# Investigating the Pakistan's Offshore Software Industry Infrastructure

## Zia Ur Rahman*1, Izaz Ahmad Khan1, Safyan Mukhtar2, Shah Suhail2, Maryam Bibi3

Department of Computer Science, Bacha Khan University, Charsadda, KPK, Pakistan1
Department of Mathematics & Statistics, Bacha Khan University, Charsadda, KPK, Pakistan2
Department of Managment Science, Bacha Khan University, Charsadda, KPK, Pakistan3

## ABSTRACT

Offshore software production is a legally binding business of great programming creation at seaward destinations with critical cost-sparing. Main purpose of this research paper is to judge the offshore software industry infrastructure. We conducted a questionnaire survey with 50 experts of 20 different software houses of Pakistan. The software houses where questioned to rank each important factor on a five pointer to determineshow the conceived value of every success factor. The survey consisted of valueable factors identified in the older research of the literature review. We have recognized Components for example, cost-saving, infrastructure. It was found out that cost-saving is common in three types of software houses that is large, medium and small. As for as appropriate infrastructure and Cost-saving is concerned, it should be addressed by vendor organizations so as to compete in theoutsoucing of offshore business.

**KEYWORDS**: Offshoring Software Industry, Infrastructure, Outsourcing, Software, Cost management, Pakistan Software Export Board, Globalization.

## 1. INTRODUCTION

The world is entering into information age which has brought about significant change in the manner the world use to run due to which a notable change is occurring in societies, associations, agencies, corporations and industries. The software industry is also in a state of transition under the impact of globalization. The software industry started in mid-1964's but its impact on the world was almost invisible till 1970 with annual turnover of $0.5 billion as shown in figure 1. The Software industry has stated development in 1970 when the IBM has started to decide investing in software. In 1979 the annual sales of US software companies was about $20 billion, in 1982 it was $10 billion and in 1985 it was came up to $25 billion[1]. The US department of commerce produced a report with the name of A Competitive Assessment of the United States Software Industry (1984) to give suggestions for keeping US at leading position in software industry after a committee of OECD conducted during 1983-84[2]. The suggestions were about achieving intellectual property legislation, dealing with piracy and reduction of tariffs to US software exports. The balance of payment in Britain became worse in 1980 due to which a study was conducted Advisory Council for Applied Research and Development (ACARD) known as A Vital Key To UK Competitiveness (1986). The Global Services Location Index (GSLI) report recommends that the leading motives for the offshoring are low ages for experienced employee's and lower costs for business [3]. The latest report highlights, automation combined with business process as a service (BPaaS) has the potential to be an even more powerful of disruptive change, also identify the strongest underlying fundamentals to potentially deliver information technology (IT), business process outsourcing and voice services [4]. There are 1,500 registered software firms with US $1.4 billion of exports. The major attracting factors of Pakistan as an offshore destination for software development includes highly skilled man-power with 20,000 IT graduates produced each year, English as medium of education, friendly tax policies and easy starting of business [5].

The size of industry and exports are US $ 2.8 billion and US $ 1.4 billion respectively based on the WTO-prescribed formula with 61% exports over last year. The figure 6 also records that there are approximately 20,000 produced by 110 educational institutes offering IT related programs; there are more than 15,000 professionals employed in export oriented activities while approximately 110,000 are total number of IT professionals. The figure 6 also shows the export targets for year 2007-08 that is US$ 162 million and a total spending for the fiscal year 2005-06 is US$ 1.4 billion. The number of IT parks is eleven with an area of 750,000 sq ft. The total software exports for fiscal year 2005 are US$ 1.050 billion. The major attractions for the offshore clients are high quality software developments, speedy and painless establishment of business, low cost basis, and emerging and state of the art telecommunication and IT infrastructure. The estimated growth is considered to be 33% annually with an estimated US$ 10 billion in the next five year [6].

Corresponding author: Zia Ur Rahman, Department of Computer Science, Bacha Khan University, Charsadda, KPK, Pakistan *zia.cs@bkuc.edu.pk

The software firms are divided into software contractors, packaged software and PC software industry. The software contractors were developing software's for computer users and manufacturers and were the starter of the industry in the mid 1950's. The packaged software firms started in the 1960's to develop the software for public and private sector organizations with the competition among them. The PC industry developed in late 1970's for personal computers. The IBM was the largest producers of the software with few Fujitsu and Microsoft as second and third respectively in 1992. The figure 1 shows software revenues from 1964 to 1985 in which an exponential growth is recorded after 1979. The term software was coined in 1959. The employment in the software industry was small in the beginning which later on increased with the time. The famous software companies of late 1950's were TRW, THE MITRE Corporation, and Hughes dynamics. Later on other companies emerged in the industry which includes computer usage company (CUC), Computer Science Corporation (CSC), The Planning Research Corporation (PRC), Informatics, and Applied Data Research (ADR) in early in 1960's [7].
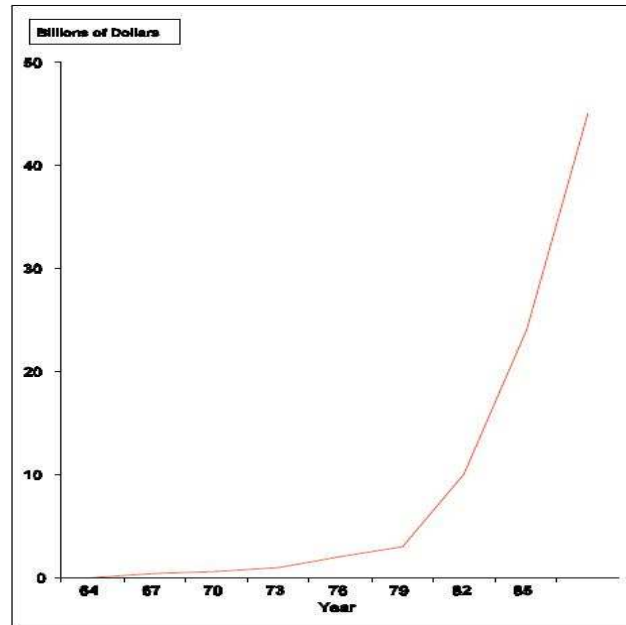
**Figure 1. Growth Curve of World Wide Software Revenues 1964-1986**

The figure 2 shows the major global software industries. The industries of India, Israel and Ireland are export oriented while that of Brazil and china is domestic. The figure 2 also shows that in 2002 Indian and Chinese industries were of almost similar sizes $12.5 and $13.3 billion while that of Brazil and Israel were $7.7 and $4.1 billion respectively in 2001. The Irish industry was $13.9 billion in total sales in 2002 of which $12.3 billion was the multinational companies and $1.6 billion domestic. The US is the largest producer of software $200 billion in sales while Japan and Germany are second and third with $85 billion $40 billion in sales. The Chinese and Brazilian industries are domestic but the growth is substantial e.g. the Chinese industry growth was 5% in 1999-2000 to 11% in 2002. The Indian software industry started with the on sight model in which Indian firms hired software programmers to work on the client side and under the client's management and same was done by the US firms. The Indian firms have a major cost advantage over there US partners in the lower end of the software services but they could not run directly with big producers as the likes of EADS, Computer Science Corporation, Anderson consulting (now Accenture) and IBM. The Indian software houses have shown competiveness by doing large projects like Y2K which has improved their image as global producers [8].

| Countries | Sales ($ billion) | Empl (000) | Sales/ Empl (000) | Software Sales/GDP (%) | Software Development Index |
|---|---|---|---|---|---|
| Brazil * | 7.7 | 160 ** | 45.5 ** | 1.5 | 0.22 |
| China | 13.3 | 190 ** | 37.6 ** | 1.1 | 0.23 |
| India | 12.5 | 250 | 50.0 | 2.5 | 0.96 |
| Ireland (MNE) | 12.3 | 15.3 | 803.9 | 10.1 | 0.34 |
| Ireland (Domestic) | 1.6 | 12.6 | 127.0 | 1.3 | 0.04 |
| Israel * | 4.1 | 15 | 273.3 | 3.7 | 0.17 |
| | | | | | |
| US | 200 | 1024 | 195.3 | 2.0 | 0.05 |
| Japan ** | 85 | 534 | 159.2 | 2.0 | 0.08 |
| Germany * | 39.8 | 300 | 132.7 | 2.2 | 0.09 |

Various sources. * = 2001; ** = 2000;

**Figure 2. The Software industry in Brazil, China and the 3Is and by comparison in the US, Japan and Germany [9]**

## 2. Major software developıng countrıes

The globalization of production of the software industry is often associated with major multinational companies (MNCs). The MNCs has a sizeable presence all around the world where development of the software is going on. The MNCs came to Israel for doing R&D to develop new technologies and techniques for developing software. The Indian software industry is service oriented where MNCs went for inexpensive skilled workers because the Indian developers are highly efficient and skilled and at the same time the cost is many time less than those in developed countries. The Irish provided them with the tax and incentives due to which MNCs started investing in Ireland by developing software products at low cost and the Irish developers provided them with European standard of skills with low cost. These MNCs includes oracle, Microsoft, Sun Microsystems, IBM etc. Other software producing companies are North Korea, Hungary, Philippines, Czech Republic and Taiwan but there size of production is comparatively small. The current global spending on the IT services, software and BPO with US $1.045 trillion [10]. The offshoring uprising carried into the worldwide economy. However there are many more existing countries where software houses have been hesitant towards set up work shop, for example Pakistan, Belarus or Ukraine [11].

## 3. Offshorıng

The research studies by NASSCOM, Gartner and Forester suggests that there is an estimated US $ 1.045 trillion of current spending on the IT services, software and BPO out of which US $280 billion is potentially offshorable [12] but the actual revenue from offshoring is US $ 40 billion [10].
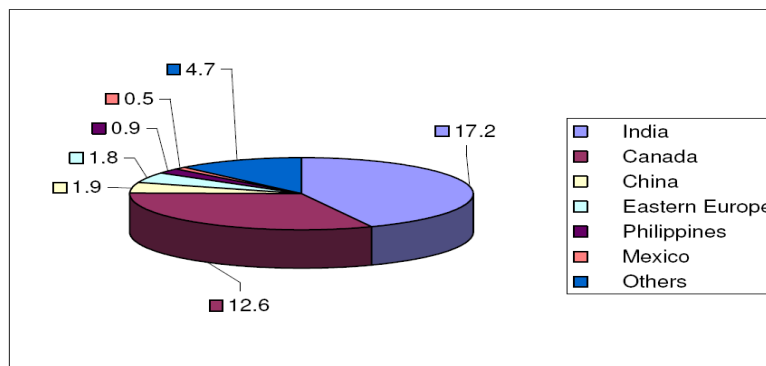


**Figure 3: Major offshore outsourcing countries**

The figure 3 shows that the major offshore outsourcing countries. India is the leading country responsible for 17.2% of global offshoring followed by Canada with 12.6%, china is third with 1.9% and Eastern Europe with 1.8%, Philippines 0.9% and Mexico 0.5%, while other countries have 4.7% [10].
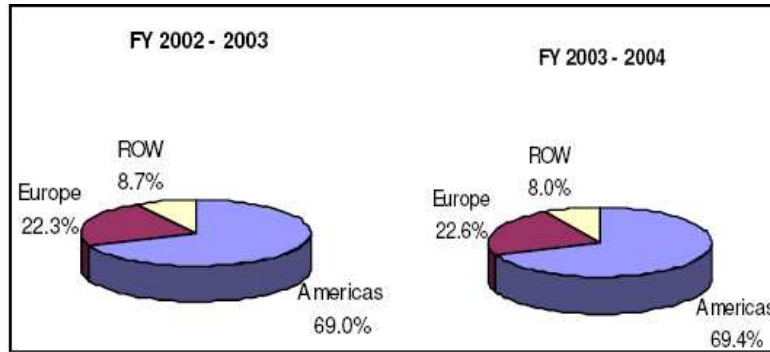


**Figure 4: Major Offshore outsourcing importers**

The figure 4 shows the major global importers for fiscal year of 2002-2003 and fiscal year 2003-2004. Americas are the largest importers with 69.0% and 69.4%, Europe has 22.3% and 22.6% while rest of the world has 8.7% and 8.0% for both the respective years[10]. The term off shoring is highly related to outsourcing. Outsourcing is the phenomenon by which an organization selects and buy items that was made within the organization or service which were also performed within the organization [13]. The term offshoring has different meaning to different people due to which it has been confused. He further suggests that offshoring is much more than outsourcing and sometime do not even include outsourcing, an organization can offshore by opening its production or services in overseas as well it can to a foreign long term contractor [14]. A phenomenon when outsourcing is outside the principal company's country [15].

The off shoring is current research has been taken as both outsourcing as well as the establishment of business of a company outside its country of origin. The offshore outsourcing involves Information Technology Outsourcing (ITO) and business process outsourcing (BPO). In ITO the contracted company provides a specific application for example all related servers, networks and software upgrades while in BPO the contracted company managers all the business processes for example accounting, procurement or HR [13]. Other types of Offshoring are staff augmentation, bundled maintenance, application support services, turnkey projects, net sourcing, enterprise partnership and joint venture [16].

In case of staff augmentation the clients manage and supplement in house teams with supplier staff while in bundled maintenance supplier is responsible for small maintenance items and minor requests, in turn key projects the supplier manage and provide final project while in net sourcing supplier hosts application and services are provided through a network. While in enterprise partnerships shared services are created to fulfil the demands of the client which ends when transformation is complete, in the case of joint venture the client and supplier commercialize the clients back office services. The ITO consists of both application support services and application outsourcing. The evolution of off shoring started when manufacturing work in 1980's shifted to the area with low labor costs. The reason behind the migration of manufacturing work between Urban and rural areas were cheap lands, tax incentives, holidays and skilled labor at lower costs. This trend is followed by global corporations by achieving higher cost arbitrage through moving internal manufacturing, operations and service functions for example call centers and back-office work to lower cost countries [15]. With further motivation of remaining close and gaining improved access to foreign markets. These organizations have started to outsource the non-principal activities to local or regional suppliers to gain access to the specialized expertise as well as low costs.

The latest trend of off shoring among the global corporation is motivated by two factors to countries mainly like India and China, while other locations are Philippines, Brazil, Ireland and Czech Republic [13].The offshore outsourcing or sometime Global outsourcing has a market of Euro 185 Billion in 2005, which will increase considerably in near future [17]. The Offshoring process is getting acceleration but apparently it is still modest because it cannot be applied to all sectors. The automobile has seen high level of Offshoring with 30% in UK and 15% in USA while the average across manufacturing is 25 % in UK and 12% in USA [14]. According to software engineering institute 40% high level of the companies are Indian in origin [18]. Forrester Research reveals that 14% of 3.30 million offshore white collar jobs will end up in low cost countries. There are many advantages of off shoring, some of the advantages are [19].

a. Cost saving:
It is the most important factor in information system (IS) outsourcing [20], [21] and off shoring as well [22]. The reason for the low cost is the difference of salaries between in the customer firm and the staff working in the firm which provides the outsourced services [22].

b. Technical feasibility:
The second advantage is the technical feasibility in measurement of security and storage which leaves off shoring much easier [23].

c. Flexibility and speed:
Most of the customers firm of off shoring are located in USA and Western Europe while the suppliers are in Asian countries. Due to the time difference 24 hour's work is possible on a project. Thus off shoring give us the feasibility of working 24 hours on a project this is increasing flexibility and speed [20].

d. High Standards and Entering to potential new market:
Customer also wants quality, [22] suggests that many US firms thinks that off shoring enhances quality as of the high staff turnover rate that they experience is not as common as with the firms providing these services [24]. All the big Indian firms have maximum level of CMM certificate [22]. Offshoring is a way of entering into new markets with high potential [25]. For example in case of china and Russia both are new markets with low labor costs but also with high economic growth as well as large population size [22].

### 4. Numerıcal results

According to Aberdeen group" If you are an offshore provider and you are not CMM certified, companies do not even consider you", which shows that quality initiative is highly important for the industry in Pakistan. The quality initiative takes feedback related to the importance of International Standards Organization/ Software Engineering Institute .The majority of surveyed firms recognize the importance of certification. The research results point out that 63.6% of the firms are ISO/SEI certified. Recent data shows that all of the firms i.e. 100.0% consider the ISO/SEI certification as shown in the table 1 and depicted in figure 5. The results shows that 100.0% have a high level of certification which is a positive sign and can easily attract the potential customers.

| Is ISO/SEI important? | | | | |
|---|---|---|---|---|
| Question | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
| Yes | 16 | 100.0 | 100.0 | 100.0 |
| No | 0 | 00.0 | 00.0 | 00.0 |

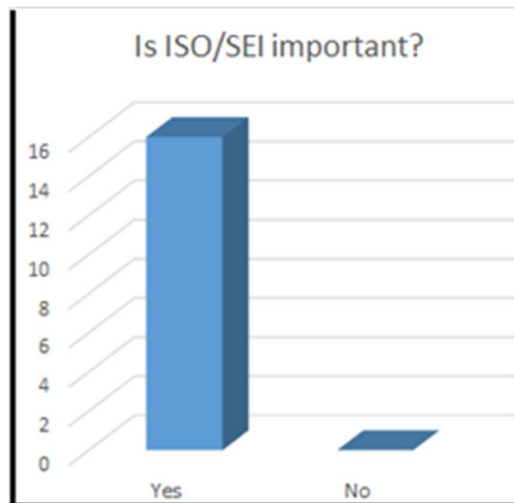Table 1: Quality initiative and industry infrastructure questioner reult



**Figure 5. Quality initiative and industry infrastructure, Is ISO/SEI important?**

Another study reveals that almost all the firms involved in the research are the members of the PSEB (Pakistan Software Export Board) as shown in table 2 and figure 6. The PSEB is established by the government of Pakistan to promote the export of software products and development of industry. The data shows that the 100.0% of the firms are the members of the PSEB. The results show that there is a high level of awareness about the organization because the firms see a purpose in joining it. The PSEB also provides link to the firms registered on its website.

| Member of PSEB | | | | |
|---|---|---|---|---|
| Question | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
| Yes | 16 | 100.0 | 100.0 | 100.0 |
| No | 0 | 00.0 | 00.0 | 00.0 |

Table 2: Quality initiative and industry infrastructure questioner result
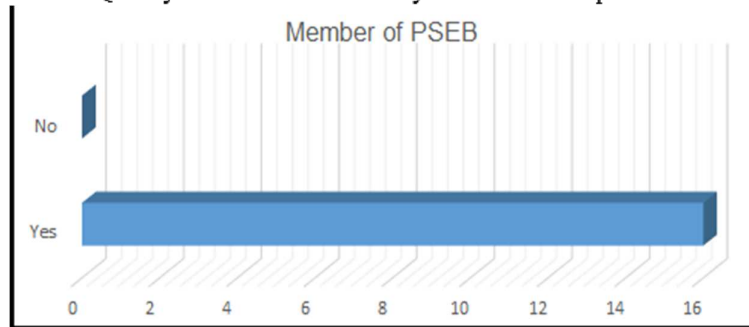


**Figure 6. Quality initiative and industry infrastructure,
Member of the PSEB (Pakistan Software Export Board)**

## 5. CONCLUSIONS

The research shows that most of the firms are aware of the internal standards i.e. ISO/SEI, and a majority of them have certification which is an important factor for attracting potential clients. The study has also revealed the fact that association support in Pakistan is high because all most all of the firms are the members of the PSEB. The PSEB provides an important facility to all software firms to be registered with it incredibly easy from where it can accessed by the potential clients much more easily. The PSEB provides an increasingly important facility of membership but now it needs to think beyond by developing the resources.

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