A STUDY ON THE ACCEPTABILITY OF CLOUD COMPUTING IN WEB BUSINESS AND SERVICE PROVIDERS

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ABSTRACT

Cloud computing deals any subscription-based or pay-per-use service that, in real time over the Internet, extends IT's existing capabilities. Cloud computing technology provides on-the-fly, point-and-click customization and report propagation for business users, so IT doesn't spend half its time making minor changes and running reports.

Increasingly, organizations are turning to cloud computation technology (It deals with any subscription-based service in real time over the Internet) to minimize the investment cost and focus on activities that have greater impact on the business. The existing traditional technology has problems like

- High Capital Cost of application software
- Periodic upgradation of application
- Less reliability in traditional technology
- No continuous support for customers from service providers

Implementing cloud computing technology is widely considered as a solution for the above problems. Hence a study is undertaken to understand the perception of software service firms in adopting the cloud computing technology.

(SUBRAMANI.K)

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LIST OF SYMBOLS, ABBREVIATIONS AND NOMENCLATURE

Symbols:

% - Percentage

$ - Dollar

Charts (Bar, Pie)

Abbreviations:

CC – Cloud Computing

IaaS - Infrastructure as a service

PaaS - Platform as a service

SaaS - Software as a service

CRM – Customer Relationship Management

VBA – Value Benefit Analysis

TCO – Total Cost of Ownership

AHP – Analytic Hierarchy Process

CCB – Capital Cost Benefit

CHAPTER 1 – INTRODUCTION

1.1. Research Background:

Cloud Computing is Internet (*Cloud*) based development and use of computer technology (*Computing*). It is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. Users need not have knowledge of, expertise in, or control over the technology infrastructure "in the cloud" that supports them.

The concept incorporates infrastructure as a service **(IaaS)**, platform as a service **(PaaS)** and software as a service **(SaaS)** as well as Web 2.0 and other recent technology trends which have the common theme of reliance on the Internet for satisfying the computing needs of the users. Examples of SaaS vendors include Salesforce.com and Google Apps which provide common business applications online that are accessed from a web browser, while the software and data are stored on the servers.

The term **cloud** is used as a metaphor for the Internet, based on how the Internet is depicted in computer network diagrams, and is an abstraction for the complex infrastructure it conceals.

As customers generally do not own the infrastructure, they merely access or rent, they can avoid capital expenditure and consume resources as a service, paying instead for what they use.

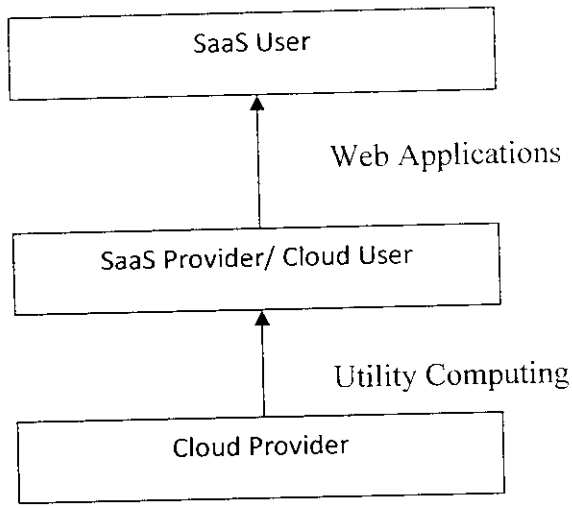


Figure 1.1: Model for Cloud Computing:

As mentioned in Figure 1.1, Cloud computing constitutes 3 steps from provider to User. Technology is provided through internet as a utility and it is made use of by user through the Web/Internet as a source.

Cloud Computing Components:

- Applications like Facebook, Google Apps, SalesForce, Microsoft Online
- Clients like Browser(Chrome), Firefox, Cloud, Mobile (Android, iPhone), Netbook (EeePC, MSI Wind) , Nettop (CherryPal, Zonbu)
- Infrastructure like BitTorrent, EC2, GoGrid, Sun Grid, 3tera
- Platforms like App Engine, Azure, Mosso, SalesForce
- Services like Alexa, FPS, MTurk, SQS
- Storage like S3, SimpleDB, SQL Services
- Standards like Ajax, Atom, HTML 5, REST

Cloud Computing Impact on Management Concepts:

Cloud computing can provide numerous benefits to a business '*Customer Relationship Management*'. One benefit is the ability to access programs without the need for new software purchases, additional IT staff and continual maintenance of such programs. Without these concerns, a business can focus on improved customer relations and improved business functions. Online host providers arm businesses with the tools to service customers in real time and whenever customers log on to the Internet. Tools like an online help desk can increase customer satisfaction and help a business run more successfully. These services can track, manage and organize data about customer contact. The ability to analyze data and note important trends allows businesses to provide increased customer satisfaction. Cloud computing provides accessible and functional tools that give businesses the ability to improve customer relations and assess necessary data. Without having to pay for expensive computer equipment, special software programs and continual maintenance of major computer infrastructures, customer relationship management on the cloud offers businesses a variety of ways to make positive changes to customer relationship management systems.

Cloud computing can benefit a business '*Sales Initiative*' in several ways. For sales endeavours, there are many automated service tools offered by host providers. The ability to collect, organize and manage leads by simply logging on to the Internet can increase a business' efficiency. Another benefit can be found in the ability to organize and manage accounts, which can strengthen a sales team. In addition, more efficient order processing tools can provide happier customers and more profits for a business. With cloud computing, host providers can offer businesses tools that improve the overall sales experience, from a customer's first contact, through the sales process, and even to addressing any needs after a

In addition to a positive impact on sales, cloud computing also offers benefits to '*Marketing Initiatives*'. With the range of services offered through cloud computing, businesses can improve their marketing strategies. Effective marketing campaigns can be driven by systems that collect helpful data on the cloud. This collected data is easy to manage, study and use. With services from host providers, a business can be certain that effective messages are delivered to the most appropriate audiences. Because effective marketing is crucial to the success of any business, the benefits of cloud computing allow businesses to approach their marketing endeavours in an inexpensive and efficient manner.

The implementation of cloud computing can improve a variety of business functions. Your business can be rewarded through improved methods of customer relationship management, more efficient and profitable sales initiatives and highly effective marketing strategies. With a growing base of satisfied customers and room for many more in your thriving business, you can experience the rewards and benefits of embracing all that cloud computing has to offer.

Impact of Cloud computing in changing the world:

- Any situation in which computing is done in a remote location, rather than on your desktop or portable device
- You tap into that computing power over an internet connection
- Security and reliability are real challenges
- Less Investment, Flexible & Efficiency

Ways that cloud computing will change business

1. The creation of a new generation of products and services.

3. A new awareness and leverage of the greater Internet and Web 2.0 in particular.

4. Reconciliation of traditional SOA with the cloud and other emerging IT models.

5. The rise of new industry leaders and IT vendors.

6. More self-service IT from the business-side.

7. More tolerance for innovation and experimentation from businesses

8. The slow-moving, dinosaur firms will have trouble keeping up more nimble adopters and fast-followers.

Key things to adopt cloud:

1. Understand the cloud and its benefits to the business: Think business, not technology – not all clouds are created equal. There are many choices, from hosted applications to hosted infrastructure – Software as a Service (SaaS), Infrastructure as a Service (IaaS); some run on premise, some run off. Each has significant benefits but only when viewed in the context of how they fit in with your current operations. User need to understand how each of these can augment your IT strategy to achieve the benefits of efficiency and agility.

2. Build off the existing operational choices and be application specific: As existing services such as CRM and e-mail are functioning well, user will gain very little by transitioning them to the cloud. In fact, these types of changes could prove confusing and incite end user rejection. However, if user is just implementing these services for the first time the cloud may give the benefits and cost savings that they need. This same rule applies to IaaS clouds. Rather than trying to replace existing infrastructure that is already working, identify workloads that are dynamic or new that constantly require attention on infrastructure

3. Think small, but plan big: Start out with a pilot. 2010 was the year of defining the cloud and 2011 will be the year of cloud implementation. James Staten, an analyst at Forrester Research, recently predicted that many will try to deploy a private cloud, but many will fail. The key is to start small and identify areas where user can extend their existing strategy with new technologies to understand the impact. For IaaS clouds, the easiest is to start with the current virtualization strategy, as the cloud uses virtualization as a core technology. Whether it is development, testing, or new web application environments, the cloud can quickly and easily be implemented with a high likelihood for success.

4. Evaluate all of the options – think agility: There are many options when implementing a cloud solution. The choice between a public or private cloud should be made based on factors such as cost, security, availability and control. Each deployment model has pros and cons; the goal is to optimize for the business requirements. If user is choosing to build their own, private cloud, vendors can help in achieving this. Portability and flexibility are important elements to consider. User need to choose a solution that works within the system, but also does not lock them into a specific environment.

5. Acknowledge the immaturity of cloud computing, but don't let it hold users back: Cloud computing is a new paradigm in IT. It has a few issues including data security and compliance, but new advancements every day continue to take the cloud to the next level. Across the industry, there are more companies and developers working on advancing this segment than many of the traditional/legacy apps. As such, users do not want to get behind the curve of the next wave of innovation. By acknowledging its immaturity and picking applications and workloads that can handle the risk, user get the benefit of getting ahead of

the movement and truly understanding the technology as it matures and how it can become an incredible weapon in IT strategy.

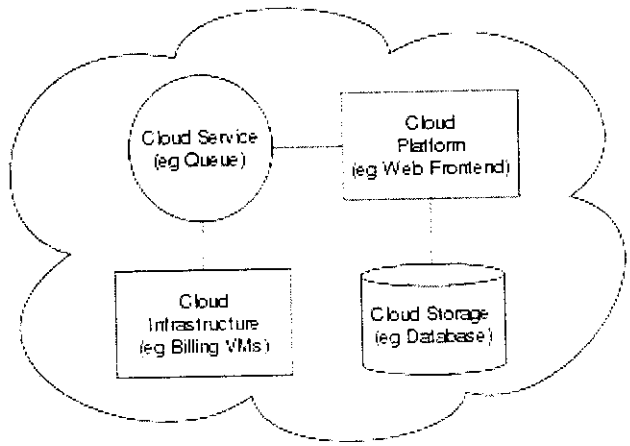


Figure 1.2: Sample Architecture of Cloud Computing:

As shown in Figure 1.2, Cloud Computing constitutes 4 parts, say Cloud as Service, Cloud as Platform, Cloud as Infrastructure, Cloud as Storage location. All these features are provided through internet.

Benefits of Cloud Computing:

- Cost-Reduction
- Increased Efficiency
- Flexibility
- Security Gains
- Reliability
- Backup facility

Risks/Limitation in Cloud Computing:

- Dependency on the Network
- Difficulty Creating Hybrid Systems
- Centralization
- Data Integrity (Security & Privacy)

1.2. IDENTIFIED PROBLEM:

The existing traditional technology has problems like

- High Capital Cost of application software
- Periodic upgradation of application
- Less reliability in traditional technology
- No continuous support for customers from service providers

1.3. NEED FOR STUDY:

Implementing cloud computing technology is widely considered as a solution for the above discussed problems. Hence a study is undertaken to understand the perception of software service firms in adopting the cloud computing technology.

This study will helps the service providers in identifying the factors that involved in adopting the cloud computing technology for their organization. This study with various analysis provides the wide idea for emerging organization on implementing the technology.

1.4. OBJECTIVES & SCOPE:

Primary Objective: To study the perception of service providers about adapting cloud computing technology

Secondary Objective: To study the cost benefits in capital investment

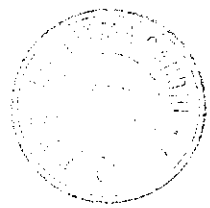
Scope of the Study:

- This Study helps in informing the management how profitable is the cloud computing
- This Study is most helpful in identifying the pro's and con's of technology
- This Study will be very useful and also help to identify the strength weakness of the present working condition
- This study helps to have a practical exposure in the field of service providers. It enables the researcher to identify the factors, which influence employer's objective of reducing cost investment and increasing the profit.
- The study will help the company to understand the present scenario in the organizations. It aims to analyze and understand the factors that need to be incorporated and improved in order to have cost benefit
- The study will helps in disclosing their opinions and views about the new technology (Cloud Computing) and also the impacts of the same.

1.5. DELIVERABLES:

- Statistical report which describe the technology in all extent.
- Impact created in the business world by using this study
- Ideas and Concepts for innovative & emerging organizations to adopt Cloud Computing technology with effective analysis.

CHAPTER 2 – LITERATURE SURVEY



2.1. REVIEW OF LITERATURE:

The following are the findings from various literatures,

As per Larry Ellison, quoted in the Wall Street Journal, September 26, 2008, the interesting thing about Cloud Computing is that we've redefined Cloud Computing to include everything that we already do. I don't understand what we would do differently in the light of Cloud computing other than change the wording of some of our ads.

As Andy Isherwood, quoted in ZDnet News, December 11, 2008, a lot of people are jumping on the [cloud] bandwagon, but I have not heard two people say the same thing about it. There are multiple definitions out there of "the cloud."

Richard Stallman, known for his advocacy of "free software", thinks Cloud Computing is a trap for users—if applications and data are managed "in the cloud", users might become dependent on proprietary systems whose costs will escalate or whose terms of service might be changed unilaterally and adversely

As Richard Stallman quoted in The Guardian, September 29 2008, its stupidity. It's worse than stupidity: it's a marketing hype campaign. Somebody is saying this is inevitable — and whenever you hear somebody saying that, it's very likely to be a set of businesses campaigning to make it true.

- Mathew Woitaszek stated that, the cloud computing from the perspective of a super computer centre resource provider, it yields two lines of inquiry: comparing the cost-effectiveness of our specialized resource to the general-purpose resources available from cloud providers, and determining whether it is advantageous to

- Merrill Lynch predicts that the cloud computing market will reach $160 billion by 2011.
- IBM claims Cloud cuts IT labour costs by up to 50% and improves capital utilization by 75%
- 51% of internet users who have done a cloud computing activity say a major reason they do this is that it is easy and convenient.
- 41% of cloud users say a major reason they use these applications is that they able to access their data from whatever computer they are using.
- As per InformationWeek Analytics survey,
    - 46% say they'll use or are likely to use cloud Iaas
    - For Saas, 56% will use it or likely to use

Table 2.1: Economic Opportunity of cloud computing

	Internal IT ($)	**Managed Services (S)**	**The Cloud (S)**
Capital Investment	40,000	0	0
Setup Costs	10,000	5,000	1,000
Monthly Services	0	4,000	2,400
Monthly Labour	3,200	0	1000
Cost Over 3 Years	149,000	129,000	106,000

The Table 2.1 demonstrates the economic opportunity cloud computing presents. This also shows how the cost difference exists in each way of implementation.

Table 2.2: Cloud Computing Activities

	All Internet Users (in %)	Those using a laptop to connect with WiFI away from home or work (in %)
Use Webmail services (like Gmail, Yahoo)	56	64
Store personal photos online	34	44
Use Online Applications (like google docs, Adobe)	29	28
Store personal video online	7	13
Pay to store files online	5	10
Backup hard drive online	5	9

Source: Pow internet & American Life Project Apr-May 2008 survey, N-1553 internet users

Table 2.2 demonstrates the Cloud computing activities happening in various areas and the number of users making use of different existing online features like webmail, online storage locations for photos, videos, files, hard drive to store personal datas, etc..

Table 2.3: Cloud Computing Activities by Age Cohorts

	18-29	30-49	50-64	65+
Use Webmail services (like Gmail, Yahoo)	77	58	44	27
Store personal photos online	50	34	26	19
Use Online Applications (like google docs, Adobe)	39	28	25	19
Store personal video online	14	6	5	2
Pay to store files online	9	4	5	3
Backup hard drive online	7	5	5	4
Have done at least one activity	87	71	59	46
Have done at least two activity	59	39	31	21

Source: Pow internet & American Life Project Apr-May 2008 survey. N-1553 internet users

Table 2.3 demonstrates the Cloud computing activities happening in various areas and the number of users making use of different existing online features like webmail, online storage locations for photos, videos, files, hard drive to store personal datas, etc.. This is done on the basis of different age of people using cloud computing.

2.2. RESEARCH GAP:

- This study or research is mainly targeting only service providers or service dependent organization.
- Since this is an emerging technology, it's impossible to collect practically proven results. Study is undertaken based on the current implementation and predicted/projected targets.

CHAPTER 3 - METHODOLOGY

3.1. TYPE OF PROJECT:

This study is Exploratory & Descriptive in nature. The study has been conducted in the form of survey, so that the inputs can be received from the respondents. This study will helps the service providers in identifying the factors that involved in adopting the cloud computing technology for their organization. This study with various analysis provides the wide idea for emerging organization on implementing the technology.

3.2. TARGET RESPONDENTS:

- Technical people in the level of project managers in any service providing organization
- Questionnaire has been designed and the responses from the service providers are obtained and analyzed.

3.3. ASSUMPTIONS, CONSTRAINTS AND LIMITATIONS:

The study was conducted among 250 respondents from different service provides. The limitations that can be a restriction to the accuracy of the research findings are.

- Technology is mainly targeting the service providers
- Cloud computing can be achieved only with the internet

3.4 RESEARCH APPROACH

Research can be defined as a systematic and scientific search for pertinent information. It is the manipulation of things, concept or symbols for the purpose of generalizing to extend or verify knowledge aids in construction of theory or in the practice of an art. Research methodology is the method by which a research is conducted. It is a way to systematically solve a problem. In research methodology the researcher studies the various steps that are generally adopted in studying a research problem along with the logic behind them.

Research design

A research design is the arrangement of conditions for collections and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design is the conceptual structure within which research is conducted it constitutes the blueprint for the collection, measurement and analysis of data.

Descriptive research design is used for this study where the pilot study was conducted among the employees and with that knowledge, questionnaires were given to the respondents.

Research design includes:

- Formulating the objectives of the study.
- Designing the methods of data collection.
- Selecting the sample.
- Collecting the data.
- Processing and analyzing the data.
- Reporting the findings.

Sources of data

The task of data collection begins after a research problem has been defined and research design plan chalked out. The primary data are those, which are collected afresh and for the first time, and thus happen to be original in character. The secondary data are those which have already existing collected data by some other else and which have already been passed through the statistical process.

Primary Data:

In the study the primary data is being collected from the top level employees of service providers. Primary data was collected through survey. The data collecting instrument used for obtaining the desired information is a questionnaire. The questionnaires were structured and direct as to make the respondents to understand it easily.

Secondary Data:

Secondary data are those data that already exists. Secondary data are collected through company profile, magazines, and previous projects done.

Sample design

A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure the researcher would adopt in selecting items for the sample. Sampling design, which deals with the method of selecting items, is observed for the given study. The researcher conducted field survey and used questionnaire as the instrument for collecting data.

Sampling unit

A decision has to be taken concerning a sampling unit before selecting sample.

Sample size

The size refers to the number of items or the units to be selected from the population or the universe to constitute a sample. The sample size must not be too large or too small it should be optimum. The sample size for the study includes 250 respondents.

Sampling procedure

The researcher must decide about the technique to be used in selecting the items for the sample. Since the entire service providers are taken for the study, the method is considered as sensex.

Sampling Methods:

- **Method:** Non-Probability
- **Technique:** Convenience
- **Sample size:** 50 companies – 250 respondents in the level of PM

3.5. DATA PROCESSING

- **Type of Data:** Primary Source
- **Instrument:** Structured Questionnaire

The data thus gathered were appropriately summarized and analyzed using the methods mentioned below.

3.6. TOOLS FOR ANALYSIS:

Simple Percentage Analysis:

The percentage Analysis $\bar{X}$ of a given series of values say X1, X2...n is defined as the sum of these values divided by their total number as.

$$\text{Percentage} = \frac{\text{No. of Responses}}{\text{Total No. of Respondents}} \times 100$$

Graphical Representation:

The graphs used in this study are Bar, Pie charts.

CHAPTER 4 – DATA ANALYSIS AND INTERPRETATION

4.1 ANALYSIS, INTERPRETATION AND DISCUSSION, INFERENCES:

Analysis means the computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups. Analysis, particularly in case of survey or experimental data, involves estimating the values of unknown parameters of the population.

Interpretation refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study. It is essential for the simple reason that the usefulness and utility of research finds lie in proper interpretation.

The data after collected has been processed and analyzed in accordance with the outline laid down for the purpose at the time of developing the research plan. This is essential for a study and for ensuring that we have all the relevant data for making comparisons and analysis.

The analysis is based on the following tools

- Simple Percentage Analysis
- Graphical Representation

Table No 4.1.1: Based of No. of Employees in concern

No. Of Employees	No. of Respondents	Percentage
Less than 100	10	4
101 – 500	15	6
501 – 1000	48	19.2
1001 – 10,000	125	50
Greater than 10.000	52	20.8
No Answer	0	0
Total	250	100

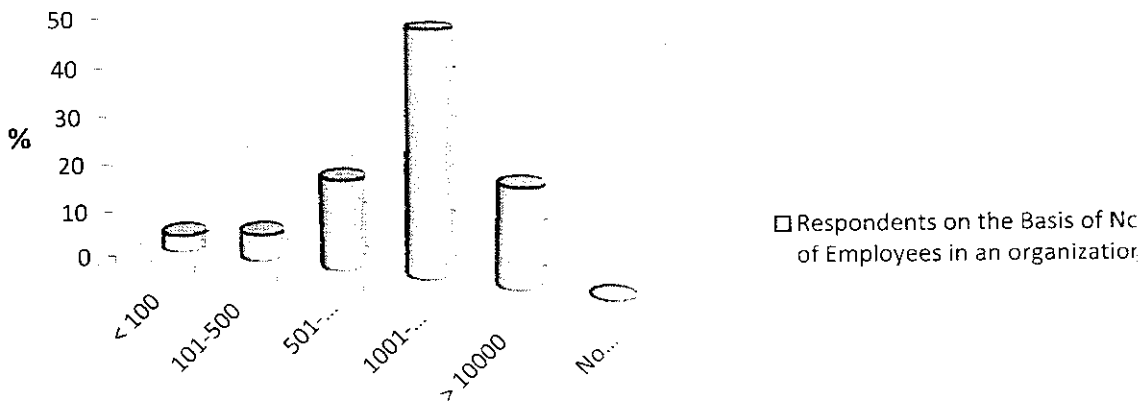


Figure No 4.1.1: Based of No. of Employees in concern

Source: Primary Data

Interpretation:

The Above table reveals that 4% of the respondents belong to the organization that has employees count less than 100 and 16% of the respondents belong to the organization that has employees count 101-500 and 19.2% of the respondents belong to the organization that has employees count 501-1000 and 50% of the respondents belong to the organization that has employees count 1001-10,000 and 20.8% of the respondents belong to the organization that has employees count greater than 10,000. Thus, we could infer from the table that nearly half of the total respondents are belonging to the bigger organizations

Table No 4.2.2 Based on No. of Employees working in Cloud Computing (CC) area

No. Of Employees in Cloud Computing	**No. of Respondents**	**Percentage**
None	176	70.4
Less than 10	32	12.8
11 – 100	0	0
101 – 500	16	6.4
Greater than 500	0	0
No Answer	26	10.4
Total	250	100

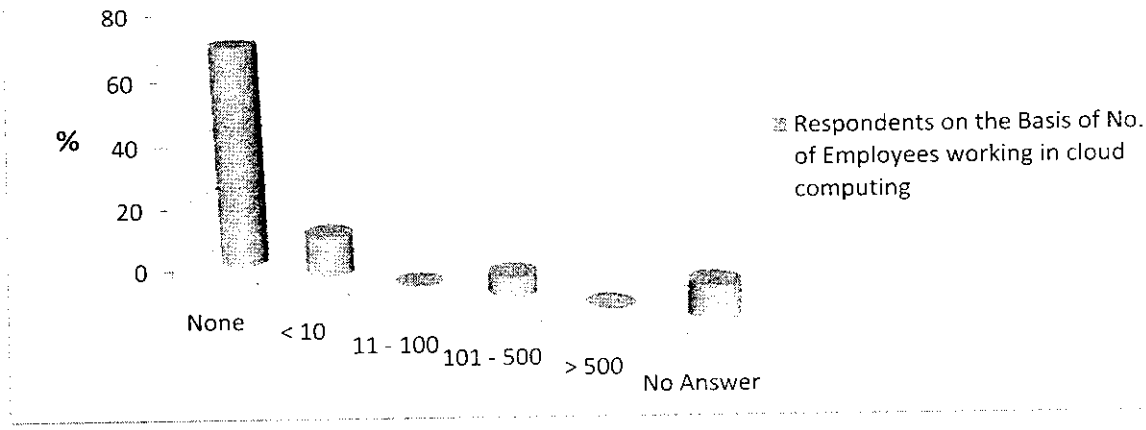


Figure No 4.1.2: Based on No. of Employees working in Cloud Computing (CC) area

Source: Primary Data

Interpretation:

The Above table reveals that 70% of the respondents belong to the organization that has none working in CC area and 12.8% of the respondents belong to the organization that has employees less than 10 working in CC area and 6.4% of the respondents belong to the organization that has employees count 101-500 working in CC area and 10.4% of the respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are working in the organization where Cloud Computing is not implemented.

Table No 4.1.3: Based of Scope of the company

Scope of company	No. of Respondents	Percentage
Local	28	11.2
Regional	36	14.4
National	84	33.6
Europe	0	0
Global	102	40.8
No Answer	0	0
Total	250	100

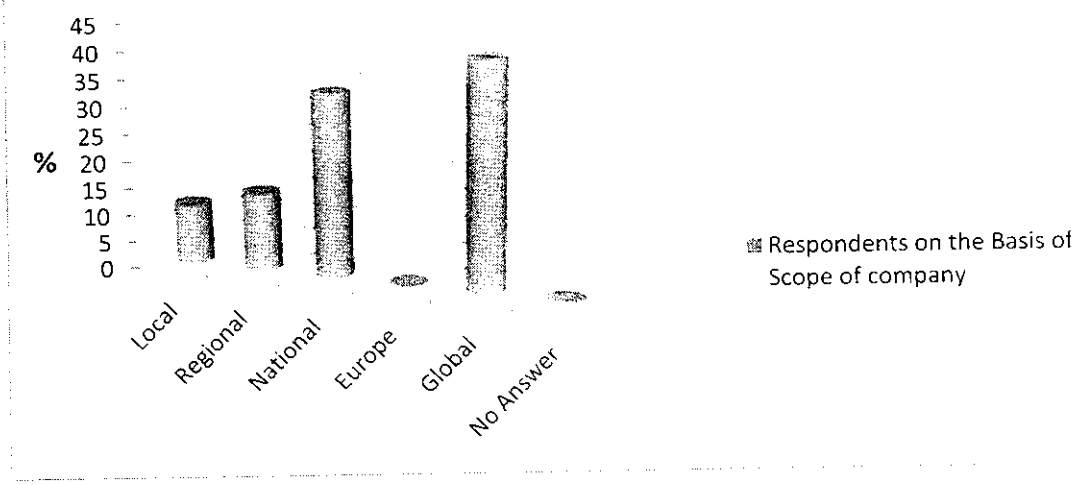


Figure No 4.1.3: Based of Scope of the company

Interpretation:

The Above table reveals that 11.2% of the respondents belong to the organization that is in the Local scope and 14.4% of the respondents belong to the organization that is in the Regional scope and 33.8% of the respondents belong to the organization that is in the National scope and 40.8% of the respondents belong to the organization that is in the Global scope. Thus, we could infer from the table that most of the total respondents are working in the organization which has Global scope

Table No 4.1.4: Respondent's classification on the basis of cloud areas in a company

Cloud Computing areas in company	**No. of Respondents**	**Percentage**
Provider of Infrastructure-as-a-service	26	10.4
Provider of platform-as-a-service	12	4.8
Provider of software-as-a-service	0	0
User of Infrastructure-as-a-service	16	6.4
User of platform-as-a-service	20	8
User of software-as-a-service	50	20
No Answer	126	50.4
Total	250	100

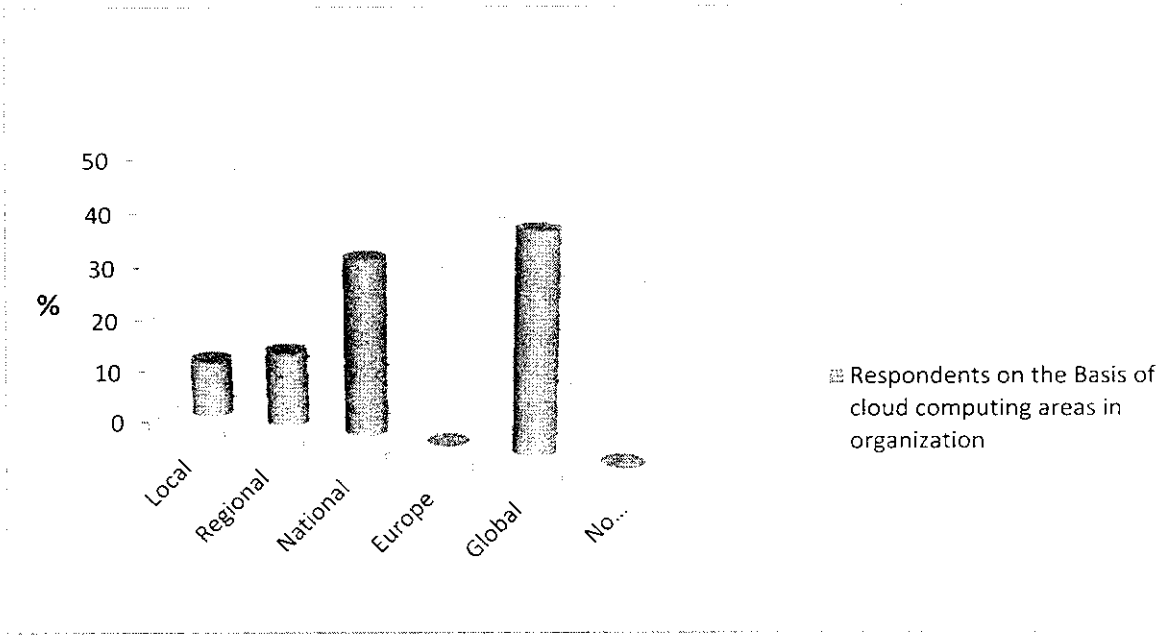


Figure No 4.1.4: Based of cloud areas in a company

Source: Primary Data

Interpretation:

The Above table reveals that 10.4% of the respondents belong to the organization that is the provider of I-a-a-s and 4.8% of the respondents belong to the organization that is the provider of P-a-a-s and 6.4% of the respondents belong to the organization that is the user of I-a-a-s and 8% of the respondents belong to the organization that is the user of P-a-a-s and 20% of the respondents belong to the organization that is the user of S-a-a-s and 50.4% of the respondents returned with no answer. Thus, we could infer from the table that most of the total respondents are working in the organization where cloud computing is not implemented completely

Table No 4.1.5 Based on selecting organization while introducing cloud computing

Organization's Criteria	No. of Respondents	Percentage
An existing Organization	166	66.4
New dedicated Organization	64	25.6
No Answer	20	8
Total	250	100

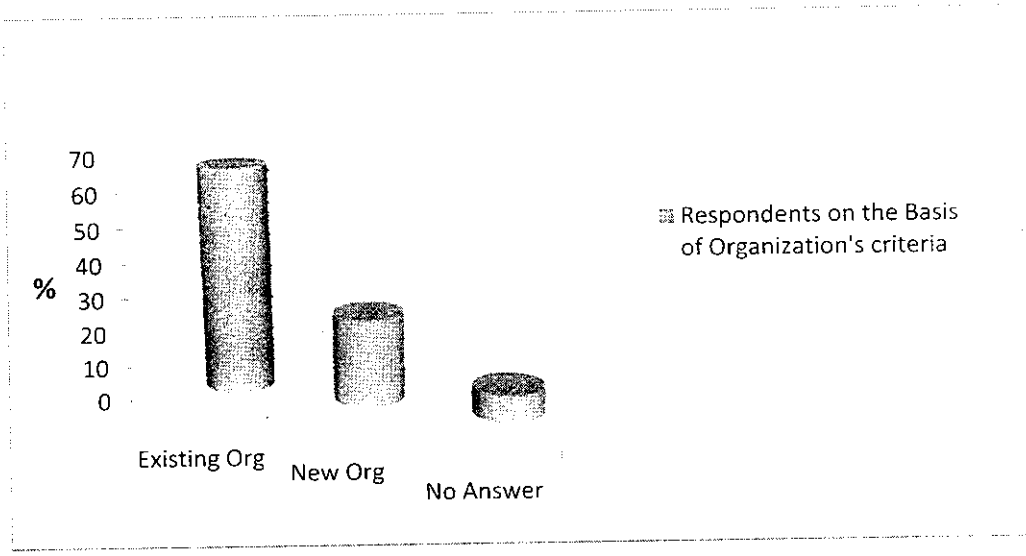


Figure No 4.1.5: Based on selecting organization while introducing cloud computing

Source: Primary Data

Interpretation:

The Above table reveals that 66.4% of the respondents says their choice will be an existing organization that provides cloud facilities and 25.6% of the respondents belong says

respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are interested in choosing an existing organization.

Table No 4.1.6: Based on where organization does stands with respect to Private Cloud Computing

Org in private cloud computing	**No. of Respondents**	**Percentage**
We do not plan to use private cloud computing	155	62
We are currently evaluating the market for private cloud computing	32	12.8
We are currently selecting prospective private cloud computing providers	26	10.4
We already have some pilot private cloud computing projects in place	0	0
We have a strategy for private cloud computing which we are currently implementing	0	0
We already use a private cloud solution	16	6.4
No Answer	21	8.4
Total	250	100

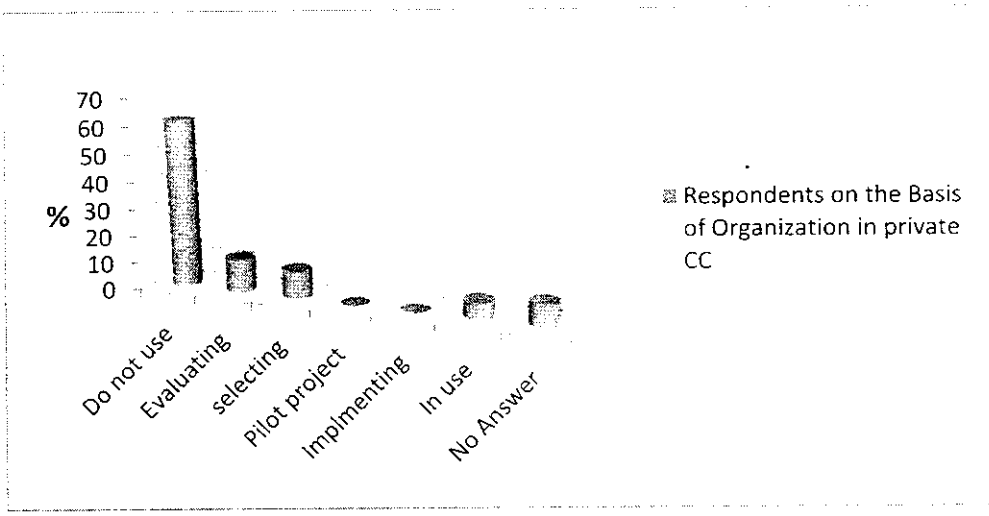


Figure No 4.1.6: Based of where organization does stands with respect to Private Cloud Computing

Source: Primary Data

Interpretation:

The Above table reveals that 62% of the respondents says they don't have any plan to use private cloud computing and 12.8% of the respondents belong says they are evaluating the market for private cloud computing and 10.4% of the respondents says they are choosing the private cloud computing providers and 6.4% of the respondents says they are already using the private cloud computing. 8.4% of the respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are not ready to use the private cloud computing

Table No 4.1.7: Basis on where does organization stands with respect to Public CC

Org in public cloud computing	No. of Respondents	Percentage
We do not plan to use public cloud computing	155	62
We are currently evaluating the market for public cloud computing	32	12.8
We are currently selecting prospective public cloud computing providers	26	10.4
We already have some pilot public cloud computing projects in place	0	0
We have a strategy for public cloud computing which we are currently implementing	0	0
We already use a public cloud solution	26	10.4
No Answer	11	4.4
Total	250	100

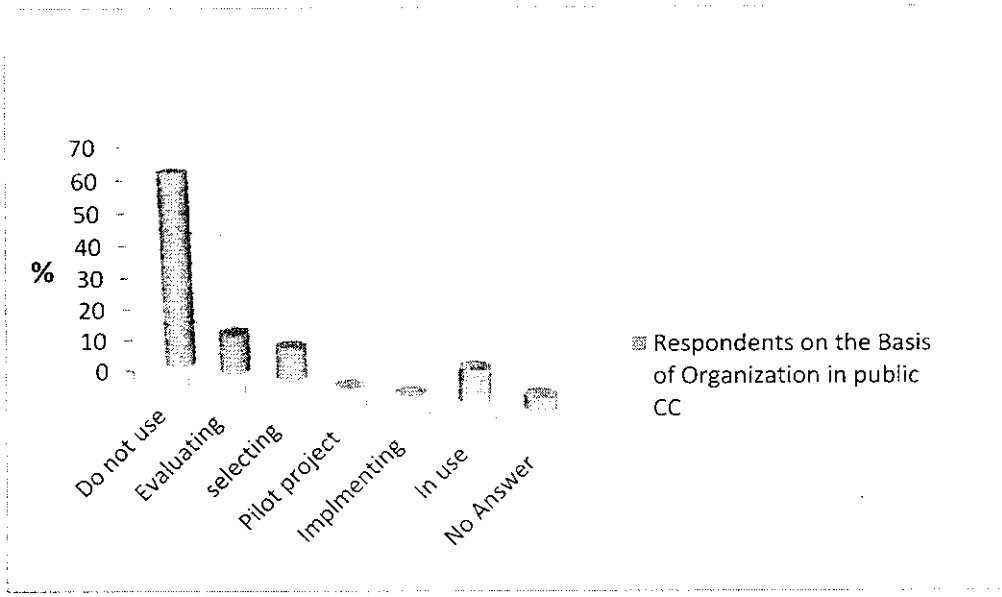


Figure No 4.1.7: Based on where organization does stands with respect to Public Cloud Computing

Source: Primary Data

Interpretation:

The above table reveals that 62% of the respondents says they don't have any plan to use public cloud computing and 12.8% of the respondents belong says they are evaluating the market for public cloud computing and 10.4% of the respondents says they are choosing the public cloud computing providers and 10.4% of the respondents says they are already using the public cloud computing. 4.4% of the respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are not ready to use the public cloud computing

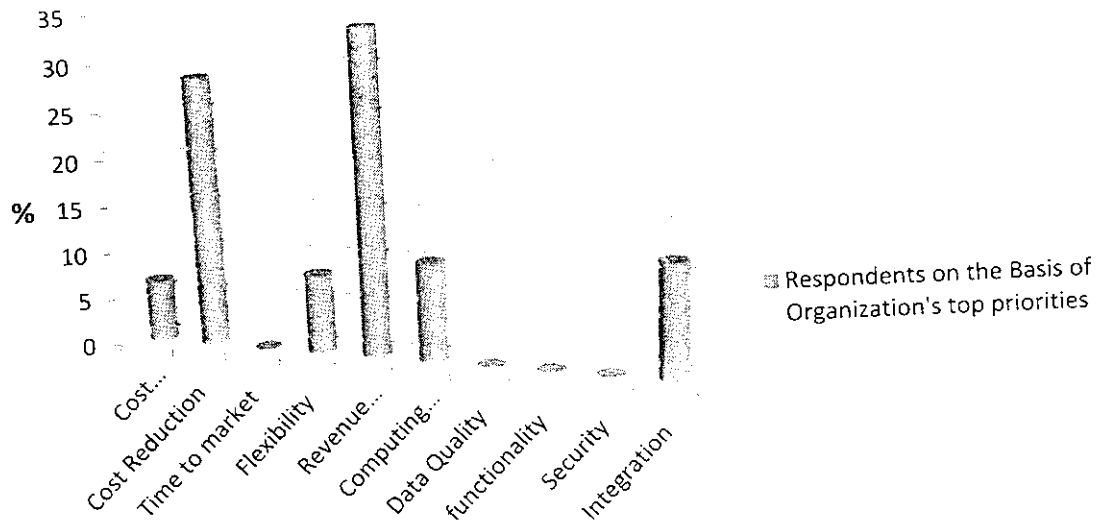


Figure No 4.1.8: Based of Organization's top IT priorities

Source: Primary Data

Interpretation:

The above chart reveals that 6.6% of the respondents choose cost transparency and 28.6% of the respondents choose cost reduction and 8.4% of the respondents choose flexibility and 34% of the respondents choose revenue increase and 10.4% of the respondents choose computing service and 12% of the respondents choose Improve Integration. Thus, we could infer from the table that respondents are equally provided with organization's priorities

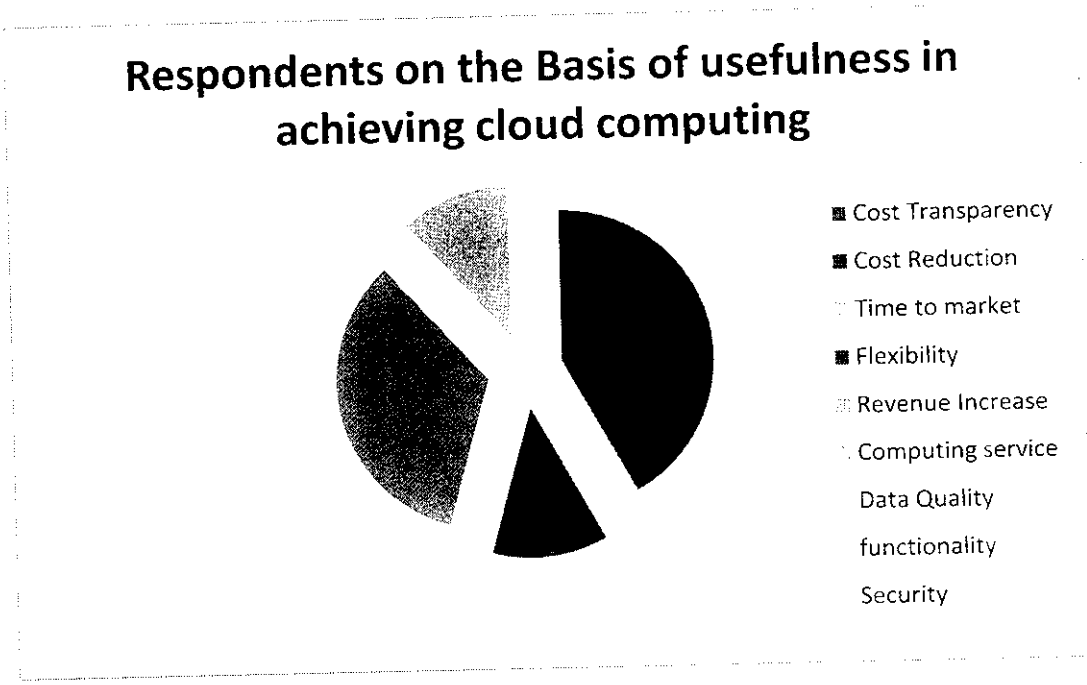


Figure No 4.2.9: Based of how useful Cloud Computing could be in meeting the following IT objectives.

Source: Primary Data

Interpretation:

The above chart reveals that 42% of the respondents choose cost reduction and 12.4% of the respondents choose flexibility and 34% of the respondents choose revenue increase and 11.6% of respondents choose Improve in integration. Thus, we could infer from the table that nearly half of total respondents choose cost reduction and increase in revenue as the useful factors

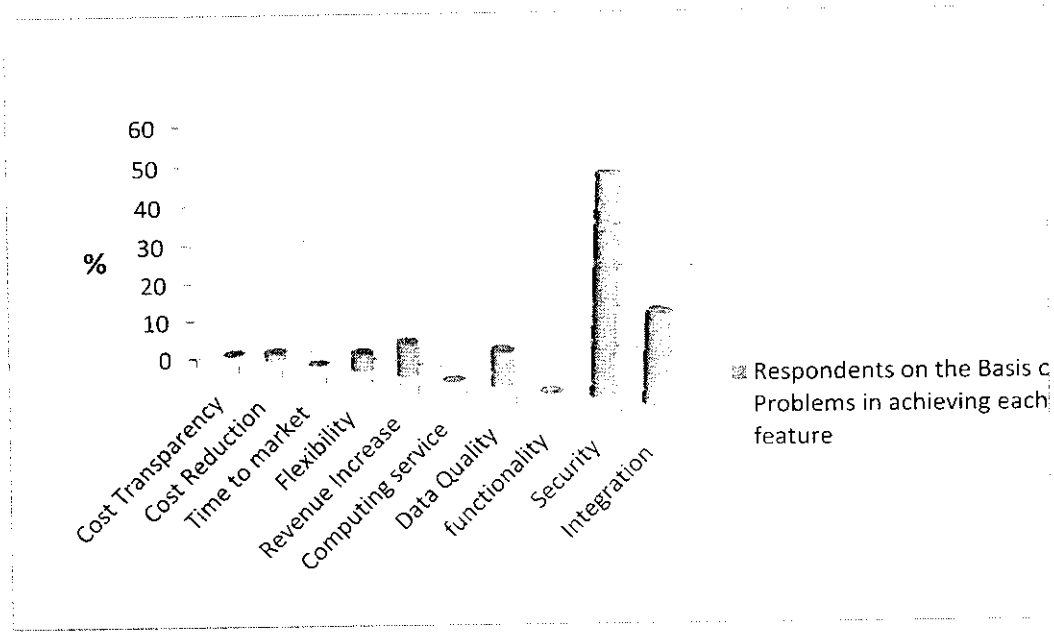


Figure No 4.1.10: Based of how problematic Cloud Computing could be in meeting the following IT objectives.

Source: Primary Data

Interpretation:

The above chart reveals that 2% of the respondents choose cost reduction and 4.4% of the respondents choose flexibility and 8.6% of the respondents choose revenue increase and 9.2% of the respondents choose data quality and 53.4% of the respondents choose improve in security and 22.4% of respondents choose Improve in integration. Thus, we could infer from the table that more than half of total respondents choose improving security will be more problematic

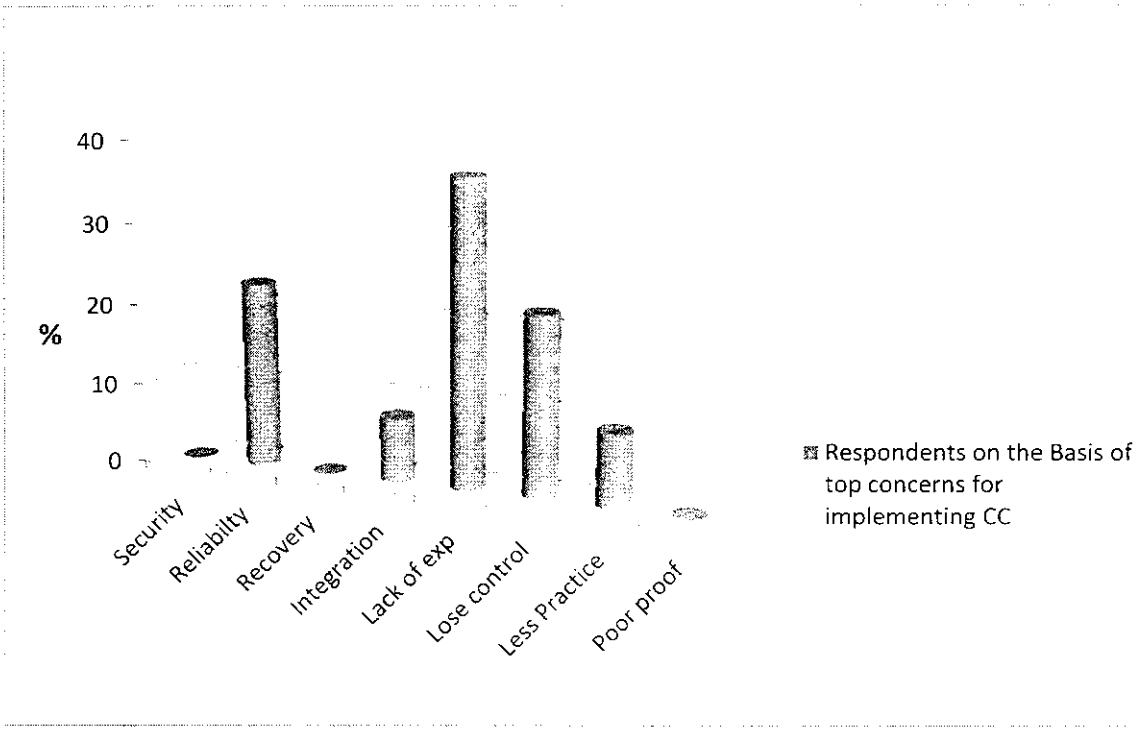


Figure No 4.1.11: Based on top concerns you might have about implementing a public cloud computing solution at your organization

Source: Primary Data

Interpretation:

The above chart reveals that 23% of the respondents choose cost reliability and 8% of the respondents choose Integration and 37.5% of the respondents choose Lack of experience and 22.3% of the respondents choose Lose of control and 9.2% of the respondents choose less practice. Thus, we could infer from the table that most of total respondents choose Lack of experience as the main concern

Table No 4.1.12: Based on aspects relevant to the area of Cloud Governance

Areas of Cloud governance	No. of Respondents	Percentage
Manageability	167	66.8
Key Performance Indicators & Key Goal Indicators	43	17.2
Use of Reference Models (ITIL, COBIT)	0	0
Manageability using SLAs	0	0
Others	26	10.4
No Answer	14	5.6
Total	250	100

Source: Primary Data

Interpretation:

The Above table reveals that 66.8% of the respondents says main aspect is manageability and 17.2% of the respondents says the main aspect is performance and 10.4% of the respondents says main aspect is Other than mentioned option and 5.6% of the respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are returned with manageability as the important aspect

Table No 4.1.13: Based on alternative methodologies in the area of Cloud Computing

Alternative Methods	No. of Respondents	Percentage
Value Benefit Analysis (VBA)	20	8
Total Cost of Ownership (TCO)	127	50.8
Analytic Hierarchy Process (AHP)	0	0
Others	0	0
No Answer	103	41.2
Total	250	100

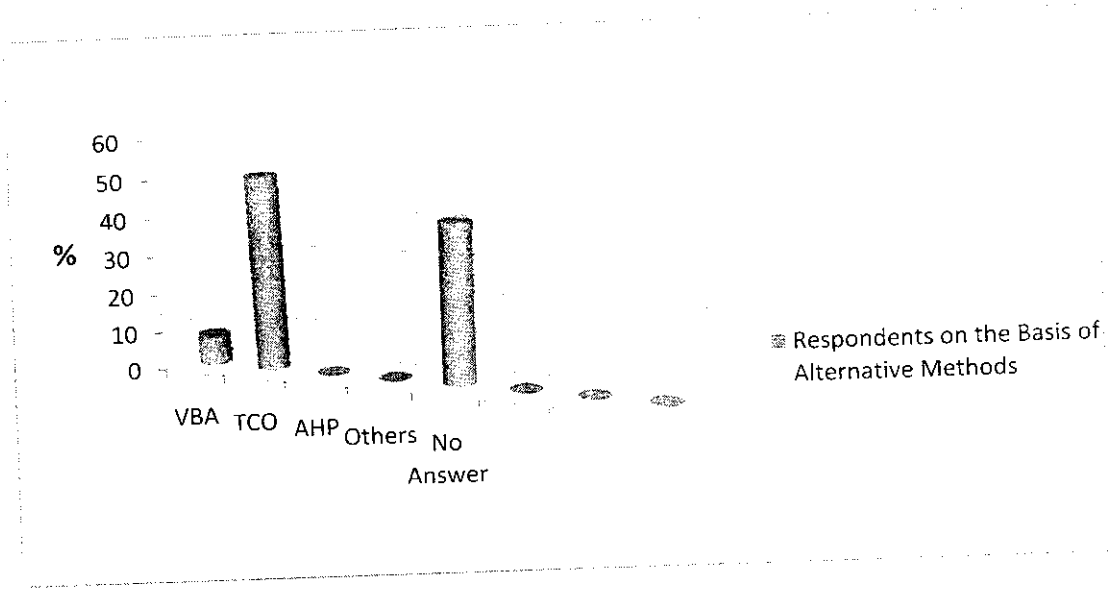


Figure No 4.1.13: Based on alternative methodologies in the area of Cloud Computing

Source: Primary Data

Interpretation:

The Above table reveals that 8% of the respondents choose VBA as an alternative methodology and 50.8% of the respondents choose TCO as an alternative methodology and 41.2% of the respondents returned with no answer. Thus, we could infer from the table that nearly half of the total respondents are interested in TCO as an alternative method.

Table No 4.1.14: Based on responsibility of the governance of Cloud computing offerings

Responsibility for governance	No. of Respondents	Percentage
The Business Unit	45	18
The IT Department	187	74.8
No Answer	18	7.2

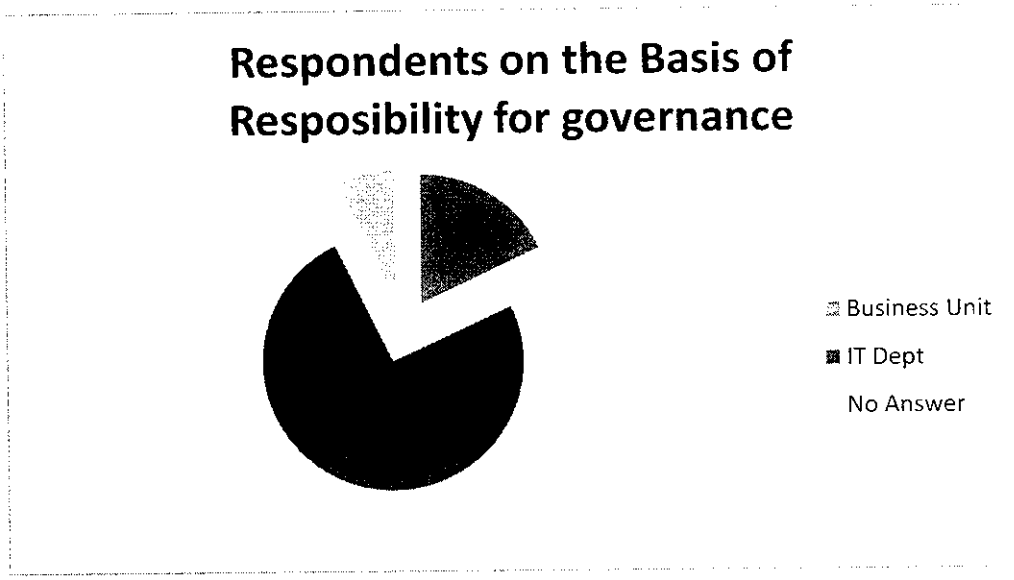


Figure No 4.1.14: Based on responsibility of the governance of Cloud computing offerings

Source: Primary Data

Interpretation:

The Above table reveals that 18% of the respondents choose business unit has good responsibility and 74.8% of the respondents choose IT department will have good responsibility and 7.2% of the respondents returned with no answer. Thus, we could infer from the table that more than half of the total respondents are having the thought that IT department has the good responsibility.

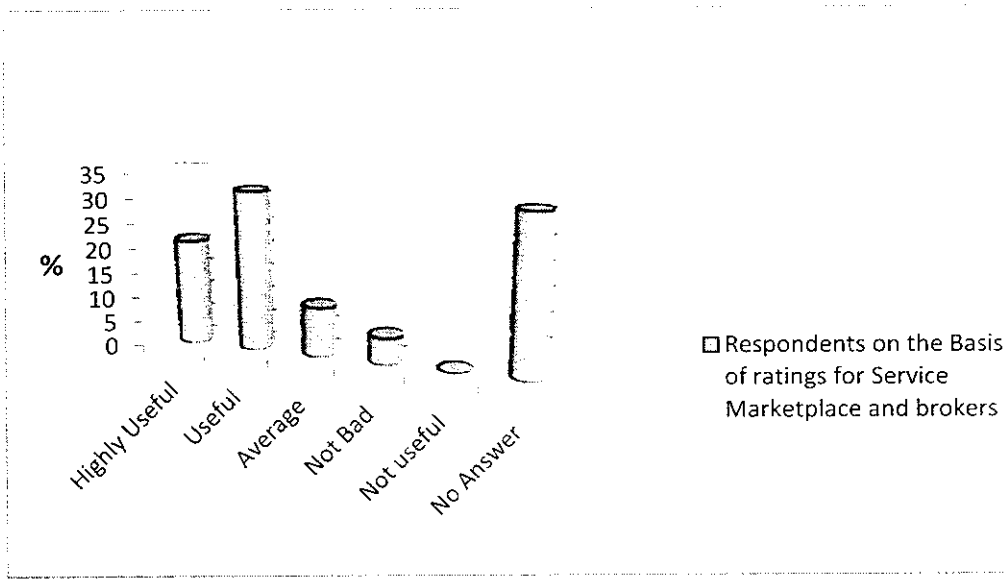


Figure No 4.1.15: Based on service marketplaces and brokers

Source: Primary Data

Interpretation:

The Above table reveals that 21.3% of the respondents choose these modes are very useful and 32% of the respondents choose these modes useful and 10% of the respondents choose these modes are moderate and 5.34% of the respondents choose these modes are not bad and 31.3% of respondents returned with no answer. Thus, we could infer from the table that most of the total respondents are having the thought that brokers and market places are useful

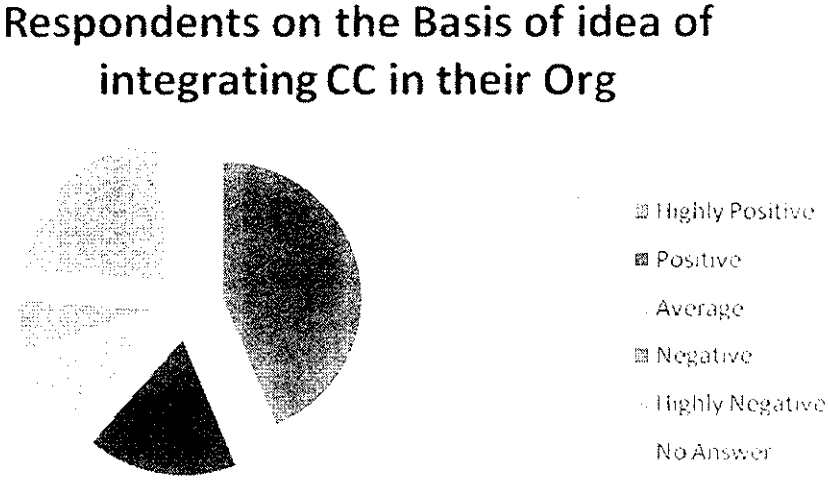


Figure No 4.1.16: Based on current experience with respect to integration of Cloud Offerings and your own IT infrastructure

Source: Primary Data

Interpretation:

The Above table reveals that 57.4% of the respondents choose cloud computing will be very useful and 23.2% of the respondents choose cloud computing will be useful and 11.4% of the respondents choose cloud computing will is moderate and 8% of the respondents choose cloud computing is not bad. Thus, we could infer from the table that most of the total respondents are having the thought that brokers and market places are useful

4.2 DIAGRAMMATIC REPRESENTATIONS:

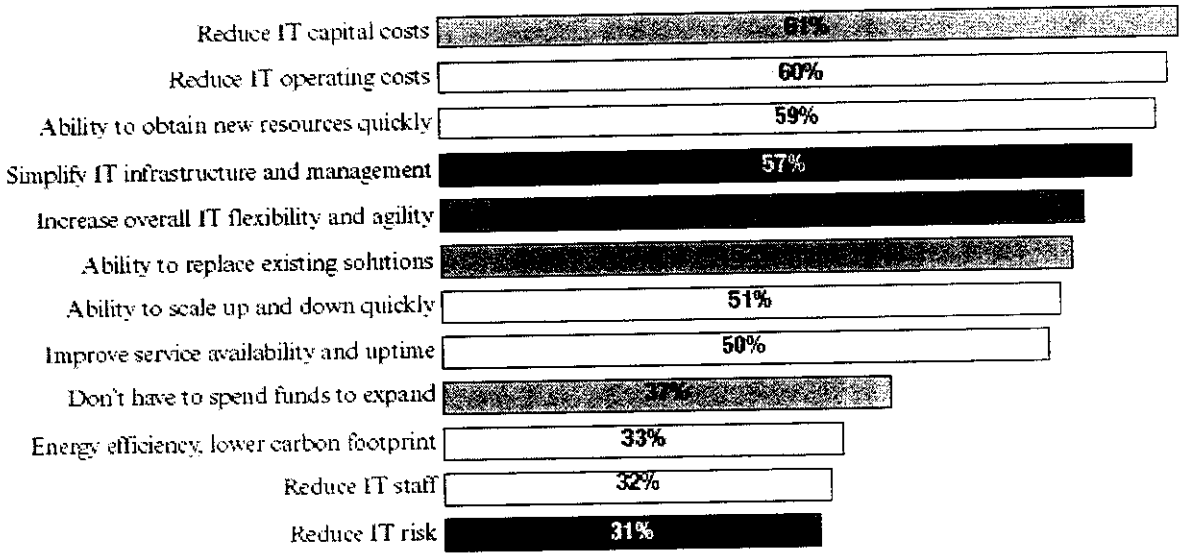


Figure 4.2.1: Factors driving Cloud Computing

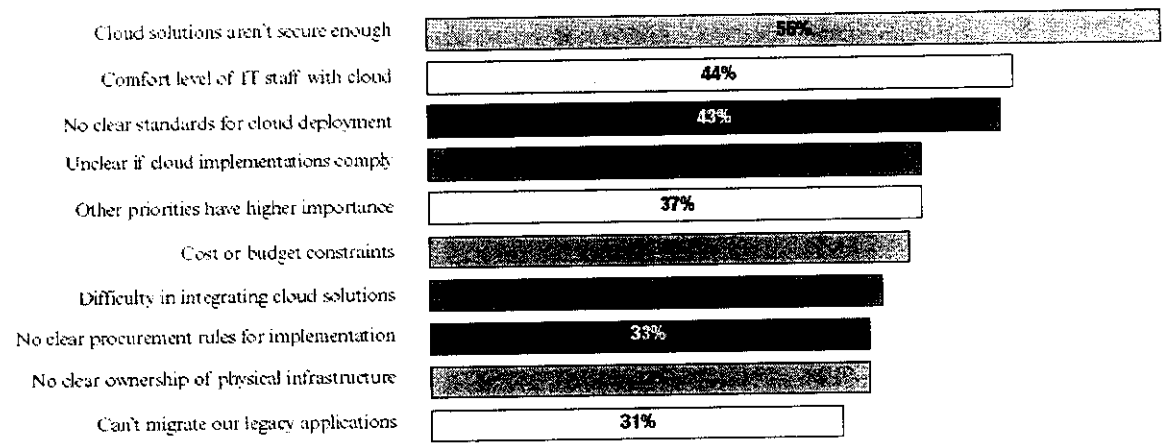


Figure 4.2.2: Various Concerns in Cloud Computing

4.3 DELIVERABLES:

- Statistical report which describe the technology in all extent.
- Impact created in the business world by using this study
- Ideas and Concepts for innovative & emerging organizations to adopt Cloud

CHAPTER 5 - CONCLUSION

5.1 SUMMARY OF FINDINGS

Current Statistics:

In this study we found a few very interesting statistics on the status of cloud computing In summary, ~69% of online users are using some form of cloud computing. Below is a rundown of the share of internet users who have done a select set of online activities that involve storing data online or accessing applications in cyberspace.

56% of internet users use webmail services such as Hotmail, Gmail, or Yahoo! Mail.
34% store personal photos online.
29% use online applications such as Google Documents or Adobe Photoshop Express.
7% store personal videos online.
5% pay to store computer files online.
5% back up hard drive to an online site.

Overall, 69% of online users have done at least one of these six activities, with 40% of internet users having done at least two of them. Convenience and flexibility are the watchwords for those who engage in at least one of the cloud computing activities listed above. 39% cite the ease of sharing information as a major reason they use applications in cyberspace or store data there. At the same time, users report high levels of concern when presented with scenarios in which companies may put their data to uses of which they may not be aware.

Future Prediction:

90% of cloud application users say they would be very concerned if the company at which their data were stored sold it to another party.

80% say they would be very concerned if companies used their photos or other data in marketing campaigns.

68% of users of at least one of the six cloud applications say they would be very concerned if companies who provided these services analyzed their information and then displayed ads to them based on their actions.

As a whole security being the major factor that stops emerging organization to implement cloud computing. Though keeping these negative apart 43% of organizations are planning to introduce cloud.

Since there is no of purchasing any software or platform or infrastructure, 67% of respondents reported that this technology reduces the capital cost to a great extent. 57% of respondents reported their organization is in process of integrating this new technology.

5.2. SUGGESTIONS & RECOMMENDATIONS:

- The Cloud appears as a single point of access for all the computing needs of consumers.
- Commercial offerings need to meet the quality of service requirements of customers and typically offer service level agreements.

- Organization should be connected to internet all the time for providing/using the services
- No need of having the software installed in each local machine when cloud computing technology is in use.

5.3. CONCLUSION:

Cloud Computing is leading the industry's endeavor to bank on this revolutionary technology which mainly targets good Capital Cost Benefit (CCB).

Cloud Computing Brings Possibilities like,

- Increases business responsiveness
- Accelerates creation of new services via rapid prototyping capabilities
- Reduces acquisition complexity via service oriented approach
- Uses IT resources efficiently via sharing and higher system utilization
- Reduces energy consumption
- Handles new and emerging workloads
- Scales to extreme workloads quickly and easily
- Simplifies IT management
- Platform for collaboration and innovation
- Cultivates skills for next generation workforce

Today, with such cloud-based interconnection seldom in evidence, cloud computing might be more accurately described as "sky computing," with many isolated clouds of services which

On the other hand, as virtualization and SOA permeate the enterprise, the idea of loosely coupled services running on an agile, scalable infrastructure should eventually make every enterprise a node in the cloud. It's a long-running trend with a far-out horizon. But among big Meta trends, cloud computing is the hardest one to argue with in the long term.

Cloud Computing is a technology which took the software and business world by storm. The much deserved hype over it will continue for years to come.

5.4. DIRECTIONS FOR FUTURE RESEARCH

- Research in Security features of Cloud Computing
- Areas used other than service providers

APPENDIX 1

6.1. QUESTIONNAIRE

1. Number of Employees in your concern

Choose one of the following answers

a) 10 or less

b) between 11 and 50

c) between 51 and 100

d) between 101 and 500

e) between 501 and 1.000

f) between 1.001 and 10.000

g) more than 10.000

h) No answer

2. Number of Employees in the area of Cloud Computing

Choose one of the following answers

a) 0

b) between 1 and 5

c) between 6 and 50

d) between 51 and 100

e) between 101 and 500

f) more than 500

g) No answer

3. Scope of the company

Choose one of the following answers

a) Local

b) Regional

c) National

d) Europe

e) Global

f) No answer

4. In which areas of Cloud Computing do you see your company?

Check any that apply

a) Provider of Infrastructure-as-a-Service

b) Provider of Platform-as-a-Service

c) Provider of Software-as-a-Service

d) User of Infrastructure-as-a-Service

e) User of Platform-as-a-Service

f) User of Software-as-a-Service

g) No answer

5. If you plan to introduce Cloud Computing, do you intend to use for this:

Choose one of the following answers

a) an existing organisation / organisational unit

b) a new dedicated organisation / organisational unit

c) No answer

6. Where does your IT organization stand with respect to private Cloud Computing?

Choose one of the following answers

a) We do not plan to use private cloud computing

b) We are currently evaluating the market for private cloud computing

c) We are currently selecting prospective private cloud computing providers

d) We already have some pilot private cloud computing projects in place

e) We have a strategy for private cloud computing which we are currently implementing

f) We already use a private cloud solution

g) No answer

Note: Private Cloud Computing denotes the usage of computing infrastructure that is enterprise-owned or leased and used by a closed user group.

7. Where does your IT organization stand with respect to public Cloud Computing?

Choose one of the following answers

a) We do not plan to use public cloud computing

b) We are currently evaluating the market for public cloud computing

c) We are currently selecting prospective public cloud computing providers

d) We already have some pilot public cloud computing projects in place

e) We have a strategy for public cloud computing which we are currently implementing

f) We already use a public cloud solution

g) No answer

Note: Public Cloud Computing denotes the usage of computing infrastructure that is sold to the public and used by a large number of different users.

8. What do you believe will be your organization's top IT priorities for 2011?

Check between 1 and 3 options

a) Business perspective: Cost transparency

b) Business perspective: Cost reduction

c) Business perspective: Time to market

d) Business perspective: Flexibility

e) Business perspective: Revenue Increase

f) Technical perspective: Dynamically allocating computing resources

g) Technical perspective: Data Quality

h) Technical perspective: Improve application functionality

i) Technical perspective: Improve application security

9. Please rate how useful Cloud Computing could be in meeting the following IT objectives.

(Choose between: 'very useful' (1) and 'not useful' (5))

	1	2	3	4	5	NA
Business perspective: Cost transparency						
Business perspective: Cost reduction						
Business perspective: Time to market						
Business perspective: Flexibility						
Business perspective: Revenue Increase						
Technical perspective: Dynamically allocating computing resources						
Technical perspective: Data Quality						
Technical perspective: Improve application functionality						
Technical perspective: Improve application security						
Technical perspective: Improve enterprise application integration						

10. Please rate how problematic Cloud Computing could be in meeting the following IT objectives.

(Choose between: 'very problematic' (1) and 'not problematic' (5))

	1	2	3	4	5	NA
Business perspective: Cost transparency						
Business perspective: Cost reduction						
Business perspective: Time to market						
Business perspective: Flexibility						
Business perspective: Revenue Increase						
Technical perspective: Dynamically allocating computing resources						
Technical perspective: Data Quality						
Technical perspective: Improve application functionality						
Technical perspective: Improve application security						
Technical perspective: Improve enterprise application integration						

11. What are the top concerns you might have about implementing a public cloud computing solution at your organization?

Check between 1 and 3 options

a) Security

b) Reliability

c) Disaster Recovery

d) Integration with legacy systems

e) Lack of internal/staff expertise

f) Lose control

g) Too few best practices to emulate

h) Scarcity of proven suppliers

12. What are the top concerns you might have about implementing a private Cloud computing solution at your organization?

Check between 1 and 3 options

a) Security

b) Reliability

c) Disaster Recovery

d) Integration with legacy systems

e) Lack of internal/staff expertise

f) Lose control

g) Too few best practices to emulate

h) Scarcity of proven suppliers

13. What aspects are relevant for you in the area of Cloud Governance?

Check any that apply

a) Manageability

b) Key Performance Indicators & Key Goal Indicators

c) Use of Reference Models (ITIL, COBIT)

d) Manageability using SLAs

e) Other: (specify)

f) No answer

14. What methodologies do you use to assess alternatives in the area of Cloud Computing?

Check any that apply

a) Value Benefit Analysis (VBA)

b) Total Cost of Ownership (TCO)

c) Analytic Hierarchy Process (AHP)

d) Other

e) No answer

15. Who is responsible for the governance of Cloud computing offerings?

Choose one of the following answers

a) The business unit

b) The IT department

c) No answer

16. How do you rate service marketplaces and brokers, e.g. www.asperado.de, www.zimory.de ?

(Choose between: 'very useful' (1) and 'somewhat useful' (5))

a) 1

b) 2

c) 3

d) 4

e) 5

f) No answer

17. What is your current experience with respect to integration of Cloud Offerings and your own IT infrastructure?

(Choose between: 'very positive (1) and very negative' (5))

a) 1

b) 2

c) 3

d) 4

e) 5

f) No answer