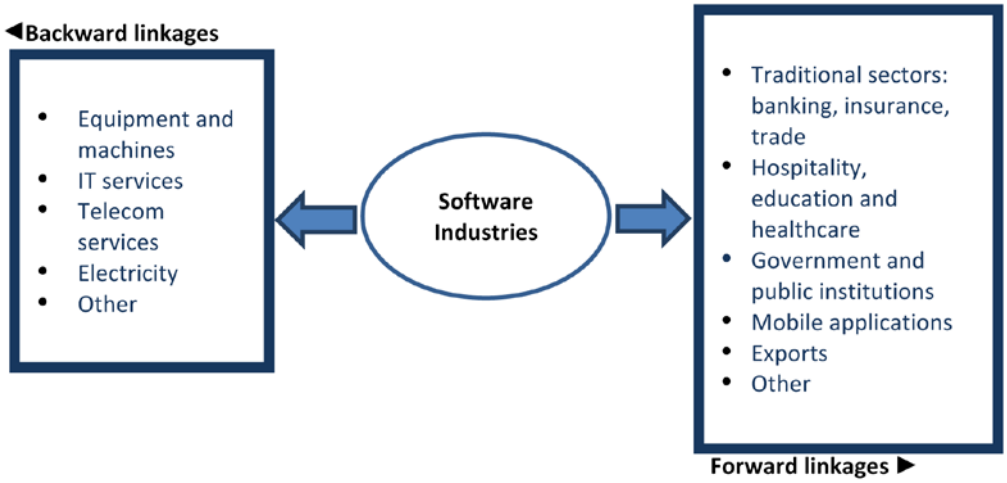
The direct effect of a project consists of the volume of activity generated by the software industry for its input and by the number of direct jobs created. The indirect effects consist of demand and jobs created at supplier factories. An induced effect consists of the impact of spending by people employed in branch activities.

The economic effect generated by software industry operators is calculated by evaluating the demand for input for each sector of activity, including raw and processed goods, electricity, water, oil products and services. These measurements estimate the magnitude of the different impacts, including direct effects, indirect impacts and induced effects.

The backward linkages take into consideration the economic effect generated by the software industry operators through their input demand. The forward linkages include the economic effects of the spending of salaries and profits in the establishment area or on the national level.

Considering the software industry value chain profile, several categories of national impact are calculated, mainly the productivity improvement resulting from the introduction of ICT in economic activity.

Figure 7.6: Links of the Software industries in Lebanon (*Backward and Forward Linkages*)



7.3.4 *Multiplier Effect*

In the absence of precise input/output tables and value chain multiplier statistics, the indirect and induced economic impacts of the software industry in Lebanon were estimated by an assessment of available data, including the National Accounts publications, which included general output, discussions with professionals and operators and benchmarking with international studies.

The multipliers for the software industries are not tabulated in the National Accounts, and therefore have been estimated by the consultant with the support of the industry experts and statisticians of the Central Administration of Statistics.

The multiplier effect in the software industry ranges from 1.5 to 1.7, according to two major components:

- Backward linkages: 1.20 to 1.30
- Forward linkages: 1.30 to 1.40

For labour, the multiplier stands at around 1.6. The multiplier is conservative for two reasons:

1. The backward linkages of the software sector are relatively short since production processes are mainly supplied by foreign companies.
2. Poor business environment, political uncertainty and economic slowdown are limiting the positive impact of forward linkages.

7.3.5 *Spin-off Effects on Business Culture*

Along with its quantitative economic impact, the software industry will have some qualitative outcomes for the local and national economy.

A role model for improving the business environment at the national level, many private economic leaders and business promoters are using software industry successes as examples to suggest reforms to ease the creation of new companies and to facilitate management procedures.

Currently promoters and owners of software industries are limited to national or Lebanese diaspora investors. For improvement, software activities need to attract FDIs. Gulf country investors are the first targets for FDIs but, at a later stage, Lebanon should attract international players of the sector;

The information technology (IT) sector has served as fertile ground for the growth of a new entrepreneurial class with innovative corporate practices, and has been instrumental in reversing the brain drain, raising brand equity and attracting foreign direct investment (FDI), leading to other associated benefits. These include:

- Contribution to a diversification of the national economy largely reliant on traditional activities, improving its integration within the international economy;
- A role as a catalyst for modernisation, mainly to ease non-traditional exports and to attract FDIs to Lebanon;
- Improvement of infrastructure and logistics assets;
- A technology transfer, still taking place through investment in new capital equipment combined with off-site and on-site job training, but also through fine-tuning of the educational system, catering for employment opportunities in growing markets;
- Introduction of a new culture of business in the area, particularly in terms of good governance and quality management. A trained labour force, with investments in intangible assets;
- The potential for the model of the software industry to be reproduced in other sectors of the economy.

8. CONCLUSION AND RECOMMENDATIONS

The Lebanese software industry is well positioned to become more competitive in order to gain benefits in terms of growth and employment. This study identified challenges and determined the different drivers for the development of the software industry.

It aims to increase the competitiveness of the cluster through a number of recommendations on different levels. Some of these recommendations are directly related to the industry itself, while others consider the whole business process and ways to improve the attractiveness of the Lebanese market for investors.

The recommendations are grouped as follows:

8.1 Improve the Business Environment

- Modernise Lebanese commercial laws and regulations;
- Amendment of regulation framework to ease businesses in their three phases: (a) implementation (b) operating and (c) liquidation;
- Streamline complex business processes, automate procedures, create one-stop shops and reduce delays and administrative costs;
- Adopt different e-laws (in discussion in Parliament).

8.2 Improve the Regulatory Framework of Intellectual Property Rights

- The Lebanese legislative framework for copyright and related rights is not sufficient to protect these rights. The protection system is not implemented and enforced in an effective manner to comfort the operators in the software industry.
- Rights holders face many practical difficulties and challenges when resorting to the Lebanese judicial system: Some are related to missing judicial measures, others to the slow investigation procedures, in addition to the unfair compensation.
- Lebanon should address these deficiencies with measures such as modernisation of laws and the introduction of more efficient judicial practices.

8.3 Access to Finance

- Provide low cost credit insurance for innovative investments;
- Extend subsidised loans for investment in research;
- Introduce guarantees for funds to cover equities and not only credits;

- Encourage the creation of capital venture funds;
- Provide innovation vouchers and tax credits for software start-ups.

8.4 Strengthen Human Resources

Software is labour-intensive and requires skilled and trained workers. In software, there is no place for workers with modest education and training, in contrast to large-scale manufacturing operations. Support for the strengthening of human resources should include:

- The promotion of research and development, especially that undertaken collectively;
- The introduction of tax rebates for investments in research and development;
- Develop and promote a market connected to the education system;
- Reinforce vocational education and apprenticeship programmes and encourage the creation of training centres;
- Involve business associations in the preparation and evaluation of university and technical school curricula;
- Develop programmes and certificates with universities specially dedicated and adapted to the fast evolving of the software industries;
- Promote the diffusion of new technologies and productivity improvements.

8.5 Introduce Tax Incentives for Software Industries

- Reduced profit tax rates for investments in rural areas or the ones targeting specific population sectors, such as women, youth or the unemployed;
- Incentives on additional employability;
- Incentives for firms investing in training and advisory services;
- Special tax and regulatory exemptions for start-ups.

8.6 Information Collection

- Develop a database and information systems;
- Develop online registries to allow communication between operators and stakeholders;
- Develop a specific consultation process with business associations, chambers and other stakeholders to foster public-private partnerships;

- Introduce a Regulatory Impact Assessment of the software industry for new policies or regulations;
- Identify a national focal point or a primary counterpart responsible for coordinating efforts;
- Map the needs of the software industry and identify the related activities to avoid inefficiencies.

8.7 Supportive Organisations

- Strengthen the capacity of incubators and accelerators to better serve software industries;
- Support cluster initiatives between software companies and complementary industries;
- Reinforce technological pooling and take advantage of collective efficiency;
- Create special economic spaces and techno-parks or techno-poles with logistics and customs facilities. Take advantage and accelerate the implementation of the Tripoli Special Economic Zone as a pilot project;
- Encourage Chambers and Business Associations to actively lead the development of companies and provide support programmes tailored to innovation and software activities;
- Support NGOs to intensify their support for under-served segments such as women, youth and those in remote areas;
- Streamlined procedures for export, along with strong and affordable costs for the infrastructure in ICT, electricity and logistics;
- Develop an institutional framework with clear roles and mandates among key government agencies for effective and coordinated policy formulation and implementation;
- Cooperation with international organisations is an essential step in identifying how the Lebanese software industry can benefit from the support and commitment of the international community. One of the most prominent partners is WIPO, which has carried out significant studies and research to promote the effective and efficient use of copyright by businesses, including software activities. Through technical assistance, WIPO's support can contribute to the Lebanese efforts to create a favourable enabling environment for software activities and a large experience of participatory processes for policy change.

8.8 A Macro Business Culture

Along with a recommendation framework, decision-makers should adopt a matrix of principles to improve the efficiency of any action plan for the software industry, including:

- Judicious choices

Successful support programmes and strategies begin with prioritisation. Ensure that the selected steps include the functionality necessary to continue to run the any action plan. Additionally, companies must be able to pick up and use the system in order to receive full benefits.

- Adopt an integrated approach

Any strategy for software activities should be designed to be complete and auditable. The Lebanese government provides economic schemes for different economic sectors. Unfortunately the low efficiency rate is due to a scattered and dispersed approach, which does not allow adjustment and revisions.

- Promote collaboration

Collaboration is a major factor in the ability of economic clusters to continue to improve. Companies should not be working in a bubble. Access to collaboration tools will foster communication and increased unity.

- Provide real-time visibility

The software sector is constantly changing, and companies are serving volatile markets. Therefore, it becomes increasingly important to stay alert by providing real-time visibility, to adjust plans, visions, and forecasts and make informed investments.

- Promotion of a global transparent market and respect of standards

The public sector's calls for tender and terms of reference have also to be 'open' to Lebanese operators. Without going to the other extreme of insisting on the use of Lebanese software companies for public tenders, Terms of References (ToRs) of public procurement should be neutral and avoid imposing any kind of specific software.

- Commit to the implementation process

Lebanese decision-makers need to understand that in order to truly transform the software industry, a strategic plan and vision requires commitment. As businesses grow they are subject to a variety of changes. Economic reform should reflect those changes.

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