



Assessing the Software Industry in Egypt

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ABSTRACT

During the 1960s computing was introduced for the first time in Egypt. However, the use and applications was limited to the government and the public sector. It was only during the early 1980s that the introduction and diffusion of computing was widespread due to the personal computer evolution worldwide. The introduction of personal computers had different implications on organizational development and growth and was coupled with other developments in the information technology industry that relate to hardware penetration, software development, and the build-up of the telecommunications infrastructure. This paper demonstrates the current status of information technology in Egypt with a focus on the assessment of the software industry as a major building block of the information technology industry and a possible active contributor to business and socioeconomic development at large.

INTRODUCTION

The use of computing started in Egypt in the 1960s. However, it was only in 1985 that the active role played by the government caused a change in the way information technology was perceived as a vehicle for socioeconomic development and a tool to improve the decision making process (Kamel, 1999). Such change brought into a developing country like Egypt was accelerated by the continuous development of new tools and techniques that had direct and concrete effects on socioeconomic development. Therefore, it is perceived that the way developing countries will manage the computer driven process of change will influence whether its development goals will be promptly achieved (Munasinghe 1987). This will also be bound to the continuous ability to invest in emerging technologies, the provision of skilled human resources and state-of-the-art information and communication technology infrastructure. Many researchers have identified information technology as the combination of information, computing and communication technologies (Schware and Choudhury 1988, Munasinghe 1987, Lind 1986). Today, with the evolution and diffusion of the Internet, the integration of these technology elements is invaluable to societies around the world and strongly contributing to globalization. In the developing world, most of the information technology applications were implemented to deal with major sectors in the economy such as education, health, energy and agriculture and only a few nations have recognized information technology as an emerging sector due to the massive technological, human and financial infrastructure required (Kamel, 1999).

In the past few years, the importance of information technology has been greatly emphasized in most developing countries in a deliberate effort to ensure that they do not lag behind (Goodman 1991, Lind 1991). In most of these countries, the government has played the most important role in the diffusion of information technology being the largest user of computers (Moussa and Schware 1992) and through its policies, laws and regulations it still exerts the largest influence on the diffusion of information technology throughout different organizations (Nidumolu and Goodman 1993).

In Egypt, since 1985, the driving force for the diffusion of information technology has been the government-private sector partnership. As part of the country's structural adjustment program, a large number of informatics projects were formulated targeting the use of information technology to leverage managerial and administrative performance in the government. These projects were targeting a number of key sectors including education, health, employment, trade and local administration. In practice, most of the projects have sought to introduce computer-based technolo-

gies to contribute to socioeconomic development. Many of these projects and the related infrastructure required in terms of software development, support and maintenance were the driving forces behind the initial steps towards the build-up of a fully integrated information and communication infrastructure with its different building blocks including: human resources, information resources, software, hardware, and networking resources.

EGYPT: "A COUNTRY PROFILE"

Egypt is the cradle of an ancient civilization dating back to 3000 BC. With a population of about 68 million, out of which 19 million in its work force, Egypt is the most populous country within the region (IDSC, 2000). About 28% of its population is enrolled in education programs (schools and universities education). It has the second largest economy in the Middle East. It has successfully implemented its economic reform program that has enabled its current economic growth rate to stand at 6.8% annually with an inflation of 3.1% (IDSC, 2000). Egypt has four basic sources of foreign exchange earnings that are equally divided between tourism, oil, Suez Canal earnings and remittances of Egyptian working abroad (Kamel, 1999).

Cairo, the capital of Egypt, is a large metropolis where buildings of French and English architecture stand next to modern skyscrapers. Cairo's 18 million inhabitants constitute nearly 26% of the total population. Egypt, like many other developing countries, is trying to expand its industrial base and modernize itself technologically with agriculture accounting for 15% of the gross domestic product and industry for 40%, Egypt has a large service sector mainly built around tourism and transportation. Its major exports are human resource capacities, petroleum products, cotton and leather products; its major imports are food, machinery and vehicles (Kamel, 1999). In building Egypt's information infrastructure, the government in collaboration with the private sector has established over 1581 information centers in various provinces, government organizations, public services and economic agencies (IDSC, 2000) yielding over 220000 trainees in various IT related aspects over the last decade with an annual increase of 10-15% in the number of trainees (IDSC, 2000). Moreover, the government of Egypt is more determined than ever to build-up Egypt's infrastructure and keep pace with the IT evolution worldwide. Respectively, in October 1999, the government established a ministry for communication and information technology and appointed one of the leading IT experts with over 25 years of experience to head it to embark on a master plan to build Egypt from an information and communication technology perspective. The

plan is based on the fact that as an emerging market, Egypt has already made considerable achievements in terms of economic development and is ready to move aggressively into the global market and the only vehicle to realize that objective is through a state-of-the-art information and communication technology infrastructure (Osman, 2000).

THE SOFTWARE MARKET IN EGYPT

The software industry in Egypt is still in its infancy stage. However, it is diverse and heterogeneous in nature with local vendors and multinationals that is present in most mature markets. Most of the software development companies provide training services to support their products and clients, which is usually conducted on a one-to-one basis as a bundled service with the software development assignment. Recently, many local software vendors are engaged in web development operations with an Internet market that is estimated to have 400000 users and served by 60 ISPs spread over Egypt's 27 provinces (Kamel, 2000).

The software industry in Egypt is divided according to the marketplace categories of software development applications that includes software tools, packaged applications, tailored applications and multimedia applications and Arabization of applications (HCG, 1999). These applications are developed and maintained by a combination of local vendors and branches of international IT vendors present in the Egyptian market. The total number of staff employed in the industry in October 2000 is estimated to be in the range of 6000 including managers, programmers and project managers mostly involved in the development and delivery of information systems to local and international markets (Osman, 2000). However, the figure excludes IT support staff working in the industry, the government and the private sector that is estimated to around 1000 and an additional 1000 experts and consultants in the IT training field. There are 130 registered firms producing software in Egypt ranging from 1 to 5 staff member start-ups through to relatively mature firms with around 50 to 150 employees (HCG, 1999). The majority of firms are located in and around Cairo or Alexandria. However, recently, some of the new start-ups are located in the new industrial areas to benefit from the tax holidays they offer.

The size of the software sector was estimated at around 50 million US dollars in 1998 as announced by the Egyptian Software Association. This represents around 17% of the cited size of the overall information technology market in Egypt that is 300 million US dollars. The Egyptian domestic marketplace is considered soft in demand and growth due to the fact that there was no significant penetration of certain sectors in the domestic industry; firms producing high value products and services have to look to the international marketplace for growth (HCG, 1999). While these numbers are not impressive if compared with other countries with more developed software industries. They do provide a foundation from which to start a serious development of the industry. Moreover, the ministry of communication and information technology has embarked since May 2000 on a plan to train 5000 fresh graduates annually on the recent IT and communication applications. The plan aims, over the next 5 years, to train 25000 fresh graduates that could represent the core of the development of a high-tech industry (Osman, 2000).

The expectation for growth in the domestic marketplace for IT products and services is expected to be in the range of 35% for services and products. Imported software accounts for 55% of software market revenues while the remaining sales comprise 19% for locally developed software, 16% for tailored software and 10% for Arabization (Osman, 2000). The market for Arabized software

is large in Egypt but there is also a great potential elsewhere with 250 million Arabic speakers in the Arab countries and worldwide to be served with language-specific software produced in Egypt (Palmgren, 1999).

The industry distribution channels in Egypt are still relatively underdeveloped with around 63% of software sales without intermediaries; 50% of tailored applications are sold bundled with niche products and services. Moreover, software sales through system integrators are low because of limited subcontracting, technical cooperation and interchange of skill and specialization's between local companies. Finally, function-oriented software is sold primarily through dealers (HCG, 1999). With regard to software demand, the government purchases generate 25% of total software revenues in Egypt, making it the largest demand segment with two major purchase determinants, which are quality and after-sales service for fear of system failure with cheaper systems (AmCham, 1998). However, only 6% of revenues are from sales to small office and homes, which is in part due to the widespread piracy rate of 86% that plagues this segment. This figure is gradually decreasing due to the newly introduced laws against violators of software piracy laws. Also, the number of software applications sold to households is increasing due to the boom in PC sales for household usage and the spread of Internet among younger generations.

The competitive advantages of Egypt's domestic software production environment have attracted numerous international producers to subcontract programming of tailored applications. Currently, 6% of subcontracting carried in Egypt is destined for export, and 15 to 20 companies are currently considered active exporters. With the presence of 60 ISPs since 1993, there is an expected significant growth in services and software applications that are Internet-based (AmCham, 1998). Moreover, to keep pace with the developments taking place worldwide in the financial marketplace, the Egyptian financial sector is expected to create high growth in the software market. There is also an increase in the demand for software development in the petroleum sector as well as in tourism and hospital management packages.

A SWOT ANALYSIS FOR THE INDUSTRY

The software industry in Egypt is better analyzed through a SWOT analysis to be able to understand where it stands and where it is heading with an overview on its strengths and weaknesses and an identification of the opportunities available and the threats faced. In that respect, the strengths linked to the software market in Egypt include an educated population, a central geographical location, availability of technical skills, and low and competitive labor cost. In terms of weaknesses, there is a minor domestic demand, lack of support to the development of competitive software companies, cost and availability of Internet infrastructure and services. With respect to opportunities, there is potential access to international markets, increase of IT penetration in government institutions, development of incubators for Egyptian firms overseas, and market penetration of PCs in homes and business. Finally, with respect to threats, the lack of value ascribed to software, piracy rates, government regulations, lack of support to the industry, lack of financial support, and limited distribution skills to serve the international software market (HCG, 1999).

Strengths

The technical skills and capacities among Egyptian software developers appear to be excellent stemming from a well educated population and one of the highest enrollment volumes in university post-graduate education worldwide. While most hiring managers agree that new university graduates are not sufficiently

trained, software companies are filling this gap by providing on-the-job training. With the exception of the development of core tools, Egyptian software programmers should have no major problems competing with their technology skills. Labor costs in Egypt, while increasing, are still well below the levels found in the United States and Europe. These costs can be as low as 4 US dollars per hour for senior programmers as compared to 85-175 US dollars per hour for high quality contracting rates in the United States and Europe. Consequently, Egyptian software companies that choose to target offshore development opportunities should have a strong marketing message. With respect to demographics, Egypt has a young and educated workforce, which can be leveraged if the country determines to make a strategic focus on the software industry; this is coupled with the fact that an important element for success in the software business is language and most staff in Egypt use English as a second language, providing an advantage in dealing with overseas customers. As for location, Egypt has the same day time zone advantage with Europe, and provides a second-shift for the United States. Finally, the software industry has no shortage of entrepreneurs willing to take risks in the development of their businesses. Therefore, many firms have established new market niches with products in the domestic market, despite difficult market and business development conditions (HCG, 1999).

Weaknesses

The consensus of most software companies is that recent university computer science graduates in Egypt have good technical skills but their education has been too broad and thin and lack sufficient expertise in any one technology. Therefore, software companies spend up to a year turning them into productive contributors. In some cases, especially for companies delivering customized applications, they prefer to hire industry experts and provide them with the technical training required. For example, the Information Technology Institute (www.iti.gov.eg), created by the government and supported by the private sector, fulfills this training gap by providing an intensive nine-month curriculum that focuses on specific, widely used software and network technologies; namely software skills development program (SSDP). However, the program combines too many subjects that some of the industry leaders claim that fine tuning can produce experts in specific fields such as databases or networking and hence the value-added will be much more appreciated and the outcome will be more productive.

The development of the software industry needs focusing on leveraging project management, marketing and management start-ups skills for the software industry, which is still lacking. Therefore, the institute was established as part of the government efforts to diffuse information technology among fresh graduates to help build an information technology literate society. The concept of the institute stemmed from the experience of the 80s in Egypt through the development and implementation of informatics projects that crystallized the ultimate need for highly skilled and specialized expertise in various information technology aspects (Kamel, 1998). Today, the institute has become a center of excellence specialized in information technology training to cater for the growing demand of the local market.

Another weakness is that the domestic demand for software applications in the market is small with only a minor percentage of firms that have allocated the necessary investment to improve their operations served by large local software firms and multinationals. The reason behind that fact is that a large number of managers in the industry do not recognize the value of using IT as a vehicle for business improvement in addition to the fact that there is minimal perception of the value of software related technology.

In recent years, despite a 35% growth rate, the software market continues to be relatively small. Thus, there is a need for an increasing government support to realize a change that could make a difference to the industry.

With regard to business development services to support growth, most software firms are eager to learn how to build their software businesses more effectively, most of them have excellent capacities in writing code, however the problem lies in developing project management skills and expertise, formalizing software development and testing methodologies, conducting marketing campaigns, local pricing, developing channel distribution locally and internationally, improving sales skills, and assessing business opportunities. In terms of Internet infrastructure, being the vehicle of communications and information delivery for the software industry, the situation in the Egyptian market is still its preliminary stages. Despite the increasing numbers of Internet service providers, which started operation in 1995, privatized in 1996 and reaching 60 ISPs in 2000 operating in 18 of Egypt's 27 provinces, the cost for real service is prohibitive. Moreover, there is a number of problems that relate to the current Internet service which include high bandwidth cost, telecommunication tariffs, a small subscriber base with around 400,000, reliability of the dial up service over-subscription (Osman, 2000). The Internet infrastructure is a major contributor to the software industry especially for firms intending to build offshore development businesses. High-speed Internet access is critical for communicating with overseas customers, performing software distribution, allowing customer downloads of large files and databases, and providing effective customer support for foreign customers from a support center in Egypt.

The Egyptian government provides a tax holiday for software companies pending the establishment of the companies in one of the new industrial cities. However, corporate tax rates are extremely high at 40% and above, and are a disincentive to software companies to invest in their growth and produce a profit. Taxes on print and TV advertising are also very high at 36% and do not encourage packaged software developers to advertise their products. Moreover, the thirty-year-old labor laws include no provisions for technology where an employment agreement with a non-compete clause or one that attempts to enforce the intellectual property rights of the firm is not respected under the current law, which has a very negative impact in offshore development where overseas operations developing products on a subcontracted basis look carefully to the protection of their assets, before selecting an overseas partner (HCG, 1999).

Opportunities

The concept of software business incubators is not currently present in Egypt, although many industrialists and education professionals understand its values when models of business firms partner and collaborate their activities with education institutions. The closest links appear to be donations to education institutes, which are usually done by hardware vendors, however software companies are reluctant to do so and they rarely sponsor internships and scholarships. Additionally, private business development occurs in a fragmented manner. However, throughout the last 18 months, the government role in supporting the industry included changes in tax treatment; reduction on telephone tariffs (local and international calls) and the introduction of new IP laws, which received praise from many industrialists, which represents an opportunity for the industry. However, a lot more still needs to be done to promote penetration of computing in households and access to international market, which will imply major positive changes in the development and improvement of the software industry in Egypt (HCG, 1999).

Threats

The government has contributed to reducing the piracy rate by passing anti-piracy legislation but enforcement is generally considered ineffective due to ineffective measures used. However, the presence of leading international IT vendors has actually accomplished more to improve awareness and reduce piracy and more can be done by dramatically reducing prices of second and subsequent licenses for a given product, which can remove most of the incentive to make illegal copies (Palmgren, 1999). Another problem is that there is an extremely prevalent attitude among both commercial and government customers that software has little intrinsic value as compared to the value of hardware that is highly appreciated.

In terms of financial support for the industry, unfortunately, the lack of understanding for software products also implies the difficulty for a start-up or an existing company to receive seed or expansion financing to develop their business. The combination of misunderstanding the needs and valuation characteristics of software firms and a naturally conservative model for lending makes the development of the industry a challenge. In terms of government regulations and taxation, corporate taxation levels are very high in Egypt. However most software companies enjoy a tax holiday of 5 to 20 years pending their establishment in the newly developing cities (HCG, 1999).

Another threat is the lack of market research in both domestic and overseas markets that Egyptian companies could target. Several companies indicated that there is minor software marketing in Egypt and that trade associations focus more on exhibitions losing out of much of the potential opportunity. However, for future development of the industry a strategic marketing focus needs to take place. Therefore, leading firms are taking steps to ensure that their product development and organization is being guided by market conditions rather than opportunistic situations, which encourages the industry to be supportive and paves the way for a growing demand from the industry and ensures a multiplicity of distribution channels.

ACTION PLAN

Based on the assessment of the software industry in Egypt, an action plan needs to be formulated to capitalize on the opportunities available and overcome the challenges faced. The plan will assist Egypt with potentially dramatic improvement of the software industry performance and could capitalize on the experience of successful nations that went through the process of developing successful software industries. The action plan includes identifying target markets, investing in people, developing incubator programs, improving infrastructure, and increasing government support role.

Identifying Target Markets

As the domestic market continues to be soft, most firms looking for dramatic growth should focus on the international markets where the demand is tremendous in many countries around the world representing significant market opportunities in the software industry where the key industries will include pharmaceuticals, healthcare, telecommunications, petrochemicals, retailing and publishing among others. However, Egypt is not participating in the international market at a significant level today though its firms can adequately compete in international markets and grow the relatively small market share it currently enjoys to a much larger number by taking a pragmatic approach and leveraging the experience of other countries in this process but that would require investment and support from government sources to ensure success in these endeavors.

Therefore, an important aspect of the development of the software industry capabilities will be to determine the best method to penetrate the international markets, which can only be realized through better training and education.

Investing in People

There is a need to identify the skills required and the corresponding training to ensure it matches the industry demand. Currently, at the undergraduate level, around 1200 students graduate annually from 8 different universities specializing in computer science (83%), electronic engineering (4%) and management information systems (13%). At the postgraduate level, around 870 students graduate from 5 different universities, and post-graduate institutions with masters' degree levels in computer science, networking, business information technology and software engineering (HCG, 1999). At the professional training level, around 20000 participants are trained annually in around 20 training centers in IT related areas in software, hardware, information, communications and business applications. These programs are offered by independent commercial training centers, IT vendors certified training programs such as Microsoft, Oracle, Cisco, ICL, IBM, NCR and/or university training centers (Kamel, 1998).

Incubator Programs

The software industry could benefit drastically from the development of incubator programs to link industry, education and government goals together. This could be realized through the development of marketing and support incubators in countries where tailored and packaged applications are sold, which could help achieve a much higher level of revenue per employee in overseas markets. Using this approach, Egyptian firms will gain a greater share of the revenue at the end user customer and maintain more control over the development of the business in the chosen location.

Improving Infrastructure

Improving the infrastructure is vital to ensure that firms have the equivalent of highways to operate their businesses. This can only be realized through a government supported initiative to provide very high speed Internet access to all software firms, to decrease access cost to consumers, to encourage the diffusion of Internet among households, and to create software parks. Egypt information technology market represented more than 500 million US dollars in 2000 with the capacity to grow to 1 billion US dollars by the year 2001. Industry experts have cited Egypt's information technology market between the fastest growing in the world (Mintz, 1998). In its long-term strategic plan, Egypt has an objective to create a 25 billion US dollars industry creating more than 60000 technical and managerial job opportunities. Moreover, the government has allocated 72 million square meters to develop a high technology site in the Sinai valley. The project will encourage the development of a high technology industry including cooperation with international firms and multinationals and is expected to add 2.5 billion US dollars to the gross domestic product by the turn of the decade; 1.5 billion US dollars of which will be generated through export markets (Kamel, 1998).

Increasing Government Support Role

There is a need for a more government support role to demonstrate the value of software to Egypt's future. The role could include campaigning to show the business value of software to the industry; increasing awareness, decreasing taxes; facilitating procedures to cooperation and technology transfer between multinationals and domestic software companies, supporting incubator

programs, and outsourcing government software development to the private sector.

CONCLUSION

Egypt has an excellent opportunity to develop the ingredients of a small but effective software industry. The level of effort and support given by government and supported by industry, finance and education will ultimately determine the level of success of the software industry in Egypt such as many other countries that have made software a profitable industry sector that contributes to business and socioeconomic development. There is a wealth of opportunities for Egypt to improve all aspects of development for the software industry and more could be capitalized from the experiences of other nations. Egypt could dramatically increase the level of revenue and growth in the software business with a relatively small investment and focus to be able to attain the levels of achievement realized in nations such as Ireland and India.

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