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ADOPTION OF CLOUD COMPUTING IN OUTSOURCING: A NEW MODEL

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ABSTRACT

The authors have discussed the evolution of computer manufacturing industry from the traditional model to the current lean and just-in-time manufacturing model. Information technology is outsourced to reduce cost. The outsourcing model evolution is influenced by technology changes.
The paper gives an overview of cloud computing, the current outsourcing model and relates the transformation of computer manufacturing to transformation of the emerging outsourcing model due to cloud computing. The proposed outsourcing model based on cloud computing is discussed.

KEYWORDS

Cloud, Outsourcing, SOA, SaaS, Agile.

1. INTRODUCTION

In the global economy, companies have to be competitive in providing products/services offered at affordable cost to the customers. Digitization has played an important role to compare and choose the best product/services offered by different companies at competitive price. As our focus is on Information Technology (IT) outsourcing, we are concentrating on products/services offered by IT companies. We relate Computer Manufacturing (CM) industry transformation to IT outsourcing industry transformation. In the early stages of CM, companies embraced off-shoring in order to be competitive. Off- shoring is the concept of companies setting up their own manufacturing units in countries that have cheaper labour and less cost of setting up the manufacturing unit. Rapid changes in the hardware and software technologies, open standards in computer components and standard interfaces between the components have changed the landscape of CM. Large amount of computer components are procured from third party vendors that meet the standards set by the CM Companies.

The current era of CM is based on the principles of lean manufacturing and just-in-time production. Due to the advancement in procurement, logistics and supply chain management software and collaboration with third party manufacturing vendors, it is conducive to adopt lean manufacturing (Kraemer et al., 1999). Lean manufacturing process is a way to reduce waste, such as time and resources. In other words, it is lowering waste and enhancing productivity.

We can foresee similar transition to happen in outsourcing as it happened in CM companies. Adoption of cloud computing is becoming a reality, perhaps a necessity. In the early phase of outsourcing, software development and maintenance had been off-shored to companies that were set up in developing countries, where the cost of skilled labour and setting of infrastructure for development was cheaper. In the next phase, developed countries set up their own software development and information technology offices in countries that had cheaper skilled labour and cost of setting up the infrastructure was economical. Capability Maturity Model Integration (CMMI) is a process improvement approach that provides organizations with the essential elements of effective processes, which will improve their performance(SEI). ISO 9000 addresses "Quality management" of customer's quality requirements and Applicable regulatory requirements(International Standards for Business). It is reliable to trust companies certified with CMMI / ISO 9000 for quality of work

Software based on object orientation is more componentized. This has given rise to mix and match components procured from different software vendors to produce software products. Due to service oriented

architecture (SOA) maturity, integration between products of different vendors are seamless. In SOA the business functions are exposed as services. SOA is neutral of technology. Inherently software is intangible; adapting SCRUM agile software development methodology gives more control on the software components productivity, accountability, monitoring and progress.

In this paper we discuss the current outsourcing model relating to information technology. Further the evolution of outsourcing model due to hardware and software technology is discussed. The paper briefly describes the concept of cloud computing and proposes an outsourcing model that may emerge due to adoption of cloud computing. Further, comparison of traditional outsourcing vendors to next generation vendor based on cloud computing and the initial outsourcing issues due to cloud computing are discussed.

2. OUTSOURCING

Information systems development, customization, support, enhancement and maintenance are collectively called as services. In the past, most of the services are carried out in-house. Due to evolving software & hardware technologies, it is expensive for companies to keep pace and carry out in-house services.

Information technology (IT) outsourcing is a concept of transferring the responsibility of information services to an external vendor. Services outsourced are software development, systems integration, software / hardware maintenance, support, data processing and management (Kauffman et al., 2010). IT services to grow from US$674.1 in 2006 to US$964.4 billion in 2011(Gartner, 2007).

2.1 Advantages of Outsourcing include(Gartner, 2007)

Transformation of IT services; Cost cutting and improving performance; Greater efficiency and Operational Control; Risk mitigation; Reduced Operational and Recruitment costs; Enhanced business efficiency; Increase focus on core competencies etc.

2.2 Outsourcing Model

The IT applications used by a company can be Commercial Off-The Shelf (COTS) package, a custom developed in house application or combination of both. The knowledge of a company to maintain its IT applications might be extensive or bare minimum. The IT application can be very critical to the company for its existence or IT application might not have an impact on the company. So these factors influence the selection of out sourcing services (Schwarz, 2009).

The first model of transformation is of two stages. In the first stage the external vendor taking partial or full responsibility of the existing systems. The second stage is to enhance or implement the existing system to the latest state-of-the art technology (John K. Halvey, August 2005). Popular offshore Outsourcing model are staff augmentation and managed service model. In staff augmentation the vendor provides the skilled staff only and hence there is no accountability for the quality of service. In managed level service model, vendor provides the services based on the service level agreement set by the company. There is more responsibility, involvement, control and ownership of the application by the vendor (Michael Bloch, 2009).

2.3 Keys Factors considered in the Selection of Outsourcing Company

Financial viability of the offshore company; Legal issues relating to jurisdiction; Business continuity plan of the company; Reliability of the vendor; Infrastructure, network, physical security and software; Employee's skills sets; Vendor experience and resources ; Vendor reputation; Vendor history; Experience in technology; Security issues; Experience in the domain (John K. Halvey, August 2005).

3. CLOUD COMPUTING

The Cloud is the next phase of business computing. It is the technical innovation given rise to new computational paradigm. The concept behind cloud computing is that users' computers may contain almost no data or software. There are many definitions of the Cloud. It is described as software as service, where a software application can be accessed online, as in SalesForce.com, Google Apps, NetSuite, Ariba or ZOHO. It also takes the form of platform as a service, where certain tools are made available to build the software to run in the host cloud as Salesforce, Azure, or Intalio. In Infrastructure as a service, server is built and hosted in the cloud, with the operating system and hard configuration as required, as in AMAZON AWS.

Cloud computing, is an evolution from ASP model. ASPs host applications for companies having a few software applications. It is also expensive for the companies to hire professionals to manage their own application and infrastructure. Due to globalization of business and company mergers, information technology industry realized the need for standardization. But as the legacy applications were not able to be replaced due to its business value web services evolved. Disparate applications irrespective of technology based on open source or proprietary software were able to be integrated using web services. SOA is a standard for integrating disparate applications. The cost of integration and time to integrate has been drastically reduced due to the adoption of SOA.

Software as a Service (SaaS) is a new business model where companies can rent software, instead of buying it. Due to SaaS the initial cost of procuring software is zero, companies can change the software based on the functionality required and opt for the software as needed. There is no vendor lock in for companies. Also companies can mix and match from different SaaS providers based on the need(Schwarz, 2009).

Virtualization enabled disparate operating systems to run on one server. Virtualization also gives the flexibility to dynamically increase the processing power, RAM and storage capacity to run the applications.

Internet/Network bandwidth has increased over the period and the cost of band width has reduced. The web security standards such as SAS70 (Statement on Auditing Standards) have enabled secure applications. In cloud computing the hardware infrastructure can be used as a service as well as dynamically configured to meet the demand, companies are not locked in for software or hardware.

3.1 Advantages of Cloud Computing

Cloud computing, due to its low or almost zero capital expenditure (CAPEX) and low operating expenses (OPEX) has triggered new enterprise applications affordable with low budget. There is no need to have dedicated staff to support the infrastructure. Cloud computing due to its open standards provides interoperability with other software applications across the world.

3.2 Factors driving New Model of outsourcing due to Cloud Computing

The traditional methodology used for software development life cycle is waterfall. In this methodology only after freezing the requirements design, development of the software is carried out. As the users are becoming more demanding and due to rapid changes in technology this model is not suitable. In agile, software is developed, expecting changes to happen in software development life cycle. In this methodology software is developed in iterative and incremental delivery and customers input is valid till the end of the project. Further, adopting this methodology gives more control on the project.

Object orientation due to its modularity gives the option for mix and match the best components to produce high quality software. Open source industry has given an exposure to the high end applications as portal application, business intelligent application, enterprise resource planning etc. Prior to open source, high end applications due to proprietary based was inaccessible to professionals.

There will be a rise in younger generation exposed to computer system and programming languages. Also due to open source software products, software professionals are exposed to latest software products to get themselves familiarized. All the above factors will give rise to young talent pool of software developers irrespective of developed or developing country.

In software industry, a software professional are hired based on their knowledge of technical skills. The technical skills of the professional can be assessed by the relevant technical or industry certification. Example Certified Oracle Certified Associate, Oracle Database 11g Administrator Certified Master, Java SE 5/SE 6,

TOGAF 9 Certified. PMI's Project Management Professional (PMP) etc. The certification offered by software vendors such as Oracle, IBM, PMI are based on international standards with same exam requirements, irrespective of the country. The experience of the software professional can be verified through social media website such as LinkedIn, Facebook, Google +. The technical skills and experience can be assessed remotely and within few hours or days giving access to pool of professionals whose credentials are verified at short time duration. This breaks the barrier of location of software professionals.

3.3 Proposed Outsourcing Model due to adoption of Cloud Computing

Traditionally IT outsourcing companies bid for outsourcing services/projects, must prove the capability in terms of infrastructure and skilled head count. With cloud computing, the cost of infrastructure is almost zero. Companies need only skilled head count to bid for off-shore projects. Due to low investment on infrastructure and availability of talented software developers across boundaries, there will be new emerging companies bidding for outsourcing projects. This will again reduce the cost in providing services to clients. This model will reduce the cost and increase the effectiveness of services provided by outsourcing companies. Some outsourcing companies such as TCS, Satyam and Infosys have already setup their offices in countries other than India to utilize the talent pool available in other countries.

In the traditional model, after winning outsourcing contract, there is latency in customizing the software development environment to customer's environment. Though virtualization has reduced the time, still there is latency in transferring and customizing the environment. In cloud, since all the software is accessed through the Internet, the latency time in setting up the environment is negligible. Setting up the application environment is reduced to a few hours. The software development work can be done by developers working from any part of the world.

Companies bidding for contract in traditional outsourcing model need to invest upfront on the hardware and software after winning the contract. If by any reason the contract is cancelled, based on the contract either outsourced or outsourcing company will have to bear the cost. But in cloud based outsourcing model the upfront of cost for software and hardware is negligible and also the exit fee is minimized as the software and hardware is based on utilization.

The proposed outsourcing model, the company providing outsourcing service can be located in any part of the world. The selection criteria for the company is to have CMMI / ISO 9000 certified to prove its adoption of standard process and credibility, the reporting facilities that are provided to customers, Service level agreement offered, past projects and the laws and regulation of the country the out sourced company is set up/located. The outsourced company after winning the project will hire team to the project. As the infrastructure is hosted in cloud, the team members for the project can be located any part of the world.

In the proposed outsourcing model, staff can be located in any part of the world having relevant technical skills. The technical skills and experience of the software professional can be assessed almost accurately. Agile development methodology enables to check the progress of the project on day to day basis. The team needs a computer and broadband connection only; whereas the traditional outsource model requires the infrastructure for hardware, cost of software procurement and office facility provided for the team. After the team members are selected laptops can be dispatched to them and project can be started within a few days. The proposed outsource company over head is reduced as the team members for the project are hired for specific project. There is no cost of office facility and overhead cost of staff salary.

The cost of setting future outsourcing companies is drastically reduced and also the cost of the software products too. This is turn reduces the cost of information systems and companies adopting this model can pass on the saving to their customers.

4. OUTSOURCING ISSUES

Firstly standardization is to be formulated in the industry for cloud space outsourcing. Currently companies are offering public clouds. A few companies offering cloud spaces are new entrants to the market. So an organization moving into cloud outsourcing model space must not depend on services provided by one vendor (Guoli, 2010). Companies must mitigate the risk by hosting applications with a few cloud providers to avoid the risk of closure of cloud service providers. Service level agreements (SLA) are not well defined in

cloud business model. As the cloud models are based on dynamic configuration, the current SLA is still applicable only for static deployment model. Quality of Service (QoS) is dependent on the SLA.

4.1 Comparison of Traditional Outsourcing Verses Cloud Computing Outsourcing

Properties that are required for outsourcing	Current Outsourcing model	Emerging Outsource model based on cloud
Infrastructure set up	Own facility or hire from ASP	Renting based on need
Cost of infrastructure set up	Upfront cost	No upfront cost
Vendor lock in	Proprietary configuration	Based on open standards
Software license cost	Upfront investment	Subscribe and pay per use
Time to set up infrastructure	Few days / weeks	Few hours
Application / data backup	In house staff is responsible	Provided by the cloud vendor
To set application platform	Few hours to few days	Set up instantaneous
Broadband access	Not mandatory	Mandatory
Office facility	Provided for the team	Not provided

5. CONCLUSION

Cloud computing provides infrastructure/platform services to support business information requirements on pay per use model. Software as a Service provides the agility for business to choose the software on need basis without vendor lock in. We have addressed the advantages of cloud computing and the driving factors that initiates a new outsourcing model. Initially there might be a few market players using this opportunity, as cloud computing matures, there will be more outsourcing companies entering the new model. This in turn gives competition in outsourcing vendors, thereby reducing the cost of IT services. Currently there is no standardization in cloud computing service level agreement. Still the security is not well defined. But all this will be sorted out as the technology matures.

In traditional offshore companies the salary of the software professionals is an overhead as staff needs to be retained and paid salary. In the proposed model the cost of software professionals is reduced, as staffs are paid on project basis. Also the team performances are assessed regularly based on the work performance/ software delivery. The overhead cost of infrastructure for hardware, software and office facility is almost fraction of the cost compared to traditional outsource model. This in turn reduces the cost of software services.

Software professionals need to update their skills and productive to be employable. This reduces the cost of the Software professionals and gives rise to highly skilled professionals paid based on their ability.

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