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From outsourcing to Cloud computing: evolution of IT services

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Abstract

Purpose – Many organizations are outsourcing their information technology (IT) related services to a third party vendor for quite some time. However, the IT services industry including outsourcing is going through rapid changes with the increasing adoption of Cloud computing. The purpose of this paper is to compare global IT outsourcing with Cloud computing along with the evolution of traditional IT services.

Design/methodology/approach – Cloud computing is a model for provisioning and consuming IT capabilities on a need and pay by use basis. This helps in shifting the cost structure from capital expenditure to operating expenditure and also helps the IT systems to be more agile. This innovative model of acquiring IT related services has made organizations revisit their infrastructure and platform services strategy and optimize their IT spending while improving overall agility. This paper compares global IT outsourcing with Cloud computing along with the evolution of traditional IT services.

Findings – The impact of Cloud computing on IT outsourcing is no doubt significant. Cloud computing represents a fundamental shift in how organizations pay for and access IT services. It has created new opportunities for IT services providers and the outsourcing vendors will have to modify their strategy to take advantage of this new computing paradigm.

Practical implications – This research is relevant for practitioners as well as researchers in the field of IT outsourcing and Cloud computing.

Originality/value – This research compares global outsourcing with Cloud computing along with the evolution of IT services. Very little research has been done in this nascent and important area.

Keywords Global outsourcing, Cloud computing, SaaS, PaaS, IaaS, Information technology, Outsourcing

Paper type Viewpoint

1. Introduction

Global information technology (IT) outsourcing has been going through significant changes as many organizations are increasingly using Cloud services (Armbrust *et al.*, 2010; Badger *et al.*, 2011; Weinhardt *et al.*, 2009; Zhang *et al.*, 2010). According to Dhar and Balakrishnan (2006):

IT outsourcing is an act of delegating or transferring some or all of the information technology related decision making rights, business processes, internal activities, and services to external providers, who develop, manage, and administer these activities in accordance with agreed upon deliverables, performance standards and outputs, as set forth in the contractual agreement.

Global offshore outsourcing involves contracting with a low-cost offshore service provider that assumes responsibility for all or part of the information systems development lifecycle. In addition to lower cost, other benefits of offshore development and outsourcing include access to specialized technical skills and services, and the ability to respond to IT labor shortages according to variations in global supply and demand.



Cloud computing is the latest trend to outsource some or complete IT operations to run a business from the public Cloud that provides a flexible and highly scalable technology platform for an organization's business operations (Armbrust *et al.*, 2010; Badger *et al.*, 2011; Catteddu and Hogben, 2009). It lowers IT costs and provides organizations with the people and expertise to create a "pre-integrated suite" of software applications. Various analysts' reports predict billions of dollars in revenue from Cloud computing (Gartner Press Release, 2010; Reuters, 2011). Market research firm Gartner believes that worldwide Cloud services revenue is projected to reach \$148.8 billion in 2014 (Gartner Press Release, 2010). IT research firm Forrester predicts that the global Cloud computing market will be \$241 billion in 2020 (Reuters, 2011).

Cloud computing poses serious challenges to traditional business process outsourcing and have a profound impact on how IT outsourcing is done (Weinhardt *et al.*, 2009; Zhang *et al.*, 2010; Zhou *et al.*, 2010). This paper is organized as follows. In Sections 2 and 3, the benefits and best practices of outsourcing are discussed, respectively. We present an overview of Cloud computing and compare it with outsourcing in Section 4. Section 5 deals with the evolution of IT services. Conclusions are discussed in Section 6.

2. Benefits of outsourcing

For many organizations, software development is not the core competence. A healthcare or an insurance company would like to focus on providing competitive services, rather than spend valuable resources on developing software in-house. Outsourcing allows these companies to keep their business focus and brings about efficiency and productivity by outsourcing software development and IT related services to a third party. General services like payroll processing, e-mail, web services and hosting, call centers, and storage area network are being increasingly outsourced (Alvares *et al.*, 1995; Ang and Straub, 1998; Bahli and Rivard, 2003; Beamish *et al.*, 1995; Clark *et al.*, 1995; Cross, 1995; Lacity and Willcocks, 1995; Lee *et al.*, 2003).

Outsourcing helps the management to off load the burden of legacy systems, and allows them to focus on developing new strategic applications to take advantage of increasing globalization, to rapidly deploy products and services globally, to gain competitive advantage, to generate higher profits, and to achieve increased customer satisfaction (Clark *et al.*, 1995; Dhar and Balakrishnan, 2006; Diromualdo and Gurbaxani, 1998; Feeny *et al.*, 1995; Goo and Nam, 2007; Hall and Liedtka, 2007; Hirschheim and Lacity, 1993; Kinnula *et al.*, 2007).

As many IT outsourcing vendors came out aggressively in the market, they could offer very low-cost value-added services. Many IT service providers are coming out with attractive proposals, technologies, and innovative business models to influence the top management to think about outsourcing as a sensible low-cost alternative.

In general, organizations typically outsource when they expect to receive one or more of the benefits as described in Table I (Ang and Straub, 1998; Cross, 1995; Goo and Nam, 2007; Hirschheim and Lacity, 1993; Kinnula *et al.*, 2007; King and Malhotra, 2000; Nam *et al.*, 1996).

3. Best practices for outsourcing

Some of the common practices are summarized as follows (Beamish *et al.*, 1995; Dhar and Balakrishnan, 2006; Feeny *et al.*, 1995; Joint *et al.*, 2009; Lacity and Willcocks, 1995; Weinhardt *et al.*, 2009):

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Lower costs

The outsourcing vendor can reduce the overall direct and overhead costs of developing or managing the IT solutions, as compared to the parent company. This can be achieved thru, effecting economy of scales, better management of excess capacity with the vendor, pooling together of knowledge and experience in diverse industries, higher IT application skills. Outsourcing reduces the costs. The funds then could be effectively utilized to develop infrastructure for future growths

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Faster development cycle

The enterprise can get the advantage of developing and marketing the product or service earlier to the market, ahead of its competitors

Performance assurance and quality

The vendor can guarantee higher performance assurance and quality. This could be achieved by adopting higher standards, better integration practices, taking advantage of the latest technology, and better response time

Professional, and geographically dispersed service
Creative and structured leases

The vendor can offer professional service, in many cases round the clock, over the diverse geographical areas, which may be outside the state boundaries

The vendor can offer creative and structured leases, which may allow the company to partly or fully initiate, finance, and staff its strategic new initiatives, at relatively low risk. The company thus can transfer the risk of failure largely to the vendor, especially in the areas where the company does not have core competence. These contracts could be flexible enough to accommodate the variations in supply-demand, cash flows, and business cycles

Table I.
Benefits of outsourcing

- 24 by 7 project management including monitoring by teams that are distributed globally.
- Complete project management control with the organization, where the vendor supplies project expert technical knowledge, manpower, and other intellectual resources.
- The outsourcing vendor participates in formulating design specifications.
- Access to value-added products from the vendor (a good example will be the American Express outsourcing deals with IBM wherein IBM shared the web-based expense tracking application with American Express (Greenmeier, 2002)).
- Both parties must understand the compliance requirements that the partnership may be subject to.
- Robust and thorough business and QA processes are developed and maintained for the project by both the company that is outsourcing as well as the vendor.
- A procedure for knowledge transfer process must be in place as this is extremely important. Also proper security measures should be implemented to minimize the risk during the transfer process.
- Appropriate analysis of information security plan must be done in order to safeguard the data. Compliance issues, disaster recovery, physical security, etc. should be clearly articulated.
- Develop strategic partnerships with the outsourcing vendor.

4. Overview of Cloud computing

Cloud computing allows users to choose from a pool of hardware, software, and networking infrastructure managed independently within an organization or externally by a vendor (Armbrust *et al.*, 2010; Joint *et al.*, 2009). These computing capabilities are available on a pay-per-use basis either as infrastructure, platform or services and are used to deliver business applications typically via World Wide Web (Joint *et al.*, 2009).

There are broadly three layers of Cloud computing, shown by Figure 1 (Weinhardt *et al.*, 2009; Buyyaa *et al.*, 2009):

- (1) Software as a Service (SaaS) – it is the highest level of abstraction on the Cloud and the applications are delivered over the World Wide Web as a service. This layer of Cloud service offers a wide range of applications from productivity (e.g. office-type) applications to enterprise applications such as e-mail hosting, supply chain management or enterprise resource planning.
- (2) Platform as a Service (PaaS) – it is the next level of abstraction, which not only do the technical abstraction but essential application infrastructure services such as computation, messaging, connectivity, access control, etc. In the traditional in-house computing model, a group of network, database, and system management experts are needed to keep everything up and running. With Cloud computing, these services are now provided remotely by Cloud providers under this layer.
- (3) Infrastructure as a Service (IaaS) – this is the lowest layer in Cloud computing. IaaS providers abstract IT infrastructure resources such as storage and memory as services. A Cloud service provider manages the physical infrastructure; provisions virtualized infrastructure of operating systems to the end-user. The consumer here is given complete ownership of the virtual image which one can configure according to the requirements. Products offered through this layer include the remote delivery and support (via World Wide Web) of a full computer infrastructure (e.g. virtual servers, storage devices, etc.).

4.1 Economics of Cloud computing

- *Multi-tenancy drives value.* Multi-tenancy means that a single instance of a particular software runs on a server and it can serve multiple clients (tenants) simultaneously. By implementing a multi-tenant architecture, each software application is configured to virtually partition its data and each client works with a customized pre-configured virtual application instance. This kind of architecture

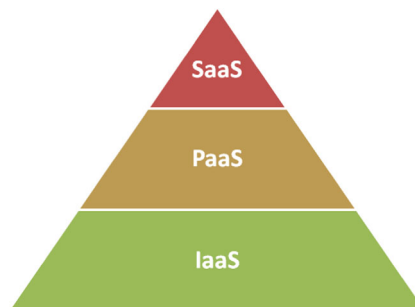


Figure 1.
Three layers
of Cloud computing

has several advantages – for example, a single instance to maintain including troubleshooting, fixing, and upgrading. By doing this, the Cloud service provider is able to manage its resources efficiently. Please note that designing the multi-tenant architecture may be more expensive to begin with but the long-term benefits outweigh the up-front costs that may be higher initially (Weinhardt *et al.*, 2009).

- *Faster time-to-market with on demand, elastic IT services.* Cloud computing lowers IT expenditure in two fundamental ways – it leverages a “virtual suite” of pre-integrated Cloud-based applications and infrastructure and simplifies the complexity of traditional IT services. Cloud computing also reduces infrastructure management and monitoring costs and optimizes resource utilization by provision on demand (Buyyaa *et al.*, 2009).
- *Reduced total cost of ownership through shared infrastructure.* Cloud computing depends on service providers also known as Cloud providers for various low level management and service levels of their multi-tenant applications, platforms, and infrastructures. This also leads to minimal capital expenditure (Capex) through pay-as-you-use-model. It implies that the reduction of the TCO by optimally using the hardware and software licenses (Armbrust *et al.*, 2010; Weinhardt *et al.*, 2009; Buyyaa *et al.*, 2009).

Cloud computing is ideally suitable for the following business scenarios

- Greenfield projects have limited budgets: most of the organizations often roll out new services and offerings to their customers with innovative solutions for higher customer satisfaction and gain market share. With limited IT budgets, it is always difficult to make investments on such initiatives. By choosing Cloud services for these new initiatives, the up-front investment to get started becomes minimal, and there are no penalties due to infrastructure failures. In addition, Cloud services allow to quickly deploying infrastructure and services on demand. Hence innovative pilot projects can easily take advantage of the Cloud services and deploy them with minimal risk (Armbrust *et al.*, 2010; Buyyaa *et al.*, 2009).
- IT operations and systems management along with maintenance expenses are high as well as complex: when IT operations and systems management is complex and costs are high, Cloud computing offers low cost easy to manage operational solutions and minimize capital expenditure. Some Cloud service providers offer automatic failover systems and monitoring services that reduce overall management and operational costs (Armbrust *et al.*, 2010; Catteddu and Hogben, 2009; Weinhardt *et al.*, 2009).
- Business processes have unpredictable demand for IT services: in many occasions, systems are engineered to handle large-scale operations while in reality the demand of such computing needs seldom reaches its peak. The fluctuations in computing demand varies over time and hence many systems are underutilized and computing recourses are wasted. This leads to inefficient use of infrastructure (both hardware and software) and poor capacity planning. Cloud computing addresses these issues with on demand elastic services which can be easily scalable as computing need grow (Catteddu and Hogben, 2009; Weinhardt *et al.*, 2009; Buyyaa *et al.*, 2009).

- Non-core IT operations are commoditized: many IT services that can be commoditized such as e-mail, archiving, storage, etc. are ideal candidates for Cloud services. By outsourcing these services to a Cloud service provider will often lead to a reduced IT infrastructure expenditure and operational overheads to maintain and manage such services (Armbrust *et al.*, 2010; Weinhardt *et al.*, 2009; Buyyaa *et al.*, 2009).

4.2 Early adopters of Cloud computing

Many organizations including start-ups have quickly adopted Cloud computing. For example, Animoto, a start-up that creates videos for consumers and corporations, uses Amazon EC2 and S3 to manage sudden spikes in usage (Peterson, 2008). Amazon provided Cloud services EC2 to *New York Times* (2008) to convert full page images of its newspapers from 1851 to 1922 into PDF as a part of its archiving solutions. NASDAQ Market Replay provides a NASDAQ-validated replay and analysis of the activity in the stock market. The application uses the Amazon Simple Storage Service (S3) for persisting historical market data (Amazon Press Release, 2008). BNP Paribas is using an on-demand computing service from IBM to run its risk application (Mohamed, 2006).

5. Evolution of it services

In order to understand the relation between Cloud computing and outsourcing, one has to take into consideration the similarities, differences between outsourcing and Cloud computing along with the current challenges of Cloud computing. Table II describes the similarities whereas Table III discusses the differences between Cloud computing and outsourcing. The customers want efficient, economical, and flexible delivery of IT services from their outsourcing partners along with flexible payment options (i.e. pay-per-use models). In addition, increasing number of customers expect innovations or the identification of a customer-specific innovative solution from their outsourcing service providers (Catteddu and Hogben, 2009). Cloud computing tries

IT outsourcing	Cloud computing
Reduce cost using third party vendors	Reduce cost using Cloud-based services
Minimize risk	Minimize risk
Global scale	Global scale
Quick time to market	Quick time to market
Applications delivered by a third party	Applications delivered by Cloud-based services
Control and application management done by third party	Control and application management done by Cloud service provider
Security is a concern as data is handled by third party	Security is a concern as data is stored in the Cloud
Various non-core business services deployment and integration can be done through outsourcing	Cloud services deployment and integration can be done through outsourcing
Dedicated data centers available for data protection and privacy	Private Cloud aims to protect data and privacy
Backup systems, disaster recovery, and high availability are supported	Backup systems, disaster recovery, and high availability are supported
24-hour support and availability	24-hour support and availability

Table II.
Some similarities between IT outsourcing and Cloud computing

IT outsourcing	Cloud computing
Outsourcing means transferring some or all of the IT related decision making rights, business processes, internal activities, and services to external providers	The framework allows organizations to manage the building blocks of IT, provided by other people in the same way they would their in-house infrastructure, but without the challenges that such complex architecture would normally produce. Most of the benefits of the outsourcing are achieved, without the majority of drawbacks. Control is retained, and the risk profile and commitment for the organization are minimal
Initial up-front cost required in most cases	No up-front costs: the CapEx and installation are absorbed into the rental charges
Services are not necessarily on demand	On demand: near-instant scaling /adding of resources
More capacity planning required for future demand	Flexibility with regards to increasing/decreasing resources
Lots of hidden costs	Cost is more transparent
High level of customization possible	Less customization
More project management, onshore offshore coordination and governance required	Less project management, onshore offshore coordination and governance required
Outsourcing vendors can offer value-added services along with strategic and management consulting	Strategic and management consulting are beyond the scope of Cloud computing
Usually specifies where data resides, how it is protected, who has access, which measures are in place to accommodate political or natural disasters	Lack of provisions for compliance, business continuity, security, and privacy of data
Any custom application development occurs on the top of pre-selected Cloud platforms	Uses a pre-determined set of Cloud applications and infrastructure to meet IT demands
Longer contracts	Shorter contracts

Table III.
Some differences between IT outsourcing and Cloud computing

to address many of these challenges posed by the customers. It attempts to provide the technical basis to meet customer's variable demands. Moreover, Cloud computing aims to meet these business demands were first addressed by providers that have not been part of the traditional outsourcing market so far. New infrastructure providers, such as Amazon, Microsoft, Google, created new services with innovative business models to market their former by-products (e.g. large storage and computing capacity) as Cloud services. With this new strategy, they entered the traditional outsourcing value chain and became competitors with established outsourcing vendors. These new Cloud service providers offer innovative ways of IT provisioning through pay-per-use payment models and fulfill customers' needs for efficiency, cost reduction, and flexibility. Previously in traditional outsourcing models, the physical resources (hardware and software) have been deployed either by the customer or the service provider.

With Cloud computing, there is a paradigm shift to an asset-free provision of technological resources. Hence, there is a need for IT service providers including outsourcing vendors to demonstrate greater value and differentiation of services along with the rapid deployment of Cloud services.

Although many organizations have embraced Cloud services, there are significant challenges.

Table IV summarizes various challenges of Cloud computing. Recent survey shows that many early adopters are not fully satisfied with the Cloud services as security still remain a major concern (Reuters, 2011).

The emergence of Cloud computing and virtualization and pay-per-use models have added to the complexity of outsourcing relationships. Cloud computing has created opportunities for IT outsourcing vendors as a great deal of services associated with Cloud computing such as Cloud services implementation, integration, management, and support are necessary for successful deployment. The outsourcing vendors are embracing Cloud computing to their advantage and positioning them to meet the challenges with new tools and technologies along with a robust delivery network. The evolution of IT services can be summarized as follows:

- *Growing acceptance of global delivery.* Regional boundaries are diminishing and global delivery model is becoming a standard practice. The success attributes to efficient communication, lower costs along with value-added services (Catteddu and Hogben, 2009; Lee *et al.*, 2003; Weinhardt *et al.*, 2009; Buyyaa *et al.*, 2009).
- *Increasing client sophistication.* Organizations today are more mature and educated buyers of IT services. Because of their previous experience of working with outsourcing vendors, they are quite efficient in vendor management. They clearly understand the complexities and challenges of outsourcing and are quite clear about their requirements and expectations. This has resulted in timely outcome of the projects and value-based pricing along with formation of long-term strategic relationships (Hall and Liedtka, 2007; Joint *et al.*, 2009; Nam *et al.*, 1996; Buyyaa *et al.*, 2009).

Challenges	Description	Specific issues
Security and privacy	There is a lot of concern about the security and privacy of the data. Many CIOs are not comfortable about their data located in a data center in a foreign country	Different countries have different laws related to the protection and privacy of data
Maturity and performance	Many Cloud providers may not be able to provide 24/7 service always. Cloud outages may cause severe damage to the services and any breach of service level agreements will lead to huge potential losses	High availability is a major concern. Hence a reliable service is very much necessary
Compliance and data sovereignty	Cloud service providers need to comply with the requirements that may restrict about hosting services in the data centers in that country. Organizations are subject to audits and oversights which may restrict them from free exchange of data from one country to another	Organizations in many countries have specific requirements and laws about data sovereignty
Lack of standards	True standards for how applications communicate and control applications that are in a vendor's Cloud have not yet been established	Cloud service providers have their own proprietary standards and switching from one Cloud service provider to another becomes quite complicated

Table IV.
Some challenges
of Cloud computing

- *Adoption of multi-sourcing and higher vendor accountability.* As a result of a large number of poor executions and failure of traditional IT outsourcing projects, many organizations are shying away from large, multi-year commitments for outsourcing projects. Instead they are opting for short-term projects, which involve allocating separate IT functions to different vendors. By doing this, they are leveraging skills and value propositions of each vendor thereby reducing risk and increasing efficiency (Dhar and Balakrishnan, 2006; Goo and Nam, 2007; Nam *et al.*, 1996).
- *Increased scale and breadth of service providers.* The leading outsourcing vendors are expanding their operations on a global scale along with a wide range of services (Lee *et al.*, 2003). These factors coupled with increasing number of Cloud services and management make them serious contenders for larger deals and acquisitions in the global market. In addition, these vendors also bring a wealth of program management expertise and governance and help their clients achieve success for their outsourcing projects.
- *Increasing use of Cloud services and virtualization.* To meet the specific requirements of clients and forge long-term relationships with them, outsourcing vendors are embracing emerging delivery models including Cloud-based services (Lee *et al.*, 2003; Buyyaa *et al.*, 2009). For example, SaaS is a preferred delivery model for on-demand services. It provides a low-cost access to various applications across a global network. It provides greater flexibility and allows customers to focus on core business processes rather than developing and managing IT infrastructure. This results in faster payback on investment, timely deployment of various services and excellence in service delivery and minimization of risk.

Virtualization hides the physical characteristics of a computing platform from users, creates a simulated computer environment showing another abstract computing platform such as an operating system, a server, a storage device or network resources.

Although traditional, asset-heavy IT outsourcing deals will not go away immediately; most of the leading IT outsourcing vendors are investing in Cloud services and are coming up with Cloud-based offerings to stay ahead of the competition. The smart outsourcing vendors are well positioned to take advantage of this opportunity to embed Cloud services within their broader outsourcing offerings and become Cloud services providers themselves. Such innovative offerings can potentially open up segments of markets, such as the small and mid-size businesses.

6. Conclusions

Cloud computing is a model for provisioning and consuming IT capabilities on a need and pay by use basis. This helps in shifting the cost structure from capital expenditure to operating expenditure and also helps the IT systems more agile. This innovative model of acquiring IT related services has made organizations to revisit their infrastructure and platform services strategy and optimize their IT spending while improving overall agility.

Cloud computing represents a fundamental shift in how organizations pay for and access IT services. It has created new opportunities for IT services providers and the outsourcing vendors. Cloud computing will have significant impact on outsourcing vendors, who must adopt new strategies to include Cloud services as part of their

offerings to keep up with the profound changes in the IT services industry. They should experiment with Cloud services and understand which models are suitable for their clients. This will help them to identify new business opportunities that arise from Cloud computing.

CIOs need to analyze the benefits of Cloud computing along with business impacts. They must have a short-term and a long-term plan for deployment. CIOs must also get support from all the stakeholders including the top management. They also should come up with a transition plan for all the users switching from old system to this new computing paradigm. In addition, a training program for the users should be implemented wherever necessary.

The Cloud service providers should be aware that security is a great concern for most organizations. Data protection and privacy issues are holding back wide scale adoption of Cloud computing in the enterprise. The current challenges must be addressed including developing acceptable compliance and security policies, reducing the risk by developing robust infrastructure for reliability and high availability along with performance guarantee.

The outlook of IT services industry looks promising as IT outsourcing vendors enhance their portfolio with various Cloud offerings. Many emerging trends will impact the future of IT services and Cloud computing that include the integration of new services with the existing ones, increasing number of applications that utilize Cloud infrastructure, and reliable global delivery models on demand. The deployment of new innovative Cloud services with attractive business models will lead to high level of customer satisfaction and unprecedented adoption of Cloud services in the enterprise.

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