Offshoring from Brazil – educational implications

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Abstract: Outsourcing of information technology (ITO) and growingly business processes (BPO) have increased tremendously during the last years and provide a great business advantage for international business services. Although low labour cost competitive countries have dominated it seems that not just the labour costs matter. Now, and especially in the future, service levels, competencies and community-based activities are also needed. India seems to be the most attractive country for both ITO and BPO practices. Other BRIC countries, China, Russia and Brazil are following. In this paper the educational implications for increasing offshoring from Brazil is discussed and compared to an Indian case.

Keywords: Brazil, offshoring, professional education

1. Background and attractiveness of Brazil for offshoring

Gartner (2007) reports Brazil is one of the most sought-after destinations, with a large population and an economy that is diverse and one of the largest in Latin America. However, Brazil’s key weaknesses are typical of those challenges facing developing countries: education, official bureaucracy, and government problems and inefficiencies. Despite that we should consider Brazil as a viable outsourcing choice for a wide range of services. Total risk-adjusted costs for specific services are comparable with those in many other destinations. However, even to achieve the relatively modest growth, significant structural changes are needed (Wilson & Purushothaman 2003)

Currently companies such as Agco, Alcatel, American Express, Blue Cross Blue Shield, Caterpillar, Citibank, Deutsche Bank have found Brazil and the list goes on. Wipro, one of the world leading Indian ICT service companies, has set up a shared services center at Curitiba together with a brewing company AmBev. (Andhranews 2008). Brazil unlike India, has a good domestic IT market that has only recently looked offshore for opportunities. Two major Brazilian IT industry organizations, the Brazilian Association of Software Companies (ABES) and the
Association of Brazilian IT, Software and Internet Companies (Assespro) promote the Brazilian software services sector and, together with Brasscom, lobby the government for policies that favor the IT sector. Softex/Apex-Brasil is a government export promotion agency that promotes growth in the IT service industry. The agency, which traditionally coordinates the participation of Brazilian companies in trade shows abroad, is starting to develop additional activities. Software exports are now growing, approximately they are in the level US$ 1 B annually. Total foreign direct investment (FDI) in 2006 was US$ 22.7 B, compared with for example, US$10 B in India. The majority of investments came from the U.S., followed by Spain, the Netherlands, France, Germany and Portugal.

However, outdated labor laws and a slow-moving official bureaucracy reduce the agility and flexibility of businesses. Brazil has implemented some effective policies to stimulate the development of the IT industry and, particularly, the IT services industry. The government also encourages technological development by providing various incentives. Therefore some additional progress in government support can be expected in the medium term. However, outdated labor laws are still a problem; they are not expected to change significantly in the short term.

Brazil is South America’s largest telecommunications market. It has more than 50 million installed fixed lines, over 50 million fixed subscribers and over 135 million mobile subscribers, in a population of roughly 188 million. Brazil has a well developed internal IT services market worth of US$ 10 billion. Especially we should consider the very sophisticated finance and banking industry developed after 1993 huge inflation (Luz 2008, Larbalestier 2005). The system is integrated through a countrywide real-time network which connects the branches and facilities (Sistema de Transferencia de Reservas). This network commands a very high level of security and IP protection in IT services. Therefore Brazil due to its cost-effectiveness is highlighted as a suitable nearshoring location (Ruohonen 2008). Brazil has one of best telecom infrastructures in Latin America, but costs are higher than countries like Chile. For example Maia (2008) urges Brazilian IT service providers to move forward to more value-added, intense and customized services and relationships.

Enforcement of intellectual property laws is a major concern of businesses that venture offshore for IT development. Brazil is ranked well among countries in terms of corruption according to Transparency International, better than India, China or Russia. World Audit places Brazil first third of countries in terms of democracy and for press freedom.
2. Educational implications

2.1 Workforce, general education and IT centres

The literacy rate for Brazilians 15 years and older is 88.6%. For those aged 15 to 24, it is 96.8%. Eight years of education are mandatory. Approximately 10% of the population aged between 18 and 24 years study at college level. Higher education enrollments have more than doubled in the past 10 years to about 4 million each year. This is still a small number when compared with international levels, and even when compared with some other countries in Latin America. About 10% of the total educated labor force have completed higher education, and about 30% completed secondary education. The government spends around 4% of GDP on education, or approximately 11% of all government expenditure.

According to Maia (2008) the largest IT centres, such as Sao Paulo and Rio de Janeiro have significant talents pools, strong local universities and well-developed markets. However, like in India, also Tier 2 cities are emerging such as Belo Horizonte. Recife and Porto Alegre have managed to create technology parks backed with strong universities. (Maia 2008)

2.2 IT education and salary competition

Brazil has shortcomings in IT education. Many of the inadequate government educational efforts are complemented by the IT user companies and service providers, which runs extensive internal IT training programs Brazil has more than 200,000 IT professionals. Every year, approximately 23,000 new IT graduates enter the industry. In addition, graduates from other areas, especially business, are hired and trained internally to become IT professionals. However, according to Luz (2008) Brazil bests India in one very important IT workforce statistic: employee turnover, while India is suffering high labour turnover at the IT sector, up to 30-40% annually.

The average Brazilian IT programmer’s annual salary is starts from US$20,000 reaching more than US$40,000. A social tax 80% to 100% is applied to salaries which burdens competitiveness. Many of the programmers therefore will be contracted as “individual service provider companies,” in which case “revenue” will be 40% to 50% higher than the salary (with no social taxes). Brazil has the lowest salary rates among nearshoring service providers in the Americas, but not when compared to India. The average annual salary is US$ 16,000 for IT outsourcing workers (US$ 10,000 for entry level) and US$13,000 for business process outsourcing (BPO) employees (US$7,500 for entry level).
However, the depreciation of Brazil currency real has improved the labor arbitrage lately. According to the latest Everest study (2008) currency depreciation in the last few months has resulted in a 12 percent reduction in operating costs.

3. Brazilian universities in master level ICT education

3.1 The best 10 of MSc level education

According to the statistics of 2006 Brazil had 2,270 universities (both private and public) and 5.8 million college students. According to 2005 data from the Ministry of Education, some 247 thousand IT professionals graduate from universities and technical schools in Brazil every year and there are 111 graduate and postgraduate courses in the IT field in Brazil. (Brasscom 2009, status 2006).

The best master level degrees according to Brasscom (2009) are

Table 1. Brasscom’s 10 best Master level degrees

<table>
<thead>
<tr>
<th>Master</th>
<th>University</th>
<th>MSc Degree</th>
<th>Academic Reputation</th>
<th>Final Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coppe/UFRJ – Alberto Luiz Institute Graduate School and Research in Engineering (<a href="http://www.coppe.ufrj.br">www.coppe.ufrj.br</a>)</td>
<td>Systems Engineering and Computer Science</td>
<td>10</td>
<td>630</td>
</tr>
<tr>
<td>2</td>
<td>PUC-Rio - Pontifícia Universidade Católica do Rio de Janeiro (<a href="http://www.puc-rio.br">www.puc-rio.br</a>)</td>
<td>Informatics</td>
<td>8.9</td>
<td>593</td>
</tr>
<tr>
<td>3</td>
<td>Unicamp - Universidade Estadual de Campinas (<a href="http://www.unicamp.br">www.unicamp.br</a>)</td>
<td>Electrical Engineering</td>
<td>4.63</td>
<td>519</td>
</tr>
<tr>
<td>4</td>
<td>UFRGS - Universidade Federal do Rio Grande do Sul (<a href="http://www.ufrgs.br">www.ufrgs.br</a>)</td>
<td>Computer Science</td>
<td>5.2</td>
<td>506</td>
</tr>
<tr>
<td>5</td>
<td>UFMG - Universidade Federal de Minas Gerais (<a href="http://www.ufmg.br">www.ufmg.br</a>)</td>
<td>Computer Science</td>
<td>8.2</td>
<td>476</td>
</tr>
<tr>
<td>6</td>
<td>ICMC/USP/São Carlos - Inst. de Ciências Matemáticas e da Computação</td>
<td>Computer Science and Mathematics</td>
<td>4.81</td>
<td>470</td>
</tr>
<tr>
<td>7</td>
<td>INPE - Instituto Nacional de Pesquisas Espaciais</td>
<td>Applied Computer Science</td>
<td>0</td>
<td>465</td>
</tr>
</tbody>
</table>
When taking a look on the websites of these universities we find more information. Top five programmes and universities are described below due to page limits of this paper.

3.2 Top 5 master programmes described

Coppe UFRJ (www.coppe.ufrj.br)
The university has good web-pages in English. The Systems Engineering and Computer Science Program was created in 1970, and has since its creation aimed at the advancement of knowledge in the areas of computer science and optimization. The program has offered degrees at the master's and doctoral levels, having already graduated 849 M.Sc. students and 227 D.Sc. students. A considerable portion of the research carried out by the Program is part of several cooperative efforts undertaken with other governmental and private institutions, both in Brazil and in other countries. The faculty engage in consulting activities in the context of advanced projects from the industry.

The last nation-wide evaluation of computer science graduate programs in Brazil, carried out by the nation’s Ministry of Education, ranked the Program being topmost among all programs (grade 6). The program has also participated actively in the Center of Excellence program of Brazil’s Ministry of Technology.

Teaching and research activities take place in the following areas: algorithms and combinatorics; artificial intelligence; computer architecture and operating systems; computer graphics; computer networks; data bases; optimization; social aspects of computing; and software engineering.

PUC-Rio (www-puc-rio.br)
First it was difficult to find information in English, but after some attempts you can find that Department of Informatics offers both Master in Computer Science and Mathematical Computing and Doctor of Science in Theory of Computing and Programming. The objectives are to educate experts in computer science and automatic problem solving. Teaching and research are in the fields of database, computer graphics, software engineering, hypertext and multimedia, human-computer interaction, programming languages, automatic reasoning and optimization, networks and distributed systems and theory of computing.
UNICAMP (www.unicamp.br)

University of Campinas (UNICAMP) pages were easy to find in English. Unicamp was founded on 1966 due to a need of growing demand for qualified personnel in a region of the country, the State of São Paulo. Faculty of Electrical Engineering and Computer Engineering (FEEC) offer undergraduate and graduate degrees in Electrical Engineering and in Computer Engineering. The Graduate Program (Master and Doctor level) in Electric Engineering of FEEC started 1972. This CE offering is jointly managed with Unicamp’s Institute of Computation. The student who joins to the course of Engineering of Computation should select for one of its two choices: Computer System, offered by Computer Institute of UNICAMP or Industrial Systems and Processes (by FEEC).

The graduate courses of Master and Doctor in Electrical Engineering of FEEC received degree 7 (the highest possible) in the evaluation of CAPES-MEC (Brazilian Ministry of Education) regarding the three-year period (2004/2007). The graduate activities in FEEC are divided in the areas of Automation, Electrical energy, Computer Engineering, Biomedical Engineering, Telecommunication and Telematics, Electronics, Opto-electronics, Micro-electronics. Up to December 2008 statistics show that 1751 Master and 715 Doctor level students have presented their thesis works.

UFRGS (www.ufrgs.br)

The Federal University of the Rio Grande do Sul (UFRGS) is the largest public university in Southern Brazil. The latest research evaluation carried out by the Brazilian Research Council (CNPq) points UFRGS as one of the top five research universities in Brazil, alongside the University of Sao Paulo (USP), the Federal Universities of Rio de Janeiro (UFRJ), Minas Gerais (UFMG), and the State University of Campinas (UNICAMP).

UFRGS web pages in English were under construction (except PDF file about post-graduate courses/programmes). However, you can find information from the Institute of Informatics website (www.inf.ufrgs.br) which states that Institute of Informatics has consistently been recognized as one of the main centers for Computer Science research, education and technology transfer in Brazil. The Institute was highly influential in laying the foundations for the computer and software industry in the state of the Rio Grande do Sul in the 1970's and in transforming the City of Porto Alegre and its vicinities into one of the top three technology clusters in the country.

The graduate program in Computer Science, founded in 1973, currently has 200 masters and 100 doctoral students. Teaching is given in areas of computer engineering, computer systems, information systems, artificial intelligence and theory of computing. As part of the SOFTEX Program of the Brazilian Ministry of Science and Technology, designed to stimulate and support the production of software for export, the Institute hosts the Center for Entrepreneurship in Computer Science (CEI/II-UFRGS)(http://www.inf.ufrgs.br/cei/), the role of which is to house new technology-based companies and provide innovative
solutions to established companies. This kind of activities are very important for growing IT enabled services export, too.

**UFMG** ([www.ufmg.br](http://www.ufmg.br))

The Federal University of Minas Gerais web pages were easy to find, also in English. Computing studies at the UFMG began at the end of the 60s at the Center for Computing – CECOM. The Department of Computer Science was created on 1976. The total of master theses is now 661 and doctoral theses 91 (3rd of April 2009).

Teaching in Masters programme is in the areas of common core such as fundamentals, algorithms and computer architecture, databases and software engineering, computer graphics and digital image processing, artificial intelligence and robotics, programming languages and compilers, computer engineering, optimization and scientific computing and computer systems and computer networks. One of the specialities of the Masters Programme is the partnership with the Federal University of Amazonas and Federal University of Viçosa and the creation of institutions with the Masters Programme. The Ph.D. in Computer Science started on 1991 and received the B concept evaluation by CAPES in 1996. Currently, the program is assessing the concept 6 CAPES. There are also special courses on systems analysis, software engineering and telecommunications networks.

### 4. Discussion

My first investigation into the Brazilian ICT-related master programmes gives an impression that many engineering and technology–oriented courses are there and collaboration with many of the ICT companies have started. These programs are more in computer science and engineering. This will certainly give basis, for example, running information technology outsourcing (ITO) services such as related to servers, shared services platforms and network maintenance. Maybe some simple BPO activities can also be activated based on this qualities. But the real challenge related to, for example, US markets, is providing more knowledge-based outsourcing such as design, parallel engineering and other knowledge-intensive service processes to foreign clients.

Some of these universities listed here give also more software engineering and information systems related courses. These courses require context and substance knowledge, such as enterprise systems management, supply chain management, e-business, customer relationship management, multimedia management, strategy and business processes and many other courses in the area on industrial management and information systems. However, this seems to be a challenge in the future. More integrated and service-oriented programmes are needed to foster more knowledge-based outsourcing business.
One of the areas is incubation, promoting entrepreneurship and small business start-ups and venture knowledge. The great business ideas are normally created in small companies and they need capital to foster. The risk of increasing Brazilian offshoring business might be negligence of small companies in favour of bigger ones. Bigger ones, domestic and international such as Indian ICT service giants, have the advantage to buy out smaller players and maybe also affect future development.

In my view it is utmost important to support engineering, industrial management and economic sciences integration in the future curriculum development. Another thing is to foster innovative entrepreneurship. Some universities in this selection have provided some means for creating innovations, such as awards, or built dedicated centers for improving small business activities in the field of ICT business.

References


